METALRETROFIT

Thermoplastic Metal Retrofit Roofing System

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CARLISLE SYNTEC SYSTEMS

METALRETROFIT

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The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing systems warranty. Construction materials and practices, building siting and operation, climatic conditions, and other site-specific factors will have an impact on the performance of the roofing system. Carlisle recommends that the building owner retain a design professional to determine appropriate design measures to be taken in order to address these factors.

This section is to serve as criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle's Thermoplastic Metal Retrofit Roofing System. Additional information essential for the design and installation of the roof system mentioned herein are also included in the Design Reference Section and also listed in the form of a Specification Supplement at the end of the Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

PART I – GENERAL

1.01 Description

The installation of this Metal Retrofit Roofing Systems may incorporate a Mechanically Fastened option, RhinoBond Attachment Method or a Fully Adhered Assembly.

The Mechanically Fastened Option is available only with TPO membrane. Both the RhinoBond and the Fully Adhered Option could incorporate TPO, PVC or KEE HP PVC.

Note: The Self Adhered Technology (SAT) membrane is available with TPO as fully adhered alternative.

1. **Mechanically Fastened Option** incorporates 45, 60 or 80-mil thick scrim-reinforced Sure-Weld TPO (Thermoplastic Polyolephin) membrane with 10" wide Pressure-Sensitive RUSS positioned along the structural purlins in the field of the roof (5' or 10' depending on wind zone). The RUSS is attached to the purlins a maximum of 12" on center utilizing Sure-Seal HP Purlin Fasteners and Piranha Plates. The membrane is adhered to the RUSS and adjoining sheets are heat welded together a minimum of 1-1/2". This option includes an acceptable loose laid insulation used to fill between standing seams (when applicable) and an acceptable insulation or underlayment is mechanically secured over the fill insulation at a rate **1 fastener per 4 square feet**, to the existing metal roof with Carlisle fasteners and plates.

2. **RhinoBond Attachment Option** incorporates 45, 60 or 80-mil thick polyester reinforced Sure-Weld TPO membrane OR 50, 60 or 80-mil thick polyester reinforced Sure-Flex PVC or KEE HP PVC membrane. RhinoBond plate appropriate for the membrane type is positioned over the structural purlins and fastened with HP Purlin Fasteners. See **Attachment 'I' – Metal Retrofit Roofing System RhinoBond Attachment Method** included at the end of this Section.

3. **Conventional Fully Adhered Option – TPO, PVC or KEE HP PVC** incorporates maximum 16' wide white, gray or tan 45, 60 or 80-mil thick scrim-reinforced Sure-Weld Thermoplastic Polyolefin (TPO) membrane OR 10' wide, white, 60 or 80-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) Spectro-Weld membrane OR maximum 10' wide, 50-mil, 60-mil or 80-mil thick Polyester or Fiberglass reinforced Sure-Flex Polyvinyl Chloride (PVC) or KEE HP PVC

membrane. The membrane is fully adhered to the substrate with the appropriate Bonding Adhesive. Adjoining sheets of membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld. This option includes an acceptable loose laid insulation used to fill between standing seams (when applicable) and an acceptable insulation or underlayment is mechanically secured over the fill insulation at a rate **1 fastener per 2 square feet**, to the existing metal roof with Carlisle fasteners and plates.

Polyester Reinforced membrane is available in widths of 10’ (white only) and 81” wide (white, gray, light gray, slate gray and tan). Fiberglass Reinforced membrane is available in 10’ width only (white, gray, light gray or tan). KEE HP enhanced Sure-Flex PVC membrane with polyester reinforcement is available in widths of 10’ or 5’ wide (white, gray, light gray and tan).

4. **FleeceBACK TPO Fully Adhered Option -** incorporates 45, 60 or 80-mil thick, 12' or 6' wide, scrim-reinforced, white, gray or tan Sure-Weld Thermoplastic Polyolefin (TPO) membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 100, 115 or 135-mils. Available in White, Gray, Tan, Slate Gray, Medium Bronze, Terra Cotta, Patina Green and Rock Brown.

5. **FleeceBACK PVC FRS** Adhered Option - incorporates 60- or 80-mil thick, 10' wide, fiberglass reinforced scrim, (white, gray, light gray and tan) Sure-Flex (PVC) membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 115 or 135-mils.

6. **FleeceBACK PVC** Adhered Option - incorporates 60- or 80-mil thick, 10' wide, polyester reinforced scrim, (white, gray, light gray, slate gray and tan) Sure-Flex (PVC) membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 115 or 135-mils.

7. **FleeceBACK KEE HP** Adhered Option - incorporates 50-, 60- or 80-mil thick, 10' wide, polyester reinforced scrim, (white, gray, light gray, slate gray and tan) Sure-Flex KEE HP (PVC) FleeceBACK 01/2026 4 membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 105, 115 or 135-mils.

   The membrane is fully adhered to an acceptable substrate with a spray or extrusion applied, two-component, low-rise Flexible FAST Adhesive.

   Adjoining sheets of Sure-Weld or Sure-Flex membrane are overlapped and joined together with a minimum 1-1/2" wide hot air weld. This option includes an acceptable loose laid insulation used to fill between standing seams (when applicable) and an acceptable insulation or underlayment is mechanically secured over the fill insulation at a rate **1 fastener per 2 square feet**, to the existing metal roof with Carlisle fasteners and plates.

8. **TPO SAT (Self Adhering Technology) Option** is a heat-weldable single-ply thermoplastic polyolefin (TPO) sheet available in 10’ and 12’ wide, white 60- or 80-mil reinforced TPO membrane laminated to an elastomeric pressure-sensitive adhesive. Limited to 20 Year Maximum Warranty. This option includes an acceptable loose laid insulation used to fill between standing seams (when applicable) and an acceptable insulation or underlayment is mechanically secured over the fill insulation at a rate **1 fastener per 2 square feet**, to the existing metal roof with Carlisle fasteners and plates.

9. **Adhered Insulation Option**

   When insulation is to be attached with Flexible FAST Adhesive, or Flexible FAST Dual Cartridges, both the bottom and top layers must be adhered in accordance with installation procedures outlined in the Spec Supplement G-03 FleeceBACK and Insulation Attachment Coverage Rates with Flexible FAST Adhesive in the Carlisle Technical Manual.

Note: Two-part urethane adhesives may not be compatible with certain types of metal roof coatings. If existing, Carlisle should be contacted for verification. Mechanical fasteners may be specified in lieu of the adhesive providing the minimum pullouts can be met.

1.02 General Design Considerations

A. It is the responsibility of the building owner or their designated representative to verify structural load limitation.

B. Existing venting around edges and wall intersections should not be closed off unless determined by designer of record. Refer to applicable details included in this section for recommended venting methods. Specific details may be submitted for Carlisle review.

1.03 Quality Assurance

Building Codes are above and beyond the intended purpose of this specification. The respective **owner** or **specifier** should consult local codes for applicable requirements and limitations. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

NOTE: For code approvals achieved with the Carlisle Roofing Systems, refer to the Carlisle Code Approval Guide, FM Global Approval Guide or UL Fire Resistance or Roofing Materials and Systems Directories.

A. Carlisle recommends the use of Carlisle supplied products for use with these Carlisle Roofing Systems. The performance or integrity of products by others, **when selected by the specifier and accepted as compatible by Carlisle**, is not the responsibility of Carlisle and is **disclaimed** by the Carlisle Warranty.

B. The specified roofing system must be installed by a Carlisle Authorized Roofing Applicator in compliance with drawings and specifications as approved by Carlisle SynTec.

C. There must be no deviations made from Carlisle's specification or Carlisle's approved shop drawings without the **PRIOR WRITTEN APPROVAL** of Carlisle SynTec.

D. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative (FSR) of Carlisle SynTec to ascertain that the membrane roofing system has been installed according to Carlisle's published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.

E. Provide polyisocyanurate insulation that meets PIMA Quality Mark Certified LTTR value through third party verification meeting ASTM C 1289, Type II, Class 1, Grade 2.

F. Provide FleeceBACK AFX membrane and polyisocyanurate insulation from ISO 14001 (Environmental Management System) Certified Facilities.

G. Refer to the Design Reference DR-07 "CRRC/LEED Information" for information. (i.e. solar emittance, solar reflectance and recycled content).

1.04 Submittals

A. To ensure compliance with Carlisle's minimum warranty requirements, the following projects should be forwarded to Carlisle for review prior to installation, preferably prior to bid:

1. Canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities).

2. Projects which incorporate purlin spacing other than 5' on center where a Mechanically Fastened membrane assembly is specified.

3. Projects where the roofing membrane is expected to come in direct contact with petroleum-based products or other chemicals.

4. Retrofit projects being refurbished for different usage.

B. Along with the project submittals (shop drawings and Request for Warranty), the roofing contractor must include pullout tests when results are below the requirements identified in this specification.

C. Shop drawings must be submitted to Carlisle by the Carlisle Authorized Roofing Applicator along with a completely executed Notice of Award (Page 1 of Carlisle's Request For Warranty form) for approval. Approved shop drawings are required for inspection of the roof and on projects where on-site technical assistance is requested.

Along with the project submittals (shop drawing and Request for Warranty), the roofing contractor must include **pullout test** results when the results are below the requirements identified in, Table included in Design Reference DR-06 "Withdrawal Resistance Criteria".

D. **Notice of Completion** (Page 2 of the Carlisle Request for Warranty form)

After project completion, a Notice of Completion must be submitted to Carlisle to schedule the necessary inspection of the project prior to issuance of the Carlisle Warranty.

1.05 Warranty

A. Membrane System Warranty is available for roofing systems on commercial buildings within the United States and applies only to **products manufactured or marketed by Carlisle SynTec**. The membrane system is defined as membrane, flashings, adhesives, sealants and other Carlisle brand products utilized in the installation. For a complete description of these products, refer to the Part II "Products" Section in this Specification and Spec Supplement "Related Products" P-01.

B. **See Table Below for information regarding Warranted Systems and Design Criteria:**

Contact Carlisle for recommended enhancements including additional perimeter sheets OR increased fastening density for increased warranty duration or wind speed coverage greater than 90 MPH.

Years	Metal Retrofit Thermoplastic Membranes (Sure-Weld TPO / Sure-Flex PVC or KEE HP) Warranty Options		
	Warranty Wind Speed Coverage		Minimum Membrane Thickness
	55, 72, 80 or 90 MPH	55, 72, 80 or 90 MPH	
	Adhered	Mechanically Fastened	
5,10, or 15 year	√	√	Sure-Weld TPO 45-mil
	√	N/A	Sure-Flex PVC or KEE HP PVC 50-mil
	√	N/A	Sure-Weld FleeceBACK TPO 100-mil
	√	N/A	FleeceBACK PVC FRS 115-mil
	√	N/A	Sure-Flex FleeceBACK PVC or KEE HP PVC FleeceBACK 105-mil
20 year	√	√	Sure-Weld TPO or Sure-Weld TPO SAT 60-mil
	√	N/A	Sure-Flex PVC or KEE HP PVC 60-mil
	√	N/A	Sure-Weld FleeceBACK TPO 115-mil
	√	N/A	FleeceBACK PVC FRS 115-mil
	√	N/A	Sure-Flex FleeceBACK PVC or KEE HP PVC FleeceBACK 115-mil

Notes: N/A = Not Acceptable √= Acceptable

Table II

Up to 20-Year TPO Metal Retrofit Fastening Roofing System

Deck Type: Metal Retrofit, R-Panel and Trapezoidal metal roof fastened into the Purlins

15 Year Warranty - 45-mil Sure-Weld TPO			
20 Year Warranty - 60-mil Sure-Weld TPO			
Add an extra perimeter sheet for 25/30-Year TPO Metal Retrofit Fastening Roofing System			
25/30 Year Warranty - 80-mil Sure-Weld TPO			
For Building Height of less than 60' tall			
Peak Gust Wind Speed Warranty	**Perimeter Zone**	**Minimum Number of Perimeter sheets by Building location from Coastline or Large Body of Water**	
		Greater than 4 Miles	**4 miles or less**
55-MPH	1 Perimeter = 5' wide Perimeter Zone	1 @ 12" o.c	
	2 Perimeters = 10' wide Perimeter Zone		2 @ 12" o.c
72-MPH	2 Perimeters = 10' wide Perimeter Zone	2 @ 12" o.c	
	3 Perimeters = 15' wide Perimeter Zone		3 @ 12" o.c
80-MPH	2 Perimeters = 10' wide Perimeter Zone	2 @ 12" o.c	
	3 Perimeters = 15' wide Perimeter Zone		3 @ 12" o.c
90-MPH	3 Perimeters = 15' wide Perimeter Zone	3 @ 12" o.c	
	4 Perimeters = 20' wide Perimeter Zone		4 @ 12" o.c
100-MPH	4 Perimeters = 20' wide Perimeter Zone	4 @ 12" o.c	
	5 Perimeters = 25' wide Perimeter Zone		5 @ 12" o.c
110-MPH	Every 5' Purlin fastened at 12" o.c across the entire roof.		
120-MPH	Every 5' wide Purlin fastened at 6" o.c across the entire roof.		
Contact Carlisle's Project Review Team at 877-797-8370 Option 3			

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use Purlin or RetroDrillers fasteners for Sure-Weld TPO into the Purlins for Metal Retrofit, Steel less than 22-Gauge Steel, R-Panel and Trapezoidal metal roof.

(B) TPO RhinoBond Plates into the Purlins is an option for TPO Membrane.

(C) TPO option, 10" wide Pressure Sensitive RUSS can be used beneath the field sheets for perimeter securement at 12" on center.

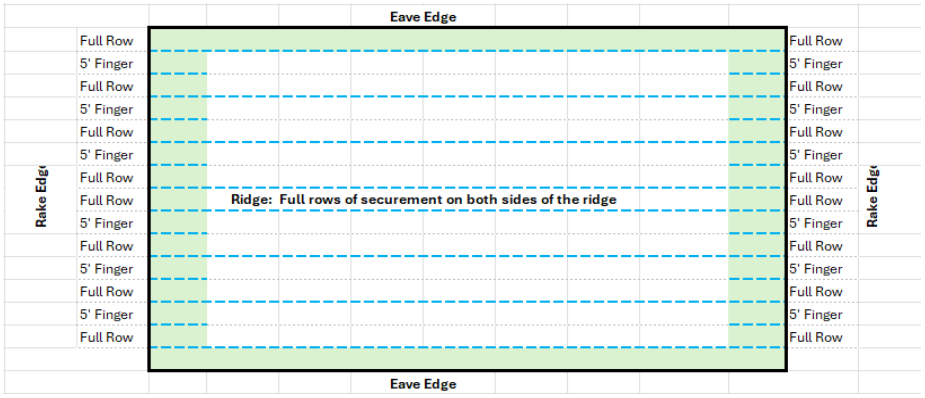
(D) Fastening Rate for all Insulation and Cover Boards is with 8 fasteners per 4x8 boards.

Approvals are based upon the Withdrawal Resistance Criteria for the minimum pullout value based upon deck type (Refer to the Design Reference DR-06).

Click on this link to take you to the Design Reference DR-06: ..\Letters\Carlisle DR-06 Withdrawal Resistance Criteria.pdf

A Metal Retrofit Project is similar to a Mechanically fastened system, but instead of fastening into the Steel deck you are fastening into the Purlins that support the Metal Roof. Typically the Purlin spacing is 5-foot on center. Per diagram below, the membrane is fastened into the first purlin a minimum of 4-ft and a maximum 5-ft from the eave shall be a full row of securement. Second purlin in from the Eave shall have a row of securement coming in from the Rake edge a minimum of 5-ft [wind fingers]. Third purlin from the Eave shall be a full row of securement. The pattern of alternating perimeter securement [5-ft from each rake edge] and full rows of securement will continue up to the top where the last or top purlin shall have a full row of securement. All fastened with Carlisle HP Purlin or RetroDriller Fasteners and HP Polymer Plates. At the Ridge, full rows of securement on both sides of the Ridge.

5' wide Perimeter Zone = 1 perimeter sheet



10' wide Perimeter Zone = 2 perimeter sheets

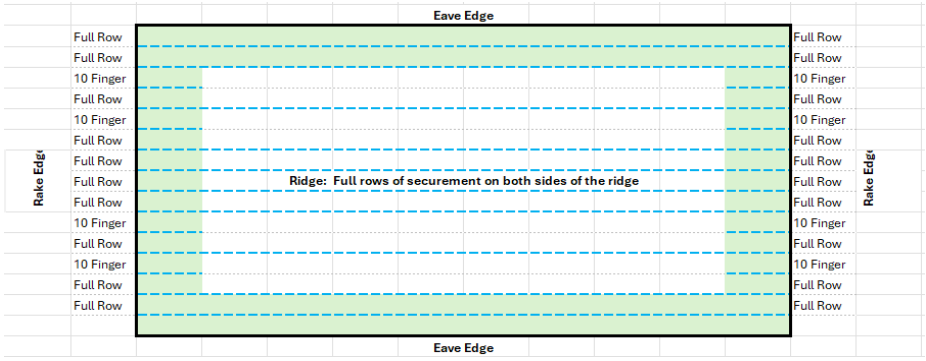


Table III

Up to 20-Year PVC Metal Retrofit Fastening Roofing System

Deck Type: Metal Retrofit, R-Panel and Trapezoidal metal roof fastened into the Purlins

15 Year Warranty - 50-mil Sure-Flex PVC
15 Year Warranty - 50-mil Sure-Flex PVC KEE HP
20 Year Warranty - 60-mil Sure-Flex™ PVC
20 Year Warranty - 50-mil Sure-Flex™ KEE HP PVC
Add an extra perimeter sheet for 25/30-Year PVC Metal Retrofit Fastening Roofing System
25 Year Warranty - 80-mil Sure-Flex PVC
25 Year Warranty - 60-mil Sure-Flex KEE HP PVC
30 Year Warranty - 80-mil Sure-Flex PVC
30 Year Warranty - 80-mil Sure-Flex KEE HP PVC
For a Building Height of less than 60' tall

Peak Gust Wind Speed Warranty	Perimeter Zone	Minimum Number of Perimeter sheets by Building location from Coastline or Large Body of Water	
		Greater than 4 Miles	4 miles or less
55-MPH	1 Perimeter = 5' wide Perimeter Zone	1 @ 12" o.c	
	2 Perimeters = 10' wide Perimeter Zone		2 @ 12" o.c
72-MPH	2 Perimeters = 10' wide Perimeter Zone	2 @ 12" o.c	
	3 Perimeters = 15' wide Perimeter Zone		3 @ 12" o.c
80-MPH	2 Perimeters = 10' wide Perimeter Zone	2 @ 12" o.c	
	3 Perimeters = 15' wide Perimeter Zone		3 @ 12" o.c *
90-MPH	3 Perimeters = 15' wide Perimeter Zone	3 @ 12" o.c	
	4 Perimeters = 20' wide Perimeter Zone		4 @ 12" o.c
100-MPH	4 Perimeters = 20' wide Perimeter Zone	4 @ 12" o.c	
	5 Perimeters = 25' wide Perimeter Zone		5 @ 12" o.c
110-MPH	Every 5' wide Purlin fastened at 12" o.c across the entire roof.		
120-MPH	Every 5' wide Purlin fastened at 6" o.c across the entire roof.		

Contact Carlisle's Project Review Team at 877-797-8370 Option 3

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use Purlin or RetroDrillers fasteners for Sure-Flex PVC into the Purlins for Metal Retrofit, Steel less than 22-Gauge Steel, R-Panel and Trapezoidal metal roof.

(B) RhinoBond Plates into the Purlins is an option for PVC Membrane.

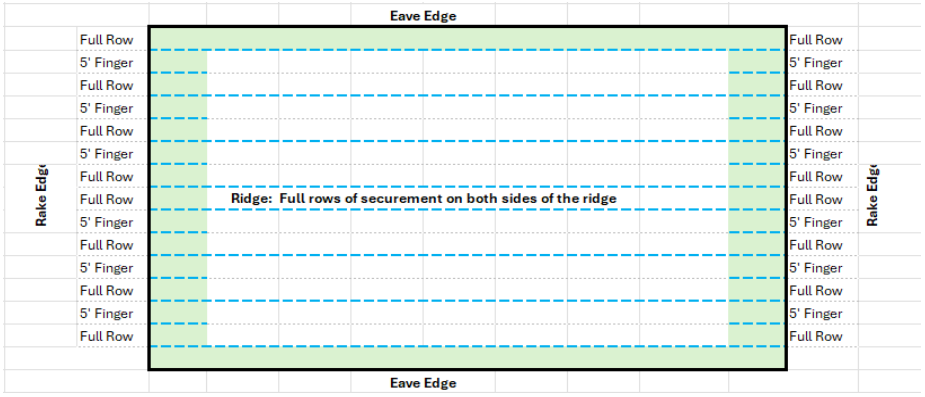
(C) Fastening Rate for all Insulation and Cover Boards is with 8 fasteners per 4'x8' boards.

Approvals are based upon the Withdrawal Resistance Criteria for the minimum pullout value based upon deck type (Refer to the Design Reference DR-06).

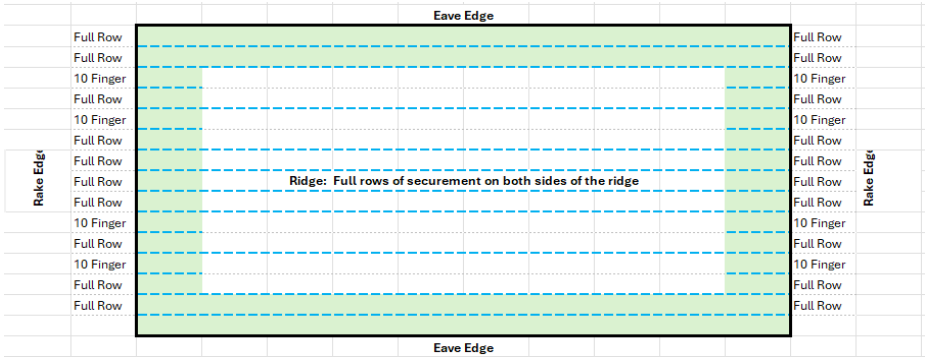
Click on this link to take you to the Design Reference DR-06: ..\Letters\Carlisle DR-06 Withdrawal Resistance Criteria.pdf

A Metal Retrofit Project is similar to a Mechanically fastened system, but instead of fastening into the Steel deck you are fastening into the Purlins that support the Metal Roof. Typically the Purlin spacing is 5-foot on center. Per diagram below, the membrane is fastened into the first purlin a minimum of 4-ft and a maximum 5-ft from the eave shall be a full row of securement. Second purlin in from the Eave shall have a row of securement coming in from the Rake edge a minimum of 5-ft [wind fingers]. Third purlin from the Eave shall be a full row of securement. The pattern of alternating perimeter securement [5-ft from each rake edge] and full rows of securement will continue up to the top where the last or top purlin shall have a full row of securement. All fastened with Carlisle HP Purlin or RetroDriller Fasteners and HP Polymer Plates. At the Ridge, full rows of securement on both sides of the Ridge.

5' wide Perimeter Zone = 1 perimeter sheet



10' wide Perimeter Zone = 2 perimeter sheets



1.06 Job Conditions

A. When possible on multiple level roofs, begin the installation on the highest level to avoid or minimize construction traffic on completed roof sections.

B. When roof slopes exceed 5” per horizontal foot, use of an Automatic Heat Welder may be more difficult. A Hand Held Hot Air Welder should be specified.

C. Wood nailers are required for the securement of metal edgings, scuppers, and insulated pipes. Wood Nailer shall be secured per specifier recommendation or in accordance with FM Global’s Property Loss Prevention Data Sheet 1-49. Refer to Design Reference DR-08 “Wood Nailers Securement Criteria” in Carlisle Technical Manual shall be referenced.

D. When fastening to a structural purlin, a trial fastener should be installed when purlins are heavier than 12 gauge to determine the feasibility of the HP Purlin Fastener. HP Purlin Fasteners are designed to engage purlins 18 to 12 gauge.

E. Due to the wide variety of edge conditions found in metal buildings, edge details may be submitted to Carlisle for review preferably prior to installation.

F. Fiberglass insulation is not physically compatible with this roofing system and cannot be utilized over the existing metal roof (even when specified in multiple layer applications in conjunction with an acceptable underlayment).

1.07 Product Delivery, Storage and Handling

A. Deliver materials to the job site in the original, unopened containers.

B. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must be comply with the requirements of the specifier/owner to prevent overloading and possible disturbance to the building structure.

C. Job site storage temperatures in excess of 90° F (32° C) may affect shelf life of curable materials (i.e. adhesives and sealants)/

D. **When the temperature is expected to fall below 40° F (5° C)**, outside storage boxes should be provided on the roof for temporary storage of liquid adhesives and sealants. Adhesives and sealant containers should be rotated to maintain their temperature above 40° F (5° C).

E. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

F. Do not store adhesive containers with opened lids due to the loss of solvent that will occur from flash-off.

G. Store Carlisle membrane on provided pallets in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable tarpaulins.

H. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage

PART II – PRODUCTS

2.01 General

The components of this roofing system are to be products of Carlisle or accepted by Carlisle as compatible. The installation, performance or integrity of products by others, **when selected by the specifier and accepted by Carlisle,** is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle warranty.

2.02 Membrane/Related Products

A. **Membranes**

1. **Mechanically Fastened Option**

    a. **Sure-Weld** 45-mil, 60-mil or 80-mil thick reinforced TPO (Thermoplastic Polyolefin) membrane available in white, gray or tan. The membrane is available in widths up to 16 feet wide. Also available in TPO special colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green)

2. **RhinoBond Attachment Option**

    a. **Sure-Weld** 45, 60 or 80-mil thick polyester reinforced TPO (Thermoplastic Polyolefin) membrane available in white, gray or tan. The Membrane is available in widths up to 16 feet wide. Also available in TPO special colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green).

    b. **Sure-Flex** 50-mil, 60-mil or 80-mil thick reinforced PVC (Polyvinyl Chloride) membrane (white, gray, light gray, slate gray or tan) or polyester reinforced KEE HP PVC (Polyvinyl Chloride) membrane (white, gray, light gray and tan). Either membrane is available in 10 feet wide.

3. **Conventional Fully Adhered Option**

    a. **Sure-Weld** 45-mil, 60-mil or 80-mil thick reinforced TPO (Thermoplastic Polyolefin) membrane available in white, gray or tan. The membrane is available in widths up to 16 feet wide. Also available in TPO special colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green)

    b. **Sure-Flex** 50-mil, 60-mil or 80-mil thick reinforced PVC (Polyvinyl Chloride) membrane (white, gray, light gray, slate gray or tan) or polyester reinforced KEE HP PVC (Polyvinyl Chloride) membrane (white, gray, light gray or tan). Either membrane is available in 10 feet wide.

    c. **Spectro-Weld** 45 or 60-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane available in white. The membrane is available in 10’ wide sheets.

4. **FleeceBACK Fully Adhered Option**

    a. **Sure-Weld FleeceBACK** 100, 115, or 135-mil membrane available in white, gray or tan. The membrane is available in various widths up to 12 feet wide.

    b. **Sure-Flex KEE HP FleeceBACK** (polyester reinforced) 105, 115, or 135-mil membrane (white, gray or tan) is available in various widths up to 10 feet wide.

    c. **Sure-Flex FleeceBACK PVC** (polyester reinforced)115, 135 mil membrane available in white, gray, or tan.

    d. **Sure-Flex FleeceBACK PVC FRS** (fiberglass reinforced) The membrane is available in 115-mil thickness in 10’ x 80’ rolls and 135-mil thickness in 10’ x 65’ rolls in white, gray or tan.

5. **SAT (Self Adhering Technology) Option**

    a. **Sure-Weld SAT** 60- or 80-mil reinforced TPO (Thermoplastic Polyolefin) membrane available in white, gray or tan. The membrane is available in 10’ or 12’ wide sheets.

For membrane physical properties and other related products, refer to the appropriate “Products” Section of the appropriate membrane specification.

B. **Related Products**

1. **Carlisle EPS (Flute-Filler):** A custom-made, high performance insulation consisting of a superior closed-cell, lightweight expanded polystyrene (EPS) that meets the requirements of ASTM C578. The product offers a long-term, stable R-Value and has excellent dimensional stability, compressive strength and water resistant properties. It is custom-manufactured for each specific application, and is readily available in a variety of lengths, widths and shapes to meet virtually any job condition.

2. **Carlisle H-Shield Polyisocyanurate (Flute-Filler):** A custom-cut insulation consisting of a closed-cell polyisocyanurate that meets the requirements of ASTM D2126. It is custom-cut for each specific application, and is readily available in a variety of lengths and widths.

3. **SecurShield HD:** A rigid roof insulation panel composed of a high-density, closed-cell polyisocyanurate foam core laminated to a premium-performance, coated-glass fiber-mat facer specifically designed for use as a cover board.

4. **HP Purlin Fastener:** A hex-head, threaded, self-drilling, black epoxy electro-deposition coated (E-Coat) fastener used for membrane/RUSS securement into structural purlins (12-18 gauge) in conjunction with Sure-Weld Metal Retrofit Roofing Systems.

5. **HP Fastener:** A threaded E-coat square head fastener for insulation and additional membrane attachment (Adhered Roofing Systems) in conjunction with 2” diameter polymer plates.

6. **HP-X Fastener:** A heavy duty #15 threaded fastener with a #3 Phillips drive used with Carlisle’s Piranha™ Fastening Plate to secure Mechanically Fastened Roofing Systems.

7. **Insulation Fastening Plates**: A nominal 3" diameter metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

8. **Seam Fastening Plates**: A 2" diameter metal plate used for insulation attachment on Mechanically Fastened Roofing Systems or membrane securement on Adhered Roofing Systems in conjunction with the appropriate Carlisle Fastener.

9. **Piranha Plate:** A 2-3/8” diameter metal barbed fastening plate used primarily for membrane securement in conjunction with HP Purlin Fasteners. The plate is also used in conjunction with appropriate fasteners for securement of insulation/membrane underlayments in mechanically fastened assemblies.

10. **10” wide TPO Pressure-Sensitive RUSS:** Used as a primary securement for the TPO membrane in Mechanically Fastened TPO assemblies. A 45-mil thick reinforced TPO membrane with 3” wide and 35-mil thick cured synthetic rubber pressure-sensitive adhesive laminated along both sides. Used in conjunction with TPO Membrane Primer.

11. **Sure-Weld Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of non-reinforced Sure-Weld Flashing. The sheet is cut to the appropriate width and used to fabricate metal drip edges or other roof perimeter edging profiles. Sure-Weld Membrane may be heat welded directly to the coated metal. Available in white, gray or tan. Refer to appropriate Carlisle Detail for additional information.

12. **Sure-Flex PVC Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 40-mil non-reinforced Sure-Flex Flashing. The sheet is cut to the appropriate width and used to fabricate metal drip edges or other roof perimeter

edging profiles. Sure-Flex Membrane may be heat welded directly to the coated metal. Coated metal is available in sheets 4' x 10' and comes packaged 10 sheets per pallet. Available in white, gray or tan.

13. **TPO Contour Rib:** an extruded TPO profile used to simulate standing seam metal roofing system that is welded directly to an adhered TPO membrane.

14. **PVC Contour Rib:** an extruded PVC profile used to simulate standing seam metal roofing system. Heat welded directly to an adhered PVC membrane.

For membrane physical properties and other related products, refer to the appropriate "Products" Section of the appropriate membrane specification.

PART III – EXECUTION

3.01 General

In addition to the criteria contained herein, the "Installation" Section for the specified roof assembly should be referenced in its entirety.

When feasible, begin the application at the highest point of the highest roof level and work to the lowest point to prevent moisture infiltration and to minimize construction traffic on completed sections. This will include completion of all flashings and terminations.

3.02 Existing Metal Roof Criteria

A. Defects in the existing metal roof or purlin system must be reported and documented to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Roofing Applicator shall not proceed unless the defects are corrected.

B. The following chart identifies the minimum pullout values which must be achieved with both the HP Purlin Fastener, which is required for RUSS/RhinoBond Plate securement, and the HP or HP-X Fastener, which is required for additional membrane securement around penetrations (i.e. vent pipes) and is recommended for insulation securement:

Purlins		**Metal Roofs (Mechanically Fastened Systems Only)**	
Gauges	**HP Purlin Fastener** Min. Pullouts (lbs./fastener)	**Gauges**	**HP or HP-X Fastener** Min. Pullouts (lbs./fastener)
12	1,000	24	300
14	1,000	26	200
16	800	28*	150
18	600		

* Pullouts must be submitted to Carlisle when an Adhered Assembly is to be selected.

Withdrawal resistance tests are strongly suggested to determine the suitability of the existing metal roof and structural purlins for the application of this roofing system.

CAUTION: Visually inspect existing metal roof and conduct pullout tests at low areas (i.e. eaves and valleys) or areas of concern during visual inspection.

3.03 Substrate Preparation

A. Clear the substrate of debris and foreign material.

B. Wood nailers are required at all roof edges where metal edging and gutter systems are specified and must be flush with the top of the specified membrane underlayment.

When treated lumber is specified, it is recommended that only lumber that has been pressure treated with salt preservatives be specified. Lumber treated with other wood preservatives such as, Creosote, Pentachlorophenol, Copper Naphthenate, Copper 8-quinolinolate, will adversely affect the membrane when in direct contact and are, therefore, unacceptable.

C. On standing seam metal roofs, two layers of wood nailers are required with the first layer installed between the raised standing seams, flush with the top surface of the seams. These nailers must be mechanically fastened directly to the structural purlins with Sure-Seal HP Purlin Fasteners spaced a maximum of 16 inches on center. Sections of wood nailers installed between standing seams must have a minimum of 2 fasteners positioned approximately 3 inches from each end of the nailer (spaced no more than 16 inches apart).

The top layer of wood nailers is then fastened to the bottom layer of wood nailers with HP or HP-X Fasteners spaced a maximum of 16 inches on center with all fasteners penetrating the bottom layer of wood nailers a minimum of 1 inch.

Note: In lieu of fasteners, galvanized or coated nails may be used to secure the top nailer when positioned 4inches on center and staggered 3/4 inch on center. The nails shall be sufficient in length to penetrate the bottom nailer a minimum of 1-1/4 inch.

D. On corrugated metal roofs, batt insulation or other compressible filler must be used beneath perimeter wood nailers to minimize infiltration of air beneath this roofing system.

E. On flat seam metal roofs, the underside of the wood nailer should be notched at the flat seam areas to achieve a smooth, stable base.

Note: The existing metal roof may be trimmed at metal edge and gutter locations to minimize the dimension between the edge purlin support and the edge of the metal roof. This will allow standard size nailers (2” x 6”) to be fastened to the edge purlin flush with the roof edge.

3.04 Installation

A. **Insulation Placement and Attachment**

1. Membrane underlayment must be butted together with no gaps greater than 1/4 inch. Gaps greater than 1/4 inch are not acceptable.

2. On standing seam metal roofs, insulation must be installed in multiple layers. The first layer of insulation is used as a fill between standing seams, relatively flush with the top surface of the seams. A second layer of insulation is placed over the first layer and the standing seams to serve as the membrane underlayment.

3. When mechanical fasteners are specified for insulation securement, the bottom layer (fill boards) can be loose laid with the top layer (membrane underlayment) mechanically fastened to the metal roof at the rate of **1 fastener per 4 square feet for Mechanically Fastened Systems**.

4. When mechanical fasteners are specified for insulation securement, the bottom layer (fill boards) can be loose laid with the top layer (membrane underlayment) mechanically fastened to the metal roof at the rate of **1 fastener per 2 square feet for Adhered Systems**.

5. **RhinoBond Attachment Method Option**

   Refer to **Attachment 'I' – Metal Retrofit Roofing System RhinoBond Attachment Method**

6. When insulation is to be attached with Flexible FAST Adhesive, or Flexible FAST Dual Cartridges, both the bottom and top layers must be adhered in accordance with installation procedures outlined in the **Spec Supplement G-03 FleeceBACK and Insulation Attachment and Coverage Rates with Flexible FAST Adhesive** in the Carlisle Technical Manual.

   Note: Two-part urethane adhesives may not be compatible with certain types of metal roof coatings. If existing, Carlisle should be contacted for verification. Mechanical fasteners may be specified in lieu of the adhesive providing the minimum pullouts can be met.

B. **Membrane Installation**

1. **Mechanically Fastened Option**

   a. Securement for this roofing system is accomplished by splicing the membrane to the Pressure-Sensitive RUSS (10 inch wide for TPO) that is positioned along the structural purlins and spaced 5 feet or 10 feet on center depending on project wind zone. The RUSS is attached to the purlins a maximum of 12 inches on center utilizing HP Purlin Fasteners and Piranha Plates (TPO). Refer to appropriate Carlisle Details.

   b. Securement of the membrane at the perimeter roof areas shall be achieved by attaching the membrane to the RUSS positioned along the first purlin from the roof edge/eave (perpendicular to the roof slope). Along the rake edges, membrane securement is achieved with RUSS positioned along all purlins for a distance of no less than 5 feet. Refer to appropriate Carlisle Details for required fastening density according to project wind zone.

   c. When using Pressure-Sensitive RUSS, appropriate membrane primer must be applied to the membrane in accordance with standard procedures.

   d. Install consecutive membrane sheets allowing a minimum overlap onto the adjacent membrane sheets following respective membrane application requirements.

   e. For additional information pertaining to membrane splicing, refer to the appropriate Membrane Specification in the Carlisle Technical Manual.

   f. Additional membrane securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb flashing, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2" in one horizontal foot, and at other penetrations in accordance with Carlisle's details and securement options.

2. **Induction Welding (RhinoBond / Isoweld) Attachment Method Option**

   Refer to **Attachment 'I' – Metal Retrofit Roofing System Induction Welding (RhinoBond/Isoweld) Attachment Method**

3. **Sure-Weld SAT or FleeceBACK Adhered Roofing Systems**
   For installation procedures on Adhered Roofing Systems, refer to appropriate Membrane Specification in the Carlisle Technical Manual.

4. **Other Related Work**

Refer to appropriate Membrane Specification in the Carlisle Technical Manual for additional membrane securement, membrane flashing and other related clean up work.

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Rhinobond is a trademark of OMG
Isoweld is a trademark of SFS Intec.

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P.O. Box 7000
Carlisle, PA 17013
800-479-6832
http://www.carlisle-syntec.com

METALRETROFIT

Metal Retrofit Roofing System
Induction Welding (RhinoBond/Isoweld) Attachment Method

"Attachment I"

July 2026

This is an alternate method for securing the Carlisle's Sure-Weld (TPO) or Sure-Flex (PVC) membranes and is intended to be used in conjunction with the Carlisle's Metal Retrofit Thermoplastic Specification and Details.

A. Description

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO or PVC coating. The RhinoBond or Isoweld Plates are installed with HP Purlin Fasteners to secure an acceptable insulation to a minimum 18 gauge steel purlin.

Carlisle's Polyester Reinforced Thermoplastic membrane is positioned over the secured RhinoBond or Isoweld plates and welded to the top surface of the plate with the RhinoBond Induction Welding Tool.

Induction Welding (RhinoBond/Isoweld) Metal Retrofit – Warranty Table

Warranty Wind Speed*	Securement Rows in Purlins from Eave Building Location Distance from Coastline		Maximum Securement Spacing into Purlins in the Field**	Rate of Plate Securement
	Greater than 4 miles	4 miles or less		
55 MPH	1	2	10'	12"
72 MPH	2	3	10'	12"
80 MPH	3	4	10'	12"
90 MPH	3	4	10'	12"
Greater Than 90 MPH	Contact Carlisle			

*Maximum building height of 60'-0".
**From eave, first two consecutive purlins. Every other purlin thereafter. See Metal Retrofit Membrane Attachment Details.

B. Products/Heat Welding Equipment

Other products listed in the Carlisle Metal Retrofit Thermoplastic Specification can be used as part of this alternate securement method in conjunction with the RhinoBond Welding Plates.

1. **RhinoBond or Isoweld TPO or PVC Welding Plate**: A 3" diameter, 0.028" thick, corrosion-resistant steel plate with hot melt coating on the top surface. The plate is used in conjunction with Carlisle's HP Purlin Fasteners to attach the roofing assembly and is activated using the RhinoBond/Isoweld Induction Welding Tool.

2. **RhinoBond/Isoweld Induction Welding Tool**: An induction heating tool is used to emit the magnetic field that

activates the hot melt coating on the top surface of the RhinoBond or Isoweld Welding Plate to fuse with the roofing membrane. Refer to RhinoBond Owner's Manual for additional information.

3. **Magnet**: A stand-up device that allows the weld to cool as it holds the membrane to the heated plate. Refer to RhinoBond or Isoweld Owner's Manual for additional information.

C. RhinoBond Induction Tool Calibration

Prior to proceeding with membrane attachment to the plate, the RhinoBond Induction Welding Tool must be calibrated with samples of the project specified insulation thickness and type and project specified membrane thickness. Refer to RhinoBond Owner's Manual for additional information.

1. Loose lay five RhinoBond Plates in a row about 12-24" apart or the specified membrane substrate.

2. Place membrane over the RhinoBond Plates.

3. Centering over the RhinoBond Plate under the membrane, place the Induction Welding Tool and use the device's default setting. Weld the membrane to the first plate, and when ready, completely remove Welding Tool. Immediately place the Cooling Clamp on the membrane over the plate and leave in place for 60 seconds.

4. Place Induction Welding Tool on the next plate as previously done and increasing induction energy one level by depressing the "up" button once. After welding, immediately place the Cooling Clamp.

5. Repeat above procedure for the remainder of the plates, increasing induction energy one level for each plate.

6. After allowing the membrane and plates to cool to ambient temperature, remove Cooling Clamp and use a pliers by apply force to peel RhinoBond Plate from underside of membrane to determine bonding strength. Desired result is welded ply of membrane stays fused to RhinoBond Plate.

7. Repeat trial process, if needed, adjusting energy level up or down until desired results are achieved.

   Note: Recalibrate induction tool settings is necessary when ambient temperature changes more than +/- 15°F or power to device has been interrupted.

D. Isoweld Induction Tool Calibration

Calibrate the Isoweld Induction Welding tool using the process outlined in the Owner's Manual.

E. Installation

8. After placement of insulation on substrate, attach insulation using mechanical fasteners or Flexible FAST Adhesive. See installation section of Metal Retrofit specification for further information.

9. Secure Rhinobond/Isoweld Plates and HP Purlin Fasteners at a rate designated by the Warranty Table.

   Note: Avoiding fastener overdrive to prevent plate from deforming.

10. Place Sure-Weld or Sure-Flex membrane over the appropriate RhinoBond/Isoweld Plates and allowing membrane to relax.

11. Place RhinoBond/Isoweld Induction Tool centered over the RhinoBond/Isoweld TPO/PVC Welding Plate (+/- 1") under the roofing membrane.

12. Elevate the temperature of plate from ambient to 400-500°F using induction tool.

13. Immediately place magnet on the membrane over the plate and leave in place for at least 60 seconds.

14. Resume process ensuring membrane is attached to all plates.

F. Membrane Hot Air Welding Procedures & Additional Securement

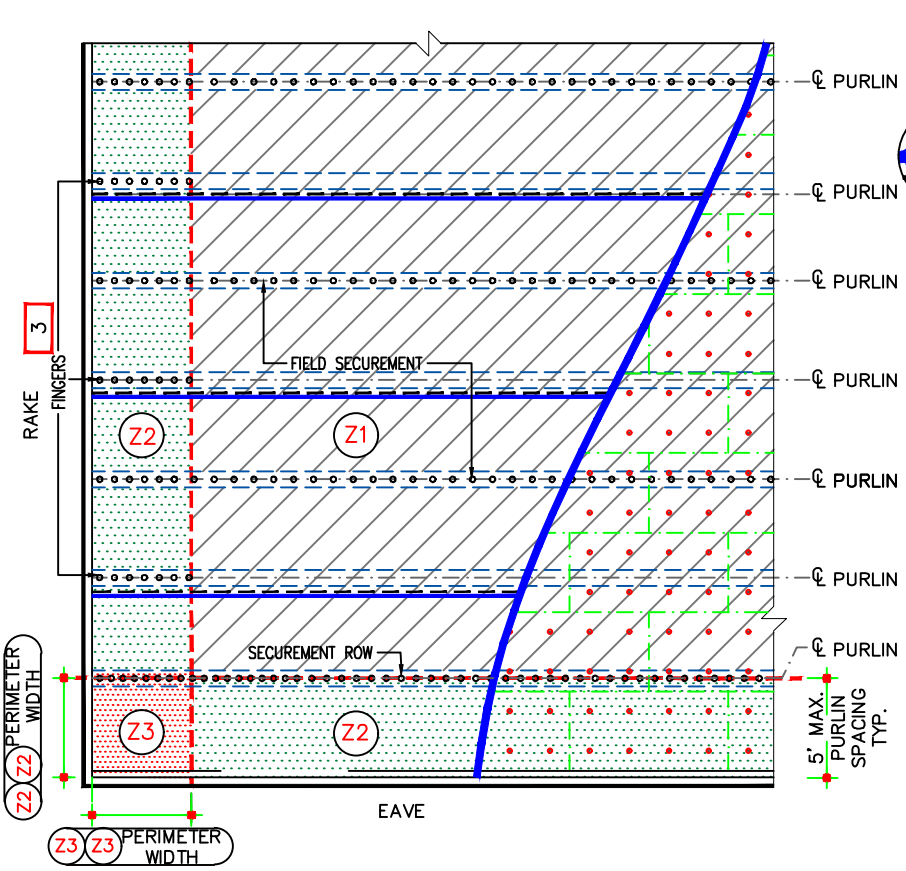
1. Adjoin membrane sheets by overlapping and heat welding the seam following standard Hot Air Welding Procedures as outlined in the respective membrane application specification.

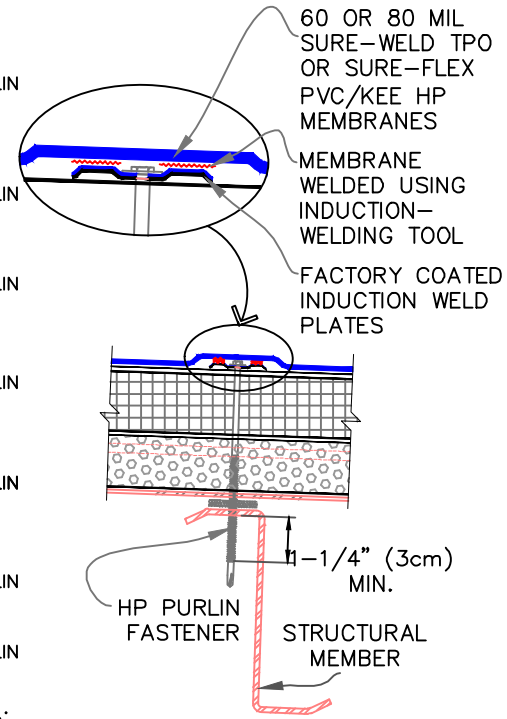
2. Base wall securement and securement around roof penetrations as well as flashings of walls and penetrations must comply with Carlisle requirements for the Thermoplastic Mechanically Fastened Roofing System.

G. Associated Installation Details

Membrane Attachment with Induction Welds: 1 Purlin Securement Row from Eave IW-2.1
Membrane Attachment with Induction Welds: 2 Purlin Securement Row from Eave IW-2.2
Membrane Attachment with Induction Welds: 3 Purlin Securement Row from Eave IW-2.3
Membrane Attachment with Induction Welds: 4 Purlin Securement Row from Eave IW-2.4

End of Section





FASTENER DETAIL

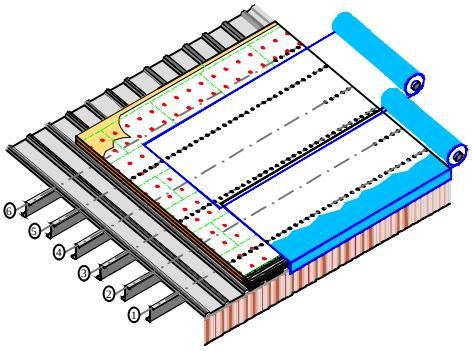
INDUCTION WELDED MEMBRANE ON METAL RETROFIT

SECUREMENT ROW (PERIMETER SHEET): 1 PURLIN FROM EAVE
INSULATION FASTENED TO EXISTING METAL ROOF

INDUCTION WELDING METAL RETROFIT WARRANTY

WARRANTY WIND SPEED*	SECUREMENT ROWS (PERIMETER SHEETS Z2/Z3) IN PURLINS PER EAVE — BUILDING LOCATION DISTANCE FROM COASTLINE			MAX. ROW (PURLIN) SPACING FOR FIELD (Z1)	PLATE SECUREMENT RATE
	GREATER THAN 7 MI.	7–3 MI.	LESS THAN 3 MI.		
55 MPH	1	--	--	10'	12"
72 MPH	--	--	--	--	--
80 MPH	--	--	--	--	--
90 MPH	--	--	--	--	--
>90 MPH	CONTACT CARLISLE				

* MAXIMUM BUILDING HEIGHT OF 60'



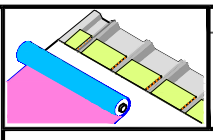
3D VIEW
NOT TO SCALE

NOTES:

1. FASTENING SPACING COULD BE ADJUSTED DEPENDING UPON THE SPECIFIED WIND UPLIFT PRESSURE. CONTACT CARLISLE SYNTEC WITH SPECIFIED PRESSURES.
2. INSULATION MAY ALTERNATIVELY BE ADHERED USING FLEXIBLE-FAST LOW-RISE POLYURETHANE ADHESIVE. SEE SPEC SUPPLEMENT G-03 – FLEECEBACK AND INSULATION ATTACHMENT AND COVERAGE RATES WITH FLEXIBLE FAST ADHESIVE.
3. FINGER LENGTH (PERIMETER FASTENING ON RAKE SIDE) SHALL BE EQUAL TO THE PERIMETER WIDTH

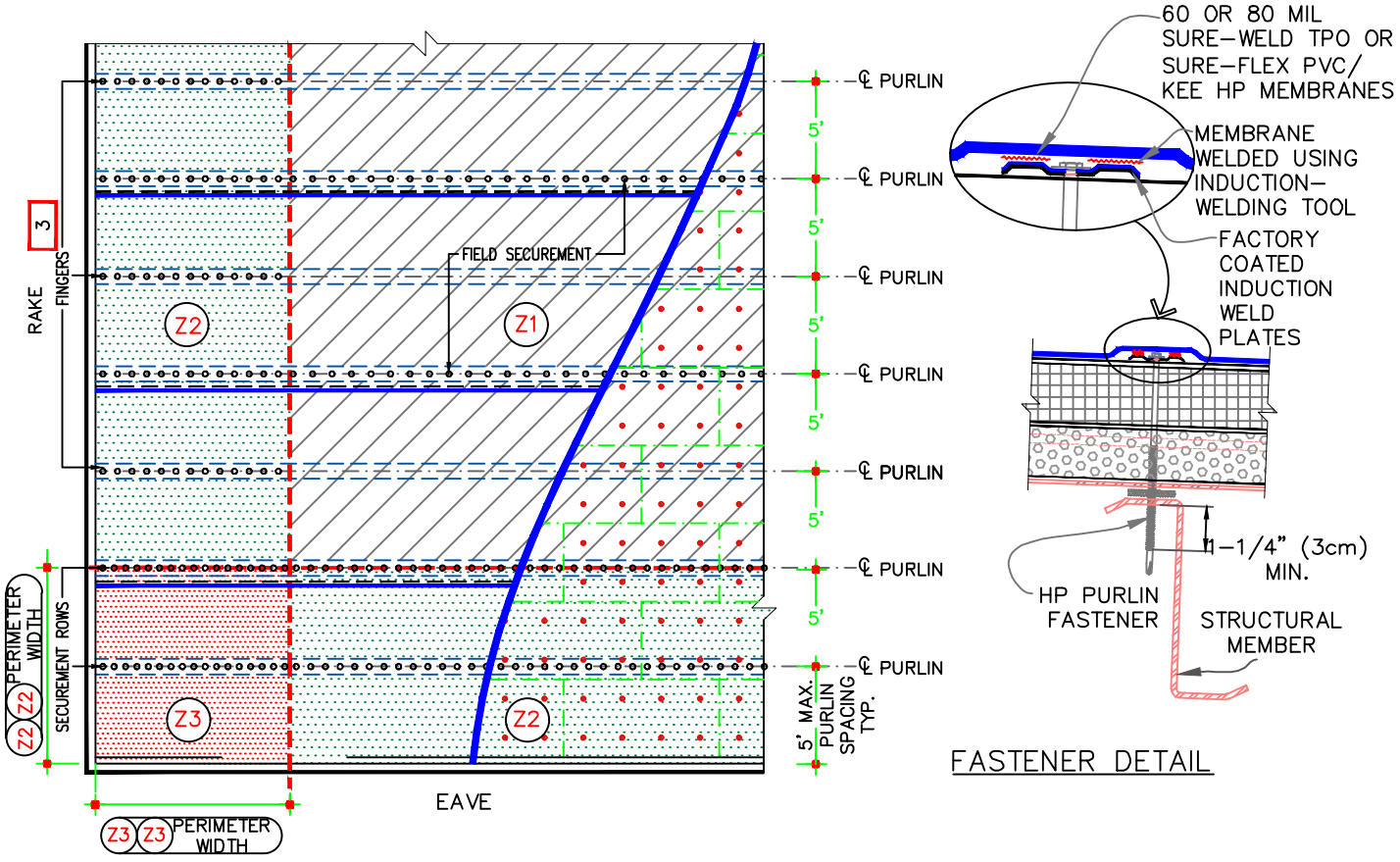
MEMBRANE ATTACHMENT WITH INDUCTION WELDS: 1 PURLIN SECUREMENT ROW FROM EAVE

FIELD
PERIMETER
CORNER
INDUCTION WELD PLATES
INSULATION PLATES/FASTENERS
HEAT-WELDED MEMBRANE SEAM



DESIGN REFERENCE
MR | W-2.1

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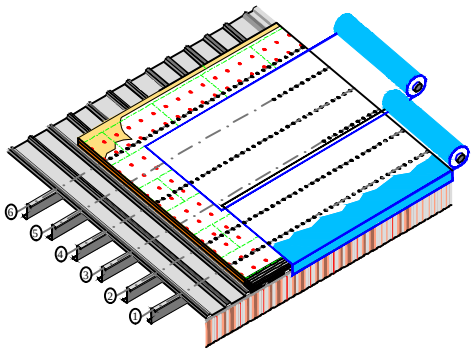
INDUCTION WELDED MEMBRANE ON METAL RETROFIT

SECUREMENT ROWS (PERIMETER SHEETS): 2 PURLINS FROM EAVE
INSULATION FASTENED TO EXISTING METAL ROOF

INDUCTION WELDING METAL RETROFIT WARRANTY

WARRANTY WIND SPEED	SECUREMENT ROWS (PERIMETER SHEETS Z2/Z3) IN PURLINS PER EAVE — BUILDING LOCATION DISTANCE FROM COASTLINE			MAX. ROW (PURLIN) SPACING FOR FIELD (Z1)	PLATE SECUREMENT RATE
	GREATER THAN 7 MI.	7–3 MI.	LESS THAN 3 MI.		
55 MPH	--	2	--	10'	12"
72 MPH	2	2	--	10'	12"
80 MPH	--	--	--	--	--
90 MPH	--	--	--	--	--
>90 MPH	CONTACT CARLISLE				

* MAXIMUM BUILDING HEIGHT OF 60'



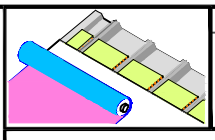
3D VIEW
NOT TO SCALE

NOTES:

1. FASTENING SPACING COULD BE ADJUSTED DEPENDING UPON THE SPECIFIED WIND UPLIFT PRESSURE. CONTACT CARLISLE SYNTEC WITH SPECIFIED PRESSURES.
2. INSULATION MAY ALTERNATIVELY BE ADHERED USING FLEXIBLE-FAST LOW-RISE POLYURETHANE ADHESIVE. SEE SPEC SUPPLEMENT G-03 – FLEECEBACK AND INSULATION ATTACHMENT AND COVERAGE RATES WITH FLEXIBLE FAST ADHESIVE.
3. FINGER LENGTH (PERIMETER FASTENING ON RAKE SIDE) SHALL BE EQUAL TO THE PERIMETER WIDTH

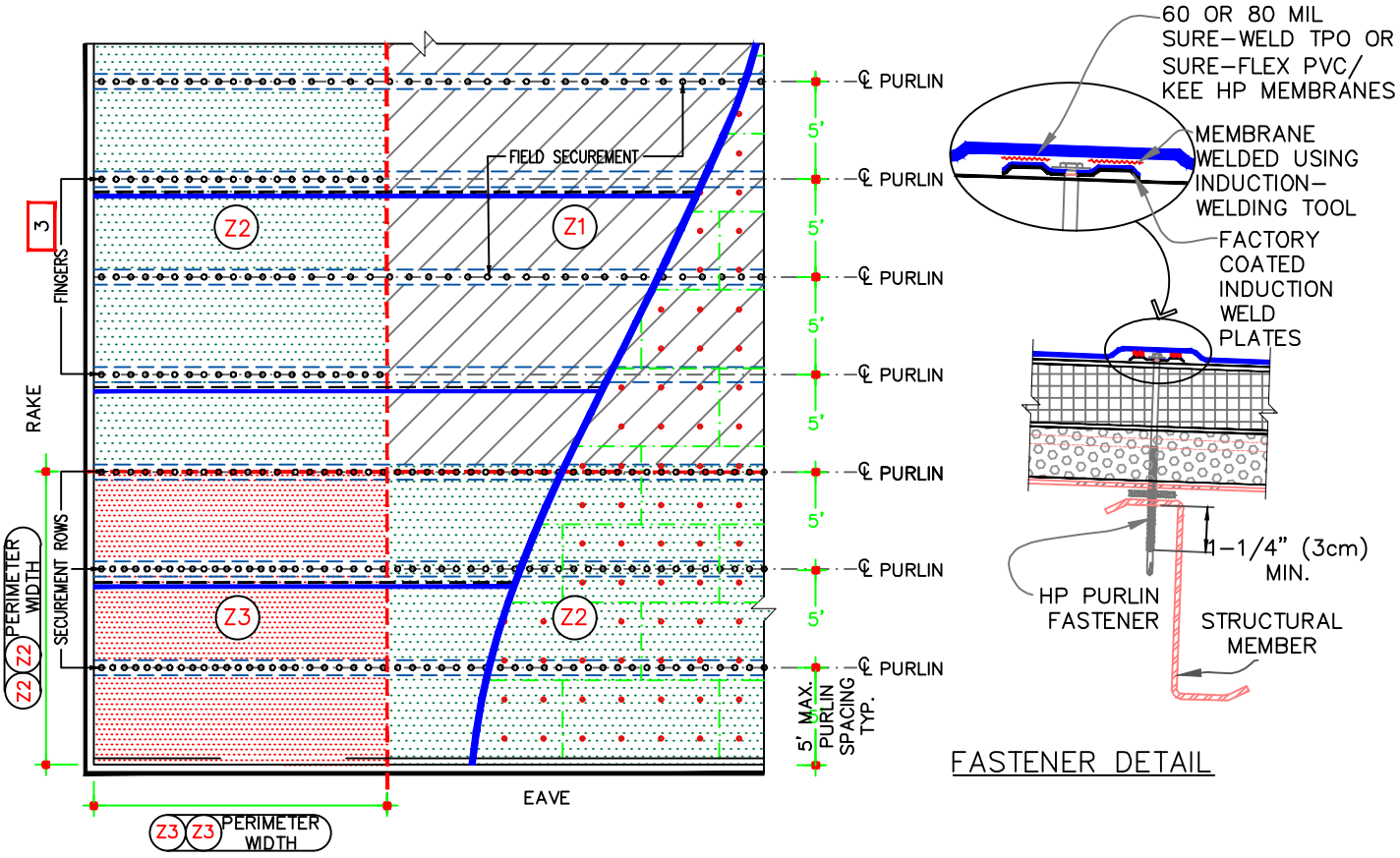
MEMBRANE ATTACHMENT WITH INDUCTION WELDS: 2 PURLIN SECUREMENT ROWS FROM EAVE

FIELD
PERIMETER
CORNER
INDUCTION WELD PLATES
INSULATION PLATES/FASTENERS
HEAT-WELDED MEMBRANE SEAM



DESIGN REFERENCE
MR | W-2.2

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FASTENER DETAIL

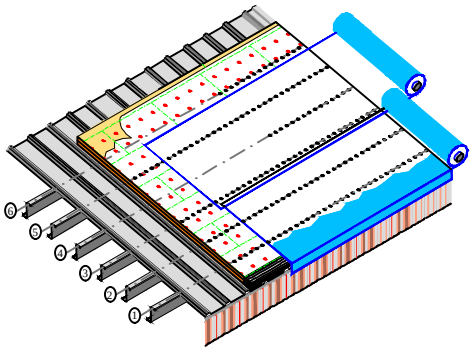
INDUCTION WELDED MEMBRANE ON METAL RETROFIT

SECUREMENT ROWS (PERIMETER SHEETS): 3 PURLINS FROM EAVE
INSULATION FASTENED TO EXISTING METAL ROOF

INDUCTION WELDING METAL RETROFIT WARRANTY

WARRANTY WIND SPEED	SECUREMENT ROWS (PERIMETER SHEETS Z2/Z3) IN PURLINS PER EAVE — BUILDING LOCATION DISTANCE FROM COASTLINE			MAX. ROW (PURLIN) SPACING FOR FIELD (Z1)	PLATE SECUREMENT RATE
	GREATER THAN 7 MI.	7–3 MI.	LESS THAN 3 MI.		
55 MPH	--	--	3	10'	12"
72 MPH	--	--	3	10'	12"
80 MPH	3	3	--	10'	12"
90 MPH	3	--	--	10'	12"
>90 MPH	CONTACT CARLISLE				

* MAXIMUM BUILDING HEIGHT OF 60'



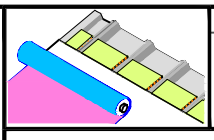
3D VIEW
NOT TO SCALE

NOTES:

1. FASTENING SPACING COULD BE ADJUSTED DEPENDING UPON THE SPECIFIED WIND UPLIFT PRESSURE. CONTACT CARLISLE SYNTEC WITH SPECIFIED PRESSURES.
2. INSULATION MAY ALTERNATIVELY BE ADHERED USING FLEXIBLE-FAST LOW-RISE POLYURETHANE ADHESIVE. SEE SPEC SUPPLEMENT G-03 – FLEECEBACK AND INSULATION ATTACHMENT AND COVERAGE RATES WITH FLEXIBLE FAST ADHESIVE.
3. FINGER LENGTH (PERIMETER FASTENING ON RAKE SIDE) SHALL BE EQUAL TO THE PERIMETER WIDTH

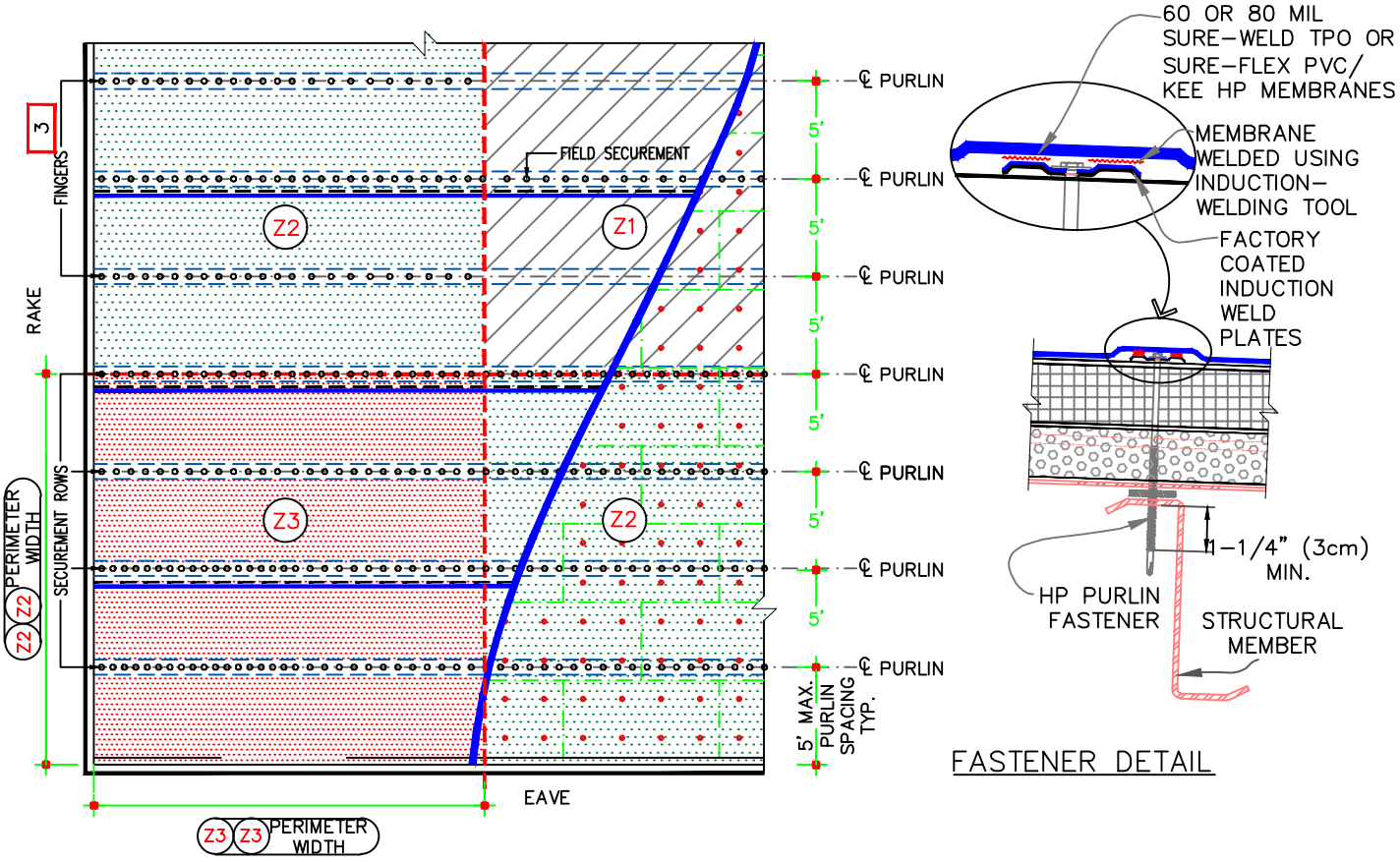
MEMBRANE ATTACHMENT WITH INDUCTION WELDS: 3 PURLIN SECUREMENT ROWS FROM EAVE

FIELD
PERIMETER
CORNER
INDUCTION WELD PLATES
INSULATION PLATES/FASTENERS
HEAT-WELDED MEMBRANE SEAM



DESIGN REFERENCE
MR | W-2.3

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FASTENER DETAIL

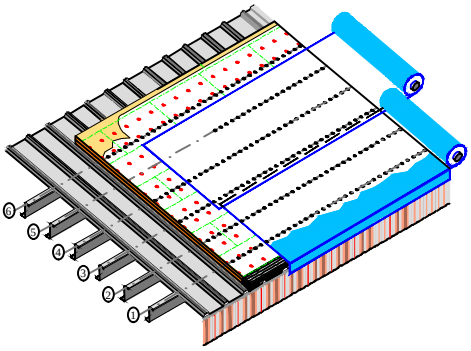
INDUCTION WELDED MEMBRANE ON METAL RETROFIT

SECUREMENT ROWS (PERIMETER SHEETS): 4 PURLINS FROM EAVE
INSULATION FASTENED TO EXISTING METAL ROOF

INDUCTION WELDING METAL RETROFIT WARRANTY

WARRANTY WIND SPEED	SECUREMENT ROWS (PERIMETER SHEETS Z2/Z3) IN PURLINS PER EAVE — BUILDING LOCATION DISTANCE FROM COASTLINE			MAX. ROW (PURLIN) SPACING FOR FIELD (Z1)	PLATE SECUREMENT RATE
	GREATER THAN 7 MI.	7-3 MI.	LESS THAN 3 MI.		
55 MPH	--	--	--	--	--
72 MPH	--	--	--	--	--
80 MPH	--	--	4	10'	12"
90 MPH	--	4	4	10'	12"
>90 MPH	CONTACT CARLISLE				

* MAXIMUM BUILDING HEIGHT OF 60'



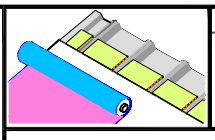
3D VIEW
NOT TO SCALE

NOTES:

1. FASTENING SPACING COULD BE ADJUSTED DEPENDING UPON THE SPECIFIED WIND UPLIFT PRESSURE. CONTACT CARLISLE SYNTEC WITH SPECIFIED PRESSURES.
2. INSULATION MAY ALTERNATIVELY BE ADHERED USING FLEXIBLE-FAST LOW-RISE POLYURETHANE ADHESIVE. SEE SPEC SUPPLEMENT G-03 – FLEECEBACK AND INSULATION ATTACHMENT AND COVERAGE RATES WITH FLEXIBLE FAST ADHESIVE.
3. FINGER LENGTH (PERIMETER FASTENING ON RAKE SIDE) SHALL BE EQUAL TO THE PERIMETER WIDTH

MEMBRANE ATTACHMENT WITH INDUCTION WELDS: 4 PURLIN SECUREMENT ROWS FROM EAVE

FIELD
PERIMETER
CORNER
INDUCTION WELD PLATES
INSULATION PLATES/FASTENERS
HEAT-WELDED MEMBRANE SEAM



DESIGN REFERENCE
MR | W-2.4

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METALRETROFIT

Sure-Weld®/Sure-Flex™

Thermoplastic Metal Retrofit Roofing Systems

Installation Details

TABLE OF CONTENTS

July 2026

Metal Edges and Gutters **Details**

Eave/Rake Edge (Coated Metal Fascia) T1.1A
Eave/Rake Edge (Coated Metal Fascia) T1.1B
Eave/Rake Edge (Non-Coated Metal Fascia) T1.2A
Eave/Rake Edge (Non-Coated Metal Fascia) T1.2B
Gutter with Coated Metal Fascia T1.3
Gutter with Metal Bar Edge Termination T1.4
Gutter With and Without Fascia T1.5
Gutter with Straps Anchored into Standing Seams T1.6
Gutter with Straps Anchored into Standing Seams T1.7
High-End Vented Roof Edge T1.8
Rake Edge T1.9
Rake Edge T1.10

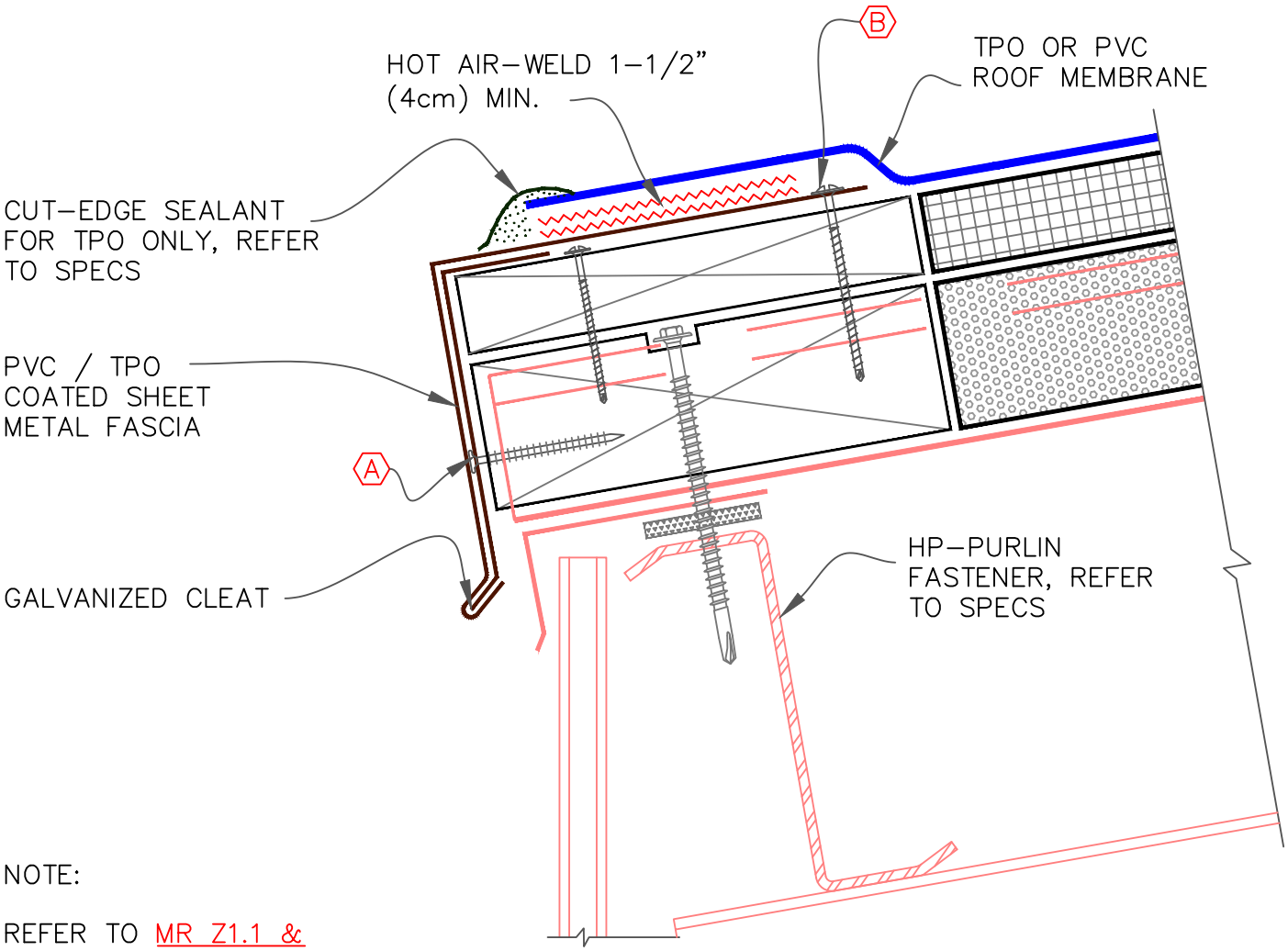
Membrane Attachment
Mechanically Fastened Membrane Attachment T2.1
Membrane Attachment - RhinoBond Assembly T2.2
Membrane Attachment Parallel to Slope (Up to 100 MPH Wind Zone) T2.3
Membrane Attachment Parallel to Slope (101 - 120 MPH Wind Zone) T2.4
Roof Perimeter Zones T2.5
Membrane Attachment Perpendicular to Slope (Up to 100 MPH Wind Zone) T2.6
Membrane Attachment Perpendicular to Slope (101-120 MPH Wind Zone) T2.7

Expansion Joints
Expansion Joint at Step Down Condition T3.1

Vertical Wall
Vertical Wall – Vented Base Detail T12.1

Ridges
Roof Ridge/Hip: Non-Vented…. T22.1
Roof Ridge: Vented…. T22.2

Common Details
Enlarged Details…… Z1.1
ANSI/SPRI ES-1 Compliant Fascia – Shop Fabricated Z1.2



NOTE:

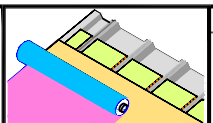
REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

Ⓐ 1–1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING–SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

EAVE/RAKE EDGE (COATED METAL FASCIA)

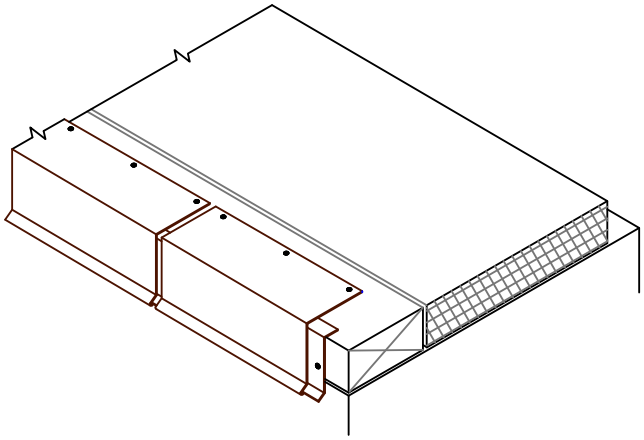
- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO. MRIT1.1A

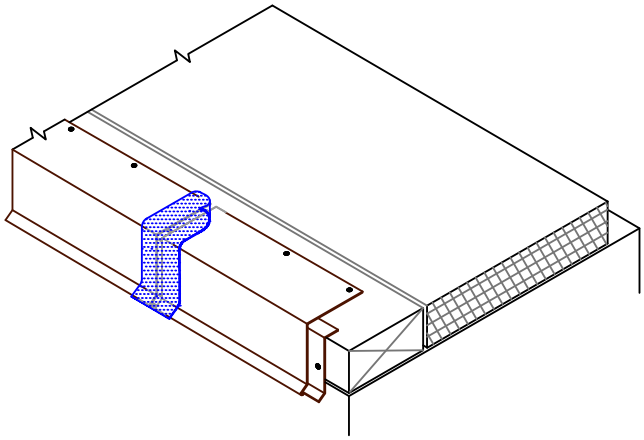
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1



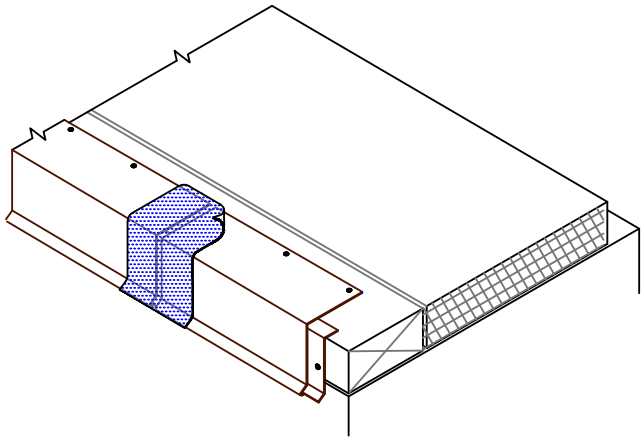
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"–1/4" (0.5cm–1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



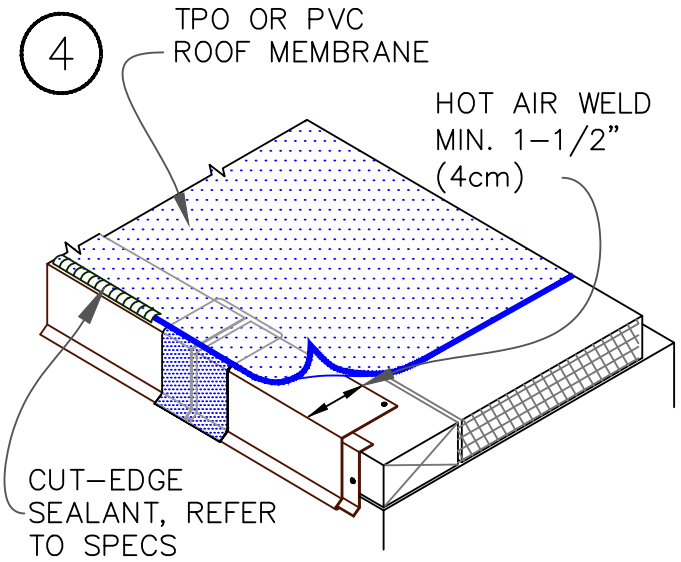
HEAT WELD 3" (7.5cm) WIDE PIECE OF NON–REINFORCED THERMOPLASTIC MEMBRANE OVER JOINT.

3



HEAT WELD 6" (15cm) WIDE PIECE OF NON–REINFORCED MEMBRANE OVER THE JOINT.

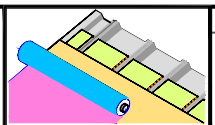
4



POSITION FIELD MEMBRANE AND HEAT WELD TO COATED METAL A MINIMUM OF 1–1/2" (4cm) AS SHOWN.

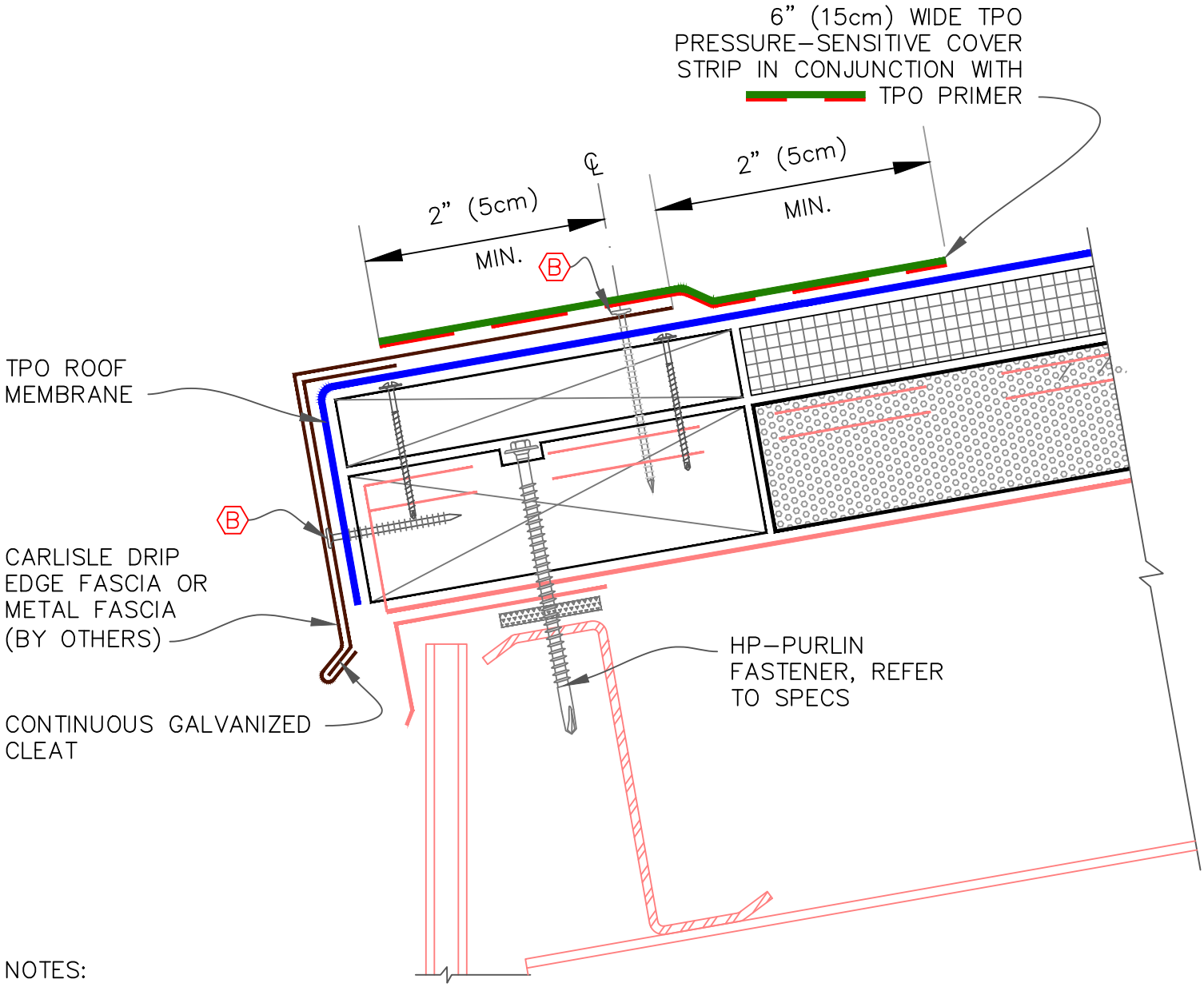
EAVE/RAKE EDGE (COATED METAL FASCIA)

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO.
MRIT1.1B

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NOTES:

1. FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY TPO PRESSURE SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM GUTTER/EDGE WITH A PITCH OF 3:12 OR GREATER. REFER TO DETAILS: MRT1.1A, MR T1.3, MR T1.4, MR T1.6.

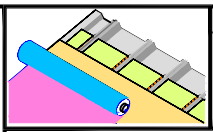
TPO ONLY (NOT FOR PVC)

Ⓐ 1-1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING-SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

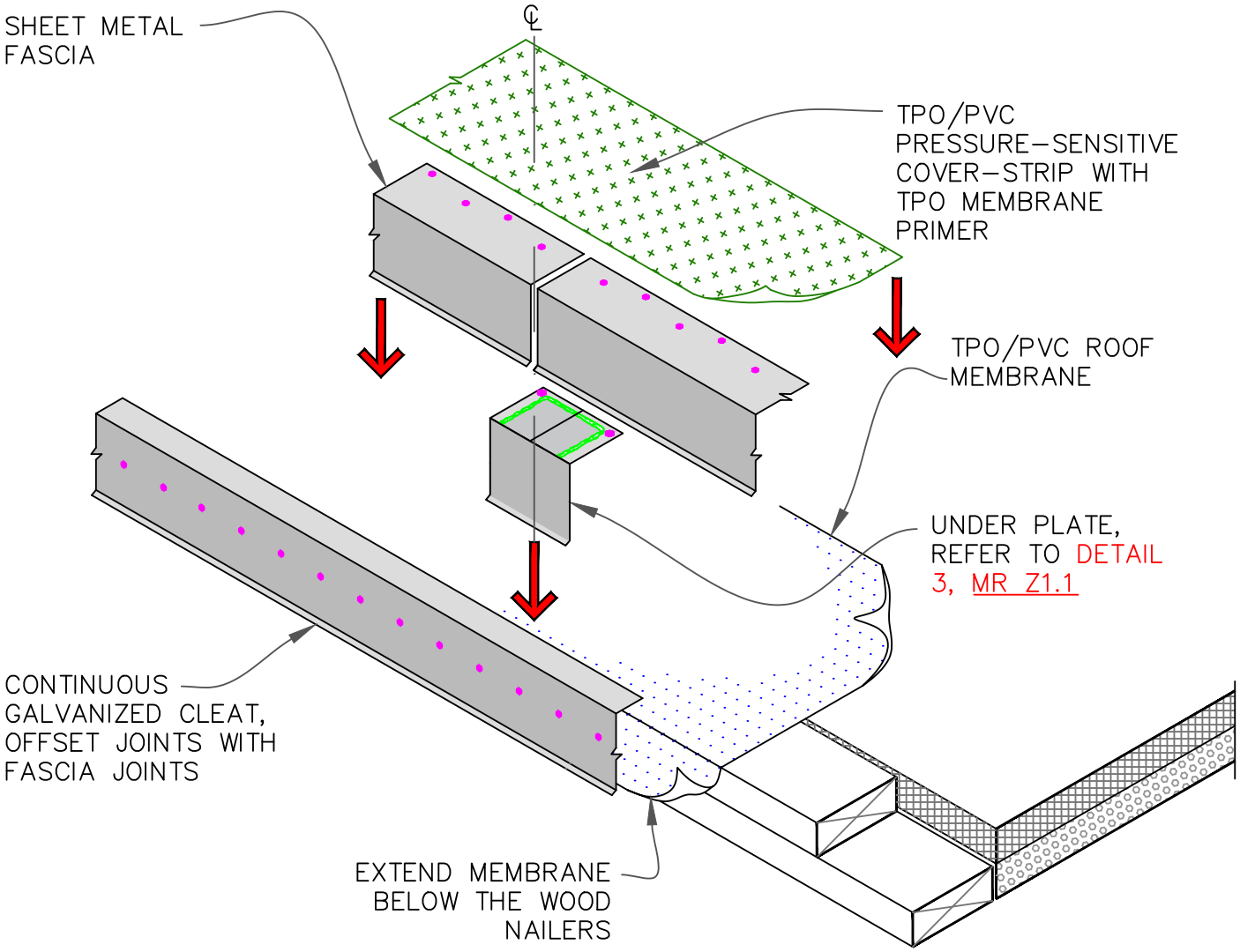
EAVE / RAKE EDGE

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO. MRIT1.2A

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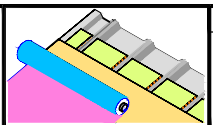


NOTE:

REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

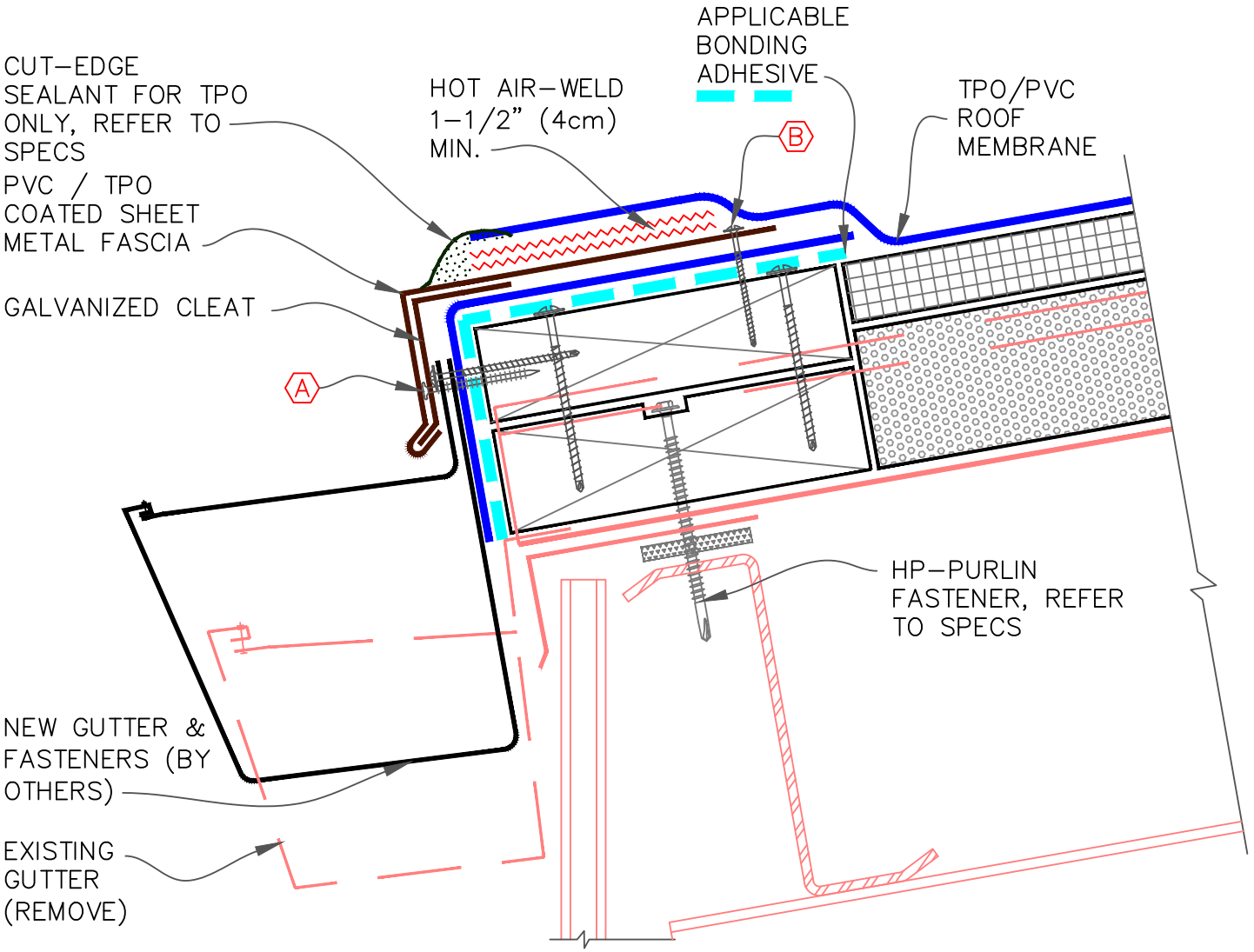
EAVE/RAKE EDGE (NON–COATED METAL FASCIA)

POLYISOCYANURATE INSULATION
IN–FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 SEE DRAWING NOTE(S)



SHEET NO.
MRIT1.2B

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NOTE:

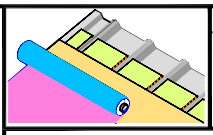
REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

Ⓐ 1–1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING–SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

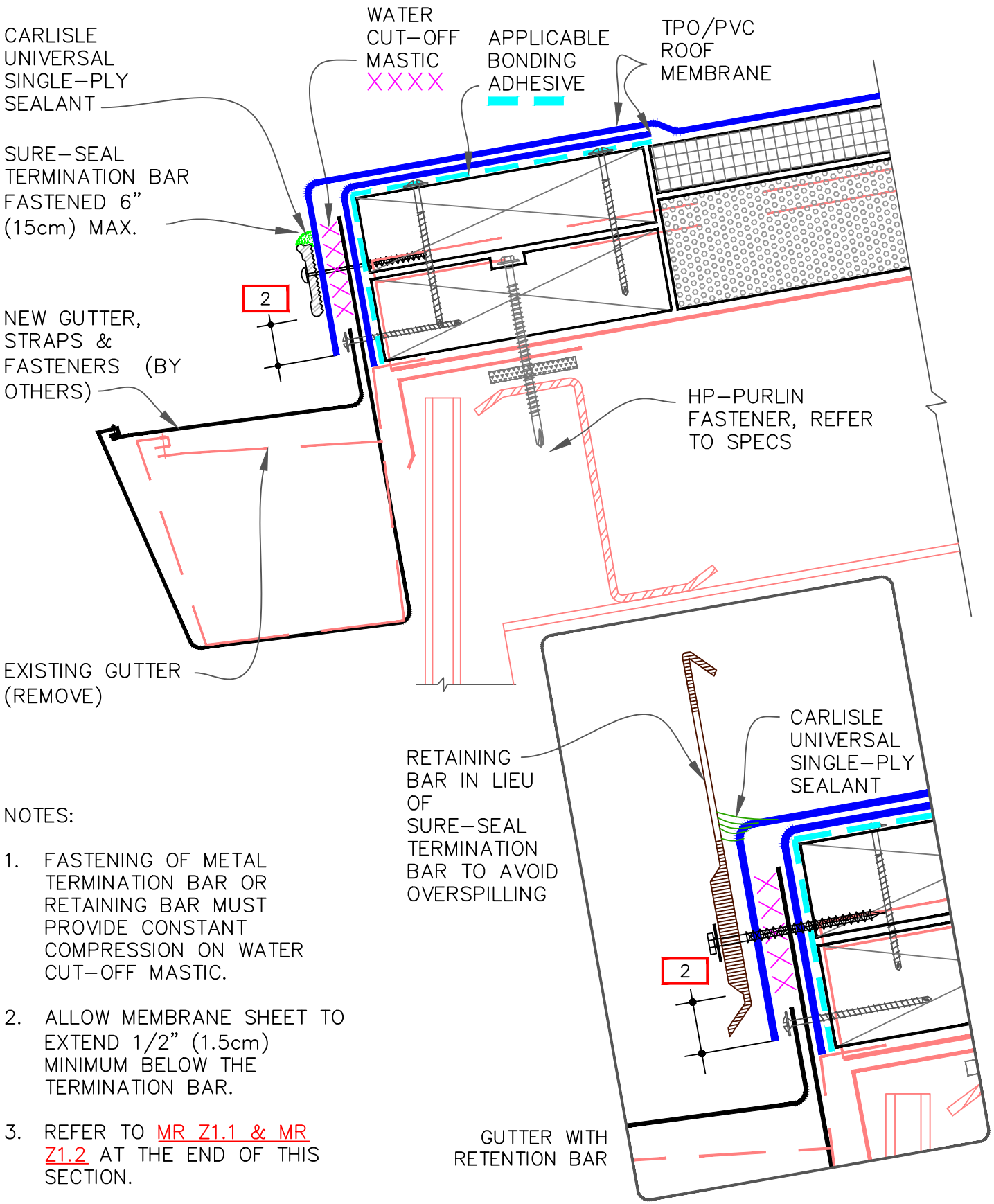
GUTTER WITH COATED METAL FASCIA

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO. MRI T1.3

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NOTES:

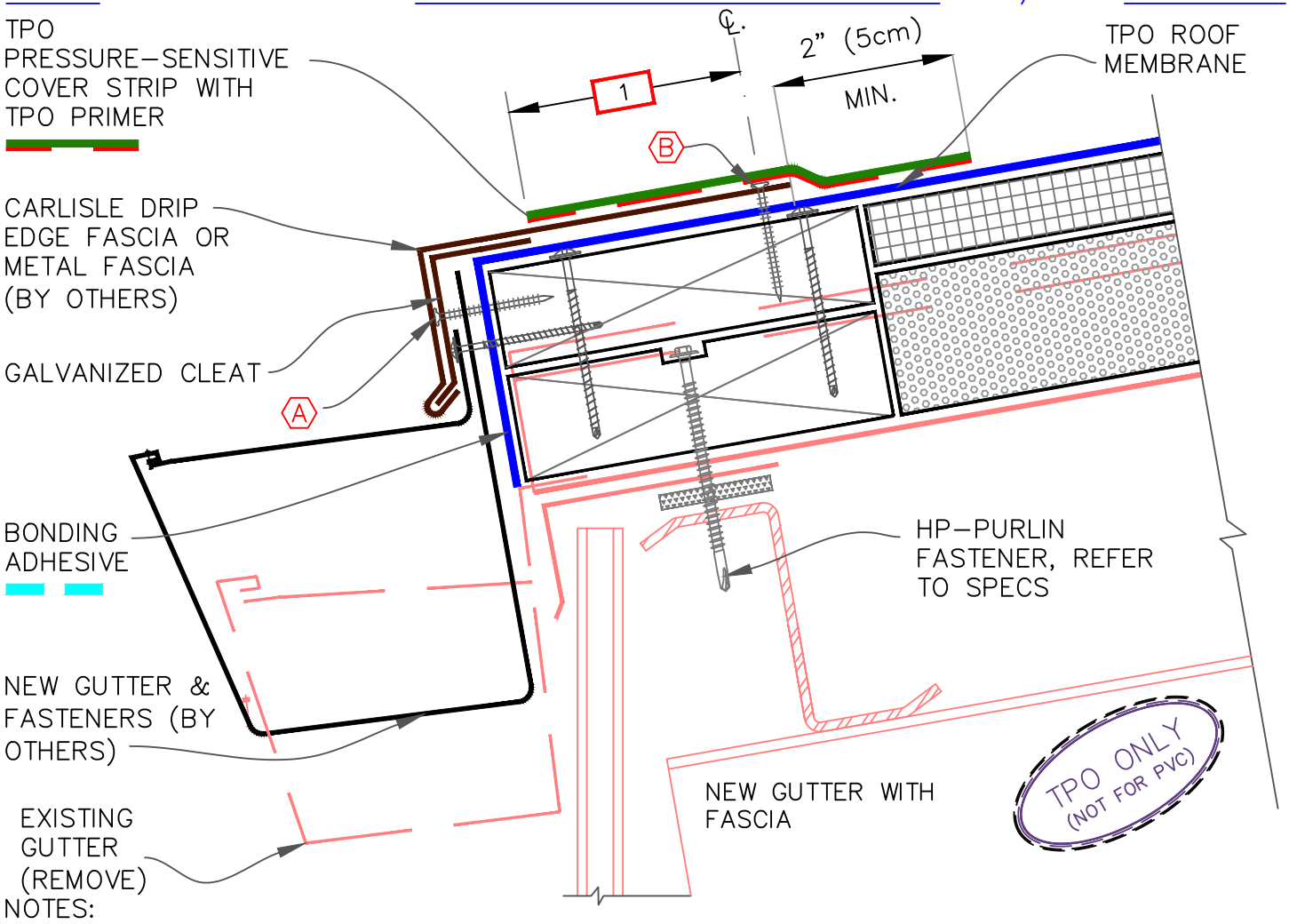
1. FASTENING OF METAL TERMINATION BAR OR RETAINING BAR MUST PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
2. ALLOW MEMBRANE SHEET TO EXTEND 1/2" (1.5cm) MINIMUM BELOW THE TERMINATION BAR.
3. REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

GUTTER WITH METAL BAR EDGE TERMINATION

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

SHEET NO. MRI T1.4

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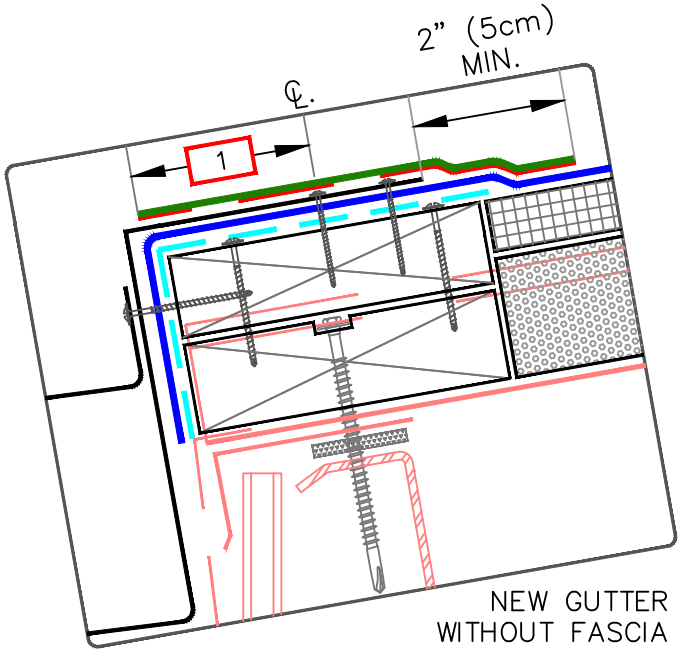


NOTES:

1. FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY TPO PRESSURE SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.
3. THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM GUTTER/EDGE. REFER TO DETAILS: MRT1.1A, MR T1.3, MR T1.4, MR T1.6.

Ⓐ 1-1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING-SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.



GUTTER WITH AND WITHOUT FASCIA

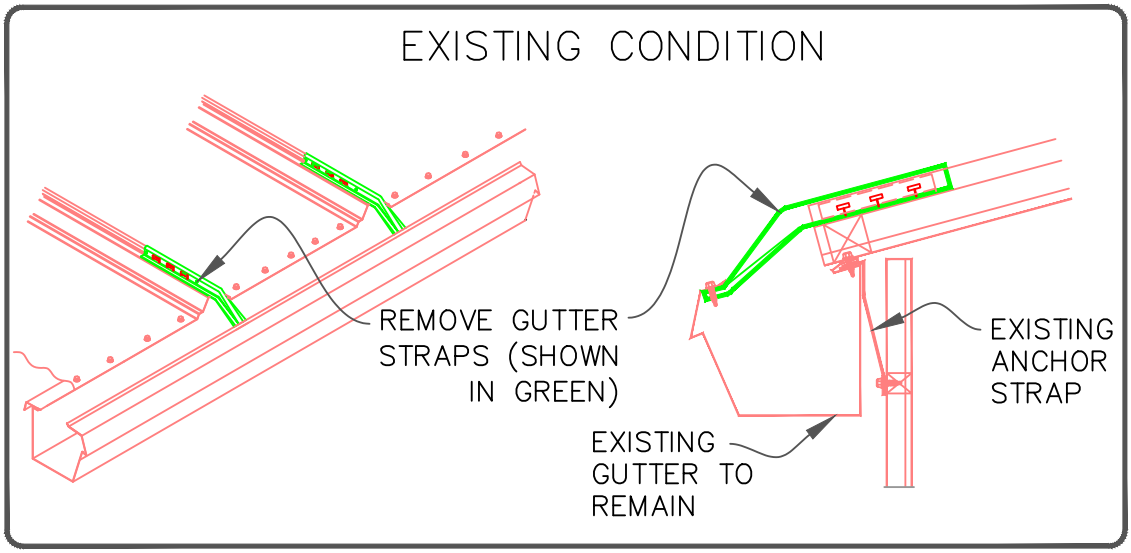
POLYISOCYANURATE INSULATION
IN-FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 SEE DRAWING NOTE(S)

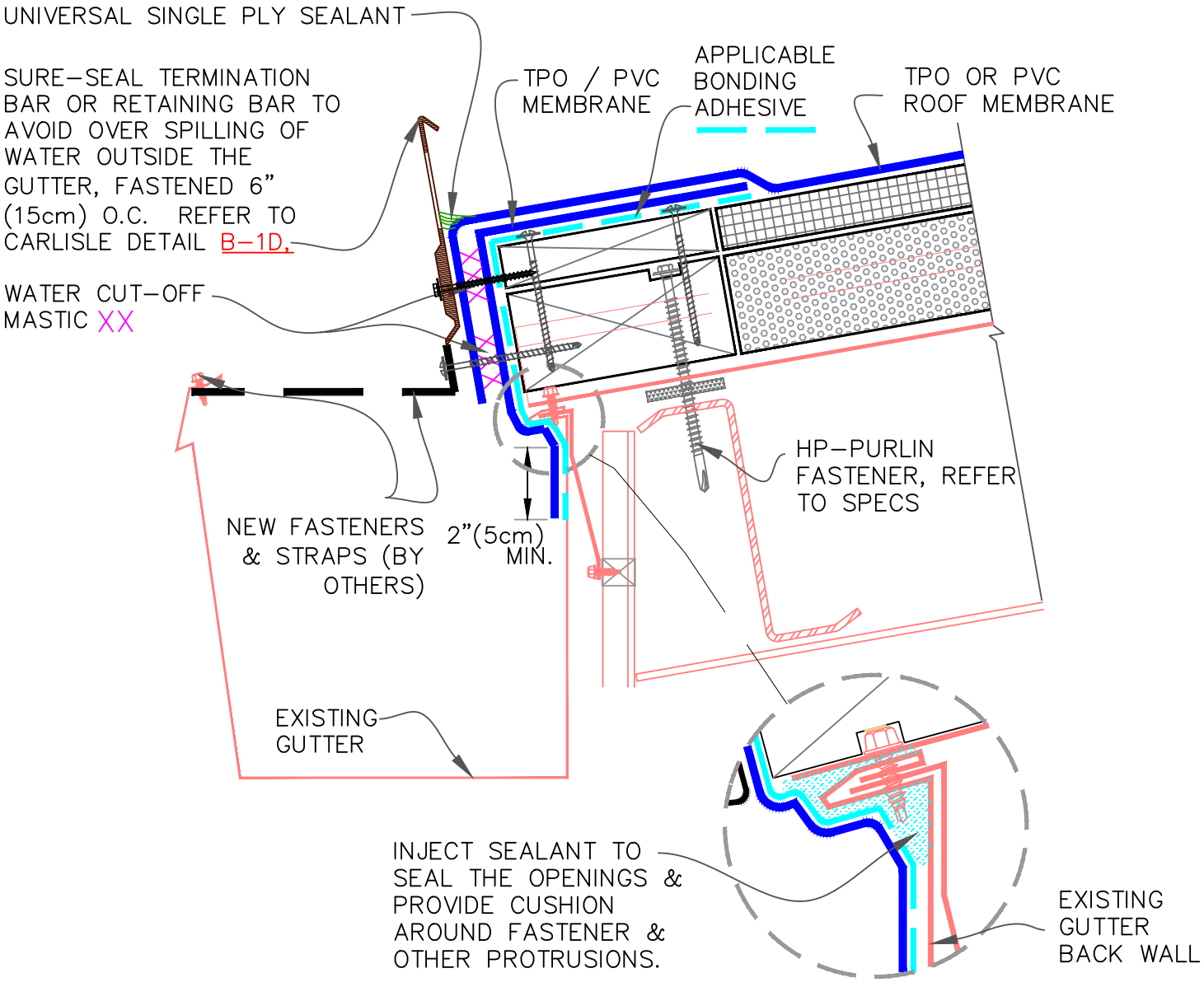
SHEET NO. MRI T1.5

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NOTE:

REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.





GUTTER WITH STRAPS ANCHORED INTO STANDING SEAMS

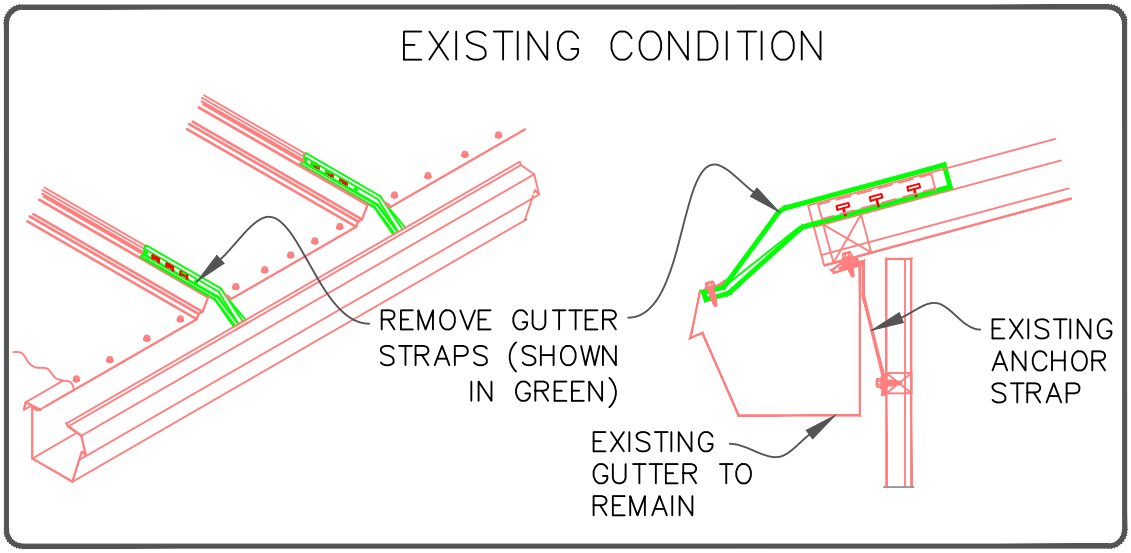
- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

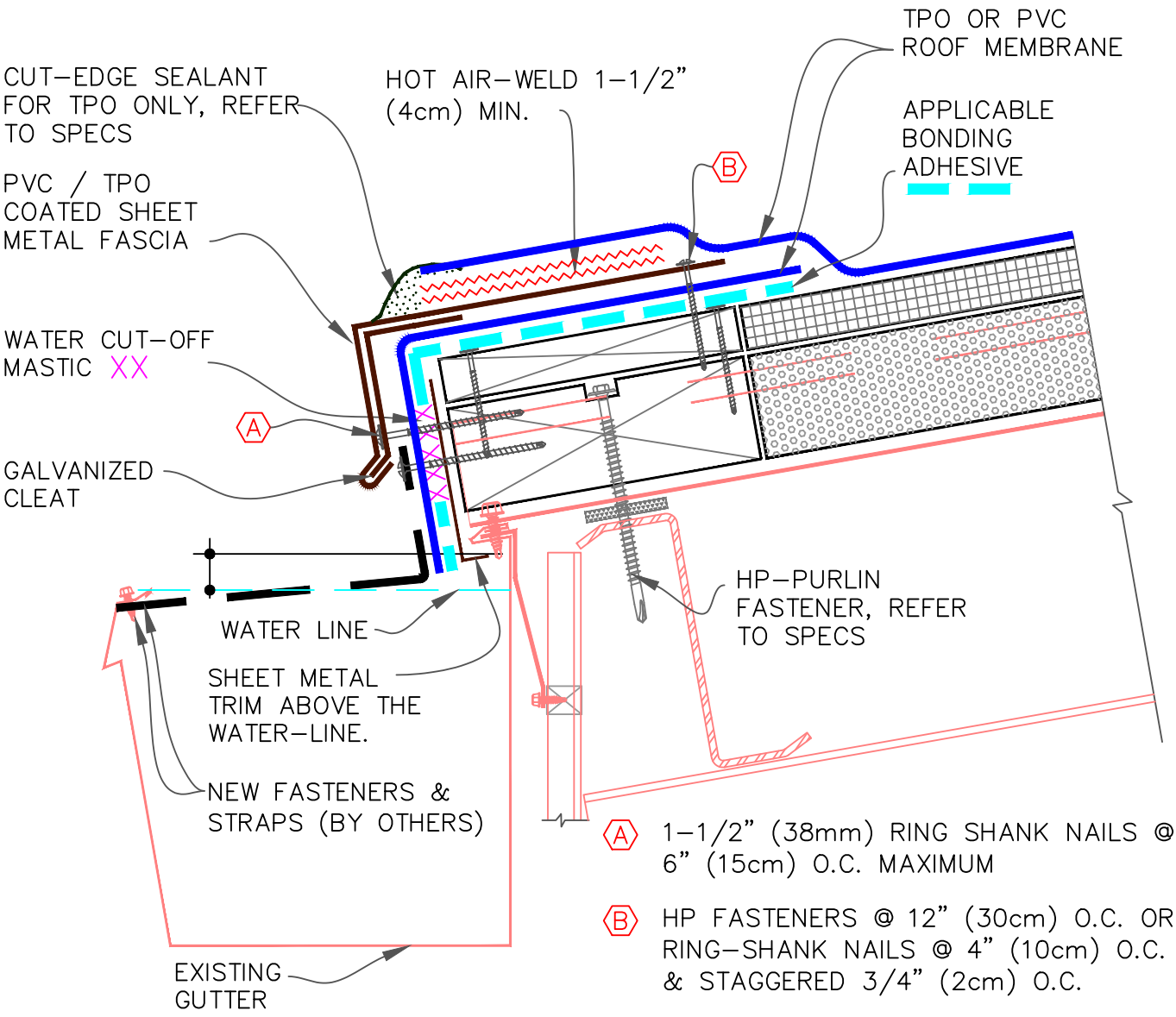
SHEET NO. MRI T1.6

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NOTE:

REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.





A 1-1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

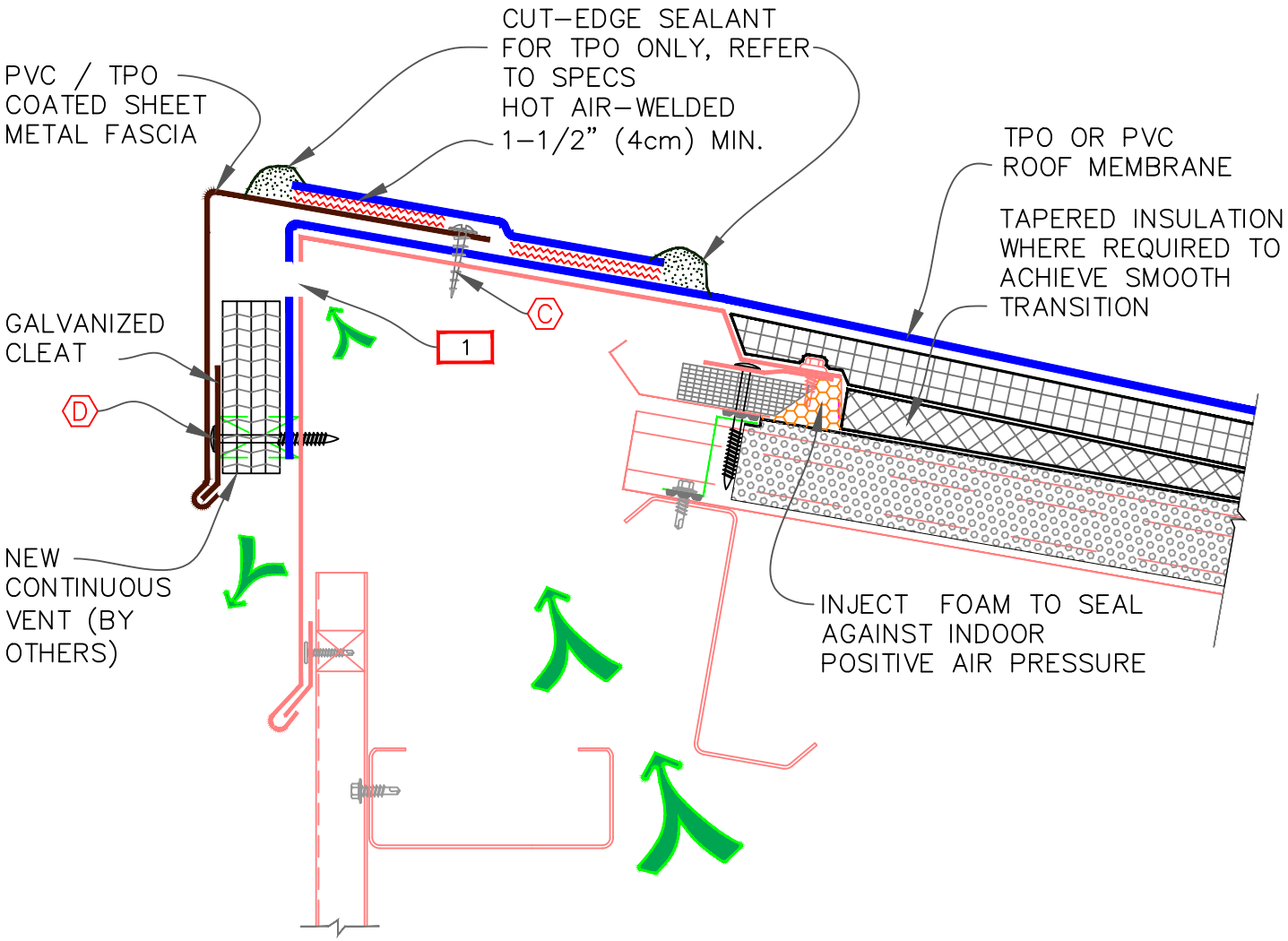
B HP FASTENERS @ 12" (30cm) O.C. OR RING-SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

GUTTER WITH STRAPS ANCHORED INTO STANDING SEAMS

POLYISOCYANURATE INSULATION
IN-FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 SEE DRAWING NOTE(S)

SHEET NO.
MRI T1.7

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NOTES:

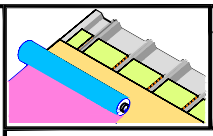
1. CUT HOLES IN EXISTING HIGH EAVE TRIM AT TOP TO REDIRECT VENTING. SPECIFIER TO CALCULATE THE VENT SIZES, FREQUENCY OF HOLES WITHOUT WEAKENING THE EXISTING SHEET METAL.
2. FOR ADDITIONAL INFORMATION REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

Ⓒ SHEET METAL SCREWS @ 6"(15cm) O.C., MAX., EXPOSED 3/4" (2cm) MIN. BEYOND EXISTING SHEET METAL SUBSTRATE

Ⓓ FASTENERS TO MATCH EXISTING @ 6" (15cm) O.C., MAX., EXPOSED 3/4" (2cm) MIN. BEYOND EXISTING SUBSTRATE

HIGH-END VENTED ROOF EDGE

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

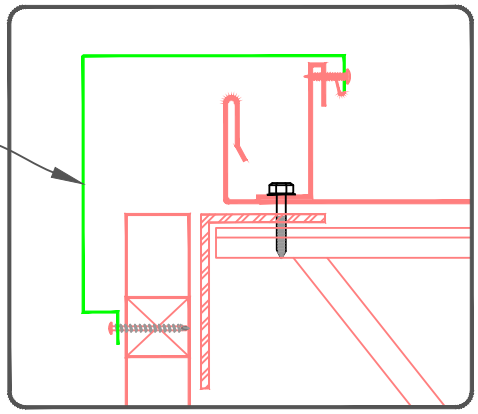


SHEET NO.
MR T1.8

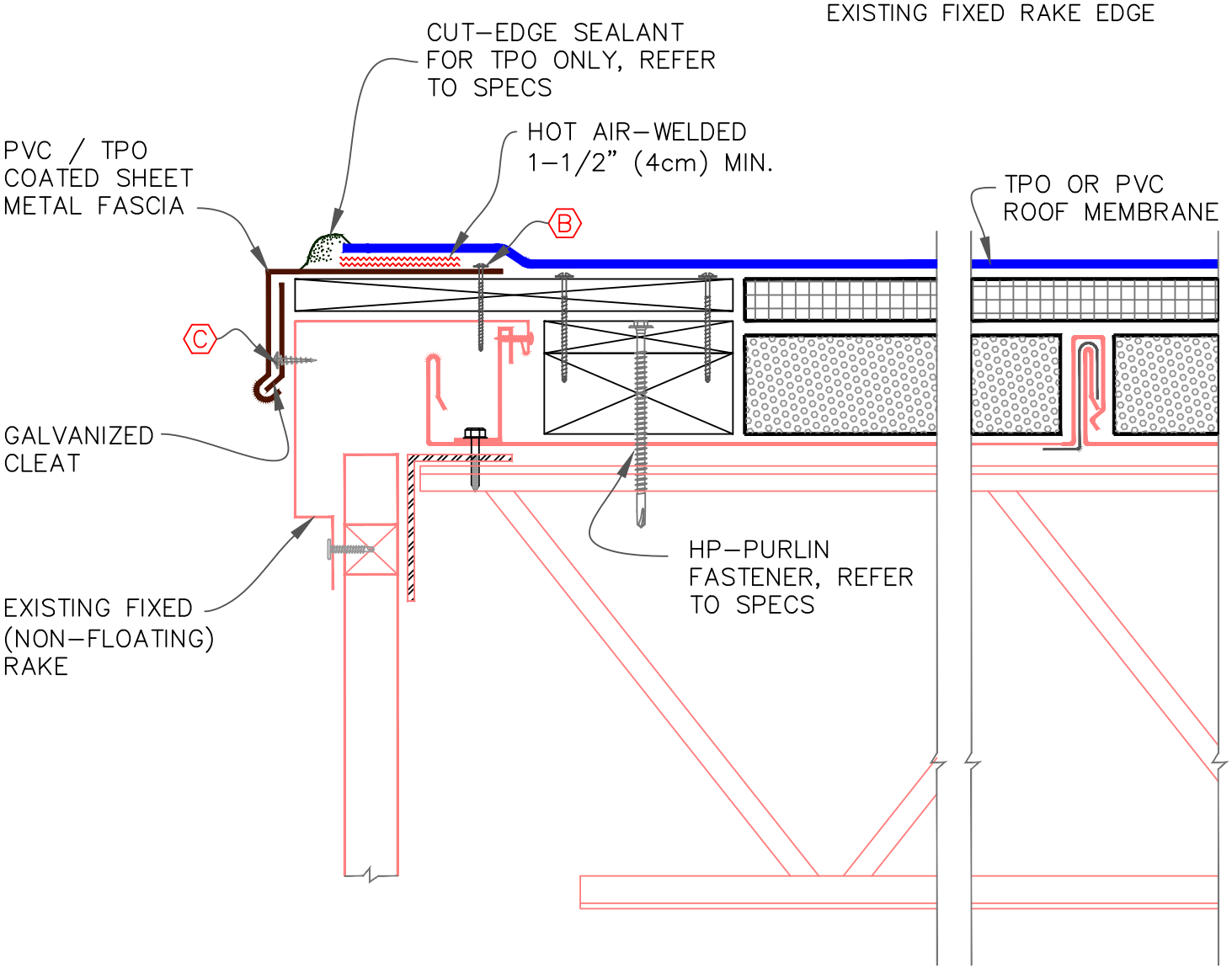
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NOTES:

1. FASCIA HORIZONTAL FLANGE MUST BE TOTALLY COVERED MINIMUM 2" (5cm) BEYOND THE NAIL.
2. REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.



EXISTING FIXED RAKE EDGE

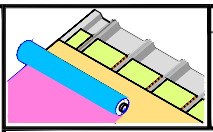


Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING-SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

Ⓒ SHEET METAL SCREWS @ 6"(15cm) O.C., MAX., EXPOSED 3/4" (2cm) MIN. BEYOND EXISTING SHEET METAL SUBSTRATE

RAKE EDGE

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

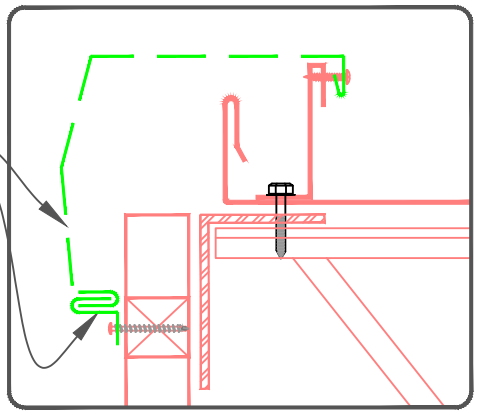


SHEET NO.
MRI T1.9

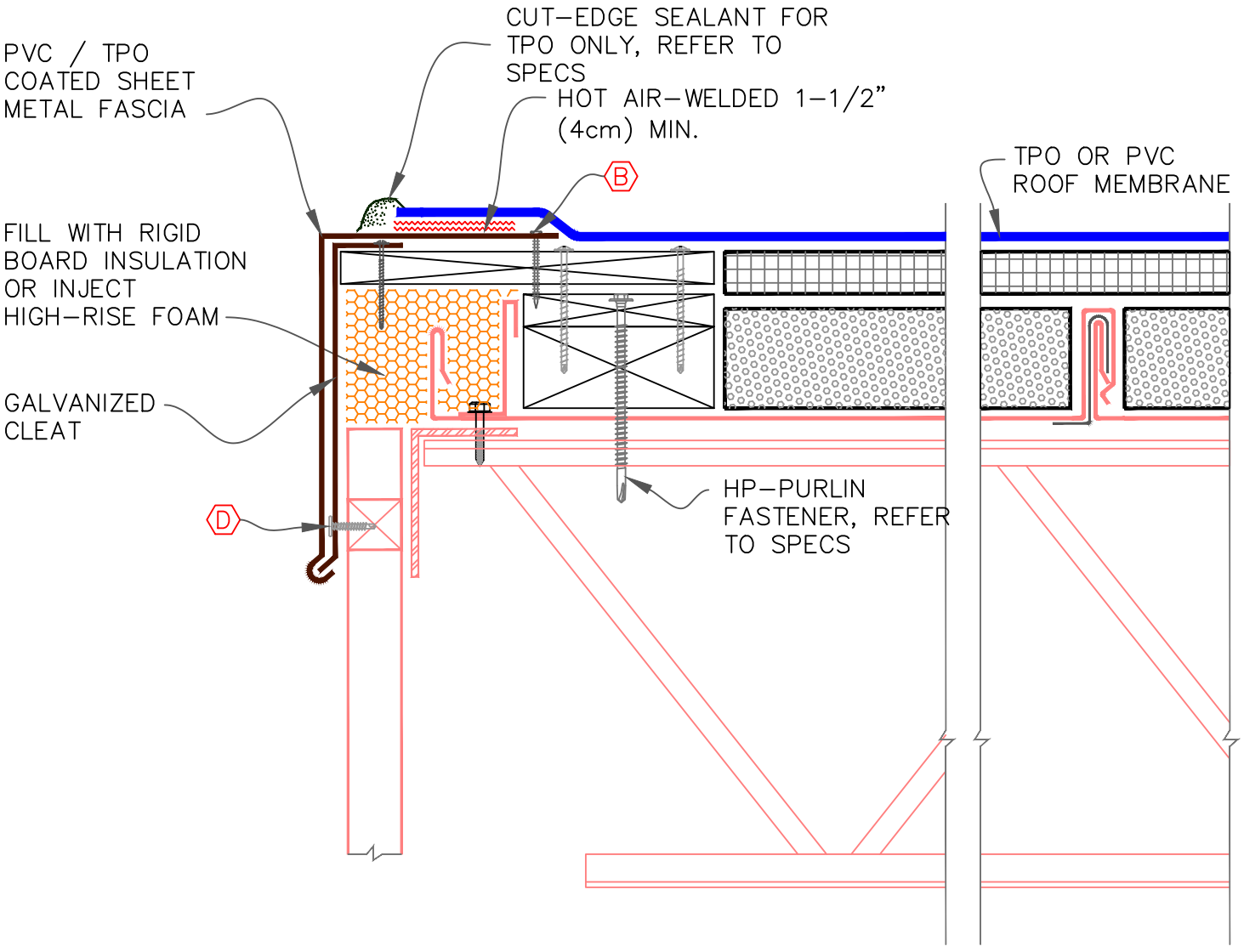
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NOTES:

1. FASCIA HORIZONTAL FLANGE MUST BE TOTALLY COVERED MINIMUM 2" (5cm) BEYOND THE NAIL.
2. REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.



EXISTING FLOATING RAKE EDGE

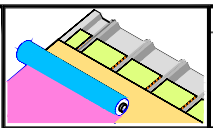


Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING-SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

Ⓓ FASTENERS TO MATCH EXISTING @ 6" (15cm) O.C., MAX., EXPOSED 3/4" (2cm) MIN. BEYOND EXISTING SUBSTRATE

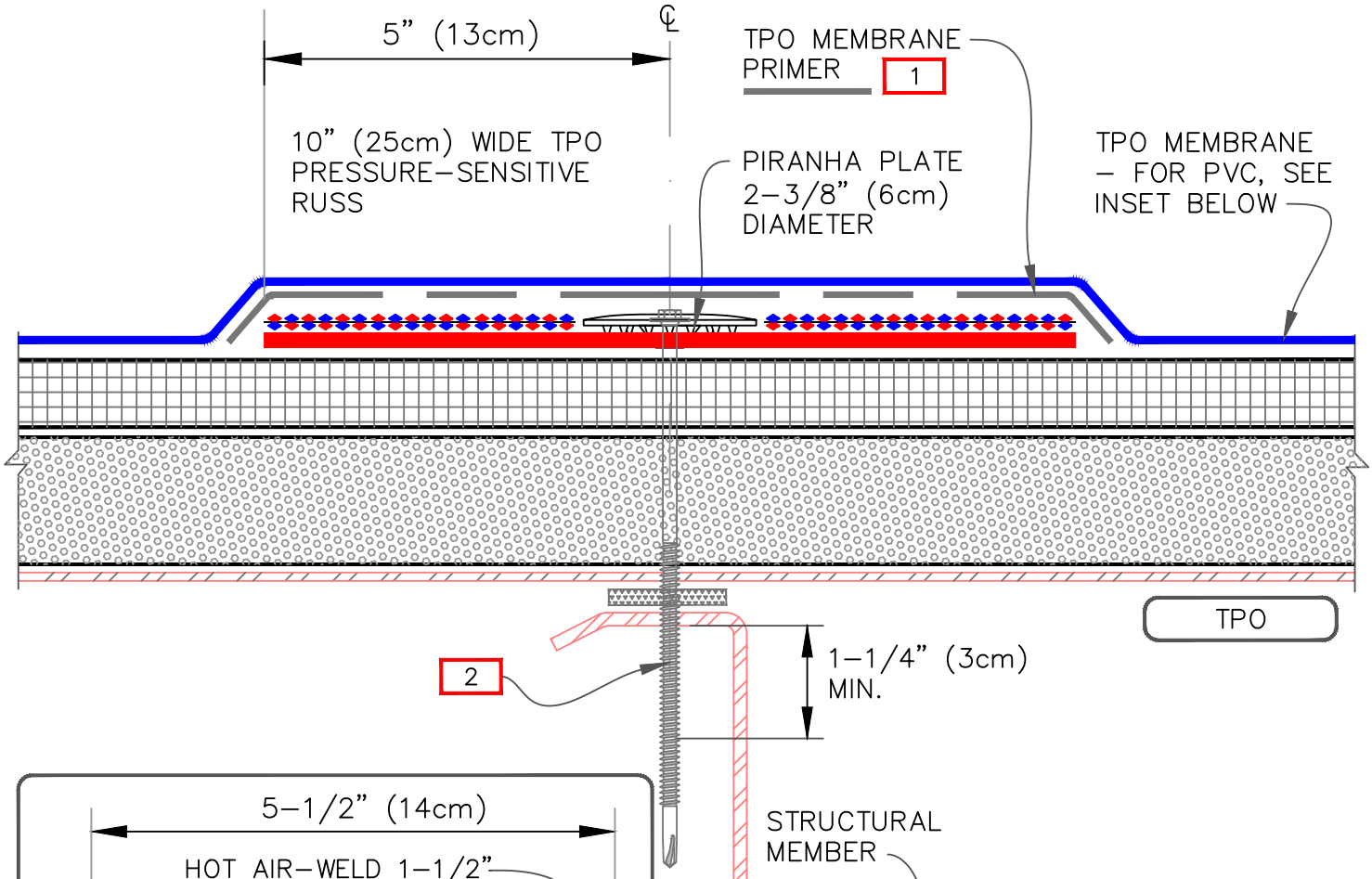
RAKE EDGE

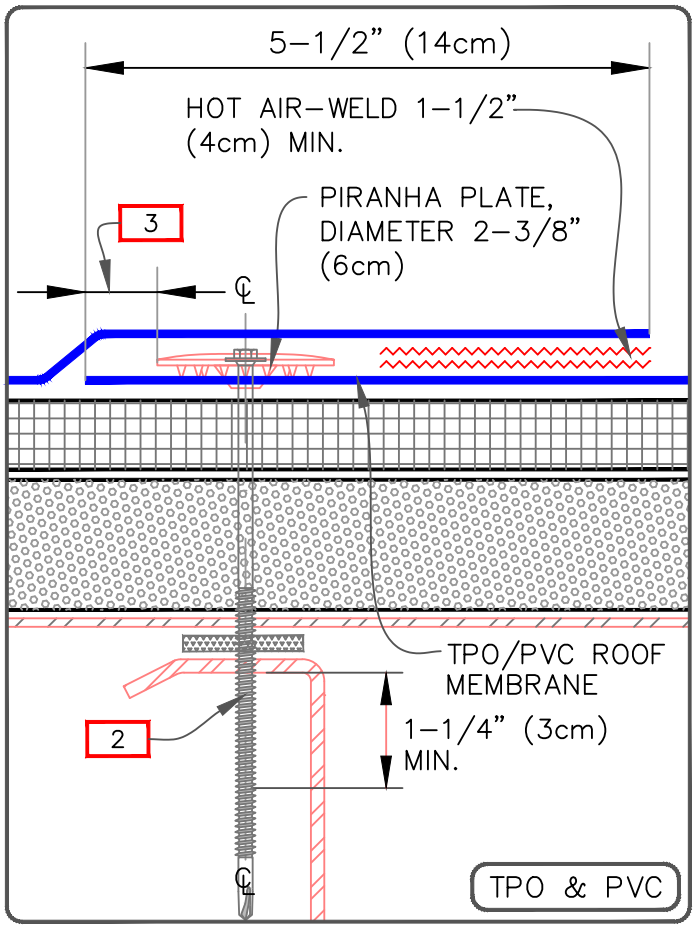
- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO. MRIT1.10

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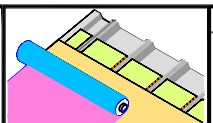


NOTES:

1. TPO MEMBRANE PRIMER MUST BE APPLIED ON THE BACK SIDE OF TPO MEMBRANE, PRIOR TO ADHERING THE MEMBRANE TO PRESSURE-SENSITIVE RUSS.
2. HP-PURLIN FASTENER MAX. 12" (30cm) O.C.
3. 1/2" (1.5cm) MIN.

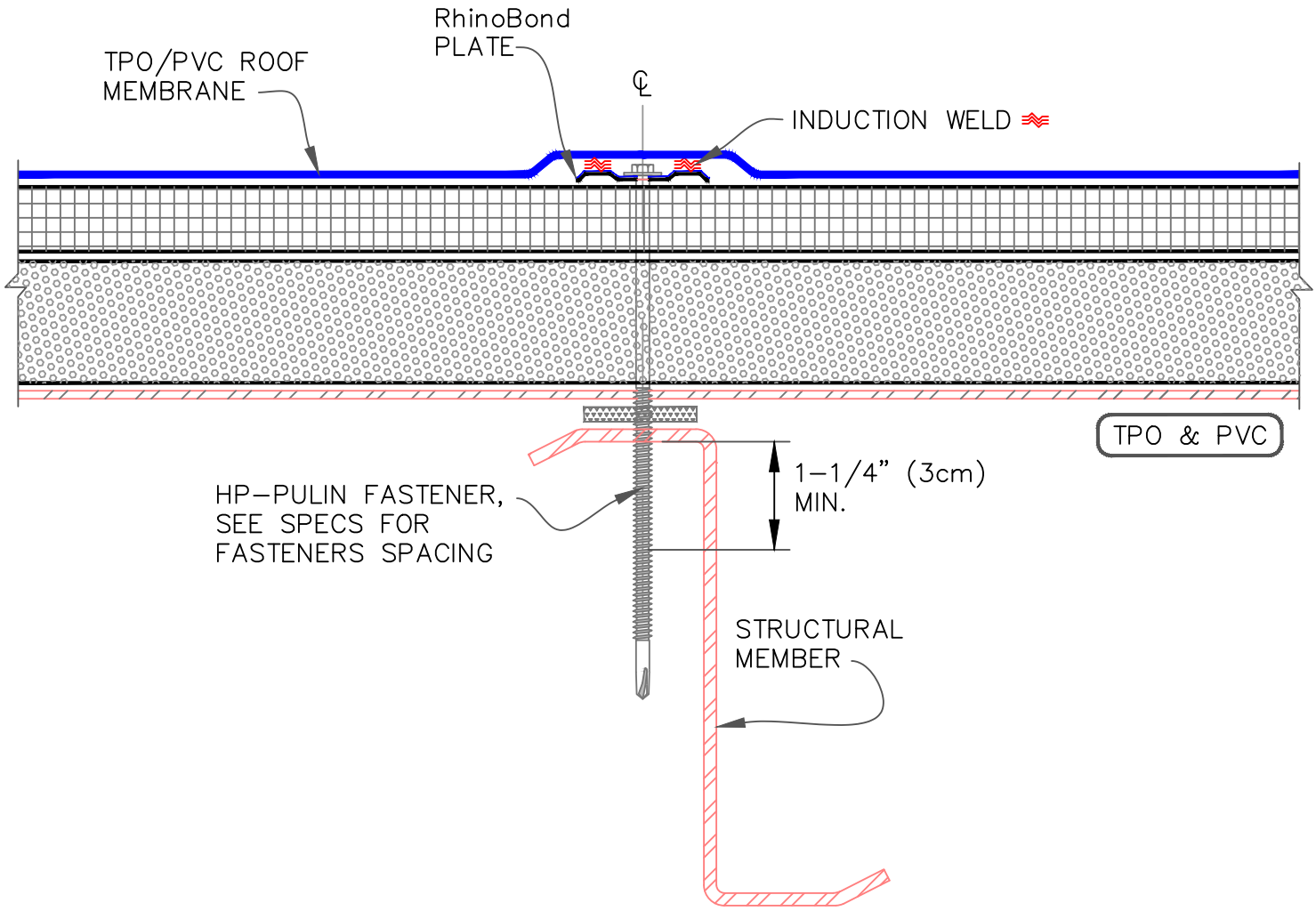
MEMBRANE ATTACHMENT

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO.
MRI T2.1

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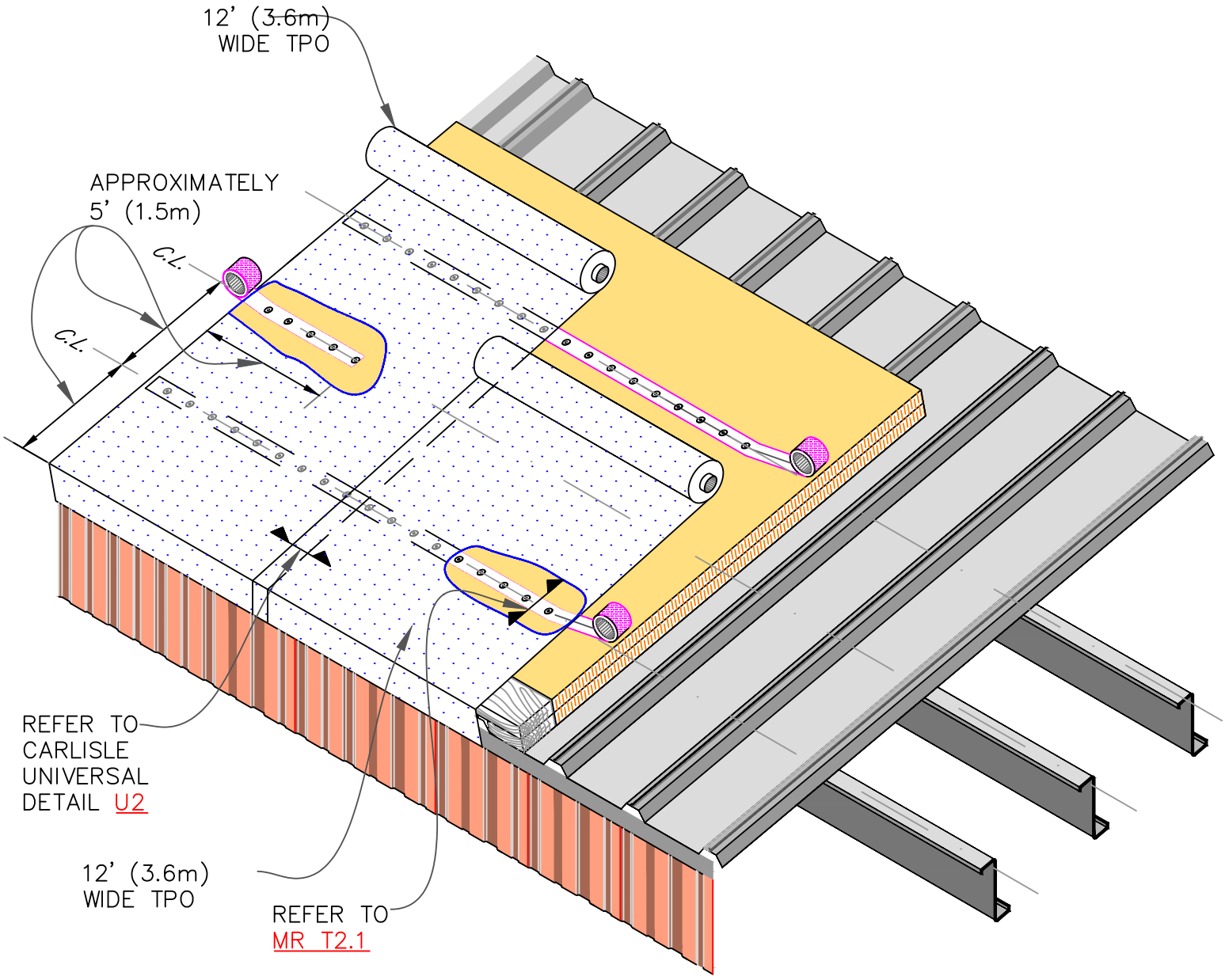


MEMBRANE ATTACHMENT – RhinoBond ASSEMBLY

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

SHEET NO.
MRI T2.2

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NOTE:

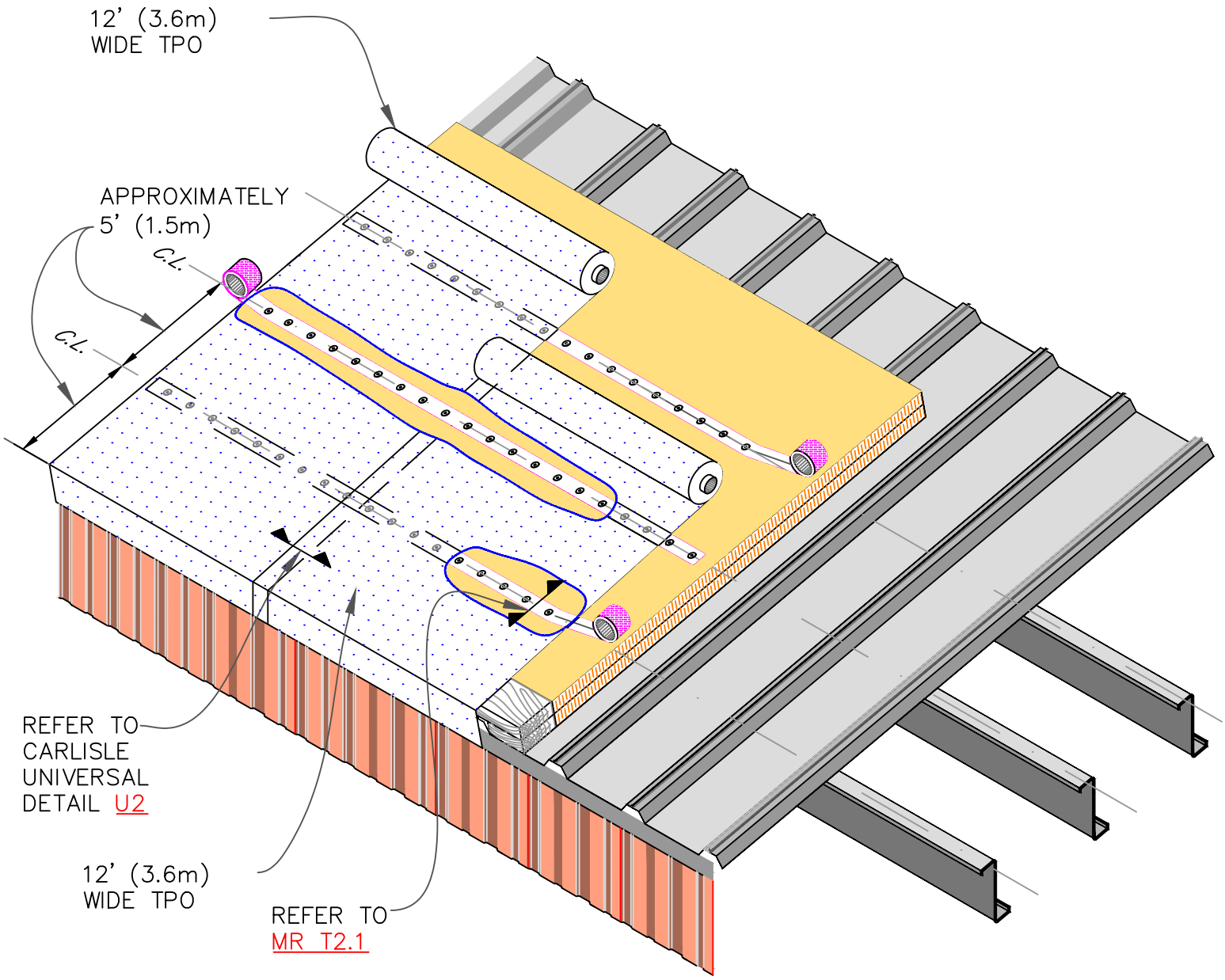
MEMBRANE SHEETS MAY BE INSTALLED PERPENDICULAR TO SLOPE. SEE DETAILS T2.6 & T2.7

MEMBRANE ATTACHMENT PARALLEL TO SLOPE – UP TO 100 MPH WIND ZONE

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

SHEET NO.
MRI T2.3

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NOTE:

MEMBRANE SHEETS MAY BE INSTALLED PERPENDICULAR TO SLOPE. SEE DETAILS T2.6 & T2.7

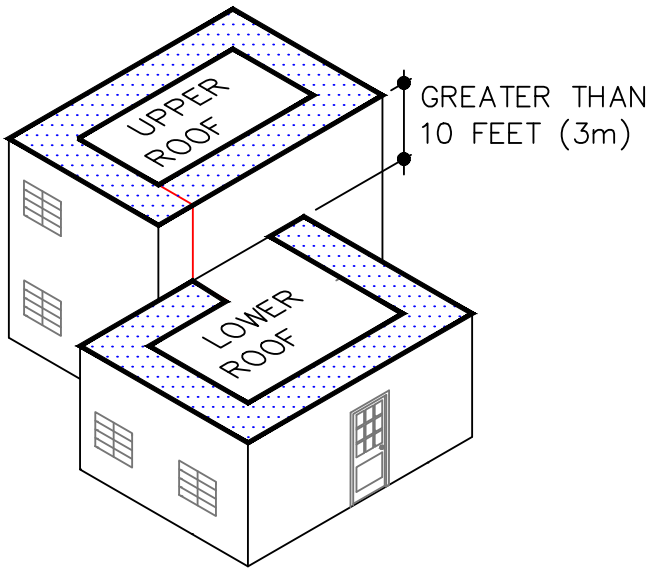
MEMBRANE ATTACHMENT PARALLEL TO SLOPE – 101 TO 120 MPH WIND ZONE

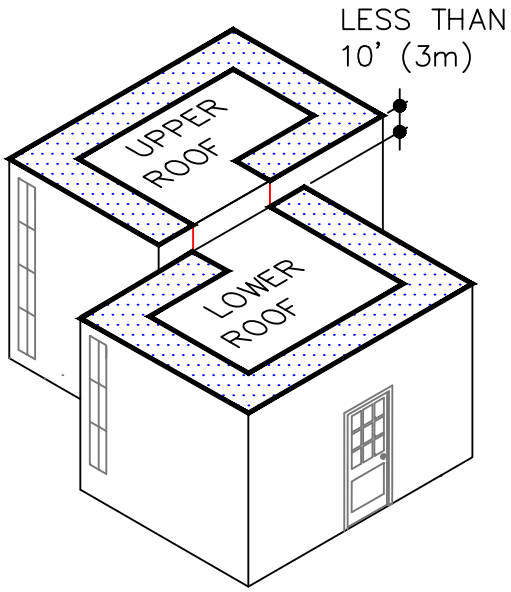
- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

SHEET NO.
MRI T2.4

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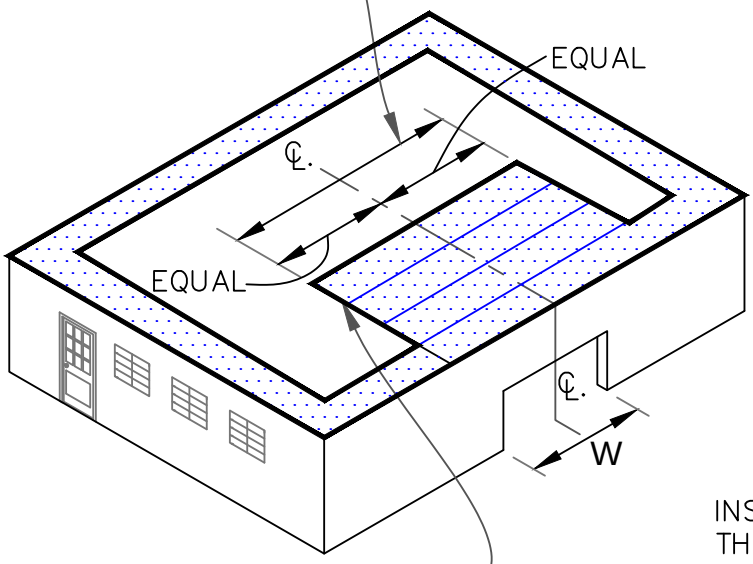
GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY FASTENED ROOF SYSTEM



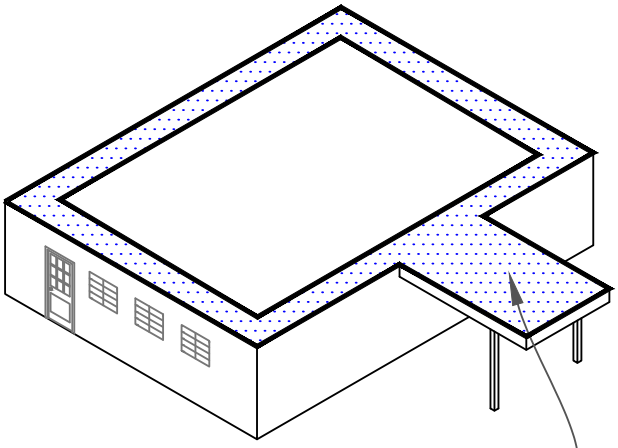


PERIMETER ZONES

WIDTH (W) X 1.5



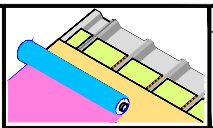
FOUR PERIMETER SHEETS CENTERED OVER LARGE OPENINGS.



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG EXTENDING ONTO THE MAIN ROOF

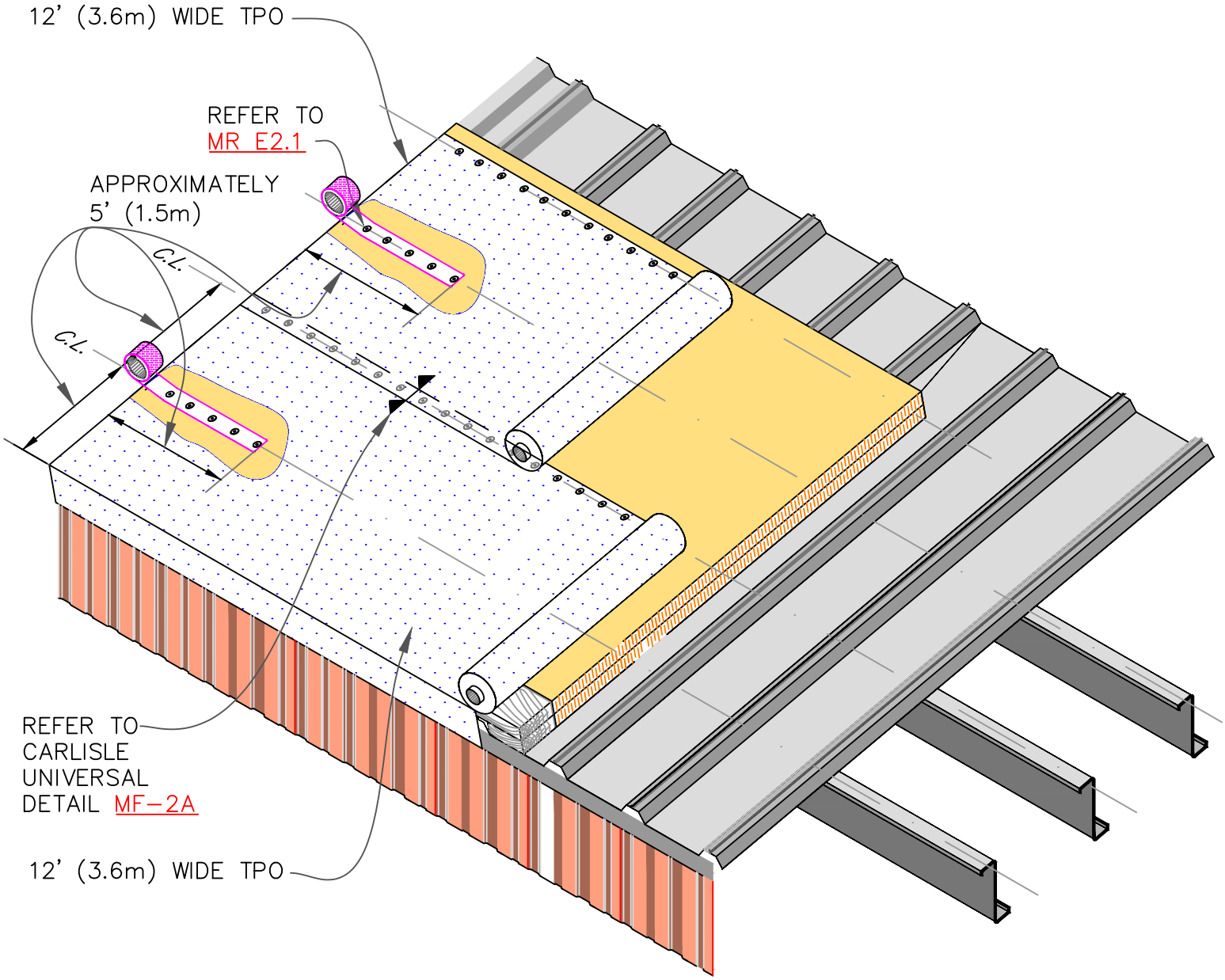
ROOF PERIMETER ZONES

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO.
MRI T2.5

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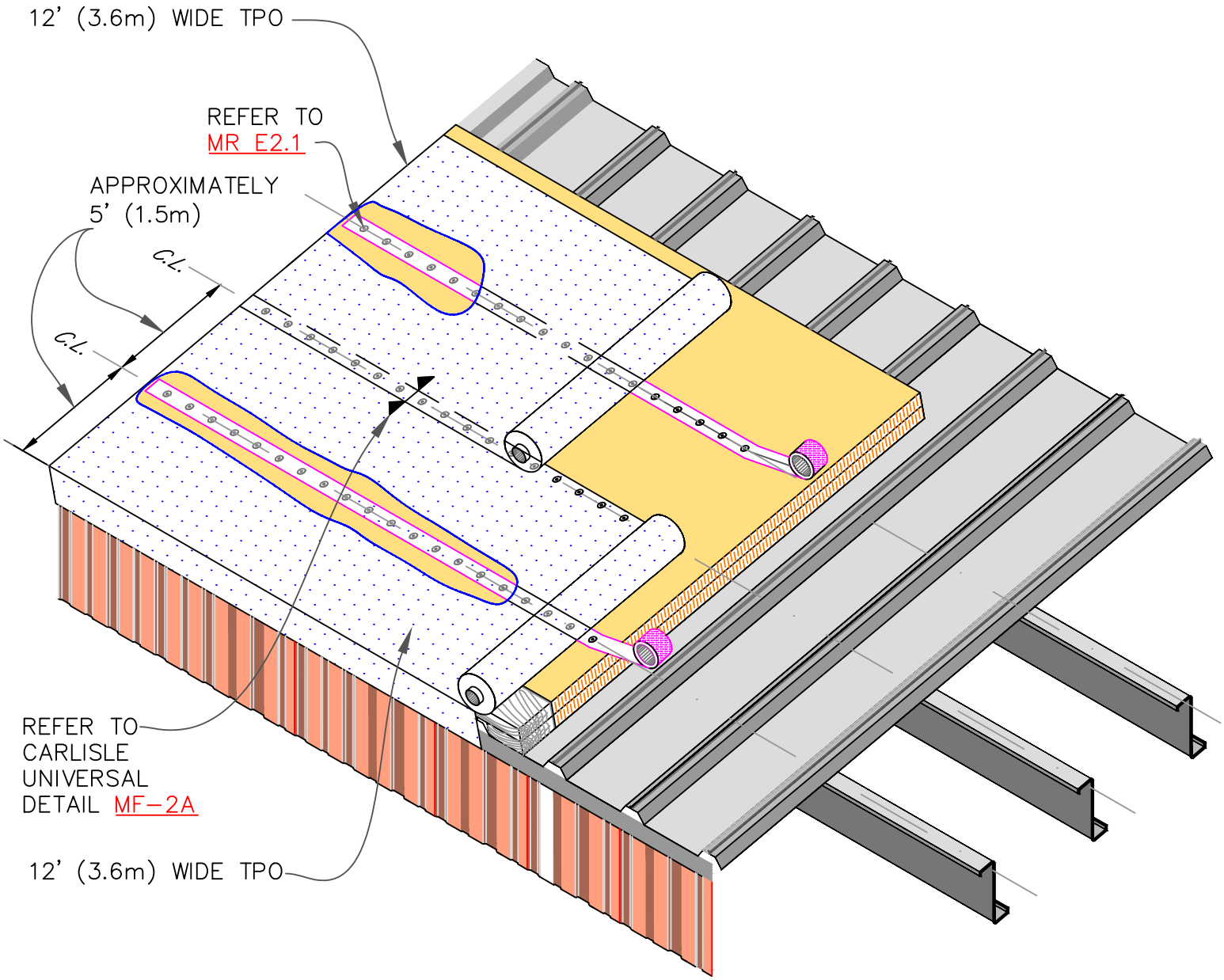


MEMBRANE ATTACHMENT PERPENDICULAR TO SLOPE – UP TO 100 MPH WIND ZONE

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

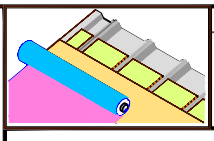
SHEET NO.
MRI T2.6

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MEMBRANE ATTACHMENT PERPENDICULAR TO SLOPE – 101 TO 120 MPH WIND ZONE

- POLYISOCYANURATE INSULATION
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

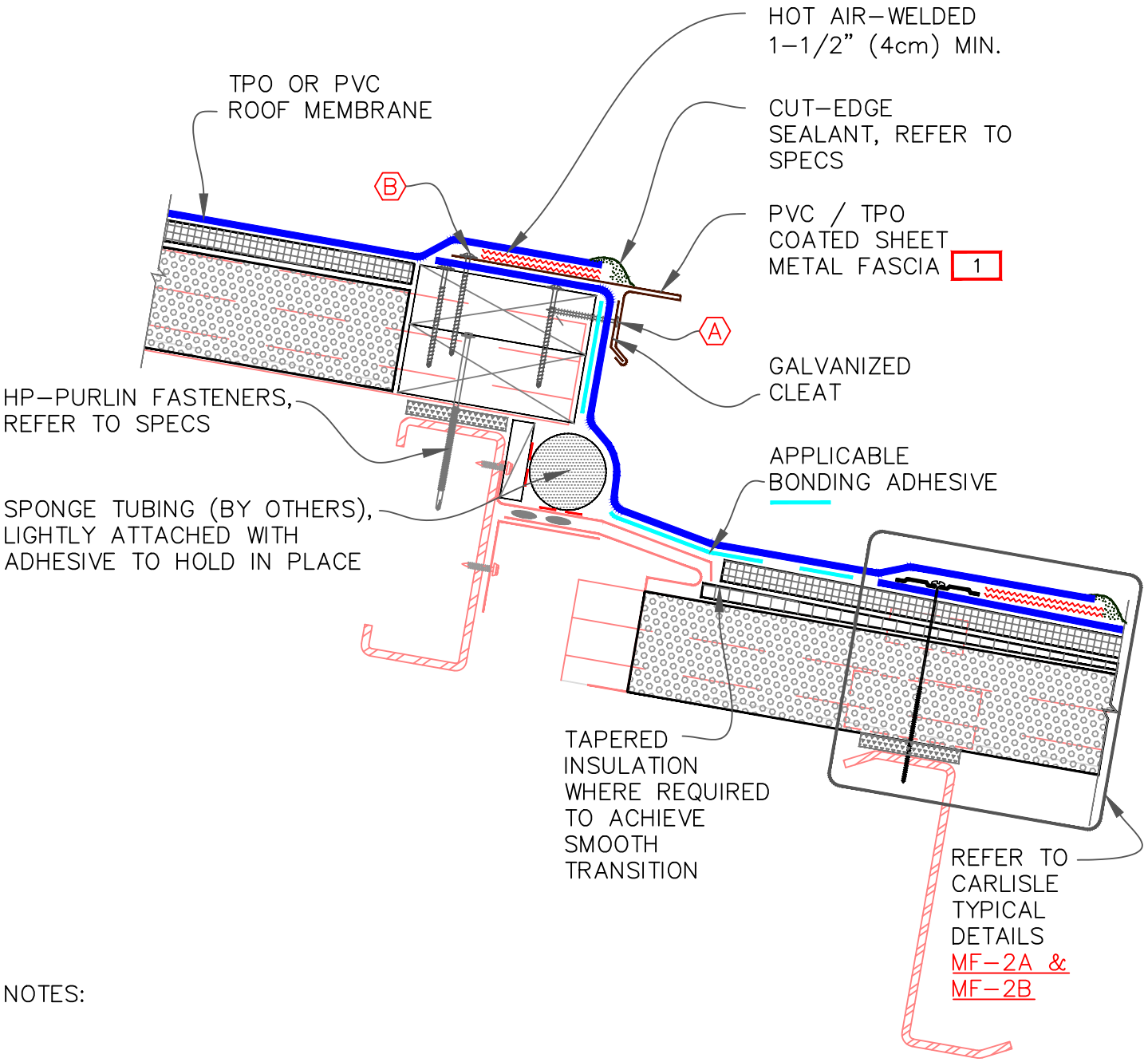


SHEET NO.
MRI T2.7

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Ⓐ 1–1/2" (38mm) RING SHANK NAILS @ 6" (15cm) O.C. MAXIMUM

Ⓑ HP FASTENERS @ 12" (30cm) O.C. OR RING–SHANK NAILS @ 4" (10cm) O.C. & STAGGERED 3/4" (2cm) O.C.

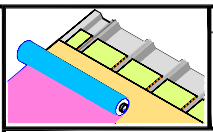


NOTES:

1. EXTEND OUT SHEET METAL MIN. 2" (5cm)
2. REFER TO MR Z1.1 & MR Z1.2 AT THE END OF THIS SECTION.

EXPANSION JOINT AT STEP DOWN CONDITION

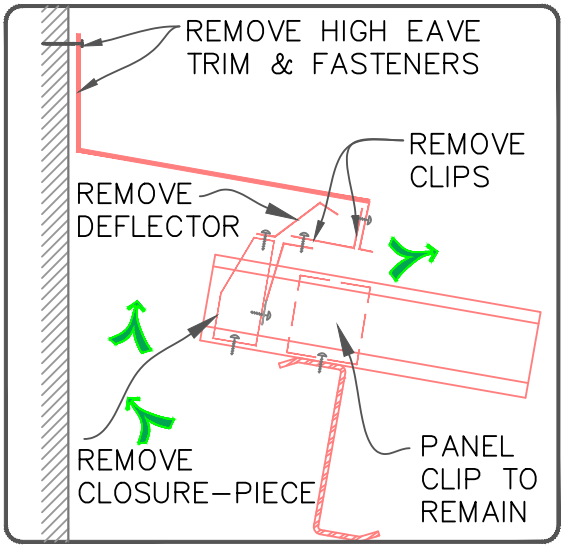
POLYISOCYANURATE INSULATION
IN–FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 SEE DRAWING NOTE(S)



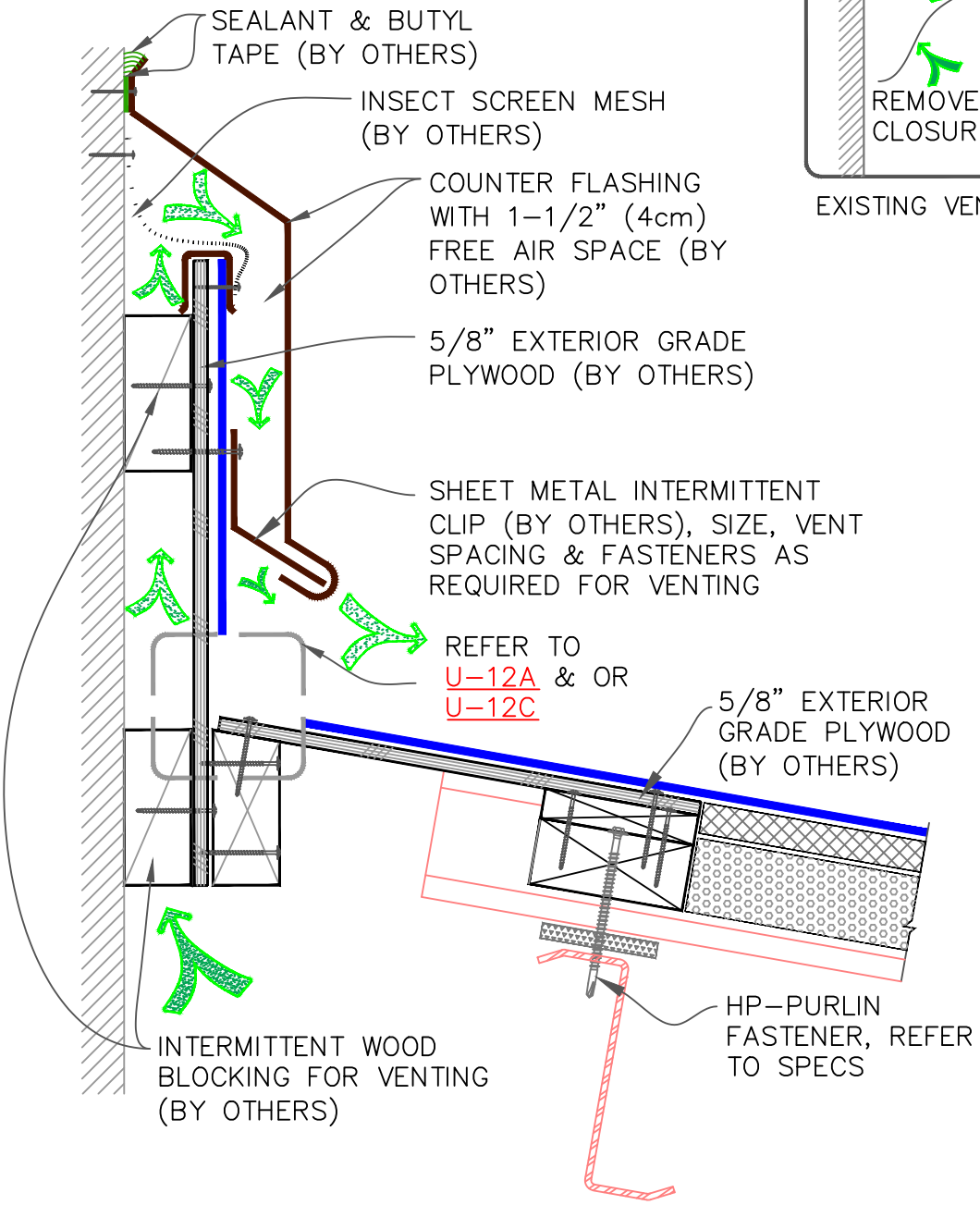
SHEET NO. MRI T3.1

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CAUTION: CONSULT WITH PROJECT DESIGNER OR STRUCTURAL ENGINEER FOR ADEQUATE SECUREMENT OF PLYWOOD AND REQUIRED VENTILATION.



EXISTING VENTING AT RISING WALL

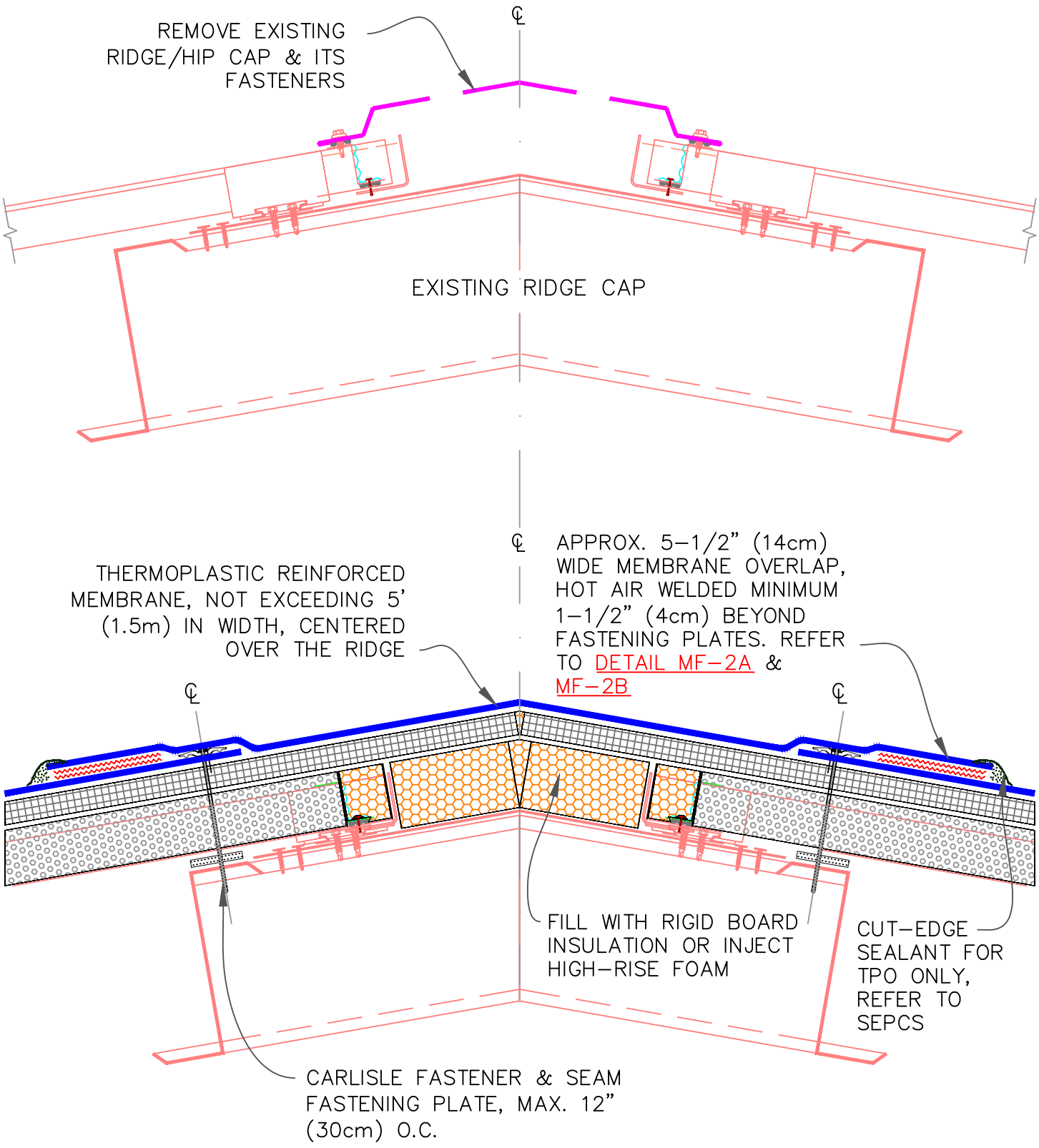


VERTICAL WALL – VENTED BASE DETAIL

POLYISOCYANURATE INSULATION
IN–FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 — SEE DRAWING NOTE(S)

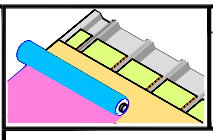
SHEET NO. MR|T12.1

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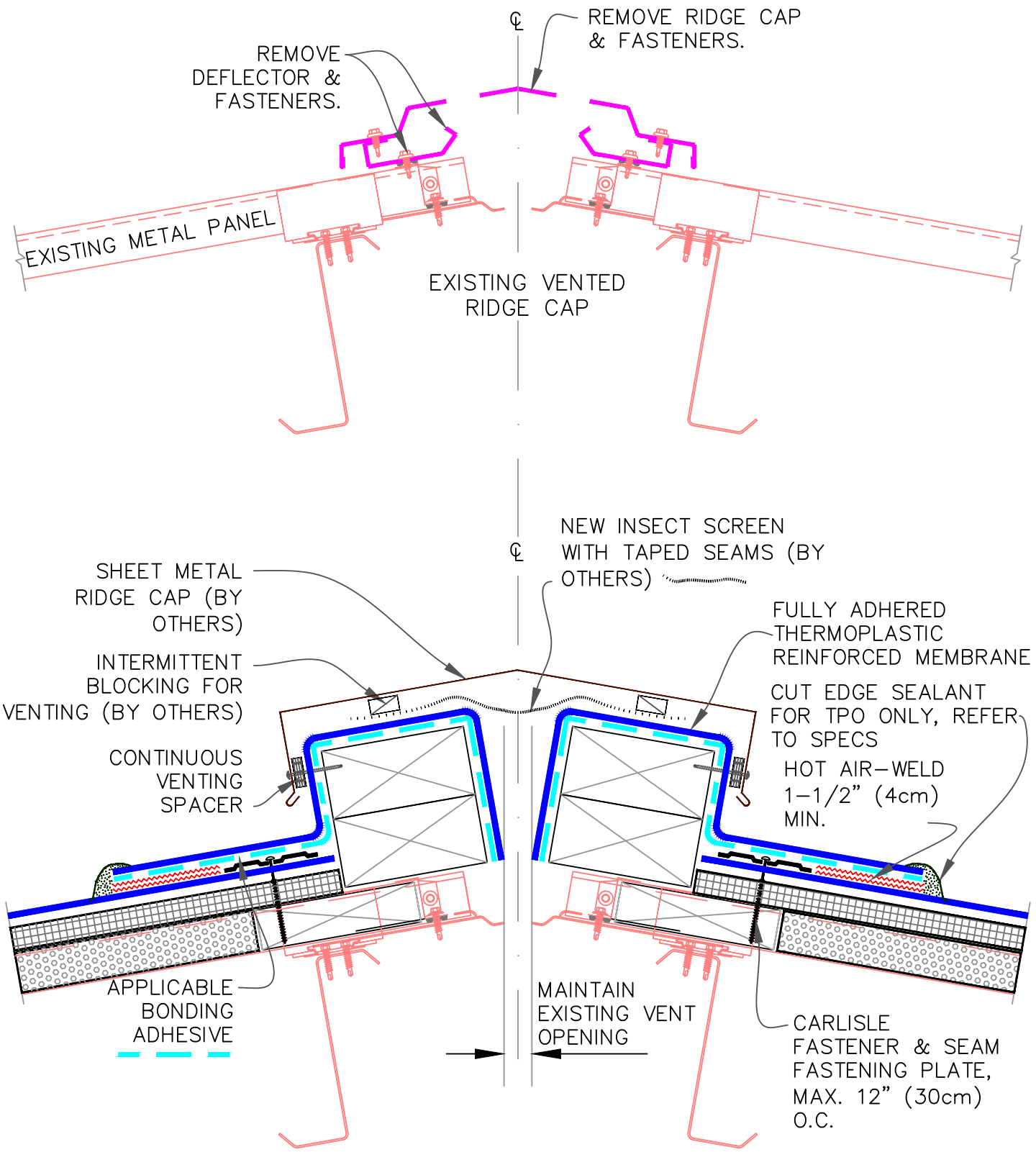
ROOF RIDGE / HIP NON–VENTED

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



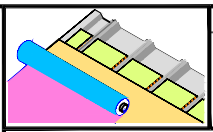
SHEET NO.
MRIT22.1

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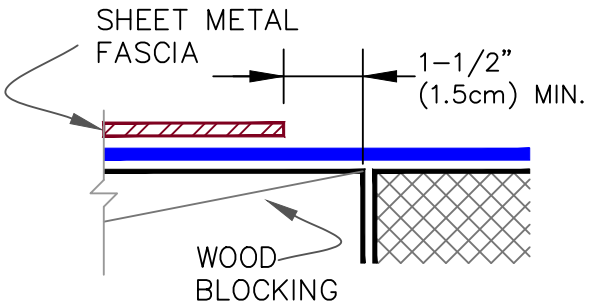
ROOF RIDGE VENTED

- POLYISOCYANURATE INSULATION
- IN–FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)

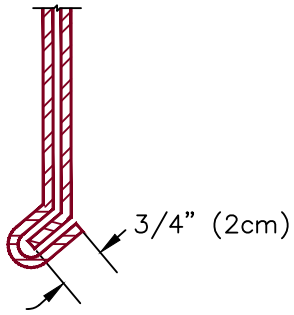


SHEET NO.
MRIT22.2

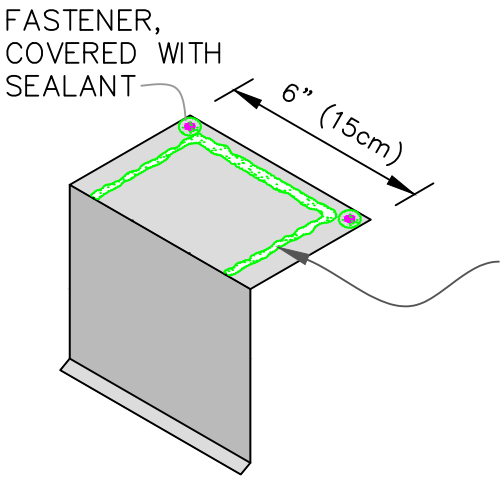
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1 WOOD BLOCKING



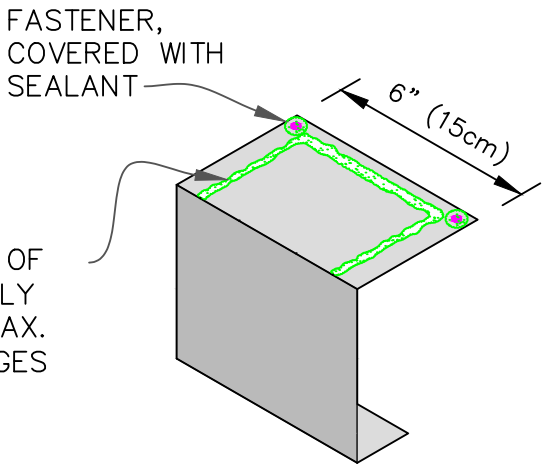
2 DRIP EDGE



3/8" (1cm) DIA. BEAD OF CONTINUOUS SINGLE-PLY UNIVERSAL SEALANT, MAX. 1/2" (1.5cm) FROM EDGES

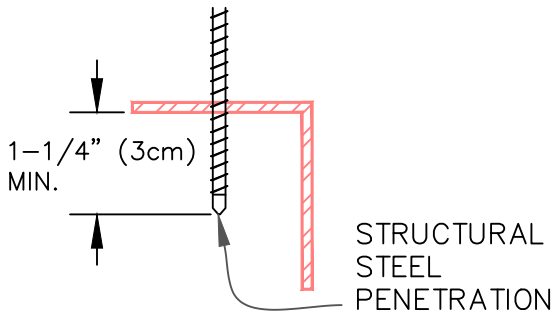
6" (15cm) WIDE CONCEALED JOINT UNDER PLATE, CENTRALLY ALIGNED BETWEEN TWO FASCIA PIECES

3 UNDER PLATE - TYP. FASCIA

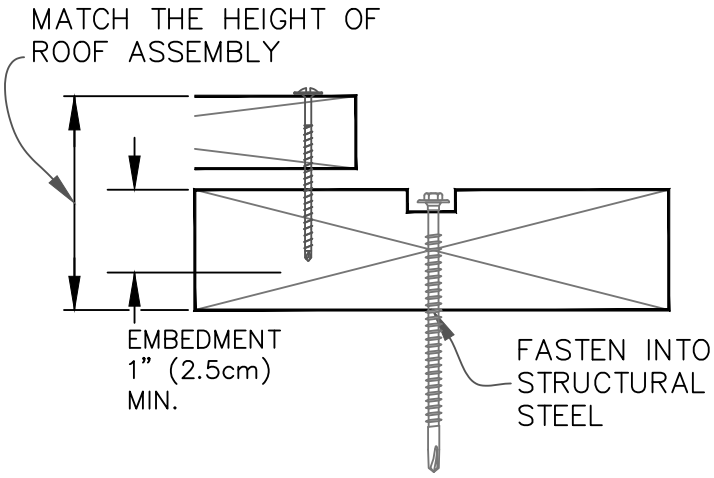


6" (15cm) WIDE, 24 GAUGE, CONCEALED JOINT UNDER PLATE, PROFILE TO MATCH WITH C-CHANNEL, CENTRALLY ALIGNED BETWEEN TWO C-CHANNEL FASCIAS

4 UNDER PLATE: C-CHANNEL



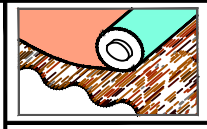
5 FASTENER INTO STRUCTURAL STEEL



6 FASTENER INTO WOOD

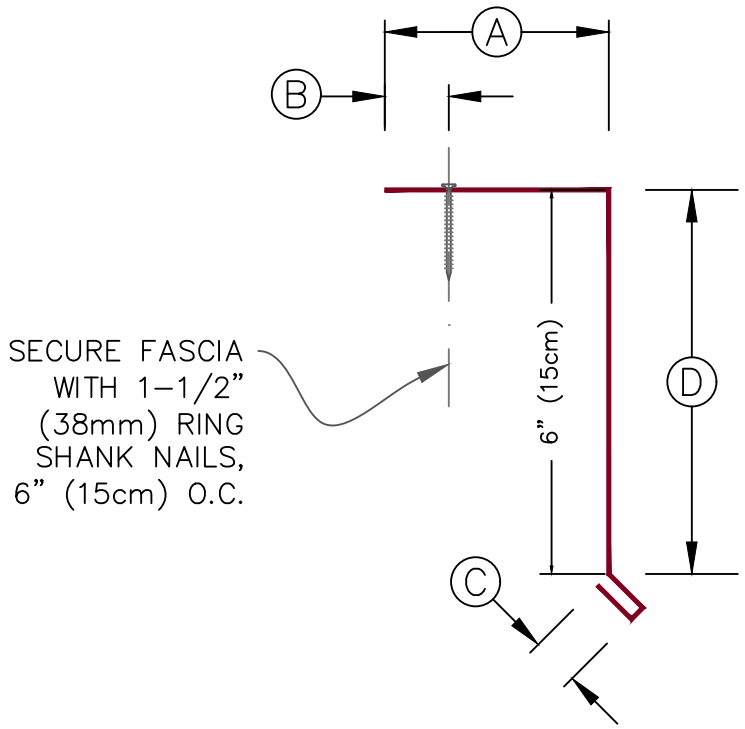
ENLARGED DETAILS

- HIGH DENSITY RECOVER BOARD
- IN-FILL INSULATION
- ROOF MEMBRANE
- WOOD NAILER (BY OTHERS)
- 0 — SEE DRAWING NOTE(S)



SHEET NO.
MRI Z1.1

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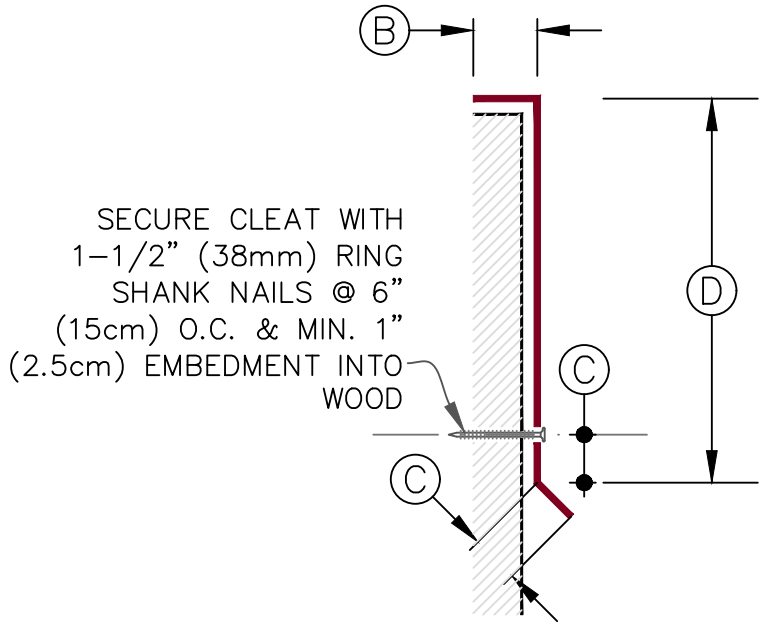


DIMENSIONS		cm
A	3–1/2"	3
B	1"	2.5
C	3/4	2
D	4" OR 6"	10 OR 15

NOTE:
ALL 1–1/2" (38mm) RING SHANK NAILS MUST HAVE 1" (2.5cm) MINIMUM EMBEDMENT INTO WOOD

A ES–1 COMPLIANT FASCIA PROFILE

24 GAUGE (0.59 mm) THICK – 10' (3m) LENGTH



B GALVANIZED METAL CLEAT

22 GAUGE (0.75 mm) THICK

TABLE 1: (TEST DATA)		
ES–1	COMPLIANT	
RE–1	424	PSF (POUNDS/SQUARE FOOT)
	62.62	(kilogram/sq.meter)
	614	pascals (Pa)
RE–2	435	PSF (POUNDS/SQUARE FOOT)
	64.24	(kilogram/sq.meter)
	629.95	pascals (Pa)

ANSI / SPRI ES–1 COMPLIANT FASCIA – SHOP FABRICATED

HIGH DENSITY RECOVER BOARD
IN–FILL INSULATION
ROOF MEMBRANE
WOOD NAILER (BY OTHERS)
0 SEE DRAWING NOTE(S)



SHEET NO.
MRI Z1.2

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