CARLISLE®

SYNTEC SYSTEMS

SPECIFICATIONS AND DETAILS

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INDEX

July 2024

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Sure-Seal®/Sure-White®/Sure-Tough™ EPDM Roofing Systems
Adhered, Ballasted and Mechanically Fastened

Sure-Seal® EPDM Roofing Systems

Sure-Tough™ EPDM Roofing Systems

Sure Weld®
Mechanically Fastened and Adhered Roofing Systems

Sure-Weld® TPO Roofing Systems

Sure-Flex™
Mechanically Fastened and Adhered Roofing Systems

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Adhered and Mechanically Fastened Roofing System
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INSTRUCTIONS FOR NAVIGATING THE CARLISLE DIGITAL BINDER

1. All Carlisle roof membrane specifications and associated details as well as all Specification Supplements and Design References are located in this digital binder.

2. The complete digital binder contains bookmarks for the main index, Membrane Specification / Details, Spec Supplements and Design References.

3. All Table of Contents are linked as well and can be used to quickly navigate to the page needed. Digital tabs can be utilized by clicking on any Table of Contents Item at the beginning of each section. Clicking on a “tab” will take the reader directly to the section.

4. All references within each specification section which refers to a Spec Supplement, Design Reference or Detail is also linked in **“light blue”** throughout the document.

5. Click on the **“light blue”** text for direct access to specific highlighted sections or details.

6. To access the binder’s bookmarks, open the Thumbnail and Bookmark Navigation Pane in your pdf viewer. Each section of the specification as well as associated details will be listed in the Bookmarks pane. Click the section needed to access that page.

Sure-Seal® EPDM Roofing Systems

Sure-Tough™ EPDM Roofing Systems

Sure-Seal®/Sure-White®/Sure-Tough™ EPDM Roofing Systems
Adhered, Ballasted and Mechanically Fastened

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Note: In addition to information listed in this section Specifiers and Authorized applicators should reference Spec Supplement and Design Reference Sections for other pertinent information.

CARLISLE SYNTEC SYSTEMS

Sure-Seal® EPDM Roofing Systems

Sure-Tough™ EPDM Roofing Systems

Sure-Seal®/Sure-White®/Sure-Tough™ EPDM Roofing Systems Adhered, Ballasted and Mechanically Fastened

July 2024

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 Design "A" Adhered, Design "B" Ballasted and Reinforced Mechanically Fastened EPDM Membrane Roofing Systems. 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.

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

PART I - GENERAL

1.01 Description

A. **The Design "A" Adhered Roofing System** incorporates **Sure-Seal (black) 60- or 90- mil thick non-reinforced or Sure-Seal (gray) 60-mil thick non-reinforced or Sure-White (white**) **60- or 90-mil thick non-reinforced or Sure-White (white) 60-mil thick reinforced or 45-, 60- or 75-mil Sure-Tough™ reinforced** EPDM membrane. An acceptable insulation is mechanically fastened to the roof deck or adhered with Carlisle supplied urethane-based insulation adhesive or hot asphalt and the EPDM membrane is fully adhered to the insulation with Carlisle EPDM Bonding Adhesive (Sure-Seal Bonding Adhesive, Low-VOC Bonding Adhesive, Water Based Bonding Adhesive and CAV-GRIP III Bonding Adhesive). Adjoining sheets of EPDM membrane are spliced together using 3" or 6" wide SecurTAPE™ and Primer OR Factory-Applied TAPE (FAT™) and Primer. There are no maximum slope restrictions for the application of this roofing system.

Note: When non-reinforced EPDM membrane is used, Carlisle recommends a minimum of 60-mil thick material. Sure-Seal FR 45-mil non-reinforced EPDM may be utilized when specified or required by the owner or owner's representative.

Water based adhesive may be used for projects with 20 year maximum warranty and wind speed coverage up to 72 mph.

B. **The Design "B" Loose Laid Ballasted Roofing System** incorporates minimum **45-mil thick Sure-Seal (black) non-reinforced or minimum 60-mil Sure-Tough reinforced EPDM membrane**. Both the EPDM membrane and an acceptable membrane underlayment or insulation are loose laid over the substrate and held in place with a minimum of 10 pounds of ballast per square foot depending upon wind load requirements. Adjoining sheets of EPDM membrane are spliced together using 3" or 6" wide SecurTAPE and Primer OR Factory-Applied TAPE (FAT) and Primer. The maximum roof slope for this roofing system is 2" to one horizontal foot.

C. **The Mechanically Fastened Roofing System** incorporates **45-, 60- or 75-mil Sure-Tough or 60-mil Sure-White (white-on-black) reinforced EPDM membrane**. An acceptable insulation is mechanically fastened to the roof deck

and, depending on project criteria; the reinforced membrane is mechanically fastened with the appropriate Carlisle Fastener and 2" or 2-3/8" diameter Fastening Plates (Polymer Seam Plates required over steel deck) or Fastening Bars at 6" minimum to 12" maximum along the center of the membrane splice.

Adjoining sheets of EPDM membrane are spliced together using 6" Factory-Applied TAPE (FAT) and Primer OR 6" SecurTAPE and Primer. Field membrane sheets are either 5', 6.5', 8' or 10' wide depending upon wind load requirements, building height and type of roof deck. At the roof perimeter, a heavier fastening density is required utilizing 5', 6.5' wide sheets or 9" wide Pressure-Sensitive RUSS (Reinforced Universal Securement Strip). The maximum roof slope for this roofing system is 18" in one horizontal foot.

This roofing system can also be specified over an existing standing seam, flat seam or corrugated metal roof with the membrane secured to the structural purlins. Refer to the Metal Retrofit System Specification and Details.

NOTE: The selection of various components (i.e. insulation, underlayment, membrane thickness, etc.) may vary depending on desired Warranty coverage. Refer to appropriate Warranty Tables listed in Paragraph 1.05.

Assemblies with membrane fasteners 12" or longer must be submitted for Carlisle's review to ensure adequate securement due to the possibility of increased dynamic fastener movement. Such assemblies when accepted may require the use of additional insulation fasteners and the use of 1/2" SecurShield™ HD Recover Board.

1.02 General Design Considerations

A. Projects where wind speed coverage greater than 55 mph is specified or those with a 20-year or longer Total System Warranty will require additional enhancements beyond those outlined in this section. Prior to installation, refer to Warranty Tables in Paragraph 1.05.

B. Petroleum based products; certain chemicals and waste products (i.e., grease, oil, animal fats, etc.) are not compatible with these roofing systems. Carlisle should be contacted for verification of compatibility and recommendations concerning an acceptable roofing assembly.

C. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

D. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.

E. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent subsequent damage to the membrane roofing system.

F. Concentrated loads from rooftop equipment may cause deformation of insulation/underlayment and possible damage to the membrane if proper protection is not provided. A protection course or sleepers must be specified.

G. Drainage

1. Drainage must be evaluated by the Specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated. Carlisle specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or the owner's design professional.

2. Small incidental areas of ponded water will not impact the performance of this roofing system; however in accordance with industry standards, the roofing assembly **should be designed to prevent ponding** of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live loads and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

3. **Tapered edge strips, crickets or saddles** are recommended where periodic ponding of water may occur. When the slope of the taper exceeds 2" to one horizontal foot additional membrane securement at the base of the tapered edge strip, cricket or saddle will be required.

4. On **Sure-White Roofing Systems,** a slope greater than 1/8" per horizontal foot is recommended to serve the long-term aesthetics.

H. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to **Design Reference DR-01 Construction Generated Moisture"** included in the Carlisle Technical Manual.

I. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

2. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.

3. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

J. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when polyurethane adhesive is used to attach the roof insulation.

NOTE: If left unaddressed, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth.

K. **Retrofit - Recover Projects** (when the existing roofing material is left in place)

1. The removal of existing wet insulation and membrane must be specified. The Specifier shall select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.

2. A core cut should be taken to verify weight of existing components when the roofing system is to be specified over an existing roofing assembly.

3. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. If a vapor retarder or air barrier is not specified, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding PVC membrane).

4. Existing PVC membrane must be totally removed or the existing membrane must be cut into maximum 10' by 10' sections. All PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

L. **Optional Color Coating**

1. Sure-Seal X-Tenda Coat Coating is recommended for color coating the EPDM membrane and flashing when required by the Specifier. Available in white or gray.

   X-Tenda Coat Coating can also be specified as a "Restoration System" when applied to an existing Carlisle EPDM membrane system that may qualify for a 5 or 10-year Coating System Warranty. Refer to Carlisle's published Sure-Seal X-Tenda Coat Coating Specification for specific requirements.

   NOTE: Carlisle may be contacted for other optional color coatings.

1.03 Quality Assurance

Building codes are above and beyond the intended purpose of this specification. The building **owner, owner's representative** or **Specifier** should verify 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 EPDM Roofing Systems, refer to the Carlisle EPDM Code Approval Guide, DORA (Directory of Roof Assemblies), Factory Mutual (FM) Approval Guide or Underwriters

Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

A. When recovering or retrofitting an existing roof system, the addition of new insulation (type and thickness) may alter the fire performance characteristics of the assembly. Building owners or their designated representatives shall consult the local code enforcement agency to avoid potential code violation.

B. 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.

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

D. 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.

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

F. 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.

G. For ballasted, 30-year warranty projects, the applicator must submit pictures showing the use of EPDM Primer for perimeter RUSS securement or allow random test cuts to confirm the use of EPDM Primer.

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. Air pressurized buildings, 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). Refer to Attachment IV at the end of this section for perimeter considerations, when a Mechanically Fastened System is specified.
2. Cold storage buildings and freezer facilities.
3. Design “A” Adhered Roofing Systems over 250' in height for projects with warranties up to 15 years.
4. Design “A” Adhered Roofing Systems over 100' in height for projects with warranties greater than 15 years.
5. Design “B” Ballasted Roofing System projects over 75' in height.
6. Mechanically Fastened Roofing System projects over 100’ in height.
7. Projects where the EPDM is expected to come in direct contact with petroleum-based products, waste products (i.e., grease, oil, animal fats, etc) and other chemicals.
8. Projects where hot asphalt is specified for insulation attachment.
9. Mechanically Fastened projects specified with a fastener length exceeding 12 inches.

B. 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.

Shop drawings must include:

1. Outline of roof and size
2. Deck type (for multiple deck types)
3. Location and type of **all** penetrations
4. Perimeter and penetration details
5. Key plan (on multiple roof areas) with roof heights indicated
6. Sheet width and number of perimeter sheets for Reinforced Mechanically Fastened systems
7. Sure-Seal Fastener type, length and maximum spacing (for membrane securement) for Reinforced Mechanically Fastened systems.

C. **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 the Table included in **Design Reference DR-06 “Withdrawal Resistance Criteria”**.

D. Ballasted projects incorporating a **lightweight insulating concrete** substrate, a **certification letter** is **required** from the lightweight insulating concrete manufacturer for the following conditions:

1. The membrane is specified directly over **vermiculite** or **cellular** lightweight insulating concrete with a maximum compressive strength of 140 psi.

2. The membrane is specified with HP Protective Mat as the membrane underlayment over **vermiculite** or **cellular** lightweight insulating concrete with a compressive strength between 140 - 175 psi.

The certification letter must reference the project name and location, accompany the project submittals (shop drawing and Request for Warranty) and contain the following information pertaining to the lightweight insulating concrete mix design:

1. Manufacturer's brand name
2. Maximum compressive strength
3. Average wet density
4. Average air dry density

E. When field conditions necessitate modifications to the originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to Carlisle for revision and approval prior to inspection and warranty issuance.

F. **As-Built Projects** (roofing systems installed prior to project approval by Carlisle)

The Carlisle Authorized Applicator may supply Carlisle with an As-Built drawing for a project completed prior to Carlisle's approval. The As-Built drawings:

1. Must conform to Carlisle's most current published specifications and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.
3. Must include the items identified in Paragraphs B, C and D above.

Note: As-Built projects are not recommended for those projects referenced in Paragraph A in order to ensure Carlisle warranty requirements have been met.

G. **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 and acceptance of the project prior to issuance of the Carlisle warranty.

1.05 Warranty

A. A Total 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 total 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 2 “Products” Section in this Specification and **Spec Supplement “Related Products” P-01.**

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

1. **TABLE I – Non-Reinforced EPDM Membrane Thickness for Various Warranty Options** Identifies minimum membrane thickness for non-reinforced membranes used in adhered or ballasted roofing systems.
2. **TABLE II – Reinforced EPDM Membrane Thickness for Various Warranty Options** Identifies minimum membrane thickness required for adhered and mechanically fastened assemblies using Reinforced Membrane.
3. **TABLE III – Mechanically Fastened Roofing Systems - Membrane Fastening Criteria – Up to 20 YR Warranty - Steel/Concrete Decks** Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.
4. **TABLE IV – Mechanically Fastened Roofing Systems - Membrane Fastening Criteria – Up to 20 YR Warranty - Wood (Plywood & OSB) Decks** Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.
5. **TABLE V – Re-roofing Substrate Criteria - Up to 20 YR Warranty** Identifies required substrates for re-roofing applications for adhered, mechanically fastened and ballasted roofing systems.
6. **TABLE VI – Adhered Roofing Systems - Underlayment Fastening Criteria - Up to 20 YR Warranty** Identifies required underlayment for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverage available. The Table also identifies fastening density or adhesive bead spacing

and required edge terminations.

7. **TABLE VII – Adhered Roofing Systems – Underlayment Fastening Criteria - 25 to 30 YR Warranty** Identifies required underlayment for adhered roofing systems with Warranties from 25 to 30 year based on the various wind speed coverage available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

Table I Non-Reinforced EPDM Membrane Thickness for Various Warranty Options

SURE-SEAL OR SURE-WHITE NON-REINFORCED MEMBRANES - ADHERED					
Warranty Duration	Warranty Wind Speed Coverage			Minimum Membrane Thickness	Hail Coverage
	55, 72 or 80 mph	90 to 100 mph	110 to 120 mph		*(Cover Board set in Adhesive)
5,10, or 15 year	√	√	√	60-mil Sure-Seal OR Sure-White 60-mil Sure-Seal SAT OR Sure-White SAT	1" for Adhered*
20 year	√	√	√	60-mil Sure-Seal OR Sure-White 60-mil Sure-Seal SAT OR Sure-White SAT	1" for Adhered*
25 year (3)	√ (1)	√ (1)	N/A	60-mil Sure-Seal OR Sure-White 60-mil Sure-Seal SAT OR Sure-White SAT	1" for Adhered*
30 year (3)	√ (1)	√ (1)	N/A	90-mil Sure-Seal OR Sure-White	2" for Adhered*
SURE-SEAL OR SURE-WHITE NON-REINFORCED MEMBRANES - BALLASTED					
Warranty Duration	Warranty Wind Speed Coverage			Minimum Membrane Thickness	Hail Coverage
	55, 72 or 80 mph				
5,10, 15, 20 or 25 year (3)	√ (2)			Sure-Seal 45-mil	1" for Ballasted
5,10, 15 or 20 year	√ (2)			60-mil Sure-Seal OR Sure-White	2" for Ballasted
25 or 30 year (3)	√ (2)			60-mil Sure-Seal OR Sure-White	2" for Ballasted
30 year (3)	√ (2)			90-mil Sure-Seal OR Sure-White	3" for Ballasted

Notes: N/A = Not Acceptable √= Acceptable

(1) Standard 90-8-30A, EPDM x-23 Low-VOC, Low-VOC EPDM/TPO or CAV-GRIP III Bonding Adhesive must be utilized.

(2) When Sure-Tough Reinforced membrane is specified, 60-mil membrane minimum is required for warranties for up to 20 year. Projects with 25 / 30 Year Warranty must incorporate 75-mil membrane.

(3) See Attachment II '25/30 Year Warranty Design Enhancements' for enhanced design requirements.

Table II

Reinforced EPDM Membrane Thickness for Various Warranty Options

Warranty Duration	Sure-Tough or Sure-White Reinforced Membranes								
	Warranty Wind Speed Coverage						Minimum Membrane Thickness	Hail Coverage *(Cover Board set in Adhesive)	Puncture Coverage
	55, 72 or 80 mph		90 mph		100 to 120 mph				
	Adhered	Mech. Fastened	Adhered	Mech. Fastened	Adhered	Mech. Fastened			
5,10, or 15 year	√	√	√	√	√	N/A	45-mil Sure-Tough	N/A	8 man hours
20 year	√	√	√	√	√	N/A	60-mil Sure-Tough, 60-mil Sure-White Reinforced, 60-mil Sure-Tough SAT OR 60-mil Sure-White SAT	1" for Adhered*	16 man hours
25 year (2)	√ (1)	√	√ (1)	√	√ (1)	N/A	75-mil Sure-Tough OR 75-mil Sure-Tough SAT	2" for Adhered*	32 man hours
30 year (2)	√ (1)	√	√ (1)	√	√ (1)	N/A	75-mil Sure-Tough	2" for Adhered*	32 man hours

Notes: N/A = Not Acceptable √= Acceptable

(1) Standard 90-8-30A, EPDM x-23 Low-VOC, Low-VOC EPDM/TPO or CAV-GRIP III Bonding Adhesive must be utilized.

(2) See Attachment II '25/30 Year Warranty Design Enhancements' for enhanced design requirements.

Table III

Mechanically Fastened Roofing Systems Fastening Criteria
Up to 20 YR Warranty (1)
22 GA. Steel, Structural Concrete, Wood Plank, and 3/4" Plywood Decks

Peak Gust Wind Speed Warranty	Max. Building Height	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Building Distance from Coastline					
		Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	Up to 60'	1	2	3	10'	6.5'	12" O.C.
					8'	6.5'	12" O.C.
	61' to 100'	2	2	3	10'	6.5'	6" O.C.**
					8'	6.5'	12" O.C.
72 MPH	Up to 60'	2	2	3	10'	6.5'	12" O.C.
					8'	6.5'	12" O.C.
	61' to 100'	3	4	4	10'	6.5'	6" O.C.**
					8'	6.5'	12" O.C.
80 MPH	Up to 60'	3	3	4	10'	5'***	12" O.C.
					8'	5'***	12" O.C.
	61' to 100'	3	4	4	10'	5'***	6" O.C.**
					8'	5'***	12" O.C.
90 MPH (1)	Up to 60'	3	4	4	10'	5'***	6" O.C.**
					8'	5'***	12" O.C.
	61' to 100'	4	5	5	10'	5'***	6" O.C. **
					8'	5'***	12" O.C.

* Using HP Fasteners on Steel Deck, Wood Plank and ¾" Plywood Decks with Polymer Seam Plates

**12" o.c. Spacing can be utilized by using HP-Xtra Fasteners and 2-3/8" Polymer Seam Plates.

***As an option, 9" wide EPDM Pressure Sensitive RUSS can be used beneath the field sheets for perimeter securement.

(1) 20 year is the maximum warranty available with peak gust wind speed of 90 MPH. Projects with greater wind speed coverage **MUST** be submitted to Carlisle for review and possible considerations.

EPDM Membrane Fastening Criteria
(Up to 20 Year Warranty – Up to 60' Building Height)
for Mechanically Fastening Roofing Systems
Wood (Plywood or OSB) Decks

TABLE IV

Wood (Plywood or OSB) Decks **Peak Gust Wind Speed Warranty**	**Deck Type**	**Projected Pull-Out Values**	**Min. Number of Perimeter Sheets**			**Field Membrane Width**	**Perimeter Sheet Width**	**Fastening Density (Field & Perimeter Sheets)**
			Building Distance from Coastline					
			Greater than 7 miles	**3 to 7 miles**	**Less than 3 miles**			
55 MPH	7/16" OSB	210 lbs	2	3	3	10'	5'*	9" O.C.
			2	3	3	8'	5'*	12" O.C.
	15/32" 3-Ply Plywood	240 lbs	2	2	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3	3	10'	5'*	12" O.C.
			2	3	3	8'	5'*	12" O.C.
72 MPH	15/32" 3-Ply Plywood	240 lbs	2	2	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	2	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3	3	10'	5'*	12" O.C.
			2	3	3	8'	5'*	12" O.C
80 MPH	*Contact Carlisle for Approval and Evaluation*							

*Maximum duration for OSB NOT to exceed 20 Years.

Table V **Re-roofing Substrate Criteria - Up to 20 YR Warranty**

Acceptable Roof Deck/Substrate	EPDM Membrane (See Table I and II for minimum membrane thickness)		
RETROFIT / NO TEAR-OFF	Adhered - Design "A"	Ballasted - Design "B"	Mechanically Fastened
Existing Smooth Surface BUR or Mineral Surface Cap Sheet	Direct Application (1)	Insulation	Direct Application (1)
Gravel Surfaced BUR	Insulation	Insulation	Insulation
Coal Tar Pitch	Insulation	Insulation	Insulation
Modified Bitumen	Direct Application (1)	Insulation	Direct Application (1)
Existing Single-Ply	Insulation	Insulation	Direct Application (1) (2)
Sprayed-in-place Urethane	Complete Tear-off Required	Insulation	Complete Tear-off Required

(1) Direct application permitted for projects with warranties up to 15 YR unless specifically approved by Carlisle. For acceptable insulations, when 20 YR warranty is required refer to Table VI paragraph 1.05.

(2) Direct application over existing PVC is not permitted regardless of warranty duration. Carlisle may be contacted for specific substrate requirement.

NOTE: Projects with Warranties greater than 20 YR require total removal of existing materials. Refer to Table VI and VII for further material requirements.

NOTE: Refer to Roof Deck and Substrate Criteria Table in Part III for additional installation requirements.

Table VI

Adhered Roofing Systems Underlayment Fastening Criteria
Up to 20 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for lower speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Maximum Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Underlayment Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' size board (12)		
			Field	Perimeter	
55 or 72 MPH	1" (20 psi) Polyisocyanurate or 1" (20 psi) Polyisocyanurate Eco	16(10)	12" (5)(6)	6" (5)	Carlisle Drip Edge, SecurEdge™ 200
	1-1/2" (20 psi) Polyisocyanurate or 1-1/2" (20 psi)Polyisocyanurate Eco	10			
	2" (20 psi) Polyisocyanurate Or 2" (20 psi) Polyisocyanurate Eco	8			
	1/2" SecurShield HD or 1/2" SecurShield HD Eco	12			
	1/4" DensDeck Prime or 1/4" Securock	12			
80 MPH	1/2" SecurShield HD Plus	8	12" (5)(6)(7)	6' (5)(7)	Carlisle Drip Edge, SecurEdge 200 (11)
	1/2" HP Recovery Board (2)(13)	16			
	2" SecurShield HD Composite	6			
	1/2" DensDeck Prime or 1/2" Securock (2)	8			
	1-1/2" Polyisocyanurate (25-psi) Or 1-1/2" (25 psi)Polyisocyanurate Eco	10			
	2" (25 -psi) Polyisocyanurate Or 2" (25 psi) Polyisocyanurate Eco	8			
90 MPH	1/2" DensDeck Prime or 1/2" Securock (2)	12	6" (9)	6" (7)(8)	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000
	1/2" SecurShield HD, 1/2" SecurShield HD Eco, or 1-1/2" (20-psi) SecurShield Polyiso or 1-1/2" (20-psi) SecurShield Eco	16			
	1/2" SecurShield HD Plus or 1/2" EcoStorm VSH (2)	12			
	2" (20-psi) SecurShield, 2" (20 psi) SecurShield Eco or 2" SecurShield HD Polyiso Composite	8			
	1-1/2" StormBase (OSB/Polyiso Composite)	8			
	1-1/2" Insulfoam HD Composite	16			
100 MPH	2" (25-psi) SecurShield Polyiso or 2" (25 psi) SecurShield Eco (1)	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000
110 MPH	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	16	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus				
120 MPH	5/8" DensDeck Prime or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) (1) or 1/2" EcoStorm VSH (2)	17			
	1/2" SecurShield HD Plus	24			
	2" SecurShield HD Composite	16			

FS = Full Spray or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(2) For Steel Decks, Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.

(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(5) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(6) Steel Decks - Field & Perimeter @ 6" O.C.
(7) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(9) Gravel Surface BUR – FS
(10) Reduced fastening (11 fasteners per 4x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40’.
(11) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(12) Gypsum Deck must have a minimum 6” o.c. bead spacing.
(13) HP Recovery Board cannot exceed 15 YR. Warranty

Table VI - Additional Adhered Design Considerations - Up to 20 YR Warranty

1 - Building height shall not exceed 100'*
2 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
3- Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
4- **See DR-05 for insulation fastening patterns.**

* For projects where building height exceeds 100', please submit to Carlisle for review.

Table VII — Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for SAT EPDM Adhered Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' size board (13)		
			Field	Perimeter	
55 or 72 MPH	1" (20 psi) Polyisocyanurate Or 1" (20 psi) Polyisocyanurate Eco	16 (9)	12" (4)(5)	6" (4)	Carlisle Drip Edge, SecurEdge 200
	1-1/2" (20 psi) Polyisocyanurate Or 1-1/2" (20 psi) Polyisocyanurate Eco	10			
	2" (20 psi) Polyisocyanurate Or 2" (20 psi) Polyisocyanurate Eco	8			
	1/2" SecurShield HD or 1/2" SecurShield HD Eco	12			
	1/4" DensDeck Prime or 1/4" Securock				
	2" (1.25 lb/density) Insulfoam SP*				
80 MPH	1/2" DensDeck Prime or 1/2" Securock (2)	8	12" (4)(5)(6)	6" (4)(6)	Carlisle Drip Edge, SecurEdge 200 (12)
	1/2" SecurShield HD or 1/2" SecurShield HD Eco	16			
	1/2" SecurShield HD Plus (3)	8			
	2" SecurShield HD Composite	6			
	1-1/2" (25-psi) Polyisocyanurate Or 1-1/2" (25 psi) Polyisocyanurate Eco	10			
	2" (25 -psi) Polyisocyanurate Or 2" (25 psi) Polyisocyanurate Eco	8			
	2" (1.25 lb/density) Insulfoam SP**	16	6" (4)(5)(6)	6" (4)(6)	
	1-1/2" Insulfoam HD Composite*	12	12"(8)	6"(6)(7)	
90 MPH	1/2" DensDeck Prime or 1/2" Securock (2)	12	6" (8)	6" (6)(7)	Carlisle Drip Edge (10), SecurEdge 200 (10)(11) or SecurEdge 2000 or 3000.
	1/2" SecurShield HD , 1/2" SecurShield HD Eco, 1-1/2" (20-psi) SecurShield Polyiso or 1-1/2" (20-psi) SecurShield Polyiso Eco	16			
	1/2" SecurShield HD Plus or 1/2" EcoStorm VSH	12			
	1-1/2" StormBase (OSB/Polyiso Composite)	8			
	2" (20-psi) SecurShield Polyiso, 2" (20 psi) SecurShield Eco or 2" SecurShield HD Composite	8			
	1-1/2" Insulfoam HD Composite	16			
100 MPH	5/8" DensDeck Prime or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	Carlisle Drip Edge (10), SecurEdge 200 (10)(11) or SecurEdge 2000 or 3000.
	1/2" SecurShield HD Plus				
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH				
	2" (25-psi) SecurShield Polyiso or 2" (25 psi) SecurShield Eco (1)				
	2" SecurShield HD Composite				

FS = Full Spray or Ribbons @ 4" O.C.

(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.

(2) Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(3) Not used.
(4) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(5) Steel Decks - Field & Perimeter @ 6" O.C.
(6) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(7) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Gravel Surface BUR – FS
(9) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40'.
(10) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(11) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(12) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(13) Gypsum deck must have minimum 6" o.c. bead spacing.
*Maximum warranty available 20 year.
** Maximum warranty available 15 year.

Table VII - Additional Design Considerations (Up to 20 YR Warranty)

1 - Minimum membrane thickness 60-mil SAT EPDM
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4- Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5- All "T-joints" must be overlaid with appropriate flashing material or Carlisle "T-Joint" Covers.
6 - **See DR-05 for insulation fastening patterns.**

* Projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, shall be submitted to Carlisle for review.

Table VIII Minimum Perimeter Width For Insulation Attachment For All Warranties

Width of Perimeter	Building Height
4 feet	25 feet
8 feet	26 to 50 feet
12 feet	51 to 75 feet
16 feet	76 to 100 feet
24 feet	Greater than 100 feet

Note: This Table is for reference for Carlisle System Warranties and does not replace FM requirements for FM insured projects.

C. **Access for warranty service**

It shall be the owner's responsibility to expose the membrane in the event warranty service is required when access is impaired. Such impairment includes, but is not limited to:

a. Design features, such as window washer systems, which require the installation of traffic surface units in excess of 100 pounds per unit.

b. Any equipment, ornamentation, building service units and other top surfacing materials, which are not defined as part of this specification.

c. Photovoltaic and Mounting Systems or other Rooftop equipment which does not provide Carlisle with reasonable access to the membrane system for purposes of warranty investigation and related repairs.

d. Severely ponded conditions.

CAUTION: APPLICATIONS SUCH AS WALKING DECKS, TERRACES, PATIOS OR AREAS SUBJECTED TO CONDITIONS NOT TYPICALLY FOUND ON ROOFING SYSTEMS WILL **NOT** BE ELIGIBLE FOR A MEMBRANE SYSTEM WARRANTY. CARLISLE MAY BE CONTACTED FOR OTHER AVAILABLE OPTIONS.

D. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not

limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.06 Job Conditions

A. On phased roofing, temporary closures should be provided to prevent moisture infiltration. When a temporary roof is specified, Carlisle 725TR in conjunction with CCW-702, CCW-702 LV or CAV-GRIP III Primer may be used. Refer to Product Section Part II for additional product information and **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier".**

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

C. On projects at high altitudes (6,000' and above) rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

D. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

   a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

   c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.

2. When a vapor retarder is specified, Carlisle VapAir Seal 725TR or VapAir Seal MD Air and Vapor Barrier may be used. Refer to Part II "Products" for necessary information and **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier"** for product Installation.

E. Wood nailers are required for the securement of metal edgings, deck-level scuppers, and insulated pipes. Treated or non-treated wood nailer may be specified and shall be secured per specifier recommendation or in accordance with Factory Mutual's property Loss Prevention Data Sheet 1-49. Refer to **Design Reference DR-08 "Wood Nailers and Securement Criteria"** in Carlisle Technical Manual shall be referenced.

F. For Adhered or Mechanically Fastened systems specified over existing standing seam, flat seam or corrugated metal roofs, refer to the Carlisle's Metal Retrofit Roofing System Specification in the Carlisle Technical Manual for specific installation requirements.

G. When any of the EPDM Roofing Systems are specified on a portion of a roof, tie-ins to existing roofing membranes will be required. Depending on the type of the existing roofing system, the tie-in method will vary. Total isolation between two roofing systems or weep holes may be required to address moisture migration from one roofing system to the other. Prior to the selection of any tie-in detail, ensure the selected detail will not restrict drainage.

1.07 Product Delivery, Storage and Handling

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

B. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must 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., uncured flashing, adhesives, sealants, primers, SecurTAPE and Pressure-Sensitive Flashing/Accessories).

D. **When the temperature is expected to fall below 40° F (4°C)**, outside storage boxes should be provided on the roof for temporary storage of liquid adhesives, sealants, primers, SecurTAPE and Pressure-Sensitive Flashing/Accessories. Containers must be rotated to maintain their temperature above 40°F (4°C). Refer to Product Data Sheets for individual products for temperature restrictions.

Note: Prolonged exposure of Pressure-Sensitive Flashing and SecurTAPE to temperatures below 40° F (4°C) will cause the pre-applied adhesive tape to lose tack and in extreme cases, not bond to the substrate. Refer to **Spec Supplement E-02 "EPDM Membrane Splicing and Splice Repairs"** in Carlisle Technical Manual for application procedures in colder temperatures.

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

F. Insulation/underlayment must be stored so 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

A. Sure-Seal/Sure-White Non-Reinforced EPDM Membranes

1. Cured non-reinforced EPDM (Ethylene, Propylene, Diene Terpolymer) compounded elastomer.

   45 (Black Membrane Only), 60 (Gray membrane only), or 90 mil thick Non-Reinforced EPDM membrane is available in **Sure-Seal (black)** or **Sure-White (white)**. Sure-Seal Gray is only available in 60-mil. Sure-White membranes are installed with the white surface facing up. Sure-Seal (black) membrane with thickness up to 60-mil can be available in widths up to 50' and lengths up to 150' (200' for 45-mil membrane only). Sure-White membrane with thickness of 60-mil is available up to 20' widths and lengths up to 150' long. Sure-Seal / Sure-White 90-mil membranes and Sure-Seal Gray 60-mil membranes are available in widths up to 10' and lengths up to 100'. Membrane conforms to ASTM D4637, Type I (non-reinforced).

2. **Sure-Seal KLEEN (black) EPDM Membrane** (mica dust has been removed during manufacturing) is available for sheets maximum 10' wide.

3. **Sure-Seal Gray Non-Reinforced EPDM Membrane** is available with and without FAT.

4. Refer to the physical properties listed on the following pages.

B. Sure-Tough Reinforced EPDM Membranes

1. Cured reinforced EPDM (Ethylene, Propylene, Diene Terpolymer) compounded elastomer. **Sure-Tough Reinforced EPDM Membrane** is only available in black.

   45, 60, or 75-mil thick Sure-Tough Reinforced EPDM membrane is available in sizes referenced in Table below. Reinforced membrane with polyester fabric conforms to ASTM D4637, Type II (reinforced).

Sure-Tough Reinforced Membrane Size Availability*			
Membrane Thickness	Sheet Sizes		
45-mil	5' or 6.5' x 100'	-	10' x 50' or 100'
60-mil	5' or 6.5' x 100' 5' x 200'	8' x 100'	10' x 50' or 100'
75-mil	-	-	10' x 50' or 100'

*Contact Carlisle for other custom sizes available.

2. **60-mil thick Sure-White Reinforced EPDM** membrane is available in a 10' x 100' sheet size.

3. Refer to the physical properties listed on the following pages:

45, 60 and 90-MIL THICK NON-REINFORCED EPDM MEMBRANE STANDARD AND FIRE RETARDANT (FR)

45-mil thick Sure-Seal (standard) non-reinforced EPDM membrane is used only for Sure-Seal Design "B" Loose Laid Ballasted Roofing Systems.

60 or 90-mil thick Sure-Seal FR (black) or Sure-White (white on black) non-reinforced EPDM membrane is used primarily for Adhered Roofing Systems. Either membrane can also be used for ballasted and protected membrane assemblies.

Note: Although 60-mil thick Non-Reinforced EPDM is recommended for Adhered Roofing Systems, 45-mil thick FR Non-Reinforced EPDM may be utilized, if specified.

SURE-SEAL/SURE-WHITE NON-REINFORCED MEMBRANES						
Physical Property	**Test Method**	**ASTM SPEC. (Pass)**	**Typical**			
			45-mil	**60-mil**	**60-mil**	**90-mil**
			Standard	**FR**	**White & Gray**	**Sure-Seal FR / Sure-White**
Tolerance on Nominal Thickness, %	ASTM D 412	±10	±10	±10	±10	±10
Weight, lb/ft² (kg/m²)			0.26 (1.3)	0.35 (1.7)	0.39 (1.9)	0.59 (2.9)**
Tensile Strength, min, psi (MPa)	ASTM D 412	1305 (9)	1600 (11)	1600 (11)	1600 (11)	1600 (11)
Elongation, Ultimate, min, %	ASTM D 412	300	480	465	540	540
Tear Resistance, min, lbf/in (kN/m)	ASTM D 624 (Die C)	150 (26.3)	200 (35.0)	200 (35.0)	200 (35.0)	200 (35.0)
Factory Seam Strength, min.	Modified ASTM D 816	Membrane Rupture	Membrane Rupture	Membrane Rupture	Membrane Rupture	Membrane Rupture
Resistance to Heat Aging* Properties after 4 weeks @ 240°F (116°C)	ASTM D 573					
Tensile Strength, min, psi (MPa)	ASTM D 412	1205 (8.3)	1500 (10.3)	1450 (10.0)	1345 (9.3)	1450 (10.0)
Elongation, Ultimate, min, %	ASTM D 412	200	225	280	280	280
Tear Resistance, min, lbf/in (kN/m)	ASTM D 624	125 (21.9)	215 (37.6)	215 (37.6)	185 (32.4)	215 (37.6)
Linear Dimensional Change, max, %	ASTM D 1204	±1.0	-0.4	-0.5	-0.2	-0.5
Ozone Resistance* Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen is at 50% strain	ASTM D 1149	No Cracks	No Cracks	No Cracks	No Cracks	No Cracks
Brittleness Temp., max, deg. F (deg. C)*	ASTM D 746	-49 (-45)	-49 (-45)	-49 (-45)	-67 (-55)	-49 (-45)
Resistance to Water Absorption* After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D 471	+8.0, -2.0	[+2]	[+2]	[+3.3]	[+2.0]
Water Vapor Permeance* max, perm	ASTM E 96 (Proc. B or BW)	0.1	0.05	0.03	0.02	0.03
Resistance to Outdoor (Ultraviolet) Weathering* Xenon-Arc, total radiant exposure at .70 W/m² irradiance, 176°F (80° C) black panel temp.	ASTM D 4637 Conditions	No Cracks No Crazing @ 7560 kJ/m²	No Cracks No Crazing @ 41580 kJ/m²	No Cracks No Crazing @ 41580 kJ/m²	No Cracks No Crazing @ 25200 kJ/m²	No Cracks No Crazing @ 41580 kJ/m²(black) 25200 kJ/m²(white)

* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.
** Sure-White 90-mil Membrane Weight in lb/ft2(kg/m2) is equal to 0.60 (2.9)

45, 60, or 75-MIL THICK REINFORCED EPDM MEMBRANE

The membrane is used for Adhered or Mechanically Fastened Roofing Systems

Sure-Tough membranes are formulated with fire retardants to inhibit spread of flame and meets or exceeds UL Class A requirements for slopes up to 3", depending on the assembly.

SURE-TOUGH REINFORCED MEMBRANES					
Physical Property	**Test Method**	**ASTM SPEC. (Pass)**	**Typical**		
			45-mil	**60-mil**	**75-mil**
Tolerance on Nominal Thickness, %	ASTM D 751	±10	±10	±10	±10
Weight, lb/ft² (kg/m²)			0.27 (1.3)	0.39 (1.9)	0.48 (2.3)
Thickness Over Scrim, min. in.(mm)	ASTM D 4637 Annex	0.015 (.381)	0.016 (.406)	0.020 (.508)	0.032 (0.81)
Breaking Strength, min, lbf (N)	ASTM D 751 Grab Method	90 (400)	140 (623)	140(623)	177(787)
Elongation, Ultimate, min, %	ASTM D 751 Grab Method	250 **	480**	480**	500**
Tear Strength, min, lbf (N)	ASTM D 751 B Tongue Tear	10 (45)	70 (311)	70 (311)	70 (311)
Brittleness Temp., max. deg. F (deg. C)*	ASTM D 2137	[-49] (-45)	[-49] (-45)	[-49] (-45)	[-49] (-45)
Resistance to Heat Aging* Properties after 4 weeks @ 240°F	ASTM D 573				
Breaking Strength, min, lbf (N)	ASTM D 751	80 (355)	182 (823)	182 (823)	182 (823)
Elongation, Ultimate, min, %	ASTM D 751	200**	250**	250**	250**
Linear Dimensional Change, max, %	ASTM D 1204	±1.0	-1.0	-1.0	-1.0
Ozone Resistance* Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen wrapped around 3" mandrel	ASTM D 1149	No Cracks	No Cracks	No Cracks	No Cracks
Resistance to Water Absorption* After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D 471	+8.0, -2.0	[+5.5**]	[+5.5**]	[+5.5**]
Factory Seam Strength, min.	Modified ASTM D 816	Membrane Rupture	Membrane Rupture	Membrane Rupture	Membrane Rupture
Resistance to Outdoor (Ultraviolet) Weathering* Xenon-Arc, total radiant exposure at .70 W/m² irradiance, 176°F (80º C) black panel temp.	ASTM D 4637 Conditions	No Cracks No Crazing @ 7560 kJ/m²	No Cracks No Crazing @ 35320 kJ/m²	No Cracks No Crazing @ 35320 kJ/m²	No Cracks No Crazing @ 35320 kJ/m²

* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.

** Specimens to be prepared from coating rubber compound, vulcanized in a similar method to the reinforced product.

60-MIL THICK REINFORCED EPDM MEMBRANE

The membrane is used for Mechanically Fastened or Adhered Roofing Systems.

Sure-Tough membranes are formulated with fire retardants to inhibit spread of flame and meets or exceeds UL Class A requirements for slopes up to 2", depending on the assembly.

SURE-WHITE REINFORCED MEMBRANE			
Physical Property	**Test Method**	**ASTM SPEC. (Pass)**	**Typical 60-mil**
Tolerance on Nominal Thickness, %	ASTM D 751	±10	±10
Weight, lb/ft² (kg/m²)			0.40 (2.0)
Thickness Over Scrim, min. in.(mm)	ASTM D 4637 Annex	0.015 (.381)	0.025 (.635)
Breaking Strength, min, lbf (N)	ASTM D 751 Grab Method (1)	90 (400)	225(996)
Elongation, Ultimate, min, %	ASTM D 751 Grab Method	250 **	480**
Tear Strength, min, lbf (N)	ASTM D 751 B Tongue Tear	10 (45)	70 (311)
Brittleness Temp., max. deg. F (deg. C)*	ASTM D 2137	[-49] (-45)	[-49] (-45)
Resistance to Heat Aging* Properties after 4 weeks @ 240°F	ASTM D 573		
Breaking Strength, min, lbf (N)	ASTM D 751	80 (355)	250 (1,110)
Elongation, Ultimate, min, %	ASTM D 412	200**	250**
Linear Dimensional Change, max, %	ASTM D 1204	±1.0	-1.0
Ozone Resistance* Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen wrapped around 3" mandrel	ASTM D 1149	No Cracks	No Cracks
Resistance to Water Absorption* After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D 471	+8.0, -2.0	5.2**
Water Vapor Permeance* Max. perms	ASTM E 96 (Proc. B or BW)	0.10	0.02
Fungi Resistance	ASTM G 21	N/A	0 (No Growth)
Specular Gloss at 85ºC	ASTM D523	N/A	3
Resistance to Outdoor (Ultraviolet) Weathering* Xenon-Arc, total radiant exposure at .70 W/m² irradiance, 176°F (80º C) black panel temp.	ASTM G 155	No Cracks No Crazing @ 2,520 kJ/m² 1,000 hrs.	No Cracks No Crazing @ 25,200 kJ/m² 10,000 hrs.
At 0.35 W/m² irradiance, 80°C black panel temperature		2,000 hrs.	20,000 hrs.

* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.

** Specimens to be prepared from coating rubber compound, vulcanized in a similar method to the reinforced product.

2.03 Insulations/Underlayments

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.

2. Multiple layers of insulation are recommended with all joints staggered between layers.

3. For minimum recommended R-Values, previously published by American Society of Heating and Air-Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.

4. For Insulation fastening pattern and densities refer to Carlisle Applicable Details and **Design Reference DR-05 "Insulation Fastening Patterns"**.

5. Carlisle Insulation/underlayment must be specified for all Total System Warranty projects or when the insulation is to be covered by the Carlisle Warranty. Any of the Carlisle Insulation/Underlayment may be specified subject to design restrictions included with each table.

B. **Carlisle Polyisocyanurate**

Table B1 **Polyisocyanurate** (See below for product descriptions)

Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability		
			Adhered	Mechanically Fastened	Ballasted
Carlisle InsulBase Polyisocyanurate, Carlisle InsulBase Eco, Carlisle InsulBase HD Eco	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle InsulBase NH Polyisocyanurate	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle SecurShield Polyisocyanurate, Carlisle SecurShield Eco	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield NH Polyisocyanurate	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield HD Composite Polyisocyanurate (SS HD)	2"	C1289, Type IV, Grade 2 or 3	√	√	N/A
Carlisle StormBase Composite (OSB)	1.5"	C1289, Type V, Grade 2 or 3	√	√	N/A

Design Restrictions

- Extended Warranty, those with longer duration, higher wind speed, or puncture coverage, may require the use of a cover board over Polyiso Insulation, refer to Warranty Tables in Paragraph 1.04 for applicable requirements.
- Maximum Flute Spanability shall be limited to 2-5/8" when 1" Minimum Polyiso Insulation is to be used.
- Minimum thickness of insulation board may be restricted by wind speed coverage and warranty duration, refer to Tables V and VI in Paragraph 1.05.
- The use of HD Polyiso Composite roof insulation is not recommended for Ballasted Applications.

*1.5" minimum for adhered systems. 1" minimum for mechanically fastened systems or as a base layer for adhered.

Notes: N/A = Not Acceptable √ = Acceptable

SecurShield HD is listed in Paragraph E4 below.

a. **Carlisle InsulBase Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.

b. **Carlisle InsulBase Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to glass-reinforced felt (GRF) facers, meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. UL and FM approved for direct application over steel decks, polyiso provides the highest R-value per inch of any commercially available insulation product.

c. Carlisle InsulBase HD Eco – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2" thick, 4' x 4' and 4' x 8' panels with an R-value of 2.5. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

d. **Carlisle InsulBase NH Polyisocyanurate** - A foam core insulation board covered on both sides with a glass-reinforced felt meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 4' and 4' x 8' standard size with a thickness from ½" to 4 inches. InsulBase NH contains zero halogenated flame retardants.

e. **Carlisle SecurShield Polyisocyanurate–** A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

f. Carlisle SecurShield Eco – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to high performance coated glass facers (CGF). ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi), available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. Ideal for use in adhered membrane systems. Achieves a UL Class A fire rating direct to combustible deck.

g. Carlisle SecurShield NH Polyisocyanurate - A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 4' and 4' x 8' standard size with a thickness from ½ inch to 4 inches. SecurShield NH contains zero halogenated flame retardants.

h. **Carlisle SecurShield HD Composite Polyisocyanurate** – Composite insulation panel comprised of 1/2-inch high-density (109 psi max) Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type IV, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 2" to 4.5". 4' x 4' panels are also available.

i. **Carlisle StormBase Polyisocyanurate Composite (OSB)** – Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt facer and laminated with a top surface of 7/16" or 5/8" thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 1-1/2" to 4".

C. **EPS: Expanded Polystyrene**

Table C1	**EPS: Expanded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
InsulFoam I	1”	C578 Type I	N/A	N/A	√
InsulFoam VIII	.75”	C578 Type VIII	N/A	N/A	√
InsulFoam II	.75"	C578 Type II	N/A	N/A	√
InsulFoam IX	.75"	C578 Type IX	N/A	N/A	√
InsulFoam HD Composite (SecurShield HD)	1.5”	C578 Type (I, VIII, II, or IX)	√	√	N/A
InsulLam (Various Cover Boards)	1.5"	C578 Type (I, VIII, II. or IX)	√	N/A	N/A
InsulFoam SP	1"	C578 Type VIII	√ (1)	√	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2” SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - (1) Adhered assemblies using Sure-Seal SAT or Sure-Tough SAT.					
Notes: N/A = Not Acceptable √ = Acceptable					

R-Tech Fanfold Recover Board is listed in Paragraph E4 below.

1. **InsulFoam I –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type I. Nominal density of 1.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

2. **InsulFoam VIII –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type VIII. Nominal density of 1.25 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from ¼” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

3. **InsulFoam II –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type II. Nominal density of 1.5 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

4. **InsulFoam IX –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type IX. Nominal density of 2.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

5. **InsulFoam HD Composite –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 1/2” thick SecurShield HD. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

6. **InsulLam –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB),1/2” DensDeck Prime, 1/2” Securock, or 1/2" HP Recovery Board. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

7. **InsulFoam SP –** A closed-cell lightweight expanded polystyrene (EPS) with a factory-laminated fiber glass facer. Nominal density of 1.25 lbs/cubic ft (pcf), and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or ballasted membranes. Can also be used in Adhered systems using Sure-Seal or Sure-Tough SAT Membranes.

D. **XPS: Extruded Polystyrene –** Available through Carlisle is dimensionally stable with high thermal and low water absorption performance capability. XPS is available in varying compressive strengths thicknesses and sizes. Refer to specific product data sheets for physical properties and additional technical information.

Table D1	**XPS: Extruded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
Thermapink 18	.75"	Refer to Product Data Sheet	N/A	N/A	√
Thermapink 25	1"	Refer to Product Data Sheet	N/A	N/A	√
Foamular 400	1"	Refer to Product Data Sheet	N/A	N/A	√
Dow Styrofoam Deckmate Plus	1"	Refer to Product Data Sheet	N/A	N/A	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2" SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - Refer to related products listed in **Spec Supplement P-01 "Related Products"** for other products which may be suitable for use. Carlisle must be contacted for specific requirements.					
Notes: N/A = Not Acceptable √ = Acceptable					

1. **Thermapink 18 or 25 Extruded Polystyrene**
2. **Foamular 400 Extruded Polystyrene**
3. **Dow Styrofoam Deckmate Plus Extruded Polystyrene**

E. **Carlisle Vacuum Insulated Panel (VIP)**

Table E1	**Vacuum Insulated Panel (VIP)** (See below for product descriptions)			
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
Carlisle Optim-R VIP	*1.6"	C1484	√	N/A
Design Restrictions				
*2.6" minimum for total installed system including an additional 2 layers of 1/2" SecurShield HD panels; 1 layer on top and 1 layer on bottom of Optim-R. For adhered systems only. Note: Optim-R VIP cannot be cut or punctured.				
Notes: N/A = Not Acceptable √ = Acceptable				

1. **Optim-R Vacuum Insulated Panel (VIP) –** a high R-Value vacuum insulated panel (VIP) used to provide a low-profile solution when height restrictions exist, such as windows, doors, equipment curbs, etc. Provides an R-38 insulating value in a 2.6" system thickness with up to 35% infill (non-VIP material). Available in 23.6" x 23.6" and 23.6" x 47.2" board sizes.

F. **Cover Boards / Slip Sheets**

Table F1	**Cover Boards** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
SecurShield HD, SecurShield HD Eco	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
SecurShield HD Plus	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
InsulBase HD, InsulBase HD Eco	.5"	C1289-06, Type II, Class 1, Grade 3	N/A	√	N/A
Securock Cover Board	.25"	Refer to Product Data Sheet	√	√	N/A
EcoStorm VSH	.5"	Refer to Product Data Sheet	√	√	N/A
HP Recovery Board	.5"	C208 Grade 2	√	√	√
DensDeck StormX Prime	.625"	C1177	√	√ (1)	N/A
DensDeck Prime	.25"	C1177	√	√ (1)	N/A
DensDeck	.25"	C1177	N/A	√ (1)	N/A
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√	√
HP Protection Mat	6 oz	Refer to Product Data Sheets	N/A	√	√

Design Restrictions

- HP Recovery Board and R-Tech Fanfold not recommended for direct use over Type B and F steel decks.
- Securock Cover Board, HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or DensDeck may not be used directly over New or Existing Lightweight Insulating Concrete Decks OR Structural Concrete.
- Due to some warranty restrictions, DensDeck Prime, DensDeck StormX Prime and DensDeck not recommended for use directly over existing roofing membrane without prior written approval from Carlisle. Contact Carlisle for specific requirements.
- R-Tech Fanfold primarily for use in existing roof re-covers applications or directly over structural or lightweight insulating concrete.
- HP Protection Mat may be used for Ballasted systems over Lightweight Insulating Concrete with a Maximum Warranty duration of up to 15 years. To be used for Mechanically fastened on new construction projects with Lightweight Insulating Concrete, Fiber Cement or Gypsum Deck a Maximum Warranty duration of up to 15 years.

(1) Permitted with roofs with slopes greater than 2" per foot for compliance with external fire codes, refer to UL listings or contact Carlisle.
(2) Acceptable for some roof system designs, Contact Carlisle for recommendations.

Notes: N/A = Not Acceptable √ = Acceptable

1. **SecurShield HD** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer meeting ASTM C1289, Type II, Class 4, Grade 1, for use as a cover board or recover board. Available 1/2" thick 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

   Features Ready Flash, a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

2. **SecurShield HD Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of ½" high-density, closed-cell polyisocyanurate foam core bonded to a premium performance coated glass facer (CGF) specifically designed for use as a cover board, meeting ASTM C1289, Type II, Class 4, Grade 1. Provides 5 times the R-value at one-fifth the weight of traditional gypsum cover boards. Achieves a UL Class A fire rating direct to combustible deck. Available in 1/2" thick, 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

3. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer, meeting ASTM C1289, Type II, Class 4, Grade 1. Specifically designed for use as a cover board or recover board. Available 1/2" thick 4' x 4' (6.5 lbs) and 4' x 8' panel (13 lbs) with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4' x 8' board.

4. **InsulBase HD** – a closed-cell polyisocyanurate foam core insulation board covered on both sides with glass-reinforced felt (GRF) facer meeting ASTM C 1289, Type II, Class 1, Grade 3. The product is available in 4' x 4' and 4' x 8' standard sizes with a thickness of one-half inch with an R-value of 2.5. ASTM C1289, Type II, Class 1, Grade 3.

5. **InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2" thick, 4' x 4' and 4' x 8' panels with an R-value of 2.5.. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only.

InsulBase HD delivers an R-value of 2.5.

6. **Securock Cover Board –** A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier. Available in 1/4" to 5/8" thick and 4' x 4' or 4' x 8' size boards. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

7. **EcoStorm VSH Cover Board –** an engineered composite building material made from a proprietary blend of plastic and cellulose fiber sourced from post-industrial and post-consumer waste streams. EcoStorm VSH is a durable, extremely moisture and mold resistant building material with a core that does not disintegrate or delaminate in the presence of water. Available in 1/2" thick and 4' x 8' size board.

8. **Sure-Seal HP Recovery Board** - A 1/2" or 1" thick high-density wood fiberboard with an asphalt coated facer for use as a cover board or recover board. Available 1/2" or 1" thick and 4' x 4' or 4' x 8' size boards. When used in reroof / no tear-off projects, warranty is limited to 15-year projects.

9. **DensDeck StormX Prime** – a reinforced gypsum cover board with an enhanced, moisture-resistant core and coated glass mat facers on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. DensDeck StormX Prime is extremely durable and is approved for use in assemblies meeting FM's Very Severe Hail (VSH) Classification. Available in 5/8" thickness and 4' x 4' or 4' x 8' size boards.

10. **DensDeck Prime** – gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

11. **DensDeck Cover Board** – gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

12. **R-Tech FanFold Recover Board –** Closed-cell lightweight expanded polystyrene (EPS) with polymeric laminated faces which meets ASTM C 578, while metallic side used with EPDM. Available in thicknesses of 3/8" to 3/4" with coverage 4' x 50' (2 squares). 4' x 8' units are also available.

13. **HP Protection Mat –** A nominal 6-oz per square yard UV resistant polypropylene needle punched fabric used either above the membrane as a slip-sheet for ballast or as an underlayment to the membrane. Available 15' x 300' roll (4500 square foot) weighing 0.06 lbs per square foot.

2.04 Related Materials

A. Flashing

1. **Sure-Seal/Sure-White Pressure-Sensitive Cured Cover Strip:** A 6" or 9" wide and 100' long and 12" wide by 50' long Sure-Seal or Sure-White 60-mil cured EPDM membrane laminated to a nominal 30-mil cured Pressure-Sensitive TAPE. The Cured Cover Strip is ideal for flashing gravel stops, metal edging, Carlisle Seam Fastening Plates and for EPDM repairs.

2. **Sure-Seal Pressure-Sensitive Overlayment Strip:** A nominal 40-mil black, **semi-cured** EPDM membrane laminated to a nominal 30-mil cured, Pressure-Sensitive TAPE. Available in 6" and 9" widths and 100' long rolls used to overlay seams, flash gravel stops, metal edgings and Seam Fastening Plates used for additional membrane securement.

3. **Sure-Seal/Sure-White Pressure-Sensitive Elastoform® Flashing:** A 6" x 100' and 9" or 12" wide by 50' long, 60-mil thick Sure-Seal or Sure-White **uncured** EPDM Flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with EPDM Primer.

   Sure-Seal/Sure-White uncured Pressure-Sensitive Elastoform Flashing is used to flash inside and outside corners, pipes, scuppers and field fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

4. **Sure-Seal/Sure-White Pressure-Sensitive Curb Flashing** – A 20" wide by 50' long Sure-Seal (black) cured 60-mil thick EPDM membrane with 6" wide Pressure-Sensitive TAPE along one edge to be used to flash curbs/skylights, etc.

5. **Sure-Seal/Sure-White 20" Pressure-Sensitive Cured Flashing** - A 20" wide by 50' long Sure-Seal/Sure-White cured 60-mil thick EPDM membrane, with Pressure-Sensitive TAPE the full width already applied, used to flash curbs/skylights, etc.

6. **Sure-Seal/Sure-White Pressure-Sensitive "T" Joint Covers:** A factory cut uncured 60-mil thick EPDM flashing laminated to a nominal 30-mil Pressure-Sensitive TAPE, used to overlay field splice intersections and to cover field splices at angle changes; available in 6" x 6" and 12" x 12" sizes for Sure-Seal (black) and 6" x 6" sizes for Sure-White and Sure-Seal (gray).

7. **Sure-Seal or Sure-White Inside/Outside Corner:** A 7" x 9" precut 60-mil thick (black, gray or white) Elastoform Flashing with a 30-mil Pressure-Sensitive TAPE; used for inside and outside corners, to overlay field splice intersections, and to cover field splices at angle changes.

8. **Sure-Seal / Sure-White Pressure-Sensitive Pipe Seals** with Pressure-Sensitive TAPE on the deck flange are available for use with Sure-Seal/Sure-White Roofing Systems:

   a. Sure-Seal (black) Pressure-Sensitive Pipe Seals are available in sizes: 1/2" to 3" and 1" to 6".

   b. Sure-White and Sure-Seal (gray) Pressure-Sensitive Pipe Seals are available in one size: 1" to 6".

9. **Sure-Seal / Sure-White Pressure-Sensitive Pourable Sealer Pocket**: A pre-fabricated Pourable Sealer Pocket which consists of a 2" wide plastic support strip with Pressure-Sensitive, adhesive backed uncured Elastoform Flashing; available in 4", 6" and 8" diameters for Sure-Seal (black), 6" diameter for Sure-Seal (gray) and 6" and 8" diameter for Sure-White.

B. Splice Tapes, Primers, Adhesives and Sealants/Cleaners

Refer to Product Data Sheets for material coverage rates and proper usage. Prior to the use of any of the products listed below, consult the Material Safety Data Sheets for applicable cautions and warnings.

1. **Sure-Seal or Sure-White Pressure-Sensitive SecurTAPE:** A 3" or 6" wide by 100' long splice tape used for splicing adjoining sections of EPDM membrane. 6" wide splice tape is used for Mechanically Fastened Roofing Systems and 20-year Warranty Systems. Complies with the South Coast Air Quality Management District Rule 1168.

2. **HP-250 EPDM Primer:** A solvent-based primer used to prepare the surface of EPDM membrane for application of SecurTAPE or Pressure-Sensitive products. Available in 1 or 3 gallon pails and as CAV-PRIME Pressurized Cylinders.

3. **Low-VOC EPDM and TPO Primer -** A Low-VOC (volatile organic compound) primer (less than 250 grams/liter) for

priming of EPDM or TPO surfaces prior to application of FAT, Cover strip, SecurTAPE and all other pressure-sensitive products. Available in 1 or 3 gallon pails and as CAV-PRIME Pressurized Cylinders.

4. **Sure-Seal or Sure-White Lap Sealant:** A heavy-bodied material used at splice intersections beneath "T"-joint covers, at cut edges of reinforced EPDM membrane and around uncured pressure-sensitive accessories.

5. **Carlisle Weathered Membrane Cleaner:** A clear, solvent-based cleaner used to loosen and remove dirt and other contaminants from the surface of exposed EPDM membrane prior to applying Carlisle EPDM Primer. Available in 1 and 5-gallon pails.

6. **Low-VOC Membrane Cleaner:** A Low-VOC (volatile organic compound) cleaner (100% EPA-exempted solvents) used to loosen and remove dirt and other contaminants from the surface of exposed EPDM membrane prior to applying Carlisle EPDM Primer. Available in 1 and 5-gallon pails.

7. **90-8-30A Bonding Adhesive:** A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces.

8. **EPDM x-23 Low-VOC Bonding Adhesive**: A Low-VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Adhesive is available in 5 gallon pails.

9. **Low-VOC Bonding Adhesive**: A Low-VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Adhesive is available in 5 gallon pails.

10. **Aqua Base 120 Bonding Adhesive**: A semi pressure-sensitive water based adhesive; used as a 2-sided contact adhesive for bonding Sure-Seal/Sure-White EPDM membrane to various surfaces. Complies with the South Coast Air Quality Management District Rule 1168.

11. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: priming unexposed asphalt prior to applying Flexible FAST Adhesive, adhering Sure-Seal EPDM, horizontally, for the field of the roof, and for adhering Sure-Seal FleeceBACK and Sure-Seal EPDM membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application and 750 sq. ft. per 40 lb cylinder and 1,500 sq. ft. per 85 lb cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per 40 lb cylinder and 2,000 sq. ft. per 85 lb cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.

12. **Water Cut-Off Mastic:** A one-component, low viscosity, self wetting, butyl blend mastic used as a sealing agent between the EPDM membrane and applicable substrates.

13. **Pourable Sealer**: A black, two-component, solvent-free, polyurethane based product used for tie-ins and as a sealant around hard-to-flash membrane penetrating objects such as clusters of pipes and for a daily seal when the completion of flashings and terminations cannot be completed by the end of each work day.

14. **One-Part Pourable Sealer:** A black, one-component, moisture curing, elastomeric polyether sealant used for attaching lightning rod bases and ground cable clips to the membrane surface and as a sealant around hard-to-flash penetrations such as clusters of pipes.

15. **Universal Single-Ply Sealant** A one-part polyether, non-sagging sealant designed for sealing expansion joints, control joints and counter flashings. Available in white or gray.

2.05 Fastening Components

A. **Securement Strips (RUSS)**

1. **Sure-Seal Pressure-Sensitive RUSS** (Reinforced Universal Securement Strip): A 6" or 9" wide, nominal 45-mil thick clean, cured reinforced EPDM black membrane with 3" wide Pressure-Sensitive Tape laminated along one edge for the 6" wide RUSS and along both edges for the 9" wide RUSS.

   a. **6" wide Pressure-Sensitive RUSS** is used horizontally or vertically at the base of walls, curbs, etc., in conjunction with Fastening Plates or Bars below the EPDM deck membrane for additional membrane securement.

   b. **9" wide Pressure-Sensitive RUSS** is utilized for perimeter membrane securement on Sure-Seal Mechanically Fastened Roofing Systems and primary securement on Metal Retrofit Roofing Systems.

2. **Sure-White Pressure-Sensitive RUSS** (Reinforced Universal Securement Strip): A 6" wide, nominal 45-

mil thick clean, cured, reinforced EPDM membrane with 3" wide Pressure-Sensitive Tape laminated along one edge. Used on Sure-White Adhered Roofing Systems.

B. **Fasteners**

The following Table illustrates criteria for fastening of Carlisle Insulation with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Insulation Fastening Criteria

Deck Type	Carlisle Fasteners (1)	Min. Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel or Lightweight Insulating Concrete over Steel	ASAP or InsulFast™	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10	1"	Note (2)	7/32"
	HD 14-10	1"	Note (2)	3/16"
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP, ASAP or InsulFast	Min. 1" (3)	N/A	N/A
Cementitious Wood Fiber	Polymer Gyptec	1-1/2"	Note (4)	N/A
Cementitious Wood Fiber	Lite-Deck Fastener	2”	Note (4)	N/A
Gypsum	Polymer Gyptec	1-1/2"	Note (2)	7/16", 1/2" or 9/16" (5)
Gypsum	Lite-Deck Fastener	2”	Note (5)	Note (6)

Notes: N/A = Not Applicable

(1) Only 3" diameter insulation fastening plates can be used for insulation attachment.
(2) The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most cementitious wood fiber decks do not require pre-drilling; however, Carlisle should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.

(5) Pilot hole size may be varied to maximize pullout resistance.
(6) Gypsum hardness varies, and the desired pullout may determine pilot hole size. This could range from ¼” to 5/16.

All Sure-Seal Fasteners listed below can be used with Sure-Seal or Sure-White Roofing Systems. Refer to the applicable specification for specific requirements.

1. **HP Fastener**: A threaded E-coat square head fastener for insulation and Reinforced membrane attachment for Mechanically Fastened Systems in conjunction with 2” diameter polymer seam plates. Used into steel, wood plank, minimum 15/32" thick plywood or minimum 7/16" thick oriented strand board (OSB).

2. **HP-Xtra Fastener:** An oversized diameter (.315") steel, threaded fastener used in conjunction with HP-Xtra Polymer Seam Plates for membrane securement into minimum 22 gauge steel or wood decks on Mechanically Fastened Roofing Systems.

3. **Pre-Assembled ASAP Fastener**: Carlisle’s InsulFAST Fastener pre-assembled with a 3" diameter plastic plate used for insulation attachment only on Adhered and Mechanically Fastened Roofing Systems.

4. **InsulFast Fastener**: A threaded Phillips drive fastener used with Carlisle Insulation Plates for insulation attachment to steel or wood decks.

5. **HD 14-10 Concrete Fastener**: A #14 threaded fastener with a #3 Phillips drive used for minimum 3,000 psi concrete decks.

6. **CD-10 Fastener**: A hammer-driven, non-threaded E-Coat fastener for use with structural concrete decks rated 3,000 psi or greater.

7. **Polymer Gyptec Fastener**: A non-penetrating, plastic fastener and corresponding plate used with lightweight deck substrates such as fibrous cement and gypsum.

8. **Lite-Deck Fastener:** A deep, coarse threaded fastener used to secure insulation to gypsum and cementitious wood fiber decks in conjunction with Lite-Deck Plates.

9. **HP Term Bar Nail-In**: A 1-1/4" long expansion anchor with threaded drive pin used for fastening Sure-Seal Termination Bar or Seam Fastening Plates to concrete, brick or block walls. The fastener is set by hammering

the drive pin into place.

C. **Fastening Plates And Bars**

1. **HP Polymer Seam Plate**: A 2" diameter plastic barbed fastening plate used with Carlisle HP Fasteners for membrane and Pressure-Sensitive RUSS securement for Mechanically Fastened Roofing Systems over steel roof decks.

2. **HP-Xtra Polymer Seam Plate:** A 2 3/8” diameter plastic barbed fastening plate used with HP-Xtra Fasteners for membrane and Pressure-Sensitive RUSS securement for Mechanically Fastened Roofing Systems over steel roof decks.

3. **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.

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

5. **SecurFast Insulation Fastening Plates:** A nominal 2-7/8” hexagon metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

6. **Accutrac Insulation Plates:** A nominal 3” square, recessed or flat bottomed, metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener. Flat bottom plate is used with manufactured Philips Head fasteners only.

7. **Gyptec Plates**: A 3” (26 gauge) steel plate for insulation and a 2” (22 gauge) steel plate for membrane attachment. The plates are stamped galvalume-coated steel.

8. **Polymer Batten Strip**: A 1" wide by 1/20" thick polymer bar which is pre-punched 6" o. c. packaged in 250' long coils used for membrane securement on Mechanically Fastened Roofing Systems in conjunction with HP or HP-X Fasteners. Refer to applicable Product Data Sheets.

9. **Metal Fastening Bar**: A 1" wide metal bar which is pre-punched 6" o. c. and packaged in 10' long strips to be used for membrane securement on Mechanically Fastened Roofing Systems.

2.06 Insulation Securement Adhesive

1. **Flexible FAST Adhesive:** A spray (full coverage) or bead-applied, two-component polyurethane, construction grade, low-rise expanding foam adhesive used for attaching approved insulations to compatible roof decks or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.

2. **Flexible FAST Dual Tank:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. Flexible FAST Dual Tanks utilize an HFO blowing agent. HFO (hydrofluoroolefin) blowing agents are widely recognized as the next-generation environmentally friendly blowing agent, replacing their HFC (hydrofluorocarbon) predecessor. When extruded at 12” on center the coverage rate is 3,500 to 3,700 sq.ft. per set of Dual Tanks.

3. **Flexible FAST Dual Cartridge and 5-gallon Jug Adhesive:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. When extruded at 12” on center the coverage rate is 400-600 sq.ft. per carton of Dual Cartridges or 2,000-2,500 sq.ft. per set of 5-gallon Jug Adhesive.

4. **OlyBond 500 Bag in a Box** – A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates. Packaged in 5-gallon boxes of Part A and Part B formulations that are applied using a mechanical dispenser system. Applied in 1/2" to 3/4" beads or ribbons at the rate of 1 gallon per 150-250 square feet for 12" o.c. bead spacing. Perimeter bead spacing patterns and acceptable insulation and deck types are listed in the applicable Product Data Sheet.

5. **OlyBond 500 BA Spot Shot** - A two-component, polyurethane construction grade, low-rising expanding adhesive designed for bonding insulation to various substrates. Applied in 1/2" to 3/4" beads or ribbons using a portable 1:1 applicator (oversized, dual-cartridge caulking gun). Refer to the Product Data Sheet for bead spacing with reference to building height.

2.07 Vapor/Air Barrier

1. **General**

   a. The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated by the specifier, especially on projects with high interior humidity, such as, swimming pools, breweries, pulp mills, etc.

   b. If insulation is to be adhered to the vapor retarder with FAST Adhesive, the vapor retarder must be compatible and shall be fully adhered to the substrate. Available products include Carlisle's VapAir Seal 725TR Air and Vapor Barrier, VapAir Seal MD Air and Vapor Barrier and spray or roller applied butyl coatings. Installation requirements for Carlisle's VapAir Seal 725TR Air and Vapor Barrier are identified in **Spec Supplement G-08 "Application Procedures for Carlisle's VapAir Seal 725TR Air and Vapor Barrier/Temporary Roof"** and Carlisle's VapAir Seal MD Air and Vapor Barrier are identified in **Spec Supplement G-12 "Application Procedures for Carlisle's VapAir Seal MD Air and Barrier"** in the Carlisle Technical Manual.

2. **Carlisle VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

3. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23' long (460 square feet).

4. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application.

5. **CCW-702 Primer and 702LV Primer (Low-VOC)** - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., DensDeck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

6. **CCW-702WB –** a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, DensDeck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

2.08 Edges And Terminations

A. **General**

Products listed below can be used with any of the available Carlisle Roofing Systems. Refer to the applicable Carlisle details and installation instruction manuals for specific installation criteria.

B. **Products**

1. **SecurEdge 200**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI ES-1 certified.

2. **SecurEdge 2000**: An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened and Ballasted assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI ES-1 certified.

3. **SecurEdge 300 Fascia System**: A snap-on edge system consisting of a 24 gauge galvanized metal spring clip water dam and 50 or 63-mil thick aluminum Kynar 500, colored anodized finish or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 10". Custom fascias and colors are available upon request. ANSI/SPRI/FM-4435 ES-1 certified.

4. **SecurEdge 300 Coping:** A snap-on coping system that incorporates 20 gauge anchor cleats with pre-slotted holes, a concealed joint cover and 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 300 Plus Coping** with 16 gauge anchor cleats for added performance.

5. **SecurEdge 300 Gutter** system incorporates 1” wide extruded internal gutter brackets and aluminum or galvanized steel gutter. Available in 040” (1.00 mm.), or .063” (1.60 mm) aluminum, and 22 gauge or 24 gauge Kynar 500 coated galvanized steel. Gutter support brackets are extruded aluminum. Available in box style, chamfer style, and offset profiles. Engineered to meet ANSI/SPRI GT-1.

6. **SecurEdge 3000**: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and an aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI ES-1 certified.

7. **SecurEdge 400 Coping:** two-piece assembly that consists of a continuous cleat and a decorative snap-on coping cover. This product features two cleat options: a 22-gauge (G90) pre-punched continuous cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched continuous cleat with fasteners spaced at 12" on center. SecurEdge 400 Coping is offered in 10' cleat and coping cover lengths.

8. **SecurEdge 400 Spring-Tite Gravel Stop:** is a three-piece assembly that consists of a continuous cleat, spring-stop, and decorative snap-on Gravel Stop cover. This product is available in 10' standard lengths, and features a 22-gauge (G90) continuous cleat with pre-punched slotted holes for fasteners at 12" on center. Concealed splice plates and fasteners are included with purchase.

9. **SecurEdge 400 Snap Lock Gravel Stop**: is a two-piece assembly that consists of a continuous cleat and a decorative snap-on Gravel Stop cover. This product features two cleat options: a 22-gauge (G90) pre-punched cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched cleat with fasteners spaced at 12" on center. SecurEdge 400 Snap Lock Gravel Stop is offered in 10' standard cleat and coping cover lengths.

10. **SecurSeal 200/300/400 Drip Edge:** Designed for use on Adhered and Mechanically Fastened Roofing Systems. Includes a 22 gauge continuous 12' pre-punched 90-degree angle cleat and 10’ or 12' long fascia sections. Incorporates concealed joint covers and strong 1-1/4" ring shank nails to provide long-term holding power. A selection of colors in 24 gauge steel, Kynar 500 and 32 or 40-mil aluminum finish or Kynar 500 is available. ANSI/SPRI/FM-4435 ES-1 Certified.

11. **SecurEdge 4000:** A two-piece assembly that includes a continuous cleat and a decorative fascia cover. Available in pre-painted Kynar 500-coated 0.40” formed aluminum and 24-gauge Galvalume steel, this product features 22-gauge pre-punched cleats with fasteners spaced at 12” on center. ANSI/SPRI ES-1 certified.

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12. **Sure-Seal Ballast Retaining Bar**: A ballast retaining perimeter securement system comprised of a slotted (4" on center) extruded mil aluminum retention bar with an integrated compression fastening strip. 1-1/2" stainless steel fasteners with Neoprene washers are provided for stable securement.

13. **Termination Bar**: A 1" wide and 98-mil thick extruded aluminum bar pre-punched 6" on center which incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

14. **SecurEdge Term Bar Fascia:** A 1.75" wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040" aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12' lengths for fewer joints/seams, fewer sections to handle and faster installation.

15. Other Carlisle Metal Edgings / Copings suitable for use with roofing system included in the section, can be found in the Specification Supplement G-11-18 Metal Edging.

2.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance, once a month or more, is necessary to service rooftop equipment.

1. **Walkway types:**

   a. **Sure-Seal/Sure-White Pressure-Sensitive Walkway Pads**: Sure-Seal (black or gray) or Sure-White (white) molded walkway pads with Pressure-Sensitive TAPE used to provide protection for areas of EPDM membrane that are exposed to regular rooftop maintenance.

   b. **Sure-Seal Interlocking™ Rubber Pavers**: 24" X 24" X 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in black and terra cotta.

   c. **Hanover Ballast and Lightweight Ballast Pavers:** The standard, 24" x 24" x 1-13/16" thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2" x 23-1/2" x 1-1/4" thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

2.10 Other Carlisle Accessories

Refer to Spec Supplement P-01 "Related Products" for additional accessories.

Part III – EXECUTION

Prior to commencing with the installation of any of the EPDM Membrane Systems refer to Paragraph 1.05 "Warranty Tables" for applicable components and proper securement method suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are considered to be beyond the scope of this specification.

3.01 General

A. Safety Data Sheets (SDS) must be on location at all times during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

B. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

C. A proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.

3.02 Roof Deck/Substrate Criteria

A. Proper decking shall be provided by the building owner. The building owner or their designated representative must

ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system, as well as construction loads and live loads, in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

B. When insulation is mechanically fastened to the roof deck, withdrawal resistance tests are strongly suggested to determine the suitability of the roof deck. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual proper procedures for conducting pullout tests.

C. Defects in the substrate surface must be reported and documented to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Roofing Applicator shall not proceed with installation unless defects are corrected.

D. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when polyurethane adhesive is used to attach the roof insulation.

E. **For all projects** (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.

F. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

G. For direct application over an acceptable roof deck/substrate or when HP Protective Mat is specified and approved by Carlisle as the membrane underlayment in accordance with the Roof Deck and Substrate Criteria Table, the substrate must be smooth, steel trowel finished (structural concrete), free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material.

H. **On retrofit - recover projects**, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation of type specified so it is relatively flush (+/- 1/4") with the existing surface.

1. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding PVC membrane).

2. **For existing PVC membranes**, if the membrane is not removed, it must be cut into maximum 10' by 10' sections. All PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

3. When installing this roofing system over an existing **gravel surfaced built-up roof**, **loose gravel must be removed**. Power brooming is recommended by Carlisle to remove the loose gravel, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent insulation from bridging.

4. On retrofit projects, all existing phenolic insulation must be removed.

7. Refer to table below for other Recover/Retro-fit considerations.

I. The following table identifies the **acceptable roof decks/substrates** and the **minimum underlayment** requirements for Carlisle's EPDM Roofing Systems.

Note: Refer to the Warranty Tables, Paragraph 1.05, of this specification, for the minimum underlayment requirements for a specific Warranty Coverage.

Roof Deck & Substrate Criteria

Certain warranty restrictions apply for projects with warranties greater than 15 YR. Refer to Table V "Re-Roofing Substrate Criteria" for warranty limitations in paragraph 1.05.

Acceptable Roof Deck/Substrate	EPDM Membrane		
NEW CONSTRUCTION	Adhered - Design "A"	Ballasted - Design "B"	Mechanically Fastened
Steel (min. 22 gauge) (1)(2)	Insulation	Insulation	Insulation
Structural Concrete (min. 3000 psi)	Direct Application (11)	Insulation	HP Protective Mat (10)
Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application (11)	Insulation	Direct Application (11)
Wood Planks (minimum 3/4" thick)	Direct Application	Insulation	Direct Application (11)
Fibrous Cement	Insulation	Insulation	HP Protective Mat
Lightweight Insulating Concrete	Note 3 (10)	HP Protective Mat (10)	Direct Application (10)
RETROFIT / NO TEAR-OFF	Adhered - Design "A"	Ballasted - Design "B"	Mechanically Fastened
Existing Smooth Surface BUR or Mineral Surface Cap Sheet	Direct Application (4) (11)	Insulation	Direct Application (4) (11)
Gravel Surfaced BUR (5)	Insulation	Insulation	Insulation
Coal Tar Pitch (5)(6)	Insulation (9)	Insulation	Insulation
Modified Bitumen	Direct Application (8) (11)	Insulation	Direct Application (8) (11)
Existing Single-Ply	Insulation	Insulation (7)	Direct Application (7) (11)
Sprayed-in-place Urethane	Complete Tear-off Required	Insulation	Complete Tear-off Required
RETROFIT / TEAR-OFF	Adhered - Design "A"	Ballasted - Design "B"	Mechanically Fastened
Existing roof material removed (regardless of deck type)	Insulation	Insulation	Insulation

Notes:

(1) Local codes must be consulted regarding thermal barrier requirements.

(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge.

(3) The Design "A" Adhered Roofing System may be specified directly over a new approved cellular or perlite lightweight insulating concrete substrate with a minimum compressive strength of 225 psi. Except when the lightweight insulating concrete is poured over slotted steel decks, pressure relief vents must be specified at a minimum rate of 1 every 2000 square feet. Direct Application is not permitted where the lightweight concrete is poured over an existing roofing material. Refer to **Spec Supplement G-04 "Adhered Application Over Lightweight Insulating Concrete".**

(4) Sure-Seal (black) Adhered and Mechanically Fastened Systems may be applied directly to the substrate provided asphalt on existing smooth surfaced built-up roof has a softening point above 185°F (85°C). Sure-White (white-on-black) Roofing Systems are not recommended for direct application to the substrate due to possible staining of the membrane surface. For direct application over smooth BUR or granule surface BUR or in conjunction with HP Mat make sure substrate is clean and free of roofing cement and fresh asphalt to avoid sheet contamination and staining of white color membrane.

(5) Loose gravel must be removed to avoid entrapment moisture.

(6) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.

(7) An approved Insulation/underlayment is required over existing ballasted single-ply systems and PVC roofing systems of any type.

(8) Direct application permitted over smooth surfaced modified bitumen. Membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where EPDM splices intersect modified bitumen field seams, 6" wide Elastoform or Pressure-Sensitive Flashing must be applied over intersections.

(9) If insulation is specified to be secured to an existing coal tar pitch roof with Carlisle FAST Adhesive or hot asphalt, minimum 1.5" thick Polyisocyanurate insulation is the required minimum thickness when Sure-Seal (black) EPDM is specified. Minimum 1" thick Polyisocyanurate is the required minimum thickness when Sure-White (white) EPDM is specified.

(10) For direct application, membrane system warranties are limited to 15 YR unless specifically approved by Carlisle.
(11) Maximum warranty available is 20 YR with 55 MPH warranty wind speed (72 MPH warranty wind speed over structural concrete, wood planks or plywood) Peak gust wind speed coverage. Carlisle may be contacted for other options.

J. **Vapor Retarder Installation**

For Carlisle's Vapor Retarder refer to **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier".** Follow the respective vapor retarder manufacturer's recommended installation procedures and the specifier's instructions for the installation of the product specified. When insulation is to be set in adhesive, verify compatibility with Carlisle when Vapor Retarder by others is specified.

K. **Wood Nailers**

1. Install wood nailers in locations that have been designated by the specifier and as approved by Carlisle. Refer to Design Reference **DR-08 "Wood Nailers and Securement Criteria"** for Wood Nailer Criteria.

2. Wood nailers are not covered by the Carlisle Warranty.

3.03 Insulation/Underlayment

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the dew point.

2. For new construction projects in cold climate regions, the use of vapor retarders or air barriers is strongly recommended to protect insulation from moisture generated during construction.

3. Multiple layers of insulation are recommended with all joints staggered between layers.

4. Do not install more insulation/underlayment than can be covered by membrane in the same day.

5. All insulation boards must be butted together with no gaps greater than 1/4". Gaps greater than 1/4" are not acceptable.

6. Restrictions:

a. Carlisle Roofing Systems cannot be specified in conjunction with Phenolic Insulation.

b. Fiberglass insulation cannot be specified with Carlisle's Design "A" Adhered and Mechanically Fastened Roofing Systems, even if overlaid with additional insulation or membrane underlayment.

c. Do not specify perlite boards directly under the EPDM membrane on Design "A" Adhered or Mechanically Fastened Roofing Systems.

d. Wood fiberboard manufactured by others is not an acceptable underlayment for use with Design "A" Adhered Roofing Systems unless approved in writing by Carlisle prior to installation.

e. For all EPDM Roofing Assemblies, the use of insulation by others is not acceptable when a Carlisle Membrane System Warranty is specified. Carlisle insulation must be used.

3.04 Insulation Attachment

A. **General**

1. Prior to proceeding with insulation securement refer to Warranty Tables, Paragraph 1.05, for attachment method and appropriate fastening density required for the specific Carlisle Warranty.

B. **Adhered Roofing Systems**

1. **Mechanical Attachment**, insulation fastening density will vary based on insulation type, thickness, and required warranty. Warranty Tables in Paragraph 1.05 should be referenced for fastening density and the appropriate Carlisle detail may be consulted to identify acceptable fastening pattern.

a. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Refer to Design Reference **DR-05 "Insulation Fastening Patterns"** for fastening pattern reference.

b. When insulation securement is to comply with Factory Mutual (FM) approvals, follow the requirements of the specifier concerning additional securement at the roof perimeter and corners. Also refer to Design Reference **DR-05 "Insulation Fastening Patterns"** for various fastening patterns.

c. On Reroof/No Tear off projects with a maximum roof height of 40', any Carlisle Insulation (i.e., 1/2" SecurShield HD, HP Recovery Board, Polyisocyanurate less than 1-1/2" thick) may be secured at the minimum rate of 11 Fasteners per 4' x 8' board (5 Fasteners per 4' x 4' board).

d. When Oriented strand board (OSB) is specified for membrane underlayment, utilize StormBase OSB/Polyiso Composite, mechanically fastened to the deck at the rate 17 fasteners for 4 x 8 board in accordance with Carlisle Details. When positioning OSB, butt edges and stagger joints of adjacent panels.

2. **Adhesive attachment**, Carlisle Urethane Adhesive Full Spray (Flexible FAST) or Bead (Flexible FAST or Olybond) may be used. When bead adhesive is specified bead spacing will vary based on Warranty coverage, refer to Warranty Tables, Paragraph 1.05 and appropriate Carlisle Details. CAUTION: Apply adhesive bead so that the distance from the edge of the board does not exceed half the bead spacing (i.e. within 6" of bead spacing of 12" O.C.).

a. CAUTION: Do not apply urethane adhesives directly to un-weathered asphalt, (new or residual).

b. CAUTION: Especially in cold regions on tear-off projects or new construction gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.

c. On FM Global insured projects, consult FM Global's local representative concerning the use of adhesive to attach insulation to steel decks.

d. Check to ensure the substrate is clean, free of debris, other contaminants, and dry. Adhesive cannot be applied to a wet or a damp surface.

e. Apply Adhesive over the dry substrate area at the coverage rates indicated in **Spec Supplement G-03 "Insulation Attachment with Flexible FAST Adhesive".**

f. Allow the adhesive to rise up approximately 1/8" to 3/4", depending on dispensing method, and develop strings prior to setting insulation boards into adhesive.

Note: String-time is measured by touching the adhesive with a splice wipe and looking for development of "strings" of adhesive as you pull the splice wipe out of the adhesive. With Flexible FAST Adhesive, string time is generally around 1-1/2 – 2 minutes after application at room temperature.

g. **Walk the boards into the adhesive and roll using the 30" wide, 150 pound segmented steel roller** to ensure full embedment. Optimal set up time should be approximately 5 to 7 minutes.

CAUTION: Walking on the boards immediately after placement in adhesive can cause slippage/movement until the adhesive has started to set up.

CAUTION: If the boards easily slide, string time has not been achieved.

On roofs with a slope greater than 1/2" in 12", begin adhering insulation at the low point and work upward to avoid slippage.

One person should be designated to walk/roll in all boards. Relief cuts may be necessary to allow lifted board to lay flat, or constant weight (a minimum 10 lbs for 5-15 minutes per lifted area) may be necessary to achieve adequate adhesion.

h. Refer to **Spec Supplement G-02 "Flexible FAST Adhesive Equipment and Set-Up Requirements"** and **G-03 "Insulation Attachment with Flexible FAST Adhesive"** for application procedures and coverage rates.

3. **Alternate attachment method**, the specifier may select an alternate insulation attachment that incorporates a solid mopping of the insulation with hot asphalt (ASTM D312, Type III or IV). If the attachment method is to be covered by the Carlisle Warranty, Carlisle must be contacted for specific requirements. Upon review and acceptance by Carlisle, the maximum warranty coverage available is limited to 20 Year with maximum Peak Gust Wind Speed Coverage of 72 mph.

   a. Extruded or Expanded Polystyrene insulation are not acceptable when this alternate attachment method is specified.

   b. The existing gravel surfaced built-up roof must be scraped to remove all loose gravel. Large blisters that may prevent continuous embedment of insulation must be repaired. The surface of the substrate must also be dry and clear of foreign material.

   c. On coal tar pitch, when deemed compatible by the specifier, minimum 1.5" Polyisocyanurate is the required membrane underlayment when using Sure-Seal (black) membrane. If Sure-White (white) membrane is used, minimum 1" thick Polyisocyanurate is required.

   d. For successful attachment, proper asphalt temperatures must be maintained and the specifier's requirements concerning the installation of a base sheet (where required) and quantity of hot asphalt must be followed.

   e. The maximum insulation board size shall not exceed 4' X 4'. Trim insulation boards around crickets and saddles to ensure continuous embedment.

   f. Care must be exercised to prevent contamination of the top surface of the insulation. Asphalt oozing through insulation joints must be wiped from the surface. Contact with fresh asphalt can result in discoloration of the Sure-White membrane.

   g. Use of grid nailer, subdividing the roof into individual sections of 2400 square feet, is not required, but its use is strongly recommended.

   h. The wood nailers are installed relatively flush with the insulation surface and the membrane is to be fastened with seam fastening plates and Carlisle HP fasteners on 12" o.c. For wood nailer installation, refer to Design Reference **DR-08 "Wood Nailers and Securement Criteria"**.

C. **Ballasted Roofing Systems**

1. Insulation boards shall be loose laid over the substrate.

   Note: If insulation securement is specified, only Carlisle approved insulation adhesive may be used. Mechanical securement of roof insulation is not permitted due to increased probability of membrane puncture during ballast installation or periodic rooftop maintenance.

1. Refer to Roof Deck/Substrate Criteria in Paragraph 3.02 for further information.

   Note: The use of cover boards, such as SecurShield HD, SecurShield HD Plus, DensDeck or DensDeck Prime or DensDeck StormX Prime or Securock, is not permitted in conjunction with Ballasted Assemblies to reduce possible membrane punctures. Hard cover boards do not provide sufficient cushioning beneath the membrane and therefore when the assembly is subjected to traffic, the membrane is subjected to higher point loading resulting in puncture.

D. **Mechanically Fastened Roofing Systems**

1. **Carlisle Fasteners and Fastening Plates are required for insulation securement**. Refer to Insulation Fastening Criteria Table in Paragraph 2.05, for appropriate fastener and deck penetration. The fastener can be used with either 2" diameter Sure-Seal Seam Fastening Plates or 3" diameter Sure-Seal Insulation Fastening plate.

2. **Any Carlisle approved insulation or cover board** shall be mechanically fastened to the roof deck at the minimum rate of **1.25 fasteners and plate per every 8 square feet** (5 fasteners in a 4 x 8 board) for warranties up to 15 year. Projects with up to 20 year or greater warranties (with standard wind speed coverage) require the use of 6 fasteners and plates in a 4' x 8' board (1 per 5.333 square feet).

CAUTION: Sure-Seal Polyisocyanurate Insulation with a thickness less than 1.5" installed over an

existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation.

3. Use of DensDeck, DensDeck Prime and DensDeck StormX Prime should be limited to assemblies with slopes greater than 2” per foot to ensure compliance with external fire codes, care shall be exercised to ensure polymer seam plates are fully seated.

3.05 Membrane Placement and Securement

A. **General**

1. **Ensure** that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.

2. **Sweep** all loose debris from the substrate.

3. If aesthetics are of concern when Sure-White EPDM is to be used, protection should be specified to avoid discoloration of the white membrane surface resulting from adhesive residue or excess foot traffic.

4. Adjoining sheets of EPDM membrane are spliced together using SecurTAPE and Primer.

5. In addition to the primary membrane securement (Bonding for Adhered, Ballasting for Ballasted Systems and Fastening for Mechanically Fastened assemblies), additional membrane securement is required at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope or combined slopes exceed 2" in one horizontal foot, and at other penetrations in accordance with the applicable Carlisle details. Refer to Paragraph G for additional membrane securement.

B. **Membrane Placement**

EPDM membrane with factory applied tape is available in various widths. Prior to unrolling sheets ensure the tape side is properly located so that seams are properly shingled down slope. (Pre-applied SecurTAPE should always be facing downwards once the sheet is unrolled).

1. **Position** EPDM membrane over the acceptable substrate without stretching. For mechanically fastened assemblies ensure proper number of perimeter sheets are properly positioned along the perimeter of the roof. And field sheets are positioned perpendicular to the steel deck flutes.

2. **Allow** the membrane to relax approximately 1/2 hour prior to splicing (Ballasted systems), bonding (Adhered Systems) or fastening (Mechanically Fastened).

3. **Place** adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum splice width (2-1/2” or 5-1/2” depending on warranty duration). It is recommended all splices be shingled to avoid bucking of water.

C. **Membrane Securement / Bonding - Adhered Roofing Systems (90-8-30A, EPDM x-23 LVOC, Low-VOC Bonding Adhesive or Aqua Base 120)**

1. **Adhere** EPDM membrane to an acceptable substrate with Carlisle Bonding Adhesive. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Contact type bonding adhesive must be applied to both the membrane and the surface to which it is being bonded.

2. On projects at high altitudes (6,000' and above), rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

3. **Fold** membrane sheet back so approximately half of the underside of the sheet is exposed. Sheet fold should be smooth without wrinkles or buckles.

4. **Stir** Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.

CAUTION: If aesthetics are of concern when Sure-White EPDM membrane is used, protect the white surface next to the edges of the folded membrane sheet so Bonding Adhesive will not discolor the white surface. Do not place Bonding Adhesive containers or their lids directly on the white surface of the Sure-White EPDM membrane.

5. **Apply** Bonding Adhesive evenly, without globs or puddles, with a plastic core medium nap paint roller. A 9"

roller will easily fit into the 5-gallon containers.

Apply contact type bonding adhesive to both the membrane sheet and the substrate to achieve continuous coating of both surfaces at a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate). **Depending on adhesive used and the substrate type adhesive coverage rate will vary**. Refer to Product Data Sheets for the appropriate adhesive for the proper coverage rate.

A mechanical roller dispenser or a mechanical sprayer can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained. When used, **the adhesive must be rolled after applying** with a plastic core medium nap paint roller to provide continuous coverage.

CAUTION: Due to solvent flash-off, condensation may form on freshly applied Bonding Adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of Bonding Adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat at the coverage rate, which is approximately half of the coverage rate stated above to the previously coated surface when conditions allow for continuing.

6. **Allow** adhesive to flash-off until it is tacky but will not string or transfer to a dry finger touch.

7. **Roll** the coated membrane into the coated substrate while avoiding wrinkles.

8. **Brush** down the bonded half of the membrane sheet, immediately after rolling the membrane sheet into the adhesive, **with a soft bristle push broom** to achieve maximum contact.

9. **Fold** back the unbonded half of the membrane sheet and repeat the bonding procedure.

D. **Membrane Securement / Bonding - Adhered Roofing Systems (CAV-GRIP III)**

1. **Adhere** EPDM membrane to an acceptable substrate with CAV-GRIP III Bonding Adhesive. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Contact type bonding adhesive must be applied to both the membrane and the surface to which it is being bonded.

2. On projects at high altitudes (6,000' and above), rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

3. **Fold** membrane sheet back so approximately half of the underside of the sheet is exposed. Sheet fold should be smooth without wrinkles or buckles.

4. **Connect CAV-GRIP III Cylinder** with hose and spray gun. Bonding surfaces must be dry and clean.

   CAUTION: If aesthetics are of concern when Sure-White EPDM membrane is used, protect the white surface next to the edges of the folded membrane sheet so Bonding Adhesive will not discolor the white surface. Do not place CAV-GRIP III Cylinders directly on the white surface of the Sure-White EPDM membrane.

5. **Spray apply CAV-GRIP III** Bonding Adhesive evenly to both the membrane and substrate with a minimum 2" overlap to ensure 100% coverage. Avoid heavy areas or puddles that can skin over, trap solvent and create a blister. Refer to Product Data Sheets for the proper coverage rate.

   CAUTION: Solvent flash-off can lower surface temperature below the dew point causing moisture to form on the adhesive. Slide your hand across the flashed-off adhesive on the insulation or cover board to ensure moisture has evaporated and the adhesive surface is dry and tacky prior to installing the membrane.

6. **Allow** adhesive to flash-off, especially the heavy areas of adhesive, until it is tacky but will not string or transfer to a dry finger touch.

7. **Roll** the coated membrane into the coated substrate while avoiding wrinkles.

8. **Brush** down the bonded half of the membrane sheet, immediately after rolling the membrane sheet into the adhesive, **with a soft bristle push broom**.

9. **Roll the membrane with a 150 lb weighted segmented steel roller after brooming to achieve maximum contact.**

10. **Fold** back the unbonded half of the membrane sheet and repeat the bonding procedure.

E. **Membrane Securement / Ballasting - Ballasted Roofing Systems**

1. Ballasting - General

   a. Use of temporary ballast to prevent wind uplift is the responsibility of the Carlisle Authorized Roofing Applicator. For immediate protection against wind uplift, Carlisle requires ballast to be installed as each section of the installation is completed.

   b. When using polystyrene insulation directly beneath the membrane, ballast must be applied immediately after membrane installation to prevent potential damage to polystyrene insulation products from excessive heat.

   c. Care must be exercised during application of gravel or pavers. Heavily traveled areas during ballast installation must be protected by placing temporary protection courses to prevent possible damage to the EPDM deck membrane and insulation.

2. Ballast Types/Coverage Rates

   a. The coverage rates listed in this section are considered minimum and are required by Carlisle for issuance of the standard Carlisle warranty. Depending on specific project conditions (building height, parapet height and project location), additional ballast may be necessary to provide wind uplift protection. Refer to “Attachment I” at the end of this section for suitable ballast types and coverage rates. **Comply with the specifier's requirements when an additional ballast coverage rate is specified.**

   b. **Rounded Water-Worn Gravel** must be applied over the EPDM membrane at the minimum rate of **1000 pounds per square** and must be evenly distributed to maintain an average of 10 pounds per square foot.

ASTM D 7765 SIZE NUMBER	MINIMUM COVERAGE RATE (pounds per square)	AVERAGE COVERAGE RATE (lbs./sq. ft. continuously distributed)
4 (1-1/2" nominal diameter)	1000	10
3 (2" nominal diameter)	1000	10
2 (2-1/2" nominal diameter)	1300	13
1 (3-1/2" nominal diameter)	1300	13

   Notes: In the field of the roof, some bare spots resulting from installation are permitted; however, they must not exceed 64 square inches and must be limited to no more than 2 per square (100 square feet). No bare spots are permitted in the perimeter area of the roof that is 10' wide.

   c. **Crushed Stone** must be applied in conjunction with Sure-Seal HP Protective Mat placed over the EPDM membrane. The crushed stone must be applied at the minimum rate of **1000 pounds per square** and must be evenly distributed to maintain an average of 10 pounds per square foot.

   d. **Smooth Surfaced Individual Concrete Pavers** or **Lightweight Interlocking Concrete Pavers**

      1) Lightweight interlocking pavers and individual concrete pavers with a surface other than steel troweled finish must be installed over Sure-Seal HP Protective Mat. Contact Carlisle for verification of acceptable pavers.

      2) **Individual Concrete Pavers,** when specified, must be installed loose laid and butted with no gaps greater than 1/2".

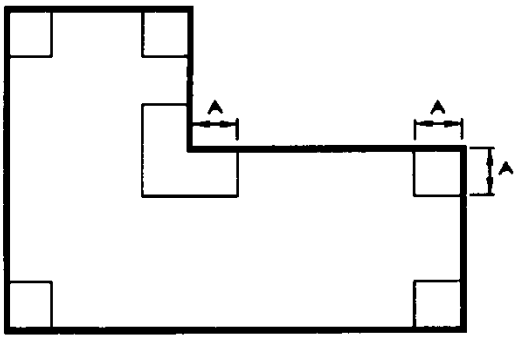
         Note: Do not install pavers heavier than 100 pounds per unit unless approved in writing by Carlisle.

      3) **Lightweight Interlocking Concrete Pavers**, when specified, must be installed in accordance with the respective manufacturer's specification and as approved by Carlisle prior to installation.

3. Ballast Criteria for Up to 20 Year Extended Warranty

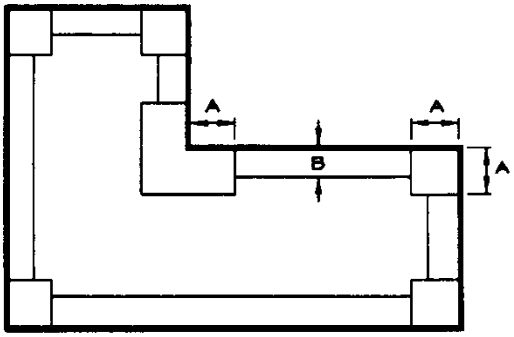
   a. Refer to installations below for calculating corner/perimeter areas for the noted warranty wind speeds available.

Ballast Requirements for 72 mph Warranty



A (Corners) = .4 Times the Building Height (10' minimum)

Ballast Requirements for 80 mph Warranty



A (Corners) = .4 Times the Building Height (10' minimum)
B (Perimeters) = 10'

b. At corner and/or perimeter areas, ballast shall be 2-1/2" nominal rounded water worn gravel conforming to gradation #1 or #2 in accordance with ASTM -D7765 method of sizing. Coverage rate shall be a minimum of 13 pounds per square foot.

c. In field areas, ballast shall be 1-1/2" nominal rounded water worn gravel conforming to gradation #4 in accordance with ASTM-D7765 method of sizing. Coverage rate shall be a minimum of 10 pounds per square foot.

4. Placement of Sure-Seal HP Protective Mat

a. When specified or required by Carlisle, position Sure-Seal HP Protective Mat loosely over the membrane with all edges overlapped a minimum of 6".

b. Extend the mat a minimum of 2" above the anticipated ballast level at the perimeter and around penetrations except for roof drains and scuppers.

c. The mat must extend to drain bases, scupper openings and the base of Dutch gutters **but must not restrict drainage**.

d. Additional matting must be installed around penetrations to prevent direct contact between crushed stone or pavers and flashing.

Note: Following the placement of the HP Protective Mat, it is necessary to install the ballast or temporary ballast to prevent the movement or displacement of unballasted fabric.

F. **Membrane Securement / Mechanically Fastened Roofing Systems (Fastening)**

1. EPDM membrane shall be mechanically attached to the structural deck with specified Carlisle Fasteners and designated Plates or Bars, for fastening densities and numbers of perimeter sheets refer to Warranty Tables, Paragraph 1.05.

2. Membrane Fastening Selection Table

Membrane Fastener Selection

Deck Type	Carlisle Fasteners*	Carlisle Plate
Steel or Lightweight Insulating Concrete over Steel	HP	HP Polymer or Seam Fastening Plates**
	HP-Xtra	HP-Xtra Polymer
Structural Concrete, rated 3,000 psi or greater	CD-10	HP Polymer or Seam Fastening Plates
	HD 14-10	HP Polymer or Seam Fastening Plates
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP	HP Polymer or Seam Fastening Plates
Cementitious Wood Fiber	Polymer Gyptec	Gyptec Plates – 2" Dia.
Gypsum	Polymer Gyptec	Gyptec Plates – 2" Dia.

Refer to Warranty Tables in Paragraph 1.05 for fastening densities and number of perimeter sheets.
*Determine proper fastener length for deck penetration, refer to Table 2.05B.
**Seam Fastening Plates for Base of Wall Angle Change Only

3. On steel decks, membrane shall be positioned with seams perpendicular to the steel deck flutes. This allows the external forces on the roof assembly to be distributed between multiple steel deck panels. Refer to Design Reference **DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual.

4. When mechanical securement is not provided in some of the Carlisle Universal Details (i.e., pipes and pourable sealer pockets), additional Seam Fastening Plates must be used for membrane securement. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

5. **Perimeter Sheets**

The number of perimeter sheets and fastener spacing is dependent on the building height, wind zone location and warranty duration as outlined in Warranty Tables in Paragraph 1.05.

The roof perimeter is defined as all edges of each roof section (i.e., parapets, building expansion joints at adjoining walls, penthouse walls, etc.). When multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 10'. Perimeter sheets are not required at the base of the wall at the lower level.

Note: Expansion joints, control joints and fire walls in the field of the roof or roof ridges with slopes less than 3" to the horizontal foot are not considered as part of the roof perimeter.

Perimeter sheets can be formed by using individual 5', 6.5' wide sheets or by sub-dividing 8' or 10' wide field sheet using 9" Pressure-Sensitive RUSS strip or row of seam fastening plates as described below.

a. **Individual perimeter sheets (5', 6.5')**

Position membrane along the perimeter of the roof over the acceptable insulation/underlayment. The perimeter membrane width from line of securement to line of securement should be approximately 4.5' – 6.0' wide depending on perimeter sheet size.

b. **RUSS (Reinforced Universal Securement Strip) Method**

1) When **field sheets are positioned parallel to a roof perimeter, 9" wide Pressure-Sensitive RUSS** shall be placed approximately down the center of the 8' or 10' wide field membrane sheets. When a RUSS divides a field sheet in half, two perimeter sheets are created.

2) When a 8' or 10' wide reinforced **EPDM membrane sheet extends perpendicular to the edge of the roof**, install **9" wide Pressure-Sensitive RUSS** beneath the EPDM membrane sheet approximately of 3'-6"' for the 8' field sheet to approximately of 4' -0" for the 10' field sheet from the edge of the roof. When multiple perimeter sheets are required, additional RUSS may be positioned approximately 3'-6" to 4'-0" from the previous RUSS to create additional perimeter sheets.

CAUTION: 6" wide Pressure-Sensitive RUSS is only available with 3" wide SecurTAPE on one side

and therefore cannot be used to form perimeter sheets.

3) Refer to Applicable Carlisle Details for installation.

c. **Fastening Plates Method (When Option a and b are not feasible)**

When field sheets extend to the edge of the roof, approved fastening plates can be installed through the reinforced membrane 3'-6" to 4'-6" from the roof edge which will be flashed with 6" wide Pressure-Sensitive Cured Cover Strip. When field sheets are positioned parallel to the roof edge, fastening through the membrane along the centerline creates two perimeter sheets. When multiple perimeter sheets are required, additional fastening plates shall be positioned 3'-6" to 4'-6" from the previously installed fastening plates. Refer to applicable Carlisle Details for installation.

d. **Building with Special Conditions:**

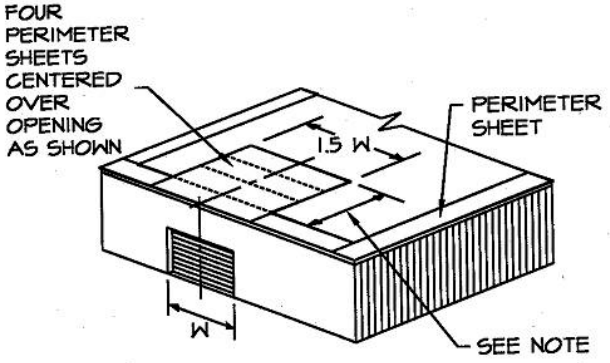
Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities) will typically require additional perimeter membrane securement, an increased fastening density or other enhancement.

e. **Buildings with large openings**

When any wall contains major openings with a combined area which exceeds 10% of the total wall area on which the openings are located, either four 5' or 6.5' wide or two 10' wide reinforced EPDM membrane sheets (centered over the opening) must be specified as shown.

1) 9" wide Pressure-Sensitive RUSS (Reinforced Universal Securement Strip) shall be specified in conjunction with the 8' or 10' wide membrane sheets.

2) The 9" wide Pressure-Sensitive RUSS is to be positioned beneath the 8' or 10' wide membrane sheet along the centerline and shall be secured with Polymer Seam Plates (required for steel decks) or Seam Fastening Plates. All fasteners and plates shall be spaced at the rate required at the roof perimeter as shown on the membrane securement charts on the previous pages.



3) As an option to the above perimeter securement, an adhered membrane section may be used in lieu of the mechanically fastened membrane at large openings in accordance with the Carlisle Specification for the Sure-Seal/Sure-White Adhered Roofing System.

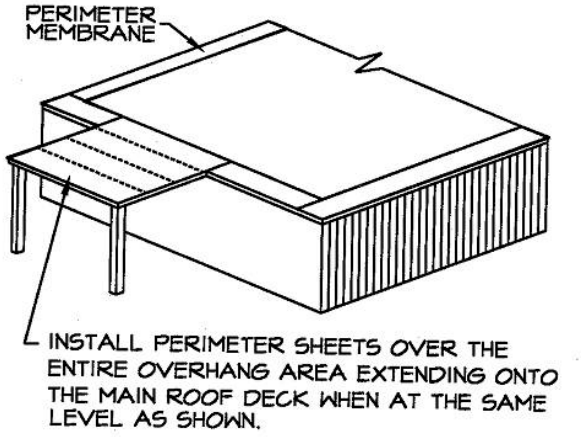
NOTE: Depth of perimeter area, noted above, shall not be less than 2.5 times the width of the opening.

f. **Buildings with overhangs**

The membrane must be specified with securement 3-1/2' to 4-1/2' over the entire overhang area extending onto the main roof deck a minimum of 3-1/2' when at the same level.

1) This can be achieved utilizing 8' or 10' wide membrane sheets in conjunction with 9" wide Pressure-Sensitive RUSS as described above.

2) As an option, an adhered membrane section may be used in lieu of the mechanically fastened membrane at building overhangs in accordance with the Carlisle Specification for the Sure-Seal/Sure-White Adhered Roofing System.



6. **Field Membranes**

a. **Position** field membrane sheets adjacent to perimeter membrane to allow a minimum 6" overlap, 3" from the center of the plate or bar in front and back.

Note: For 20-year warranty projects with a roof slope less than 1/4" in 12" (minimum 1/8" slope required) or when splices buck water, strip in seams with a 6" Pressure Sensitive Overlayment or Cured Cover Strip.

b. **Secure the field and perimeter membrane sheets** along the pre-printed blue line approximately 3" from the edge of the membrane sheet at the approved fastening density with the required Carlisle Fastener and Carlisle Seam Plates or Bars. Refer to "Membrane Fastener Selection" Table in Paragraph 3.05 for further information.

Correct fastener placement must conform to the following:

1) The **minimum** distance between the bottom membrane edge and the nearest edge of the fastening plate or bar must be **2"**.

2) The **minimum** distance between the overlapping membrane edge and the nearest edge of the fastening plate or bar must be **2"**.

c. On new construction projects, where direct application of the membrane is specified over HP Protection Mat over lightweight insulating concrete, standard 2" diameter Seam Fastening Plates must be used since the Polymer Seam Plates will not properly seat.

d. **Position** adjoining membrane sheets to allow a minimum overlap of 6" where Fastening Plates are located (along length of the membrane); at the same time overlap end roll sections (width of the membrane) a minimum of 3", for Projects with a maximum 15 Year Warranty. For 20 Year Warranties, end roll sections should be overlapped 6" with 6" SecurTAPE.

e. Work shall progress across the roof with a minimum 6" overlap provided at the previously secured sheet edge. The opposite length of the sheet must be secured with approved Fastening Plates or bars and overlapped accordingly.

G. **Membrane Splicing**

1. **General**

a. **Sure-Seal/Sure-White - Adhered or Ballasted Roofing Systems**

1) **Projects with 10, 15, 20 and 25 year warranties – Detail U-2A and U-2A.1**

Side Laps / End Laps: Tape splices must be a minimum of 2-1/2" wide using **3" wide field-applied Pressure Sensitive SecurTAPE OR 3" Factory-Applied TAPE (FAT)**. (**Detail U-2A or U-2A.1**).

Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and 6"x6" minimum (black) or 7"x9" (white) Pressure-Sensitive 'T'-Joint Cover, (for membranes of maximum thickness of 75 mil). (**Detail U-2A**). **For membranes of thickness of 90 mil**, Apply a second layer of 12"x12" Pressure-Sensitive 'T'-Joint Cover centered over 6"x6" 'T'-Joint Cover. (**Detail U-2A.1– Option 2**)

Note: In lieu of the 6"x6" or 12"x12" Pressure-Sensitive 'T'-Joint cover, a 6"x6" or 12"x12" section of Pressure-Sensitive Elastoform flashing may be used as a 'T'-Joint cover. Pressure-Sensitive Elastoform flashing is available in rolls of 6", 9" and 12".

2) **Projects with 30 year warranties – Details U-2A.1 or U-2B.1**

OPTION 1:

Side Laps / End Laps: Tape splices may be a minimum **3" wide Factory-Applied Tape (FAT) OR 3" wide Field-Applied SecurTAPE**. In addition the entire field splice must be overlaid with a continuous 6" wide Pressure Sensitive Overlayment Strip. **(See Detail U-2A.1-Option 1).**

Splice Intersections: Overlay the entire field splice with a continuous 6” wide Pressure-Sensitive Overlayment Strip. Apply Lap Sealant at all Intersections between Pressure-Sensitive Overlayment Strip. (See **Detail U-2A.1-Option 1**).

OPTION 2:

Side Laps / End Laps: Tape splices may be a minimum of 5-1/2” wide using **6” wide Factory-Applied Tape (FAT) OR 6” wide Field-Applied SecurTAPE**. **(Detail U-2A.1– Option 2).**

Splice Intersections: ’T’-Joints are to be flashed with a bead of lap sealant and 6”x6” minimum Pressure-Sensitive ‘T’-Joint Cover. Apply a second layer of 12”x12” Pressure-Sensitive ‘T’-Joint Cover centered over 6” x 6” ‘T’-Joint Cover. (**Detail U-2A.1– Option 2).**

Note: Pressure Sensitive Elastoform flashing is available only in rolls of 6”, 9” or 12” rolls. Material used for Overlayment shall be cut from the appropriate roll.

b. **Sure-Tough or Sure-White (reinforced) Mechanically Fastened Roofing Systems**

1) **Projects with 10, 15 and 20 year Warranties – Detail MF-2A and MF-2B**

Side Laps: Regardless of Warranty duration, where fastening plates are placed, shall be spliced using **6” wide Factory-Applied Tape (FAT) OR 6” wide Field-Applied SecurTAPE**. The splice tape shall be centered over the plates to extend approximately 2” on each side. SecurTAPE must extend approximately 1/8” beyond the edge of the overlapping membrane. **(Detail MF-2A).**

End Laps: Shall be spliced using either **3” wide SecurTAPE** resulting in a minimum splice of 2-1/2” wide for a maximum of 20 year warranties. **(Detail MF-2B).**

Splice Intersections: ’T’-Joints are to be flashed with a bead of lap sealant and 6”x6” pressure sensitive ‘T’-Joint Cover, (for membranes of maximum thickness of 75 mil). (Detail MF-2A).

2) **Projects with 25 and 30 year Warranties – Detail MF-2D and MF-2B**

Side Laps: Where fastening plates are placed, shall be spliced using **6” wide Factory-Applied Tape (FAT) OR 6” wide Field-Applied SecurTAPE**. The splice tape shall be centered over the plates to extend approximately 2” on each side. SecurTAPE must extend approximately 1/8” beyond the edge of the overlapping membrane. **(Detail MF-2D).**

End Laps: Shall be spliced using **6” wide Factory-Applied Tape (FAT) OR 6” wide Field-Applied SecurTAPE** resulting in a minimum splice of 5-1/2” wide for a maximum of 30 year warranties. **(Detail MF-2B).**

Splice Intersections: ’T’-Joints are to be flashed with a bead of lap sealant and 6”x6” Pressure Sensitive ‘T’-Joint Cover. Apply a second layer of 12”x12” Pressure Sensitive ‘T’-Joint Cover centered over 6” x 6” ‘T’-Joint Cover. **(Detail MF-2D).**

2. For Splicing procedures, cautions and warnings refer to **Spec Supplement E-02 “EPDM Membrane Splicing and Splice Repairs”** for information.

H. **Additional Membrane Securement**

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 as listed below.

Securement may be achieved as follows:

1. **Pressure-Sensitive RUSS (Reinforced Universal Securement Strip)**

Pressure-Sensitive RUSS is a 6" wide strip of reinforced EPDM membrane with factory-applied 3" wide SecurTAPE and is installed in conjunction with Sure-Seal Fasteners and 2" diameter Seam Fastening Plates spaced a maximum of 12" on center below the EPDM deck membrane (Polymer Seam Plates or Polymer Batten Strips are required for Mechanically Fastened Roofing Systems over steel decks). The securement strip can be fastened horizontally to the structural deck or vertically at walls and curbs.

a. Loose lay the 6" wide Pressure-Sensitive RUSS along parapet walls 6” to 9” from corners and fasten with Seam Fastening Plates and the appropriate Carlisle fastener to the roof deck or into the parapet wall. Spacing of the Seam Fastening Plates shall be a maximum of 12" on center for up to 20 year warranties (less than 90 mph warranty wind speed) and a maximum of 6” on center for 25 and 30 year warranties.

1) For horizontal attachment, the reinforced strip must be positioned a minimum of 1/8" to a maximum of 6" away from the angle change with pressure sensitive side facing away from the parapet and towards the roof plane.

2) For vertical attachment, the reinforced strip must be attached to the vertical wall with pressure sensitive side extending onto the roof surface.

CAUTION: Horizontal RUSS attachment is required when insulation is attached with adhesives to a vapor barrier or an existing asphalt based roof. For various options, Refer to **Spec Supplement G-08 “Application Procedures for Carlisle’s VapAir Seal 725TR Air and Vapor Barrier”.**

b. Adjoining sections of the reinforced strip need not be overlapped; however, gaps between adjoining sections must not exceed 1".

CAUTION: When RUSS is used for membrane securement along metal edgings, refer to the appropriate detail for applicable installation criteria. For some metal edge details, adjoining sections of the reinforced strip must be overlapped and spliced.

c. **When using Pressure-Sensitive RUSS, clean the underside of the membrane with Carlisle Primer** and allow proper flash-off prior to removing the release film from the RUSS.

CAUTION: On Adhered Systems discontinue bonding adhesive application on the underside of the membrane in area of the sheet where contact with the Pressure-Sensitive RUSS is to occur. Contact between Pressure-Sensitive RUSS and membrane coated with bonding adhesive can result in poor peel and shear values.

2. **Seam Fastening Plates**

When the use of Pressure-Sensitive RUSS is not feasible (at smaller curbs or skylights), a 2" diameter Seam Fastening Plates may be used.

a. Seam Fastening Plates may be installed horizontally into the structural deck or into walls or curbs.

b. Securement of the EPDM membrane with the approved Carlisle Fasteners and Seam Fastening Plates must be a maximum of 12" on center starting 6" minimum to 9" maximum from inside and outside corners.

c. If horizontal wood nailers are provided, secure the Seam Fastening Plates to the wood nailer with Carlisle HP Fasteners. Nails (i.e. ringshank, roofing, etc.) are not acceptable for securement.

d. After securing the Seam Fastening Plates, flash in accordance with the appropriate Carlisle Detail.

3.06 Flashings

For other requirements which must be complied with in order for Carlisle warranty to be issued, refer to Spec Supplement G-05 “Flashing Considerations / Metal Work”.

A. **General Considerations**

1. All vertical field splices at the base of a wall or curb must be overlaid with Pressure-Sensitive “T” Joint Covers, a 6" x 6" section (with rounded corners) of Sure-Seal/Sure-White Pressure-Sensitive Uncured Elastoform Flashing centered over the field splice.

2. **Pressure-Sensitive Uncured Elastoform Flashing** must be limited to the overlayment of vertical seams (as required at angle changes), or to flash inside/outside corners, vent pipes, scuppers and other unusually shaped penetrations where the use of Pre-molded Pipe Seals, cured EPDM membrane or Pressure-Sensitive Cured Cover Strip or Overlayment Strip is not practical

N**ote:** When using Pressure-Sensitive products in colder temperatures, use a heat gun to warm the product. Apply heat to the EPDM flashing side of the product. Do not apply heat directly to the preapplied adhesive. The Pressure-Sensitive Flashing must be applied immediately after Primer flashes off. Refer to “Membrane Splicing

with SecurTAPE" for application procedures in colder temperatures.

3. When using **Pressure-Sensitive Cured Cover Strip or Overlayment Strip** to overlay Seam Fastening Plates or metal edging, etc., **Sure-Seal HP-250 or LOW-VOC Primer** must be used to clean the membrane and metal flanges.

4. Special requirements may apply for certain flashing details for projects with extended warranty durations. Refer to Carlisle published details for applicable requirements when warranty coverage exceeds beyond 20 years.

B. **Walls, Parapets, Curbs, Skylights, etc.**

1. Use continuous deck membrane with Pressure-Sensitive RUSS or Seam Fastening Plates along the angle change.

a. When using Pressure-Sensitive RUSS, refer to Paragraph 3.05 G, Additional Membrane Securement, for attachment criteria.

b. When Seam Fastening Plates are used to secure continuous deck membrane, use minimum 6" wide Pressure-Sensitive Cured Cover Strip or Overlayment Strip to overlay fasteners and plates.

2. When the use of continuous deck membrane for wall flashing is not feasible, a separate piece of cured EPDM membrane may be used.

NOTE: 60 mil cured non reinforced membrane may be used as a separate wall flashing with projects of warranty 20 years or greater. The flashing may also incorporate membrane equal of thickness to that of the EPDM membrane at the deck level.

3. Adhere flashing to the wall and terminate in accordance with the applicable Carlisle Detail.

4. Use a "T" Joint Cover or 6" x 6" Pressure-Sensitive Elastoform Flashing with rounded corners to overlay vertical splices as shown on the applicable Carlisle Detail.

5. Refer to applicable Carlisle Details for various corner flashing options.

C. **Flashing of other Penetrations**, refer to **Spec Supplement G-05 for "Flashing Considerations / Metal Work"** and the applicable Carlisle detail for specific requirements.

D. **Flashing of Difficult Penetrations,** refer to **Spec Supplement G-13 for "LIQUISEAL Liquid Flashing"** for additional information and specific requirements.

3.07 Roof Walkways

Walkways are to be installed at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), other locations designated by specifier, and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to **Spec Supplement G-06 "Roof Walkway Installations".**

3.08 Daily Seal

On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration. Refer to **Spec Supplement G-07 "Daily Seal / Clean Up".**

3.09 Optional Color Coating

1. **If optional color coating is specified, Carlisle's final inspection for warranty must be conducted prior to the coating application.** This will permit the completion of any "Repair for Warranty" items without consideration for the removal and reapplication of the coating. The owner will then verify that the coating was applied after receiving the warranty.

2. If **Sure-Seal X-Tenda Coat** is specified to color the membrane surface, refer to the Carlisle X-Tenda Coat Specification for installation requirements.

3.10 Clean Up

For Daily tie-off or cleaning procedures refer to **Spec Supplement G-07 "Daily Seal / Clean Up"** in the Carlisle Technical Manual.

1. **General**

   a. Termination bars and surface mounted reglets must be installed directly to the wall surface.

   b. Carlisle recommends SecurEdge Metal Edging/Coping, Sure-Seal Termination Bar or Sure-Seal Drip Edge for membrane termination. Installation instruction sheets for Carlisle supplied accessories are available from Carlisle.

      Note: Refer to Warranty Tables in Section 1.05 for specific metal edge requirements for projects with Total System Warranties or those with extended peak gust wind speed coverage greater than 80 miles per hour.

   c. Metal work by others, when specified, must be fastened to prevent the metal from pulling free or buckling and sealed to prevent moisture from entering the roofing system or building. **Unless supplied by Carlisle, metal work securement is not included in this specification and is excluded from the Carlisle warranty.**

   d. **On retrofit projects**, existing counter flashing, edging, expansion joint covers, copings, etc., shall not be reused unless investigated by the specifier to determine its compliance to Carlisle's current details.

SPECIFICATION ATTACHMENT
EPDM ROOFING SYSTEMS

Sure-Seal® Design "B" Loose-Laid Ballasted Roofing Systems
"Attachment I"
Ballast Criteria

July 2024

A. General

The specifier must evaluate the various conditions by which the ballast requirements are dictated. Building height, parapet height and project wind zone are major factors when specifying a minimum ballast requirement. The guidelines for ballast requirements which have been published by the following organizations should be referenced:

1. American National Standards Institute, ANSI/SPRI RP-4 (current edition) Wind Design Guide for Ballasted Single-Ply Roofing Systems. This standard is referenced in the current edition of the International Building Code (IBC).

2. Factory Mutual (FM) Research Corporation Loss Prevention Data Sheets 1-28 and 1-29.

B. Ballast Types/Coverage Rates

The coverage rates listed below are considered minimum and are required by Carlisle for the issuance of the Carlisle warranty. Additional ballast coverage rates may be specified to provide additional wind uplift resistance.

1. **Rounded Water-Worn Gravel** may be placed directly on the EPDM membrane without additional membrane protection.

   a. Minimum acceptable gradation:

      1) Nominal 1-1/2" rounded water worn gravel which conforms to the following gradation: 50% retained by a 3/4" screen, 95% retained by a 1/2" screen and 98% retained by a 1/4" screen. Use ASTM C136 method for sizing gravel.

      2) Alternately, #4, #3 and #24 stone (sized in accordance with ASTM D7765 method of sizing) may be used in lieu of the stone listed above.

      3) Coverage rate shall be no less than 1000 pounds per 100 square feet and ballast must be evenly distributed to maintain an average of 10 pounds per square foot.

   b. Nominal 2-1/2" rounded water worn gravel which conforms to gradation #1 or #2 when sized in accordance with ASTM D7765 method of sizing. Coverage rate shall be no less than 1300 pounds per 100 square feet and gravel must be evenly distributed to maintain an average of 13 pounds per square foot.

2. **Standard sizes of coarse aggregate** - Based on ASTM D7655

Size Number	1	2	3	4
Nominal Size Square Openings	3-1/2" to 1-1/2"	2-1/2" to 1-1/2"	2" to 1"	1-1/2" to 3/4"
Amounts Passing Each Lab Sieve (Square Opening), Percent (%)				
4"	100			
3-1/2"	90 to 100			
3"		100		
2-1/2"	25 to 60	90 to 100	100	
2"		35 to 70	90 to 100	100
1-1/2"	0 to 15	0 to 15	0 to 15	90 to 100
1"				20 to 55
3/4"	0 to 5	0 to 5		0 to 15
1/2"			0 to 5	
3/8"				0 to 5

3. **Crushed Stone**, when specified, shall conform to the gradations approved for rounded water-worn gravel and must be installed in conjunction with Sure-Seal HP Protective Mat.

   a. HP Protective Mat must extend a minimum of 2" above the crushed stone at the perimeter and penetrations, but must be discontinued at scuppers, Dutch gutters and at drain bases.

   b. A minimum 6" overlap between adjacent sheets of HP Protective Mat must be specified.

4. **Individual Concrete Pavers**

   a. Individual pavers with a minimum weight of 18 pounds per square foot may be substituted for nominal 1-1/2" stone. Individual pavers with a minimum weight of 22 pounds per square foot may be substituted for nominal 2-1/2" stone.

   b. Individual pavers must be a maximum of two feet square. Unless otherwise required by Carlisle, pavers must weigh no more than 100 pounds per unit to allow for easy removal and replacement.

   c. Individual pavers with a surface other than a steel troweled finish as approved by Carlisle, must be installed over Sure-Seal HP Protective Mat and must be accepted by Carlisle prior to installation.

      Elevating pavers should increase life expectancy, reduce freeze/thaw effects and promote more positive drainage. Acceptable pedestals can be specified under corners of pavers to elevate paver.

   d. Individual concrete pavers shall be loose laid and butted together with no gaps greater than 1/2".

5. **Lightweight Interlocking Concrete Pavers**

   a. Depending on the type of lightweight interlocking system, Sure-Seal HP Protective Mat or manufacturer's recommended matting may be required by Carlisle as a protection layer for the membrane. **Carlisle must be consulted prior to installation concerning protective matting requirements.**

   b. Lightweight interlocking pavers (minimum 10 pounds per square foot) may be substituted for nominal 1-1/2" stone or nominal 2-1/2" stone.

   c. When lightweight interlocking pavers are specified, the respective paver manufacturer must be consulted concerning installation criteria.

   CAUTION: The securement method suggested by the respective interlocking paver manufacturer must be reviewed by Carlisle to determine membrane accessibility. If access to the membrane system is impaired by the paver interlocking mechanism (mechanical clips, strapping, adhesive, etc.), the building owner must assume the responsibility of providing access to the membrane for the purpose of investigation and warranty related repairs.

   d. Lightweight Ballast Paver – 2’ x 2’ x 1.25” weighing 15 lbs/sq. ft.

1. **Walkways**

CAUTION: Molded Walkway pads not recommended within 10 feet of the perimeter of the roof on ballasted systems to avoid discontinuation of the primary membrane securement (ballast). In lieu of molded walkway pads, concrete pavers can be used when walkway is to be extended into the perimeter area.

a. **Sure-Seal/Sure-White Pressure-Sensitive Walkway Pads**: Sure-Seal (black) or Sure-White (white) molded walkway pads with Pressure Sensitive TAPE used to provide protection for areas of EPDM membrane that are exposed to regular rooftop maintenance.

b. **Carlisle Sure-Seal Interlocking Rubber Pavers**: A 2' x 2' x 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a environmentally sound design. Paver features bi-directional drainage and freeze/thaw stability. The Sure-Seal Rubber Paver can be installed directly over the EPDM membrane without a separation layer.

c. **Hanover Pedestal Paver** – Used for light traffic areas associated with rooftop or garden roof applications. 2'x2'x2.25" thick precast concrete pavers weighing 22 psf with an elevated clearance of 1/2" from incorporated footing. The pedestal paver can either be installed in conjunction with a separation layer of HP Protective Mat or using Pedestal and shims.

Note: EPDM Pedestal and Leveling Shims – A 3/8" fixed height EPDM rubber pedestal incorporating 1/8" spacer tabs. The pedestal allows pavers to follow the contour of the roof and may be combined with 1/8" or 1/16" leveling shims to prevent paver movement and provide a more stable feel. Both Hanover Pavers and leveling shims are available from Carlisle. (Refer to product section **Spec Supplement P-01 "Related Products"**.)

d. **Hanover Ballast and Lightweight Ballast Paver** - The standard, 24" x 24" x 1-13/16" thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2" x 23-1/2" x 1-1/4" thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

e. **Other Walkway Considerations:**

Smooth concrete pavers when specified in conjunction with insulation that is mechanically fastened, must be loose laid over a slip sheet of membrane or 2 layers of HP Protective Mat. When insulation is attached with Flexible FAST Adhesive, concrete pavers may be placed over one layer of HP Protective Mat. Pavers cannot weigh more than 100 pounds per paver for ease of removal.

1. Walkways are considered a maintenance item and are excluded from the Carlisle warranty.

2. Window washing equipment will require special maintenance. Runways or window washing tracks must be utilized to prevent damage to membrane or insulation. Such details must be reviewed by Carlisle to determine reasonable access to the membrane and associated insulation/underlayment components.

END OF SECTION

SPECIFICATION ATTACHMENT
EPDM ROOFING SYSTEMS

Sure-Seal®/Sure-White®/Sure-Tough™ EPDM Roofing Systems
Adhered, Ballasted and Mechanically Fastened

"Attachment II"
25/30 Year Warranty
Design Enhancements

July 2024

Information contained in this Attachment outlines necessary enhancements required for projects where a 25 or 30-year Warranty is specified. At the applicator's or specifier's discretion, projects may be forwarded to Carlisle for warranty review prior to installation or bid.

Section **Page**

A. General

1. All products specified for these roofing assemblies must be products manufactured or marketed by Carlisle.
2. On retrofit projects, all existing roofing material shall be totally removed.
3. All projects, a final shop drawing shall be approved by Carlisle prior to installation. Shop drawings must include all pertaining details. As-Built projects are not recommended.
4. The roof assembly will vary based on warranty wind speed and hail coverage. As identified in Warranty Tables, included in this attachment.
5. An air/vapor barrier shall be used when required and must be sealed around perimeter and roof penetrations. When not specified, the roof membrane shall be adhered over perimeter wood nailer along edges to prevent air infiltration along edging, regardless of assembly type (Ballasted, Adhered and Mechanically Fastened).
6. Due to warranty length, covered in this attachment, special consideration should be given to the total R-Value of the roof assembly. Utilizing the International Energy Conservation Code (IECC) to determine the minimum level of insulation for the building project's location is recommended.
7. To optimize energy efficiency, insulation shall be installed in multiple layers with joints staggered.
8. For limitations and specific types of insulation/underlayments refer to "Section E Insulation/Underlayments"
9. 1/4" per horizontal foot slope is preferred; however, 1/8" slope with sufficient number of drains and crickets / saddles may be accepted. Assemblies described in this attachment are governed by the maximum slope limit described in the current Carlisle publication.
10. Refer to **Spec Supplement E-02 "EPDM Membrane Splicing and Splice Repairs"** and applicable Carlisle Details for additional design enhancements.

B. Membrane Criteria

1. **Adhered Roofing Systems**, the roofing membrane shall be a minimum of **60-mil thick Sure-Seal/Sure-White Non-Reinforced Membrane** utilizing enhanced details for **25 Year Warranty** Duration

   OR

   90-mil Sure-Seal Non-Reinforced Membrane OR 75-mil thick Sure-Tough Reinforced Membrane utilizing enhanced details for **30 Year Warranty** Duration.

2. **Ballasted Roofing Systems**, the roofing membrane shall be a minimum of **60-mil thick Sure-Seal Non-Reinforced Membrane** utilizing enhanced details for **30 Year Warranty** Duration

   OR

   90-mil thick Sure-Seal Non-Reinforced Membrane utilizing enhanced details for **30 Year Warranty** Duration. Maximum membrane width, not to exceed 10' wide.

3. **Mechanically Fastened Roofing Systems**, the roofing membrane shall be a minimum of **75-mil thick Sure-Tough Reinforced Membrane** utilizing enhanced details for 25 or 30 Year Warranty Duration.

4. **Non-Reinforced Membrane Criteria and Hail Coverage**

Years	Sure-Seal or Sure-White Non-Reinforced Membranes					
	Warranty Wind Speed Coverage				Minimum Membrane Thickness	Hail Coverage
	55, 72 or 80 mph		90 to 100 mph	110 to 120 mph		
	Adhered (2)	Ballasted (1)	Adhered (2)	Adhered (2)		
25 or 30 year	√	√	√	N/A	Sure-Seal/Sure-White 60-mil	**Adhered Systems (Sure-Seal / Sure-White)** 1" Dia. Hail Coverage requires a min. 60-mil Adhered to Cover Board. 2" Dia. Hail Coverage requires a min. 90-mil Adhered to Cover Board **Additional Design Requirement** Cover Board set in Flexible FAST Adhesive (SecurShield HD, SecurShield HD Plus, DensDeck Prime, DensDeck StormX Prime, or Securock - Adhered Only). **Ballasted Systems (Sure-Seal)** 2" Dia. Hail Coverage requires a min. 60-mil. 3" Dia. Hail Coverage requires a min. 90-mil. 1" Dia. Hail Coverage requires minimum 45-mil.
30 year	√	√	√	N/A	Sure-Seal / Sure-White 90-mil	

Notes: N/A = Not Acceptable √= Acceptable

(1) Sure-White membrane is not recommended for ballasted systems.
(2) Standard 90-8-30A, EPDM x-23 Low-VOC, or CAV-GRIP III Bonding Adhesive must be utilized.

5. **Reinforced Membrane Criteria and Hail Coverage**

Years	Sure-Tough Reinforced Membranes							
	Warranty Wind Speed Coverage						Minimum Membrane Thickness	Hail Coverage **(Adhered Systems Only)**
	55, 72 or 80 mph		90 mph		100 to 120 mph			
	Adhered (1)	Mech. Fastened	Adhered (1)	Mech. Fastened	Adhered (1)	Mech. Fastened		
25 year	√	√	√	√	√	N/A	Sure-Tough 75-mil	1" Dia. Hail Coverage requires a Min. 60-mil Adhered to Cover Board. 2" Dia. Hail Coverage requires a Min. 75-mil Adhered to Cover Board. **Additional Design Requirement:** Cover Board set in Flexible FAST Adhesive (SecurShield HD, SecurShield HD Plus, DensDeck Prime, DensDeck StormX Prime or Securock - Adhered Only).
30 year	√	√	√	√	√	N/A	Sure-Tough 75-mil	

Notes: N/A = Not Acceptable √= Acceptable

(1) Standard 90-8-30A, EPDM x-23 Low-VOC, or CAV-GRIP III Bonding Adhesive must be utilized.

C. Adhered System Design Criteria (25 YR to 30 YR Warranty)

1. Building height shall not exceed 100'. For projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, please submit to Carlisle for review.
2. Local Wind Zone per ASCE 7-2010 (Category II Map) shall not exceed 120 mph.
3. All Field Splice “T-Joints” must be overlaid as described in **Detail U-2A.1.**
4. The criteria is for compliance with Carlisle’s requirements for warranty, when FM Compliance is required for a specific project refer to FM Documentation and Carlisle Code Listings.
5. 6” on center fastening required for Pressure Sensitive RUSS.
6. Table below outlines insulation/underlayment requirements and application attachment methods:

Maximum Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment		Insulation/Underlayment Attachment			Metal Edging
			# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
				Field	Perimeter	
55 or 72 MPH	1-1/2" to 2" (25 psi) Polyisocyanurate (1)		16	6" (4)	6"	Carlisle Drip Edge or SecurEdge 200, 300, or 400 may be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
	Cover Board over Insulation	1/2” HP Recovery Board (2)(6)				
		1/2" SecurShield HD or 1/2” SecurShield HD Eco (3)				
		1/2” SecurShield HD Plus (3)				
		1/4" DensDeck Prime (3)				
		1/4" Securock (3)				
80 MPH	1-1/2" to 2" (25-psi) SecurShield Polyiso or 1-1/2" to 2" (25-psi) SecurShield Eco		20	6"	6"	Carlisle Drip Edge (5), SecurEdge 2000, 3000 or 4000.
	Cover Board over Insulation	1/2” SecurShield HD or 1/2” SecurShield HD Eco (3)	16			
		1/2” SecurShield HD Plus (3)				
		1/2" DensDeck Prime (3)				
		1/2" Securock (3)	20			
90 MPH	**Cover Board over Insulation**	1/2” SecurShield HD or 1/2” SecurShield HD Eco (3)	24	FS	FS	SecurEdge 2000 or 3000
		1/2” SecurShield HD Plus (3)	20			
		1/2" DensDeck Prime (3)				
		1/2" Securock (3)				
100 MPH	**Cover Board over Insulation**	5/8" DensDeck Prime or 5/8” DensDeck StormX Prime (3)	16	FS	FS	SecurEdge 2000 or 3000
		5/8" Securock (3)				
		1-1/2” StormBase (OSB/Polyiso Composite) (3)				
		1/2” EcoStorm VSH (3)				
		2” SecurShield HD Composite (3)				
		1/2” SecurShield HD Plus (3)	24			

Notes:
FS = Full Spray or Ribbons @ 4" O.C.
All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for lower speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

(1) Not for use directly on concrete decks when adhesion is specified to the structural deck.
(2) For Building heights between 51'-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(3) Hail coverage offered with substrate when Flexible FAST Adhesive is used for cover board attachment.
(4) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.
(5) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge to perimeter wood nailers.
(6) 1/2" Recovery Board limited to 55 mph.

D. Mechanically Fastened System Design Criteria (25 YR to 30 YR Warranty)

1. Building height limitation depends on structural deck type. Projects with structural concrete or steel decks are limited to 100' in height. Projects with plywood decks (3/4" min.) are limited to a maximum height of 30'. Projects with Wood plank (1" min.) are limited to a maximum height of 60'. For projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, please submit to Carlisle for review.
2. Local Wind Zone per ASCE 7-2010 (Category II Map) shall not exceed 120 mph.
3. All Field Splice "T-Joints" must be overlaid as described in **Detail MF-2D.**
4. This criteria is for compliance with Carlisle's requirements for extended warranties, when FM Compliance is required for a specific project refer to FM Documentation and Carlisle Code Listings.
5. Fasteners covered in this attachment are limited to a length not to exceed 12". Assemblies with Tapered Insulation, requiring longer fasteners than 12", shall be reviewed by Carlisle.
6. 6" on center fastening required for Pressure Sensitive RUSS.
7. Table below outlines insulation/underlayment requirements and application attachment methods:

Maximum Peak Gust Wind Speed Warranty	Deck Type	Insulation Thickness	Minimum Membrane Underlayment	Insulation Underlayment Attachment # of Fasteners per 4' x 8' board size	Metal Edging
Up to 72 MPH	Steel, Concrete or Wood Deck	< 5"	1-1/2" to 2-1/2" (25 psi) InsulBase, InsulBase Eco, SecurShield Polyisocyanurate or SecurShield Eco	6	Carlisle Drip Edge, SecurEdge 200, 300, or 400 may be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
		> 5"	Overlay 1/2" SecurShield HD or SecurShield HD Eco Cover Board over InsulBase, InsulBase Eco SecurShield Polyisocyanurate or SecurShield Eco	4	
80 MPH	Steel or Concrete Deck	Any Thickness	Overlay 1/2" SecurShield HD or SecurShield HD Eco Cover Board over InsulBase, InsulBase Eco, SecurShield Polyisocyanurate or SecurShield Eco	4	Carlisle Drip Edge (1) or SecurEdge 2000, 3000 or 4000.
90 MPH	Steel or Concrete Deck	Any Thickness	Overlay 1/2" SecurShield HD or SecurShield HD Eco Cover Board over InsulBase, InsulBase Eco, SecurShield Polyisocyanurate or SecurShield Eco	4	SecurEdge 2000 or 3000

Notes:
(1) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge to perimeter wood nailers.
(2) An air/vapor barrier shall be used when required and must be sealed around perimeter and roof penetrations. When not specified, the roof membrane shall be adhered over perimeter wood nailer along edges to prevent air infiltration along edging, regardless of assembly type.

(Sure-Tough Only)
22 GA. Steel Deck or Structural Concrete

Peak Gust Wind Speed Warranty	Max. Building Height	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field Sheets)	Fastening Density (Perimeter Sheets)
		Building Distance from Coastline						
		Greater than 7 miles	3 to 7 miles	Less than 3 miles				
55 MPH	Up to 60'	2	3	4	10'	Note 3	12" O.C.(1)	12" O.C.(1)
	61' to 100'	3	3	4	10'	Note 3	6" O.C.(1)	6" O.C.(1)
72 MPH	Up to 60'	3	3	4	10'	Note 3	6" O.C.(1)	6" O.C.(1)
	61' to 100'	4	5	5	10'	Note 3	6" O.C.(1)	6" O.C.(1)
80 MPH	Up to 60'	4	4	5	10'	Note 3	12" O.C.(2)	12" O.C.(2)
	61' to 100'	4	5	5	10'	Note 3	12" O.C.(2)	12" O.C.(2)
90 MPH	Up to 60'	4	5	5	10'	Note 3	12" O.C.(2)	12" O.C.(2)
	61' to 100'	5	5	5	10'	Note 3	12" O.C.(2)	6" O.C.(2)

(1) Using HP Fasteners On Steel Deck with 2" Polymer Seam Plates
(2) Using HP-Xtra Fasteners and 2-3/8" Polymer (HP-Xtra) Seam Plates
(3) Split Field sheet using a 9" Pressure Sensitive RUSS along the center of the sheet.

(Sure-Tough Only)
Wood Decks

Peak Gust Wind Speed Warranty	Deck Type	Projected Pull-Out Values	Min. Number of Perimeter Sheets		Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field & Perimeter Sheets)
			Building Distance from Coastline				
			Greater than 7 miles	Less than or equal to 7 miles			
55 MPH	3/4" Plywood (2)	450 lbs	2	2	10'	Note 1	12" O.C.
72 MPH	Wood Plank (2)	540 lbs	2	2	10'	Note 1	12" O.C.
	3/4" Plywood (2)	450 lbs	2	4	10'	Note 1	12" O.C.
80 MPH	Wood Plank (2)	540 lbs	2	4	10'	Note 1	6" O.C.

(1) Split Field sheet using a 9" Pressure Sensitive RUSS along the center of the sheet.
(2) Maximum Building Height Up to 60'

E. Ballasted Design Criteria (25 YR to 30 YR Warranty)

1. Building height shall not exceed 60'. For projects where building height exceeds 60' or warranty wind speed exceeds 80 mph, please submit to Carlisle for review.
2. Local Wind Zone per ASCE 7-2010 (Category II Map) shall not exceed 115 mph. Projects in greater wind zones may be submitted for review by Carlisle.
3. All Field Splice “T-Joints” must be overlaid as described in **Detail U-2A.1.**
4. For applicable membrane thickness, refer to Tables in Section B4.
5. 6” on center fastening required for Pressure Sensitive RUSS.

General

1. Carlisle Polyisocyanurate or Insulfoam EPS Insulation shall be applied in multiple layers with joints staggered between layers, following current energy codes. The layer directly under the membrane shall be 1-1/2” thick insulation and shall be loose-laid or, if specified, may be secured with bead adhesive (12” O.C. bead spacing is acceptable).

   CAUTION: The use of Mechanically Fasteners is not permitted for insulation securement.

Polyisocyanurate Insulation

1. When Polyisocyanurate insulation is specified, Carlisle InsulBase or SecurShield (20 or 25 psi) shall be utilized and is recommended. On structural and lightweight structural concrete, to safeguard against residual moisture, the use of SecurShield Polyisocyanurate is required.

Expanded Polystyrene (EPS) Insulation

1. When EPS (Expanded Polystyrene) insulation is to be utilized, only Insulfoam EPS may be used as follows:

   a. Insulfoam I (1.0 pcf density) EPS.
   b. Insulfoam VIII (1.25 pcf density) EPS.

2. On steel decks, install EPS insulation in conjunction with thermal barrier, if required for code compliance.

3. When directly installed on steel deck, total thickness of insulation must be adequate to span deck flutes.

Ballast Types/Coverage Rates

a. The coverage rates listed in this attachment are considered minimum and are required by Carlisle for issuance of the standard Carlisle warranty. Depending on specific project conditions (building height, parapet height and project location), additional ballast may be necessary to provide wind uplift protection. Refer to “Attachment I” in this Specification for suitable ballast types and coverage rates. **Comply with the specifier's requirements when an additional ballast coverage rate is specified.**

b. **Rounded Water-Worn Gravel** must be applied over the EPDM membrane at the minimum rate of **1000 pounds per square** and must be evenly distributed to maintain an average of 10 pounds per square foot.

ASTM D 7765 SIZE NUMBER	MINIMUM COVERAGE RATE (pounds per square)	AVERAGE COVERAGE RATE (lbs./sq. ft. continuously distributed)
4 (1-1/2" nominal diameter)	1000	10
3 (2" nominal diameter)	1000	10
2 (2-1/2" nominal diameter)	1300	13
1 (3-1/2" nominal diameter)	1300	13

Notes: In the field of the roof, some bare spots resulting from installation are permitted; however, they must not exceed 64 square inches and must be limited to no more than 2 per square (100 square feet). No bare spots are permitted in the perimeter area of the roof that is 10' wide.

c. **Smooth Surfaced Individual Concrete Pavers**

1) When the use of concrete paver is specified, Carlisle supplied Hanover Pedestal Paver is recommended and can be covered by the Carlisle Warranty. A pedestal system is recommended, due to increased life expectancy, however, field fabricated, cut sections (8” x 8”) of Sure-Seal/Sure-White Walkway Pads, beneath pavers, at corners of pavers.

2) Individual pavers must be a maximum of two feet square. Unless otherwise required by Carlisle, pavers must weigh no more than 100 pounds per unit to allow for easy removal and replacement.

3) Individual pavers with a surface other than a steel troweled finish as approved by Carlisle, must be installed over Sure-Seal HP Protective Mat and must be accepted by Carlisle prior to installation.

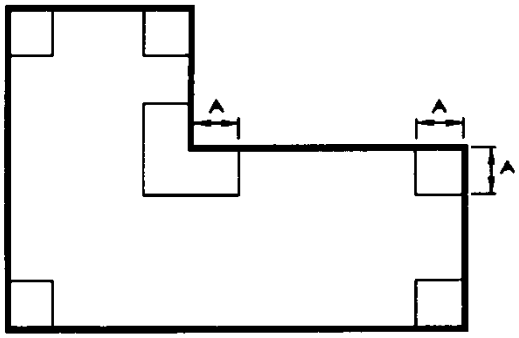
4) Elevating pavers should increase life expectancy, reduce freeze/thaw effects and promote more positive drainage. Acceptable pedestals can be specified under corners of pavers to elevate paver.

5) Individual concrete pavers shall be loose laid and butted together with no gaps greater than 1/2".

Ballast Criteria for Up to 30 Year Extended Warranty

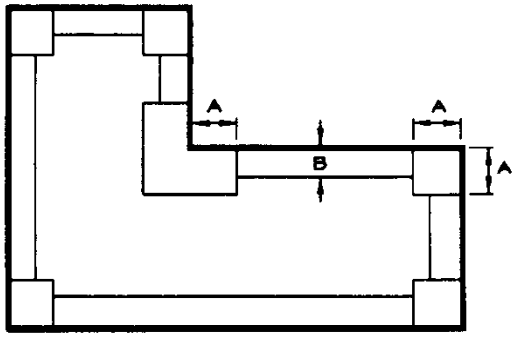
b. Refer to installations below for calculating corner/perimeter areas for the noted warranty wind speeds available.

Ballast Requirements for 72 mph Warranty



A (Corners) = .4 Times the Building Height (10' minimum)

Ballast Requirements for 80 mph Warranty



A (Corners) = .4 Times the Building Height (10' minimum)
B (Perimeters) = 10'

2. At corner and/or perimeter areas, ballast shall be 2-1/2" nominal rounded water worn gravel conforming to gradation #1 or #2 in accordance with ASTM D7765 method of sizing. Coverage rate shall be a minimum of 15 pounds per square foot.

3. In field areas, ballast shall be 1-1/2" nominal rounded water worn gravel conforming to gradation #4 in accordance with ASTM-D7765 method of sizing. Coverage rate shall be a minimum of 12 pounds per square foot.

4. Other ballasting configurations may be authorized by Carlisle, upon review and approval, prior to construction.

F. Roof Deck Criteria

1. Steel (22 gauge or heavier) **– HP, HP-Xtra or InsulFAST Fasteners are required, with a minimum pullout of not less than 450 pounds per fastener.**

   NOTE: Carlisle InsulFAST fasteners may be used with adhered systems only, if the minimum pullout requirement is met.

2. Structural Concrete (minimum 3,000 psi) **– HD 14-10 (threaded) Fasteners are required with a minimum pullout of 800 pounds per fastener.** Sure-Seal CD-10 (hammer-driven) is also applicable for adhered membrane assemblies. **In lieu of fastening, Flexible Adhesive is an acceptable alternative for insulation attachment for**

adhered assembly when used in conjunction with coated glass faced insulation and full spray.

NOTE: The use of standard (paper) faced Polyisocyanurate is not acceptable. Due to possible presence of residual moisture in concrete slabs.

3. Wood Plank (minimum 1" thick) or minimum 3/4" thick Plywood **– HP or InsulFAST Fasteners are required with a minimum pullout of 450 pounds for plywood and 540 pounds for wood planks.**

   NOTE: Carlisle InsulFAST fasteners may be used with adhered systems only, if the minimum pullout requirement is met.

4. For **Ballasted Assemblies**, the structural deck must be able to sustain the weight of a ballasted assembly (12-15 lbs of ballast, as well as other components, i.e. membrane, insulation and vapor barriers, if applicable). The structural deck must be sufficient to support concentrated construction traffic and point loading.

G. Flashing, Terminations and Other Considerations (All Assemblies)

1. All existing flashing must be removed prior to the application of new membrane. New membrane flashing must not conceal weep holes or cover existing through wall counterflashing.

2. Wall flashings shall extend above the anticipated slush line, above the roof surface, prior to written approval from Carlisle is required for lower heights of flashing.

3. Pre-fabricated accessories must be utilized, where applicable.

4. Project details must be reviewed by Carlisle, preferably prior to bid, and a written approval must be obtained. As a warranty prerequisite, the approval shall be included as part of the project submittals along with the Request for Warranty form that is required for project approval.

5. Only Carlisle supplied Sheet Metal and Edging is to be used on all projects, unless prior authorization from Carlisle has been obtained.

6. Carlisle Termination Bar is required in locations where a compression bar termination has been specified. The Termination Bar must be used in conjunction with new or existing counterflashing.

7. Where new or existing counterflashing is used, Carlisle's Termination Bar must be used as the primary termination.

8. Certain metal accessories by others may be permitted upon Carlisle acceptance for wind speed coverage less than 72 mph.

Sure-Seal® EPDM Roofing Systems

Sure-Tough™ EPDM Roofing Systems

Sure-Seal®/Sure-White®/Sure-Tough™ EPDM Roofing Systems
Adhered, Ballasted and Mechanically Fastened

Installation Details

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July 2024

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Pipe Flashing

Terminations

Parapet / Curb Flashing

Tie-Ins

Inside / Outside Corners

Sealant Pocket

Through-Wall Scupper

Lightning Rods

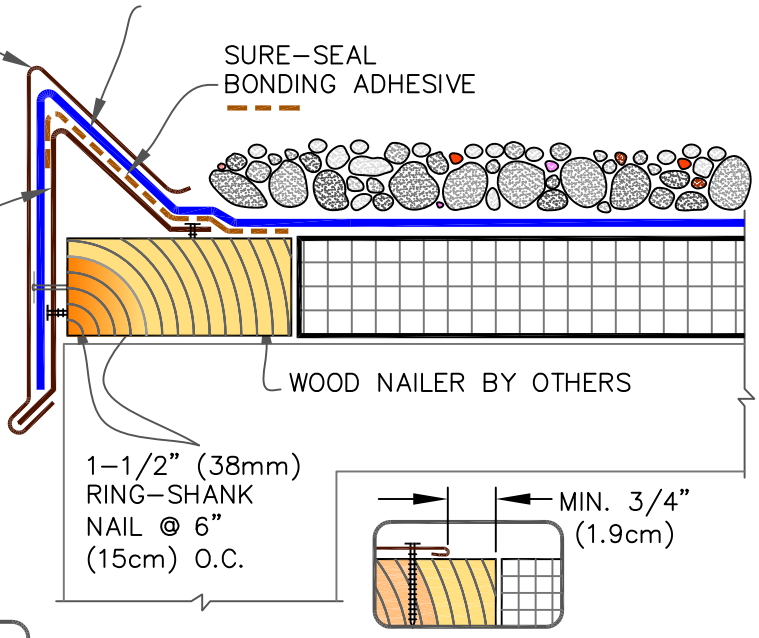
Valley

Sleeper

Penetration

SecurEdge 200 METAL FASCIA OR METAL FASCIA BY OTHERS. ALSO SEE U–1C (BOTTOM DETAIL) FOR DIFFERENT FASCIA OPTION

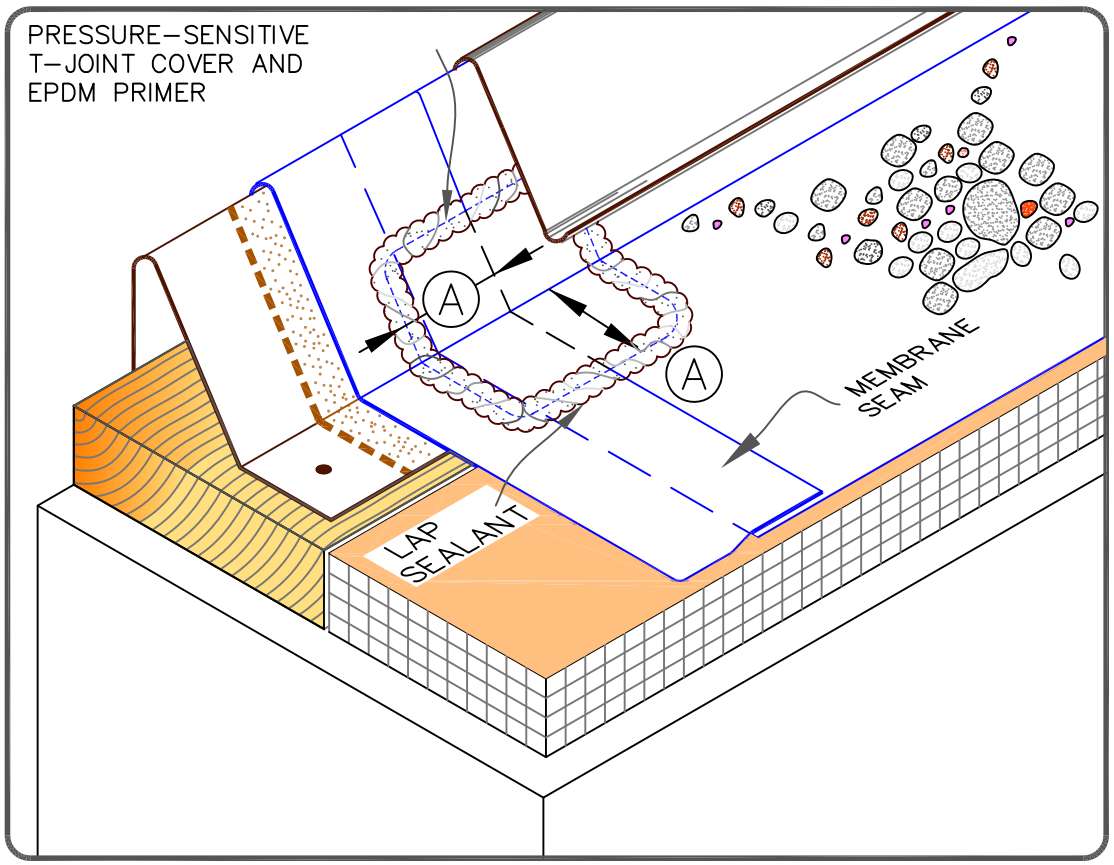
MAXIMUM MEMBRANE THICKNESS GOING OVER THE WATER DAM IS 60–MIL. FOR THICKER MEMBRANES, RUN FIELD SHEET UNDER THE WATER DAM AND STRIP–IN WITH MAXIMUM 60–MIL MEMBRANE



NOTE:

1. FOR GUTTER EDGE WITH BALLASTED ROOF ASSEMBLY, SEE DETAIL B ON U–1F

DIMENSION	cm	
Ⓐ 3"	7.5	MIN.



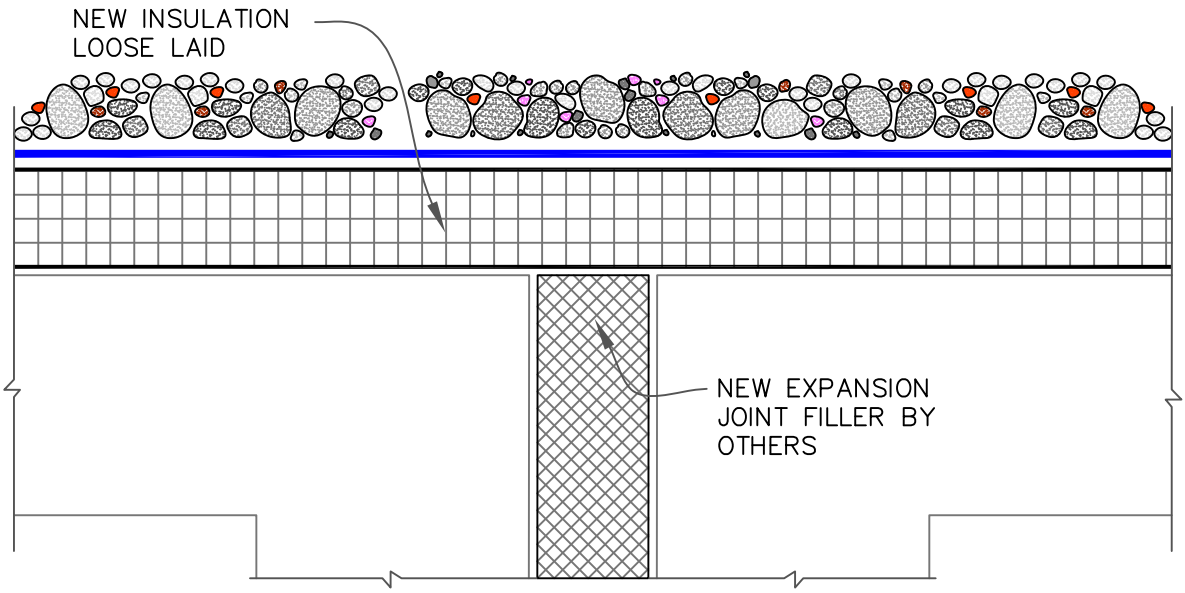
CARLISLE SYNTEC SYSTEMS

CARLISLE SecurEdge 200

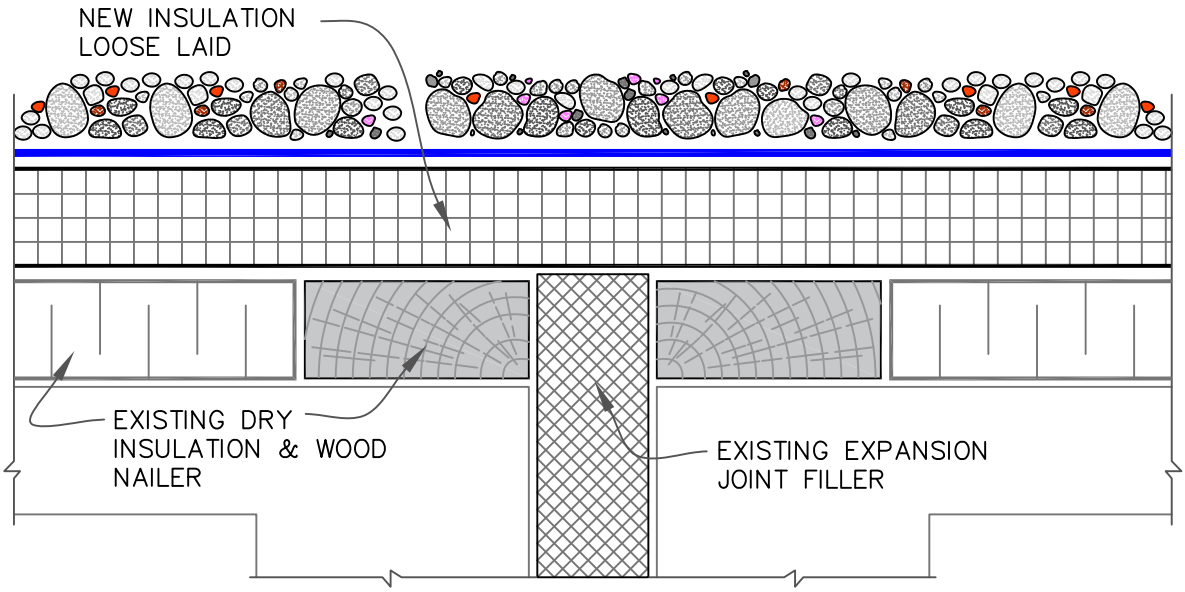
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. B–1A

B (BALLASTED STONE)



A NEW CONSTRUCTION OR REROOFING

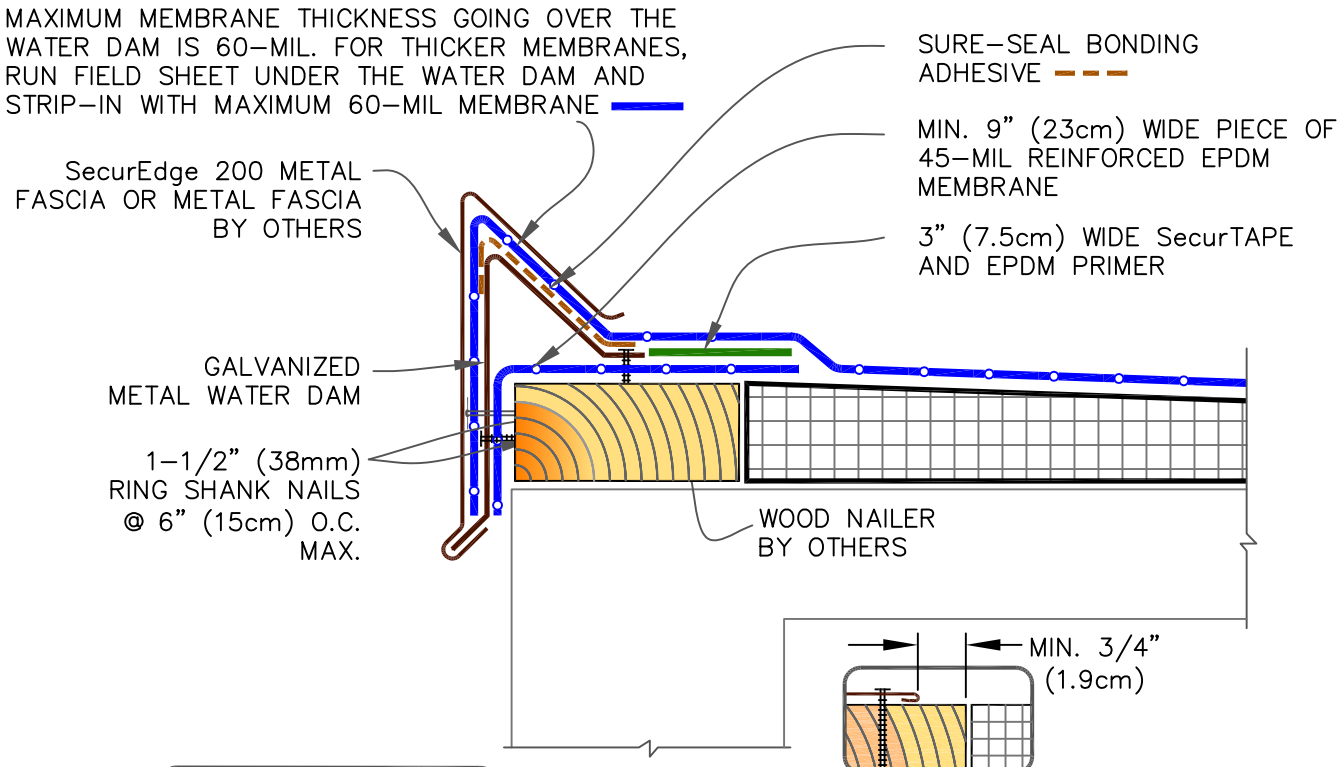


B REROOFING OR RECOVER OF EXISTING ROOF

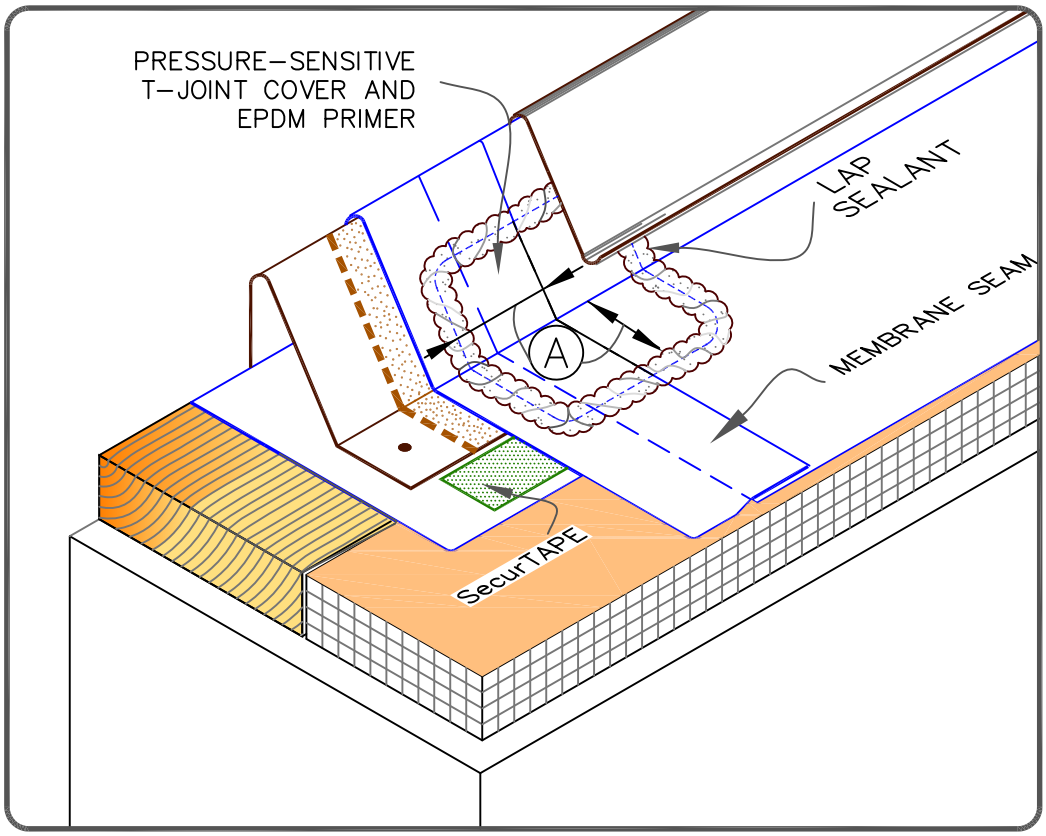
NOTE:

1. ANY OF U-3 (A, B OR C) EXPANSION JOINT DETAIL CAN BE USED WITH THE "B" SYSTEM (BALLASTED STONE ASSEMBLY)

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK EXPANSION JOINT	DETAIL NO. B-3A
	MAXIMUM WARRANTY: 30 YEARS	B (BALLASTED STONE)



DIMENSION		cm	
Ⓐ	3"	7.5	MIN.



CARLISLE SYNTEC SYSTEMS

CARLISLE SecurEdge 200

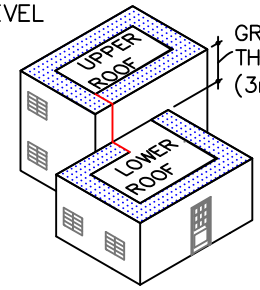
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
MF–1A
MECHANICALLY FASTENED

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

PERIMETER ZONES

SPLIT LEVEL ROOFS



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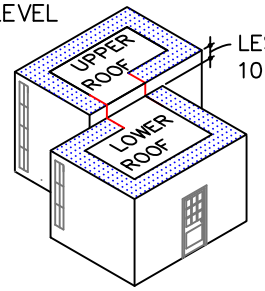
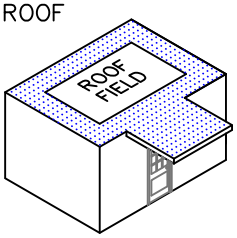
SPLIT LEVEL ROOFS



2

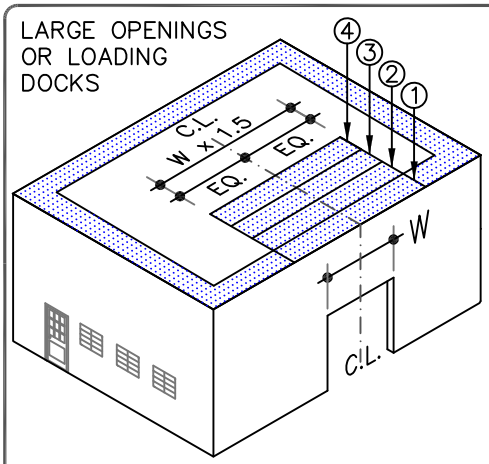
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

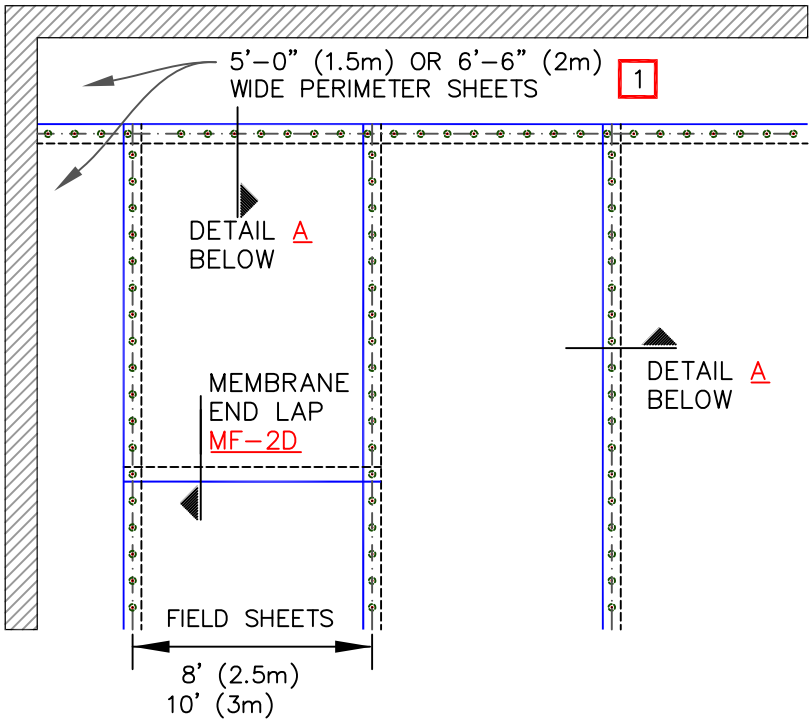
3

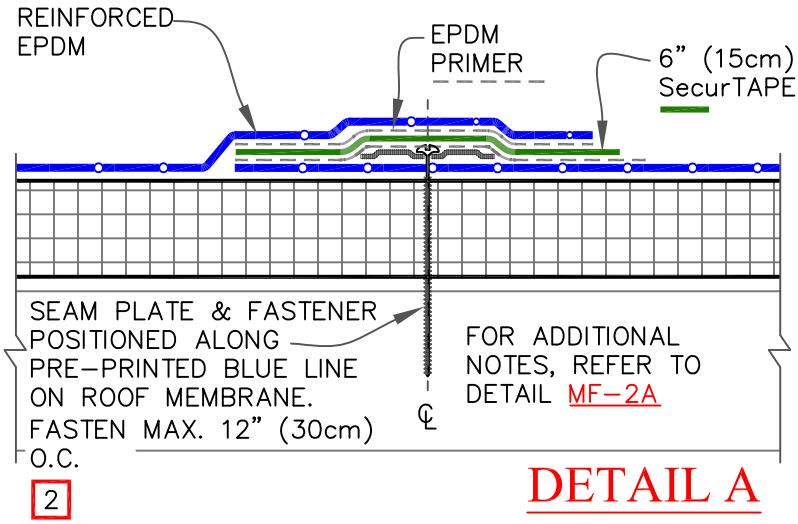
LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

4





DETAIL A

NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
2. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.

CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED EPDM SECUREMENT – OPTION 1

MAXIMUM WARRANTY: 30 YEARS

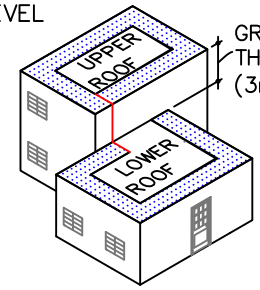
DETAIL NO. MF–2.1

MECHANICALLY FASTENED

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

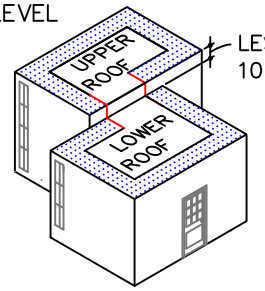
PERIMETER ZONES

SPLIT LEVEL ROOFS



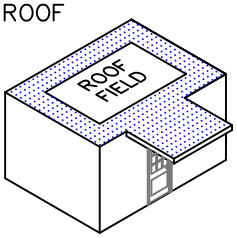
1

SPLIT LEVEL ROOFS



2

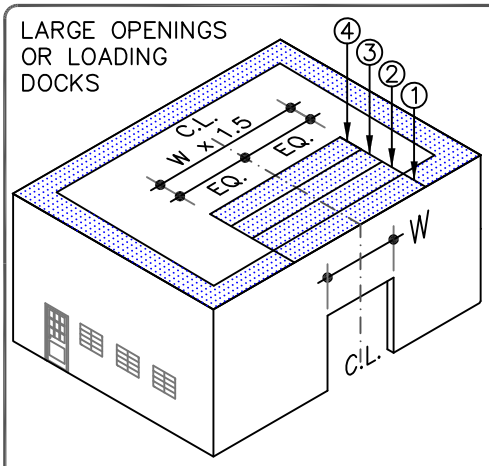
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

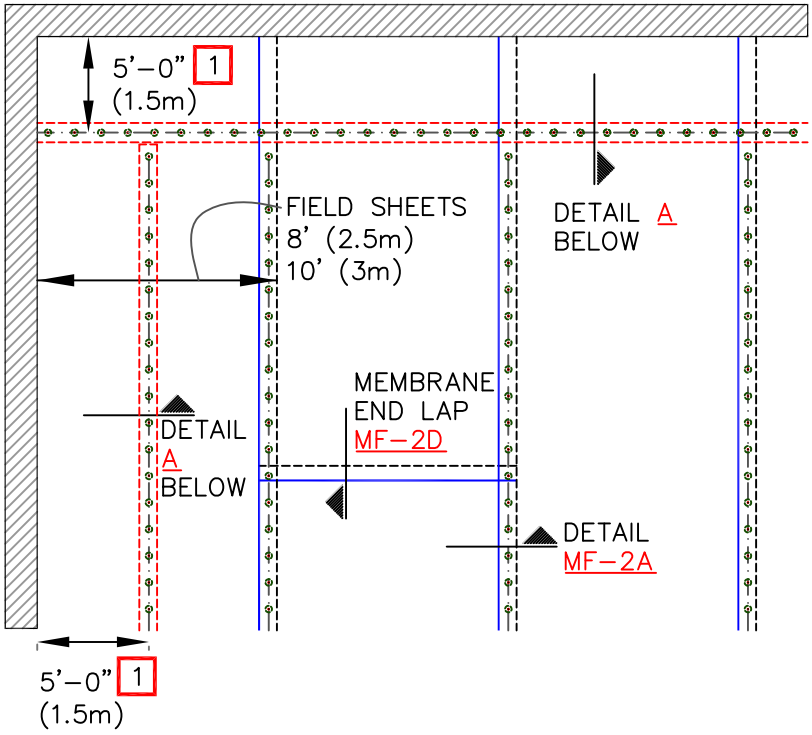
3

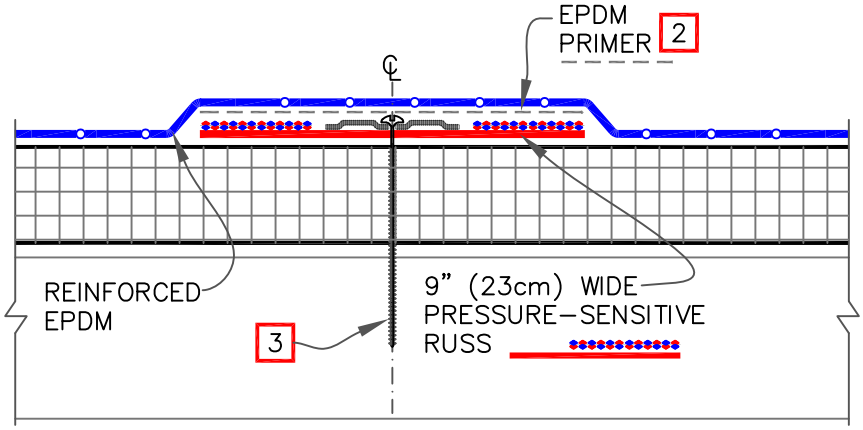
LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

4





DETAIL A

NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
2. EPDM PRIMER MUST BE APPLIED TO THE BACK SIDE OF MEMBRANE SURFACE PRIOR TO ADHERING MEMBRANE TO PRESSURE–SENSITIVE RUSS.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.

RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED EPDM SECUREMENT – OPTION 2 (RUSS)

MAXIMUM WARRANTY: 30 YEARS

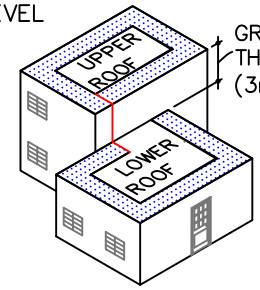
DETAIL NO. MF–2.2

MECHANICALLY FASTENED

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

PERIMETER ZONES

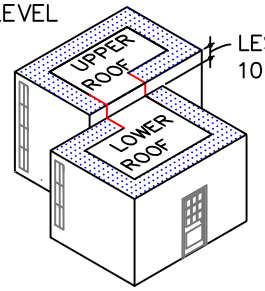
SPLIT LEVEL ROOFS



GREATER THAN 10 FT (3m)

1

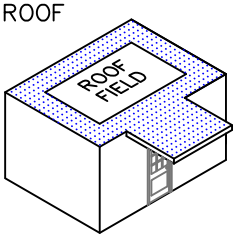
SPLIT LEVEL ROOFS



LESS THAN 10 FT (3m)

2

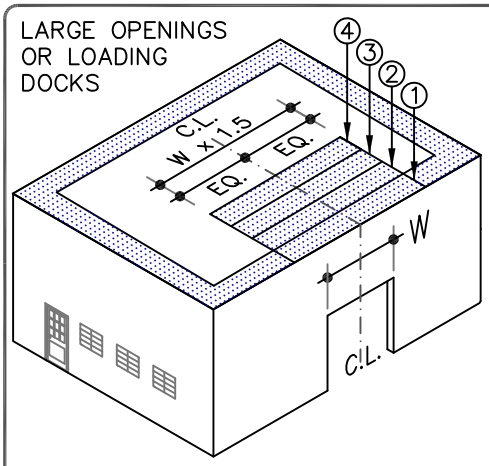
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

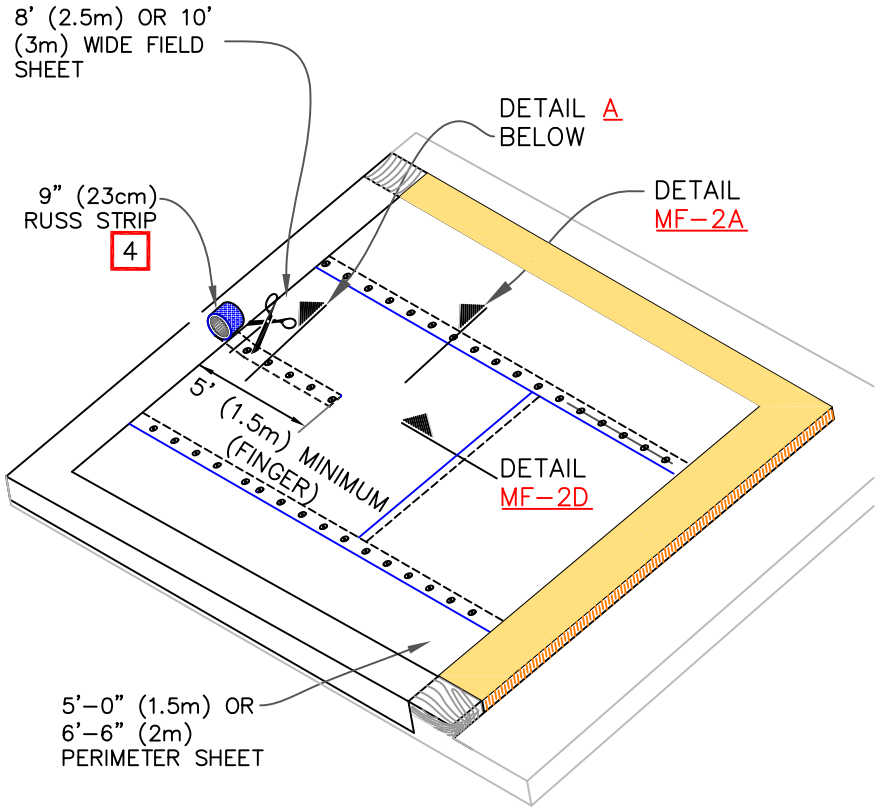
3

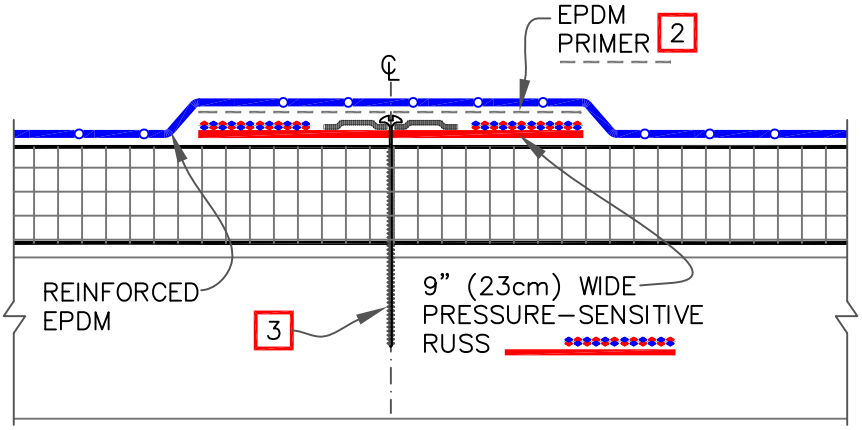
LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

4





DETAIL A

NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
2. EPDM PRIMER MUST BE APPLIED TO THE BACK SIDE OF MEMBRANE SURFACE PRIOR TO ADHERING MEMBRANE TO PRESSURE-SENSITIVE RUSS.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
4. RUSS "FINGER" MUST EXTEND THE WIDTH OF THE REQUIRED PERIMETER.

RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

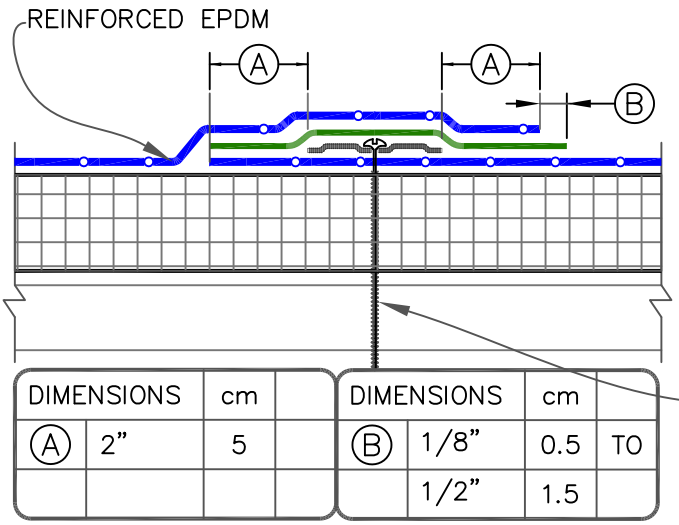
MECHANICALLY FASTENED EPDM SECUREMENT – OPTION 3 (RUSS)

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-2.3

MECHANICALLY FASTENED

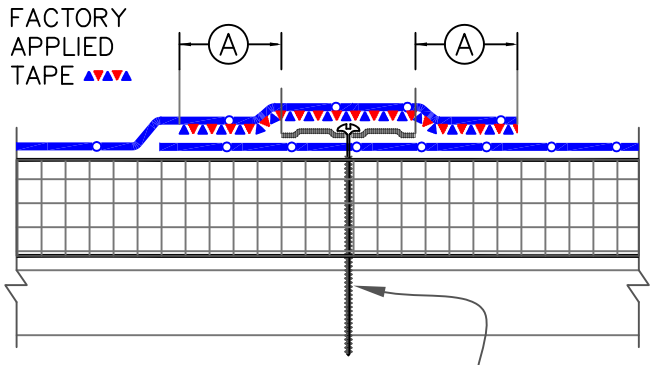
6" (15cm) WIDE SecurTAPE SPLICE



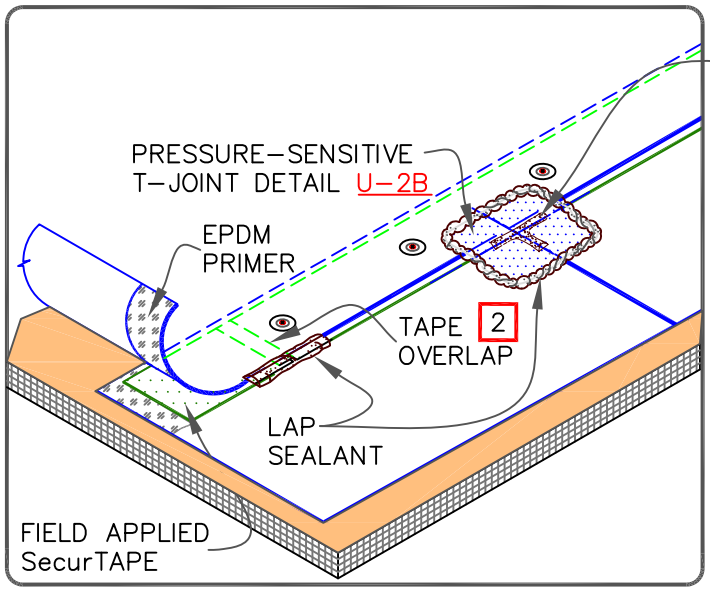
DIMENSIONS		cm	
A	2"	5	

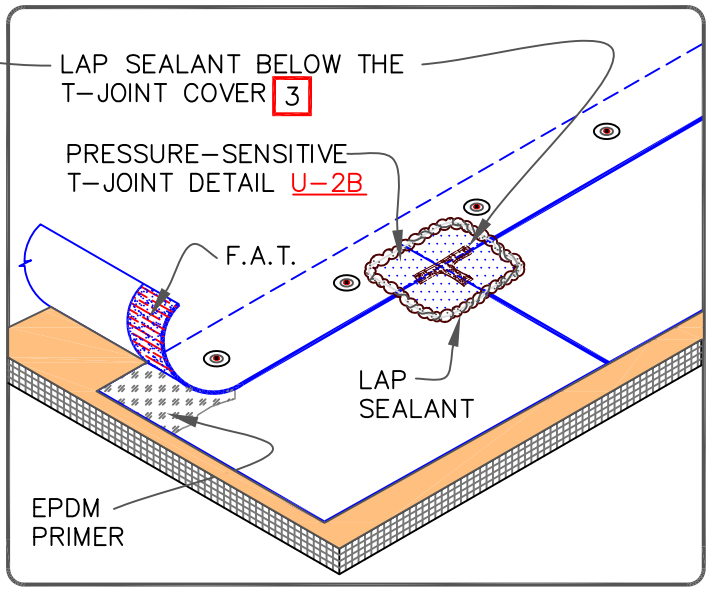
DIMENSIONS		cm	
B	1/8"	0.5	TO
	1/2"	1.5	

6" (15cm) WIDE FACTORY APPLIED TAPE



SEAM PLATE & FASTENER POSITIONED OVER PRE-PRINTED BLUE MARKS. FASTEN MAX. 12" (30cm) O.C. [1]





F.A.T. (FACTORY APPLIED SecurTAPE)

NOTES:

1. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
2. OVERLAP THE ENDS OF FIELD APPLIED SecurTAPE A MINIMUM OF 1" (2.5cm). APPLY LAP SEALANT AT TAPE OVERLAPS 2" (5cm) IN EACH DIRECTION AS SHOWN.
3. APPLY LAP SEALANT ALONG THE LEADING EDGE OF THE MEMBRANE SPLICE UNDER THE 6" (15cm) T-JOINT COVER, COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN ALL DIRECTIONS FROM THE SPLICE INTERSECTION.
4. END LAPS SHALL BE SPLICED USING 3" (7.5cm) WIDE SecurTAPE. REFER TO DETAIL MF-2B.
5. LAP SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED EPDM MEMBRANE.

CARLISLE SYNTEC SYSTEMS

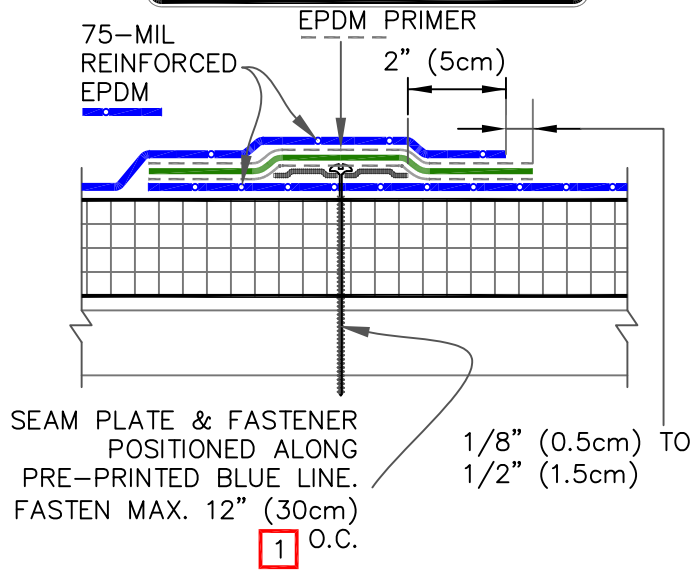
MECHANICALLY FASTENED EPDM MEMBRANE SPLICE

MAXIMUM WARRANTY: 25 YEARS

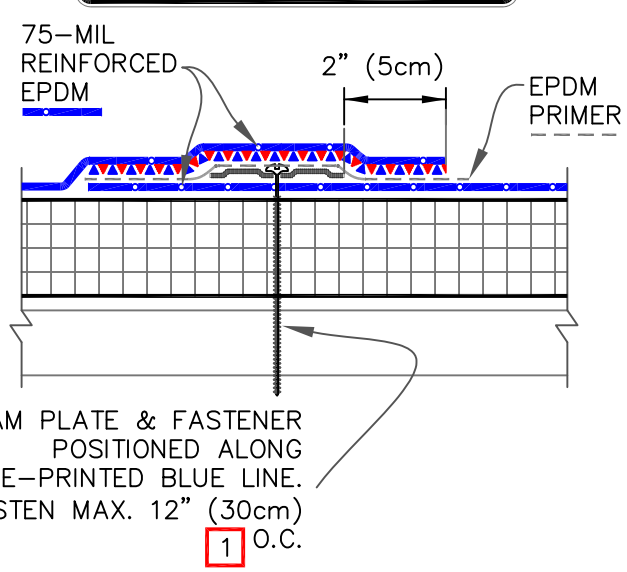
DETAIL NO. MF-2A

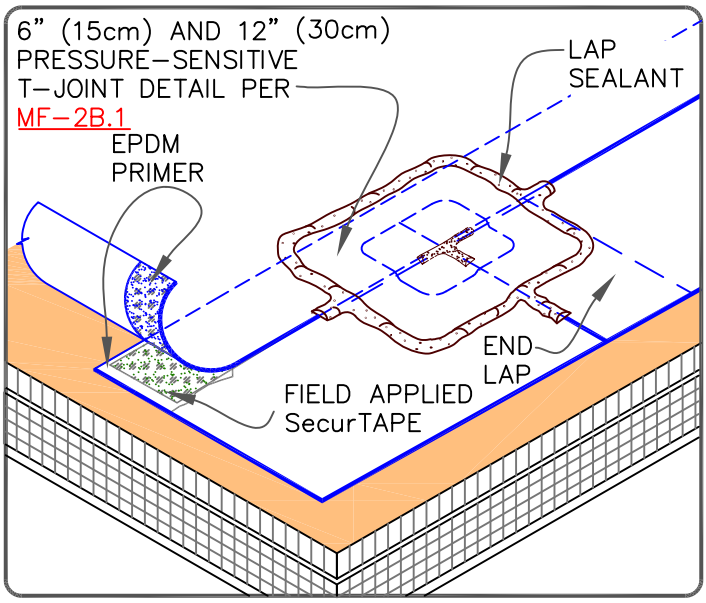
MECHANICALLY FASTENED

FIELD APPLIED SecurTAPE

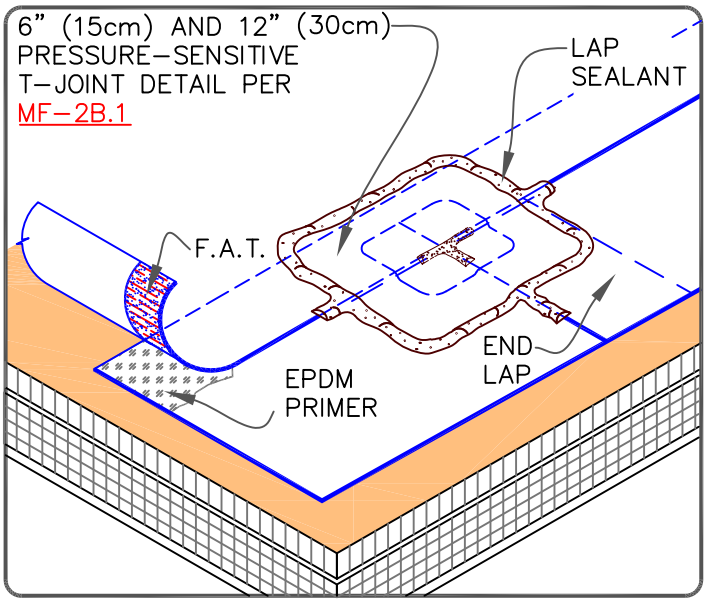


FACTORY APPLIED SecurTAPE





FIELD APPLIED SecurTAPE

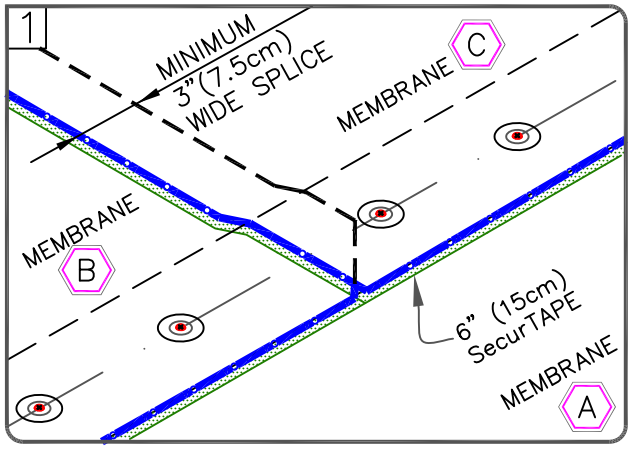


F.A.T. (FACTORY APPLIED SecurTAPE)

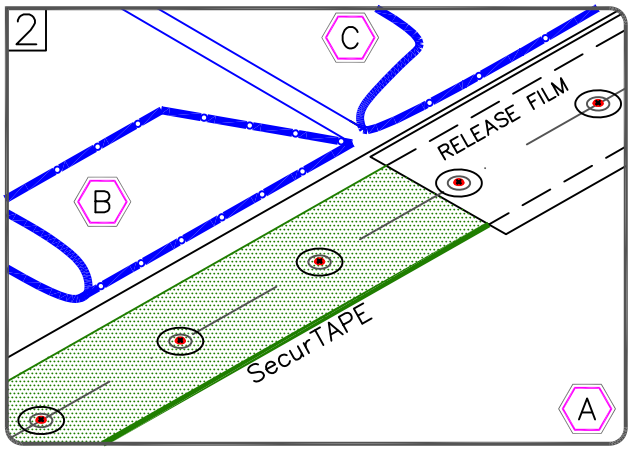
NOTES:

1. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
2. END LAPS SHALL BE SPLICED USING 6" (15cm) WIDE SecurTAPE. REFER TO DETAIL U–2A.1.
3. OVERLAP THE ENDS OF FIELD APPLIED SecurTAPE A MINIMUM OF 1" (2.5cm). APPLY LAP SEALANT AT TAPE OVERLAPS 2" (5cm) IN ALL DIRECTIONS.
4. LAP SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED EPDM MEMBRANE.

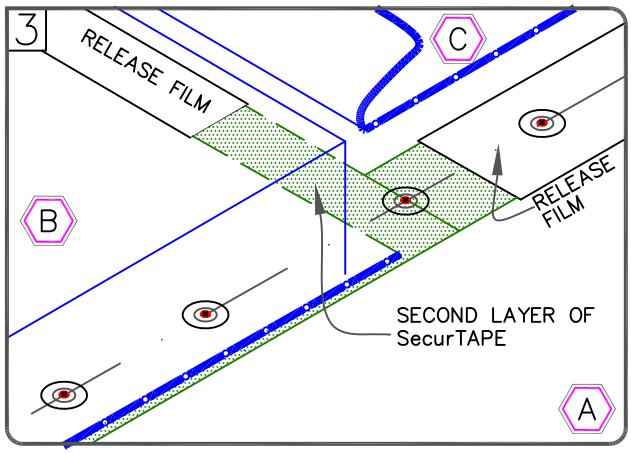
CARLISLE SYNTEC SYSTEMS	MECHANICALLY FASTENED EPDM MEMBRANE SPLICE MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. MF–2A.1 MECHANICALLY FASTENED



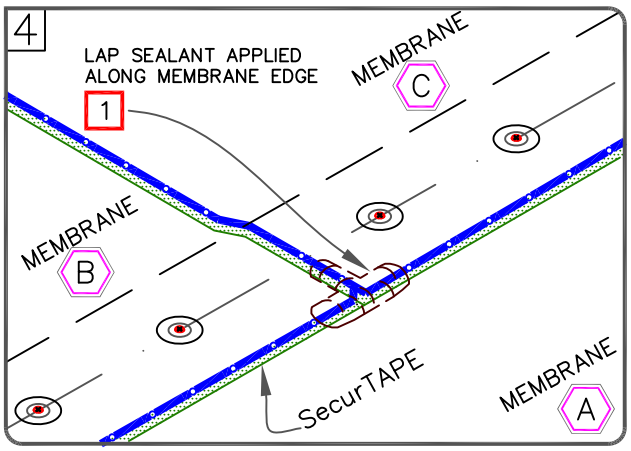
POSITION MEMBRANE TO ALLOW AN APPROXIMATE 7" (17.5cm) OVERLAP ALONG THE LENGTH OF THE MEMBRANE & 4" (10cm) AT END LAPS. THE PRE-MARKED LINE ON THE MEMBRANE EDGE CAN BE USED AS A GUIDE FOR TAPE PLACEMENT.



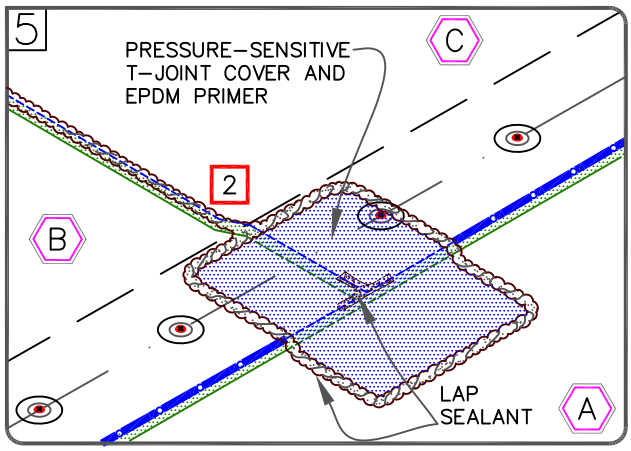
FOLD SHEETS BACK AS SHOWN. APPLY EPDM PRIMER TO THE SPLICE AREA ON BOTH SURFACES AND ALLOW TO FLASH-OFF. APPLY SecurTAPE WITH RELEASE FILM ALIGNED WITH PRE-MARKED LINE.



SPLICE SHEET B TO SHEET A AND APPLY SECOND PIECE OF SecurTAPE BETWEEN SHEET B AND C. TRIM RELEASE FILM AS SHOWN.



SPLICE SHEET C TO SHEET A AND B, PRESS TOP SHEET ONTO BOTTOM SHEET USING HAND PRESSURE TOWARDS THE OUTER EDGE OF THE SPLICE AND ROLL THE SPLICE AREA WITH A 2" (5cm) WIDE STEEL ROLLER.



APPLY PRESSURE-SENSITIVE T-JOINT COVER OR 6" (15cm) WIDE SECTION OF PRESSURE-SENSITIVE ELASTOFORM FLASHING CENTERED OVER THE INTERSECTING POINT OF THE LEADING EDGES OF THE FIELD SPLICE INTERSECTION AS SHOWN.

NOTES:

1. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (BELOW THE 6" (15cm) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

2. APPLY LAP SEALANT AT CUT EDGES OF REINFORCED MEMBRANE AND TAPE OVERLAPS. REFER TO DETAIL MF-2A.

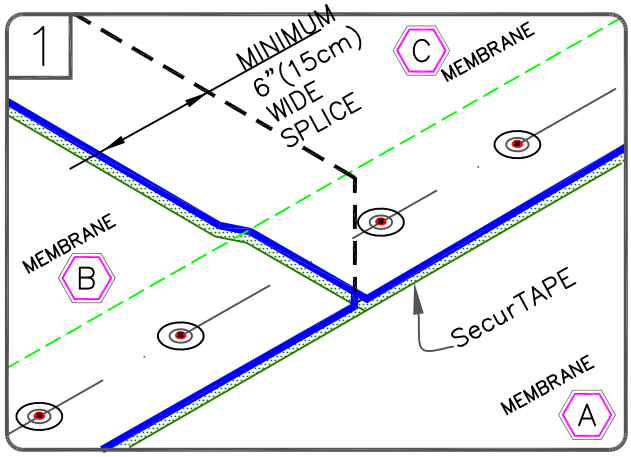
CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED EPDM MEMBRANE SPLICE INTERSECTION

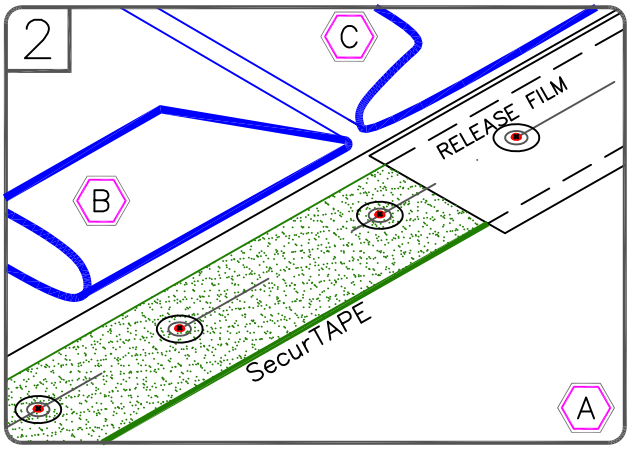
MAXIMUM WARRANTY: 25 YEARS

DETAIL NO. MF-2B

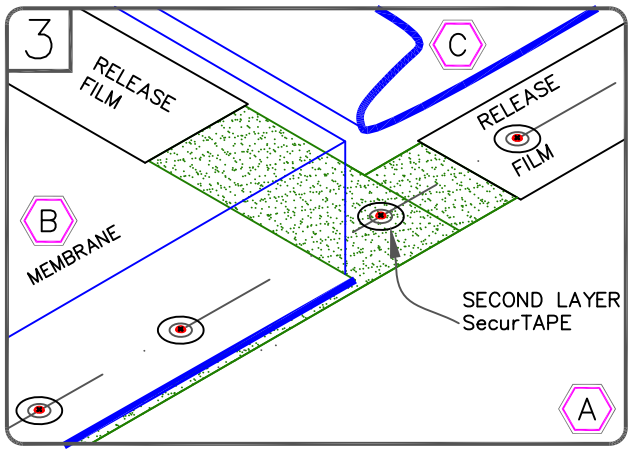
MECHANICALLY FASTENED



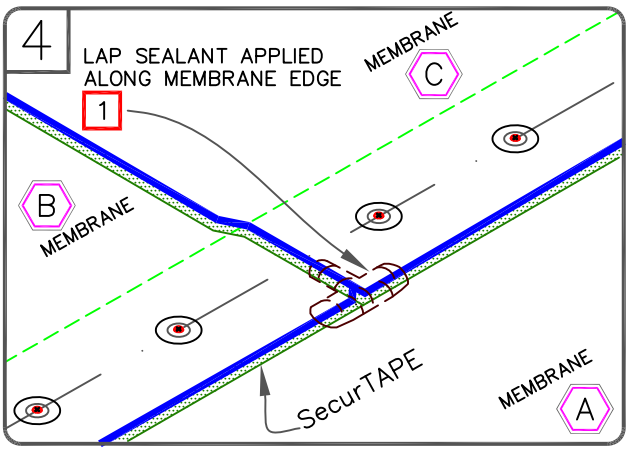
POSITION MEMBRANE TO ALLOW AN APPROXIMATE 7" (17.5cm) OVERLAP. THE PRE-MARKED LINE ON THE MEMBRANE EDGE CAN BE USED AS A GUIDE FOR TAPE PLACEMENT.



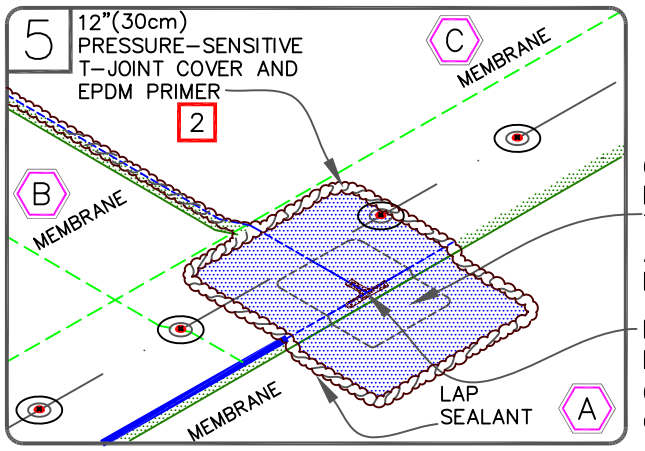
FOLD SHEETS BACK AS SHOWN. APPLY EPDM PRIMER TO THE SPLICE AREA ON BOTH SURFACES AND ALLOW TO FLASH-OFF. APPLY SecurTAPE WITH RELEASE FILM ALIGNED WITH PRE-MARKED LINE.



SPLICE SHEET B TO SHEET A AND APPLY SECOND PIECE OF SecurTAPE BETWEEN SHEET B AND C. TRIM RELEASE FILM AS SHOWN.



SPLICE SHEET C TO SHEET A AND B, PRESS TOP SHEET ONTO BOTTOM SHEET USING HAND PRESSURE TOWARDS THE OUTER EDGE OF THE SPLICE AND ROLL THE SPLICE AREA WITH A 2" (5cm) WIDE STEEL ROLLER.



APPLY 6"(15cm) PRESSURE-SENSITIVE T-JOINT COVER AND 12"(30cm) PRESSURE-SENSITIVE T-JOINT COVER OR PRESSURE-SENSITIVE ELASTOFORM CENTERED OVER THE INTERSECTING POINT OF THE LEADING EDGES OF THE FIELD SPLICE INTERSECTION AS SHOWN.

6"(15cm) PRESSURE-SENSITIVE T-JOINT COVER AND EPDM PRIMER

LAP SEALANT BELOW THE 6" (15cm) T-JOINT COVER 1

NOTES:

1. APPLY LAP SEALANT ALONG THE EDGES OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.
2. APPLY LAP SEALANT AT CUT EDGES OF REINFORCED MEMBRANE AND TAPE OVER LAPS.

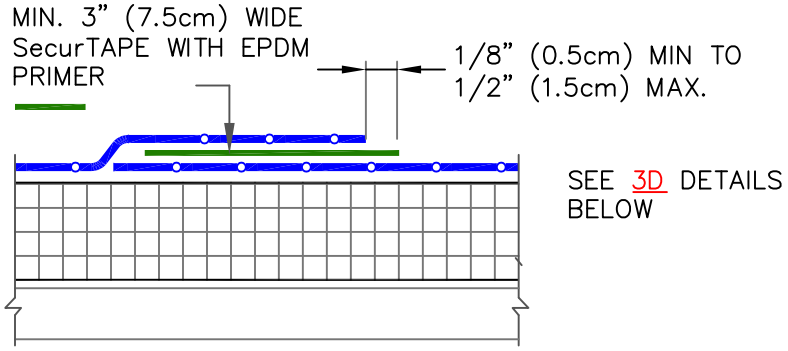
CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED EPDM MEMBRANE SPLICE INTERSECTION

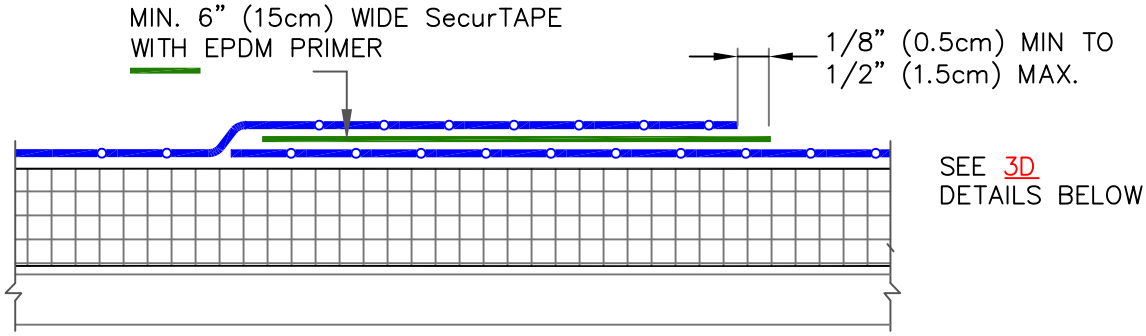
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-2B.1

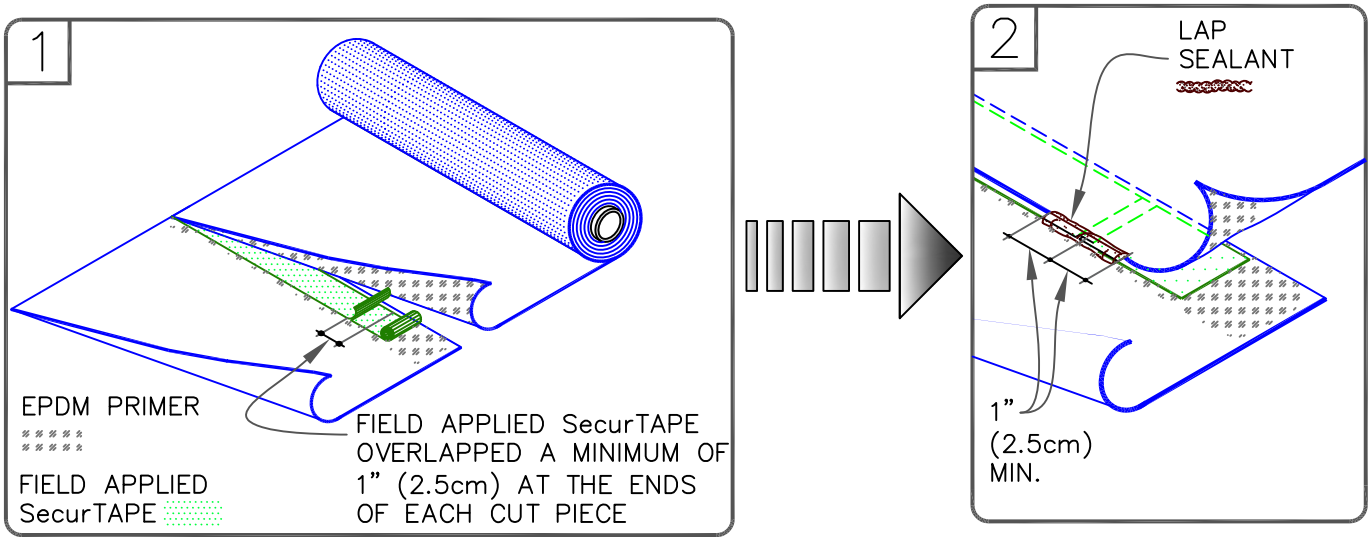
MECHANICALLY FASTENED



A UP TO 25-YEAR WARRANTY



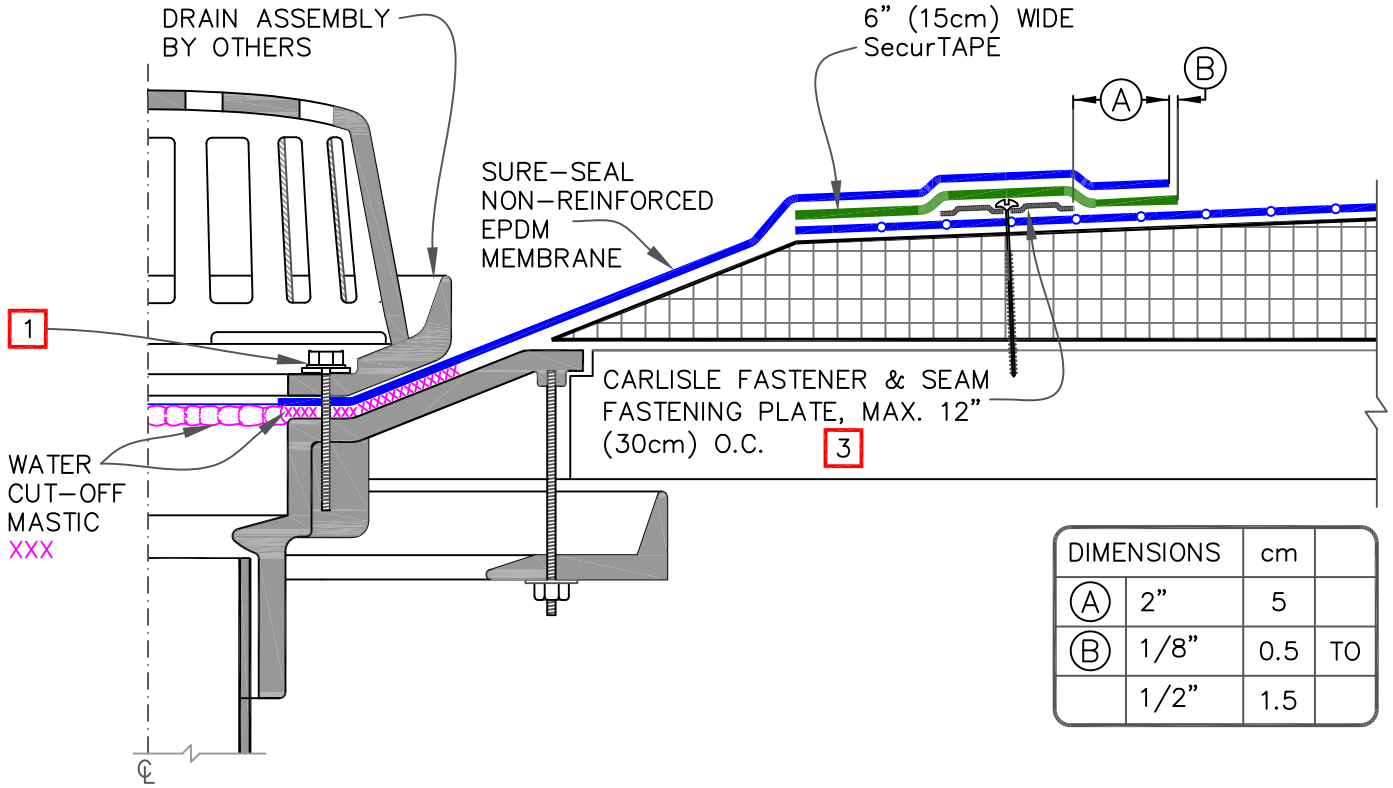
B UP TO 30-YEAR WARRANTY



NOTES:

1. APPLY EPDM PRIMER TO THE MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE-SENSITIVE FLASHING.
2. LAP SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED EPDM MEMBRANE.

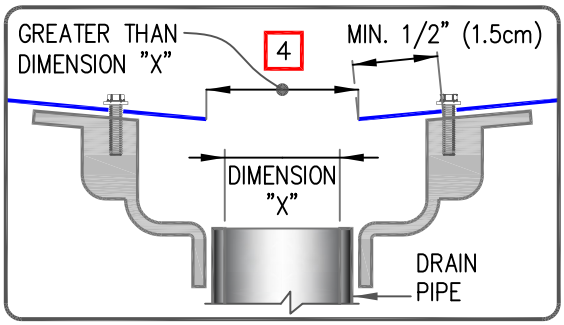
CARLISLE SYNTEC SYSTEMS	END LAP SPLICE		DETAIL NO. MF-2D
	MAXIMUM WARRANTY: 30 YEARS		MECHANICALLY FASTENED



DIMENSIONS		cm	
A	2"	5	
B	1/8"	0.5	TO
	1/2"	1.5	

NOTES:

1. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
4. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



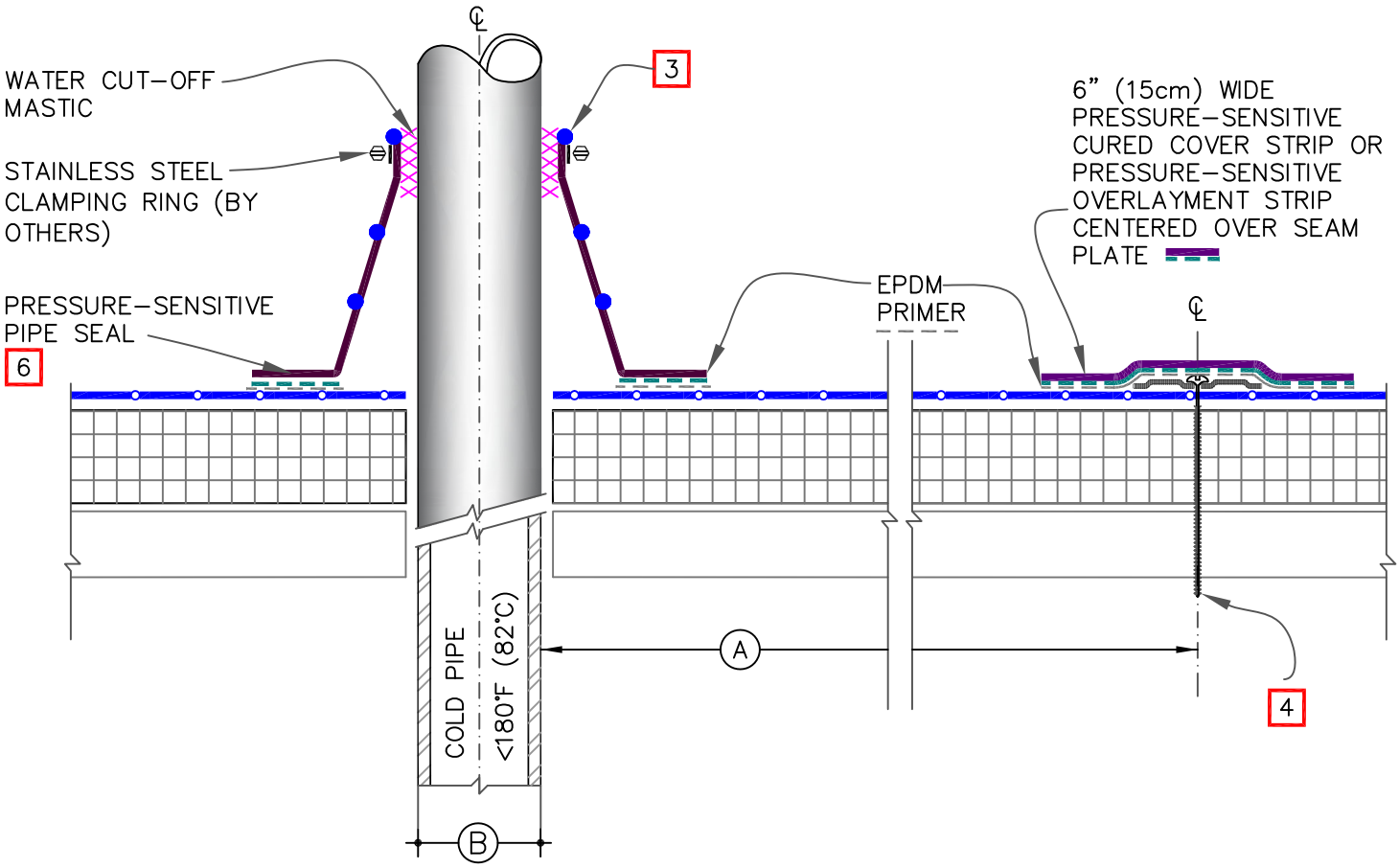
CARLISLE SYNTEC SYSTEMS

ROOF DRAIN WITH SUMP GREATER THAN 3" PER FOOT

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-6B

MECHANICALLY FASTENED



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. PRE-MOLDED PIPE SEAL MUST HAVE RIB INTACT AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. INSTALL A MINIMUM OF 4 SEAM PLATES FOR PIPES WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL SEAM PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (15cm) IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
5. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
6. DECK FLANGES OF THE PRESSURE-SENSITIVE PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.

DIMENSIONS		cm	
(A)	6"	15	TO
	12"	30	
(B)	1/2"	1.5	TO
	6"	15	

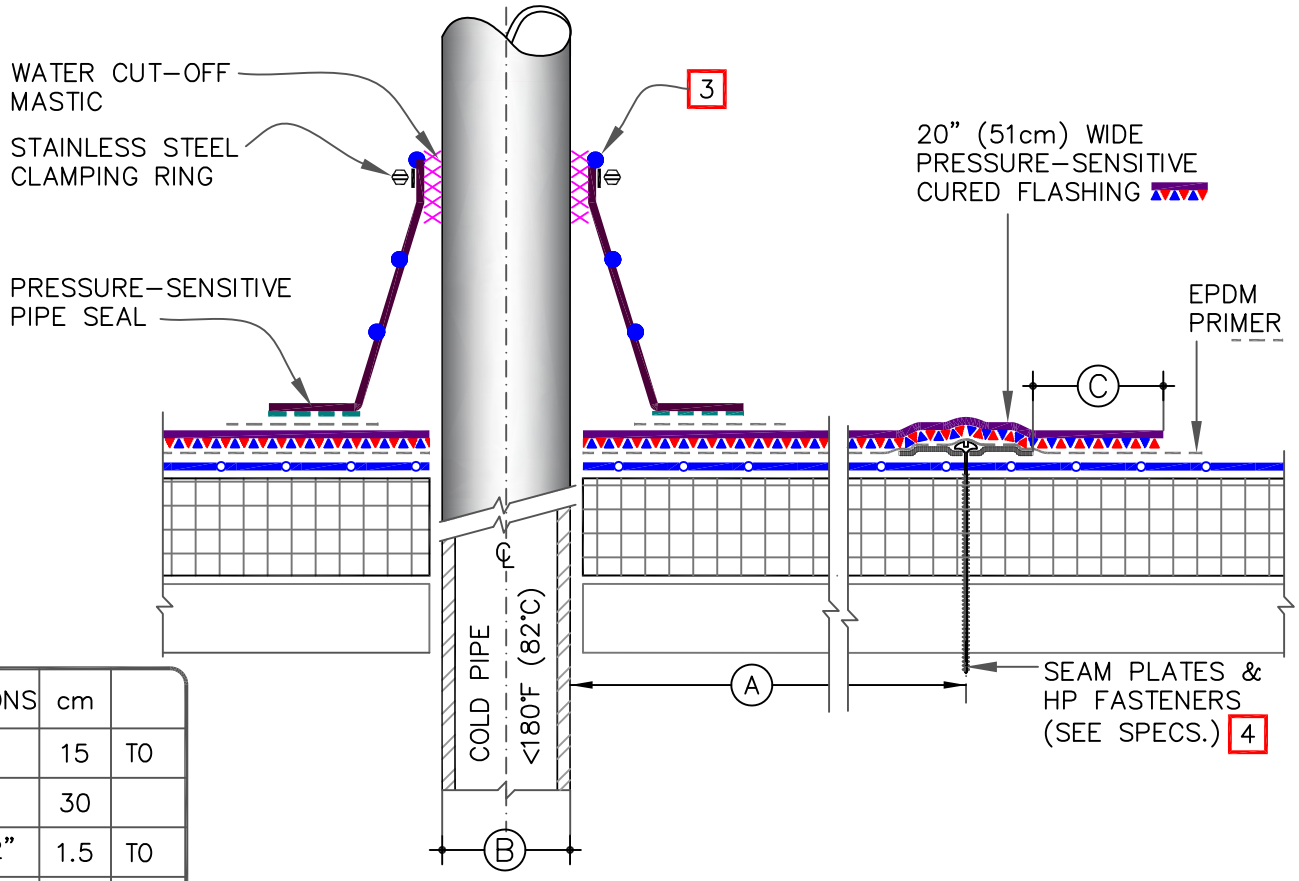
CARLISLE SYNTEC SYSTEMS

PRESSURE-SENSITIVE PIPE SEAL

MAXIMUM WARRANTY: 25 YEARS

DETAIL NO. MF-8A

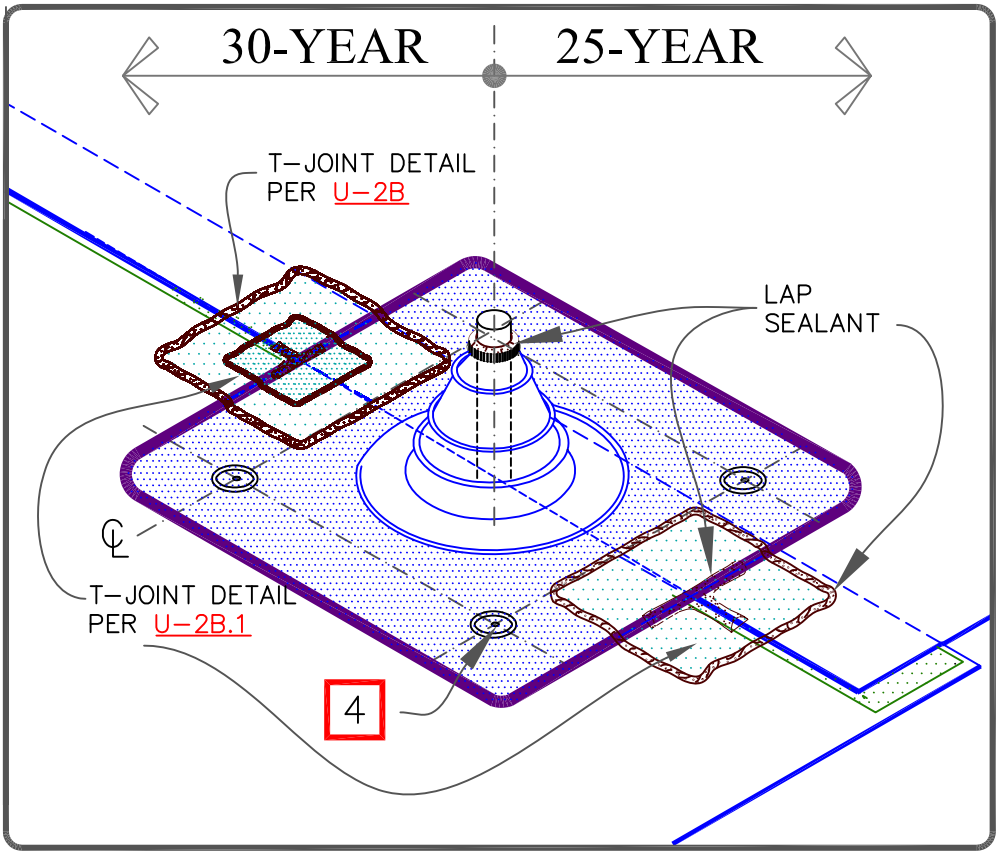
MECHANICALLY FASTENED



DIMENSIONS	cm	
Ⓐ 6"	15	TO
12"	30	
Ⓑ 1/2"	1.5	TO
6"	15	
Ⓒ 2"	5	

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. PRE-MOLDED PIPE SEAL MUST HAVE RIB INTACT AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. INSTALL A MIN. OF 4 FASTENERS FOR PIPES WITH OUTSIDE DIAMETER <6" (15cm). SEE DETAIL MF-8B OR MF-8B.1 FOR WIDER PIPES.
5. DECK FLANGES OF THE PRESSURE-SENSITIVE PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.



CARLISLE SYNTEC SYSTEMS

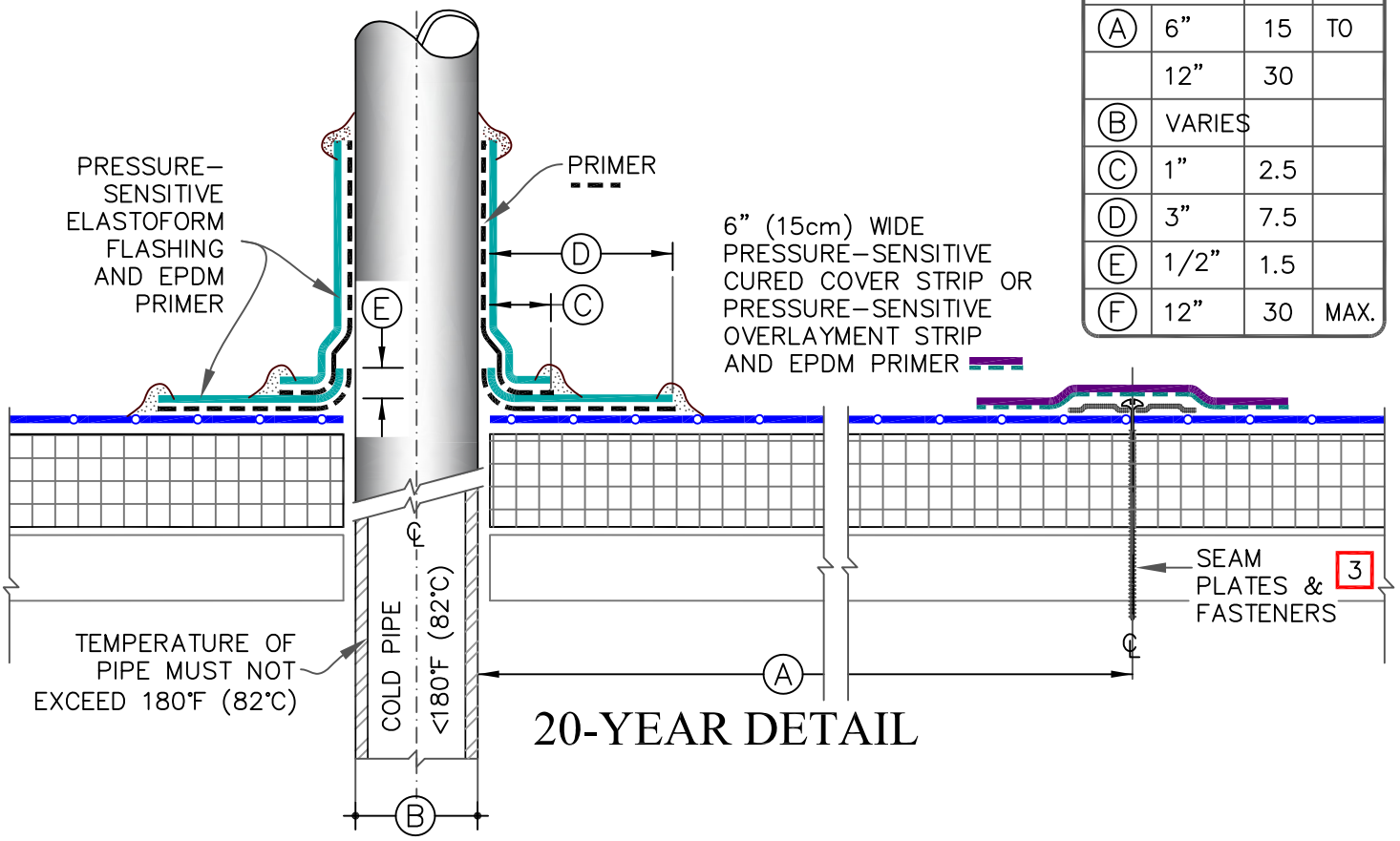
PRESSURE-SENSITIVE PIPE SEAL WITH 20" PRESSURE-SENSITIVE CURED FLASHING

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-8A.1

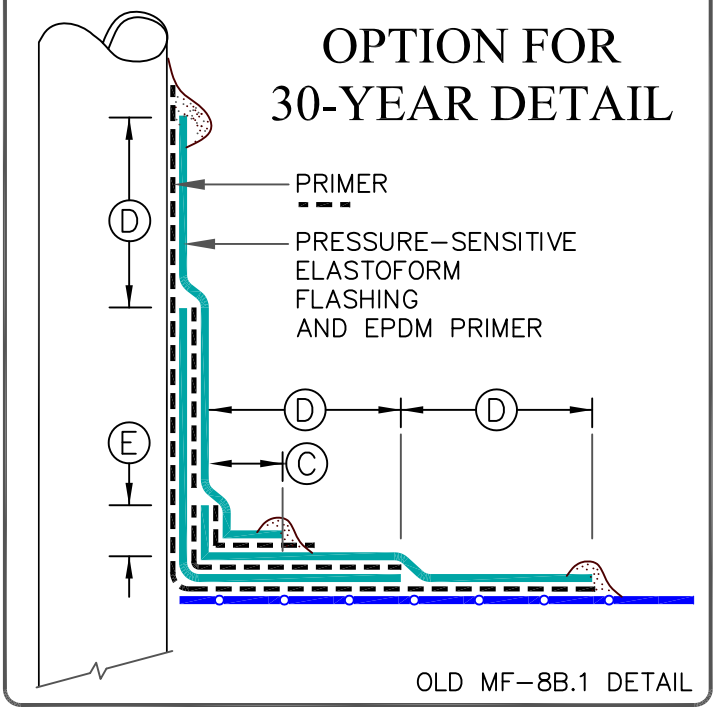
MECHANICALLY FASTENED

DIMENSIONS		cm	
A	6”	15	TO
	12”	30	
B	VARIES		
C	1”	2.5	
D	3”	7.5	
E	1/2”	1.5	
F	12”	30	MAX.



20-YEAR DETAIL

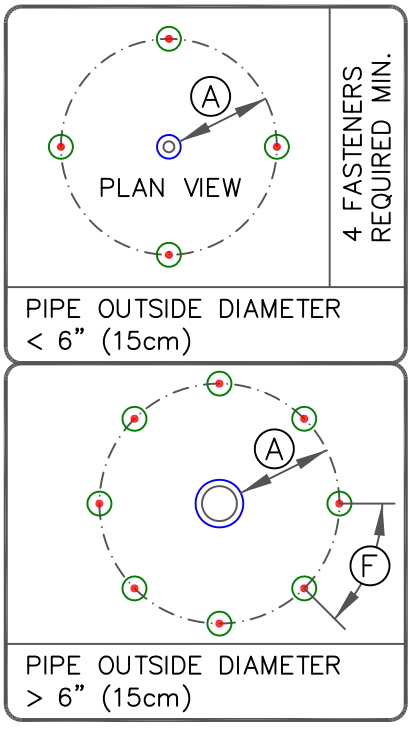
OPTION FOR 30-YEAR DETAIL



OLD MF–8B.1 DETAIL

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE–SENSITIVE ELASTOFORM FLASHING.
2. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
3. FOR STRUCTURAL STEEL TUBING GREATER THAN 12” ACROSS USE U–5 DETAILS.



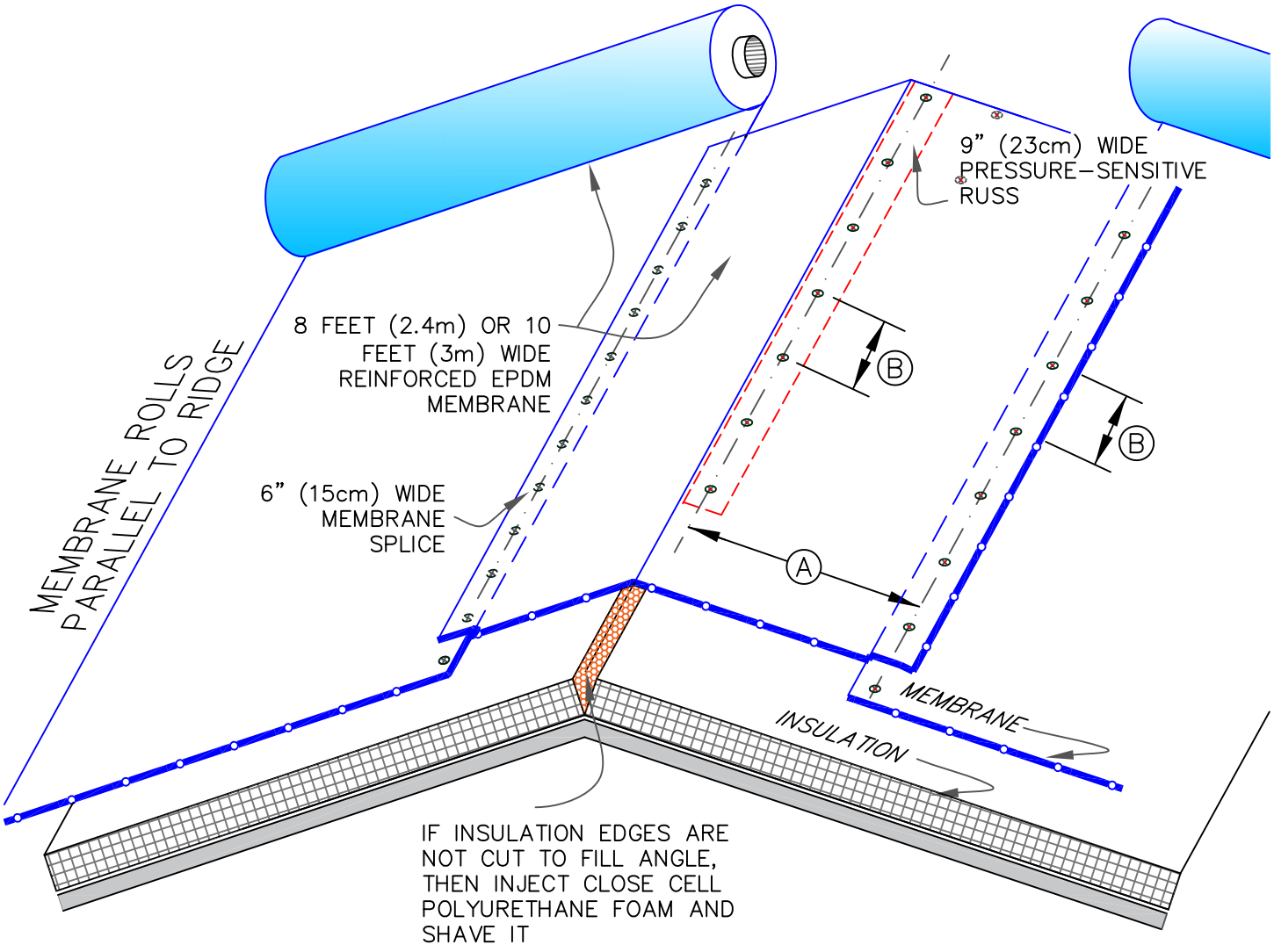
CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PIPE WRAP

MAXIMUM WARRANTY: SEE EACH DETAIL

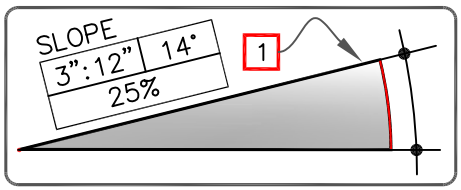
DETAIL NO. MF–8B

MECHANICALLY FASTENED



NOTES:

1. RIDGE MEMBRANE ATTACHMENT IS ONLY REQUIRED WHEN ROOF SLOPE EXCEEDS 3" TO THE HORIZONTAL FOOT (7.5cm/30cm).
2. REINFORCED EPDM MEMBRANE SHALL BE INSTALLED PARALLEL WITH RIDGE LINE (WITH MEMBRANE CENTERED OVER THE RIDGE LINE) AS SHOWN.
3. FOR PROPER MEMBRANE ATTACHMENT AND SPLICING, REFER TO APPLICABLE MF-2 DETAIL.
4. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
5. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
6. AS AN OPTION, 9" (23cm) WIDE PRESSURE-SENSITIVE RUSS MAY BE USED BENEATH EPDM FIELD SHEETS FOR PERIMETER SECUREMENT.



DIMENSIONS		cm	
A	3'-6"	110	MIN.
	4'-6"	140	MAX.
B	12"O.C.	30	MAX.

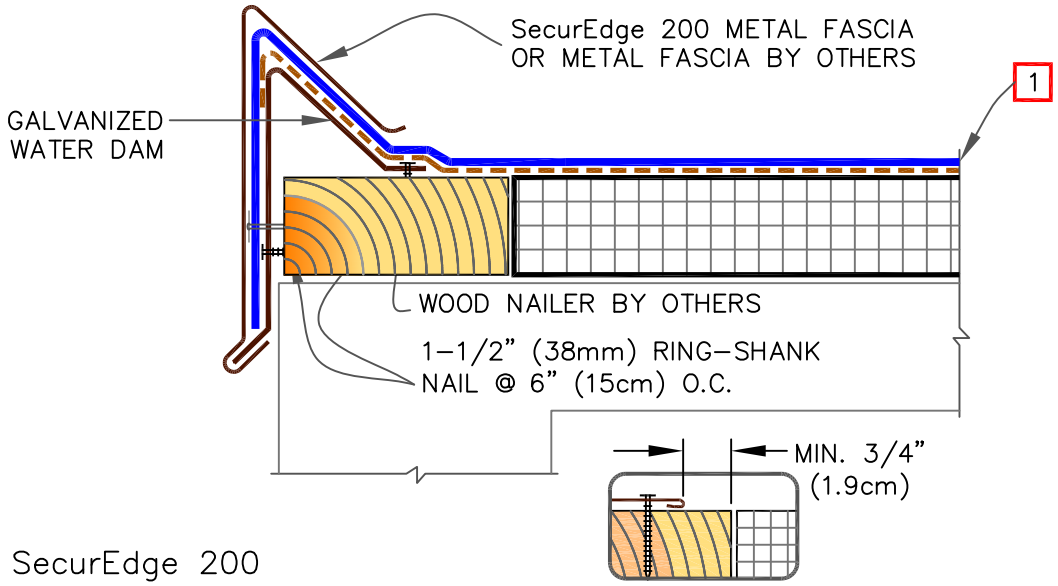
CARLISLE SYNTEC SYSTEMS

RIDGE MEMBRANE ATTACHMENT

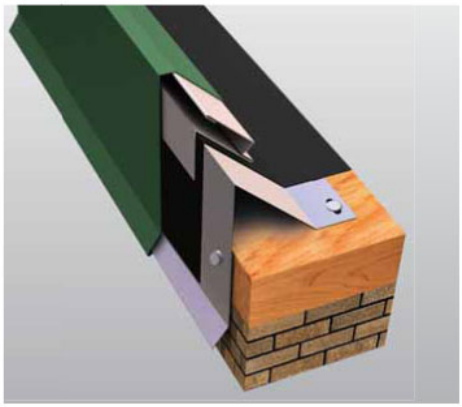
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-22

MECHANICALLY FASTENED



SecurEdge 200

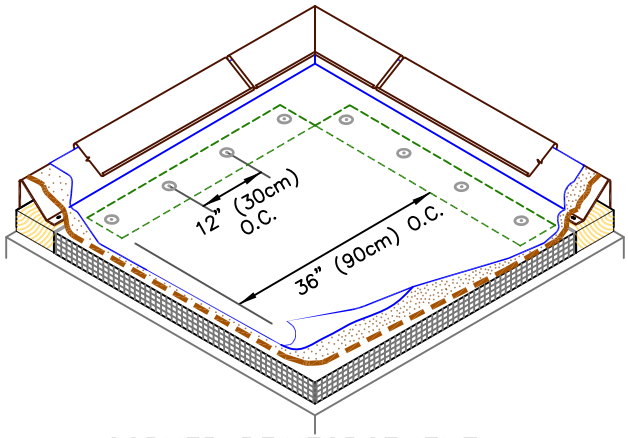


NOTES:

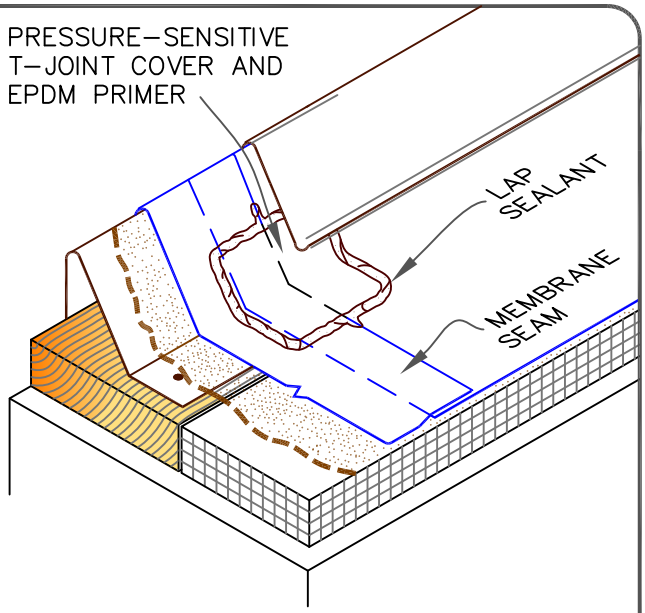
1. MAXIMUM MEMBRANE THICKNESS GOING OVER THE WATER DAM IS 60-MIL. FOR THICKER MEMBRANES, RUN FIELD SHEET UNDER THE WATER DAM AND STRIP-IN WITH MAXIMUM 60-MIL MEMBRANE.

2. USE MF-1A FOR MECHANICALLY FASTENED SYSTEMS AND B-1A FOR BALLASTED SYSTEMS.

AT CORNERS, 6" (15cm) WIDE PRESSURE-SENSITIVE RUSS MUST BE INSTALLED 12" (30cm) MAXIMUM FROM THE BASE OF THE WATER DAM AND EXTEND 36" (90cm) MINIMUM IN EACH DIRECTION.



CORNER REINFORCEMENT



MEMBRANE SEAM AT EDGE

CARLISLE SYNTEC SYSTEMS

CARLISLE SecurEDGE 200

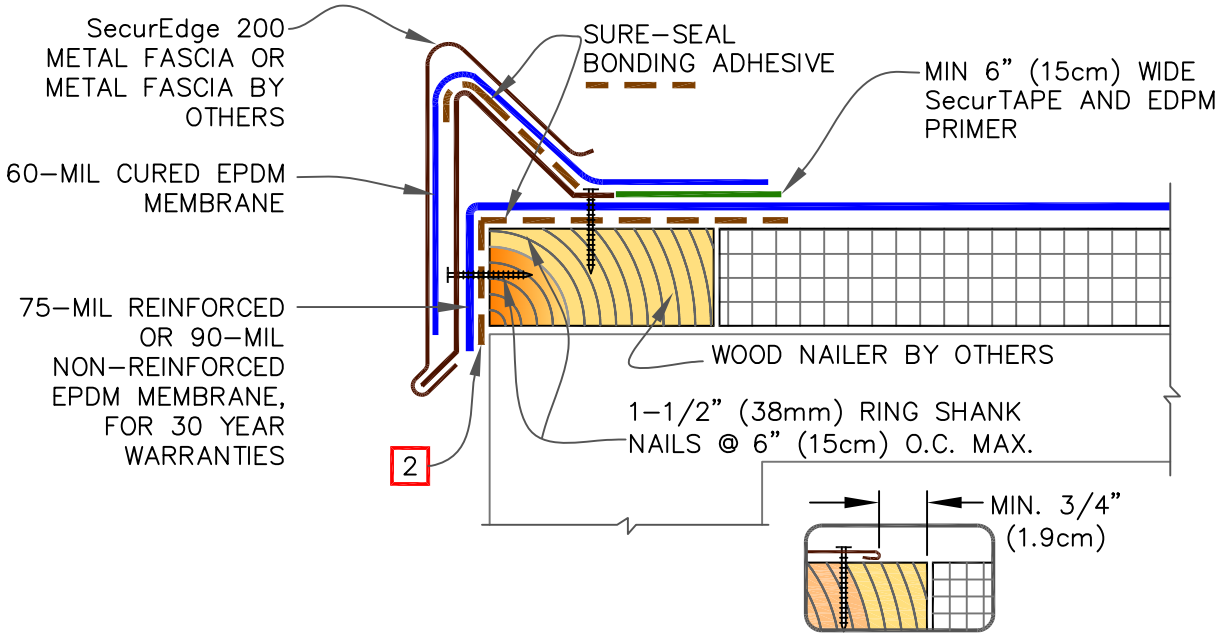
MAXIMUM WARRANTY: 25 YEARS

EPDM

DETAIL NO.

U-1A

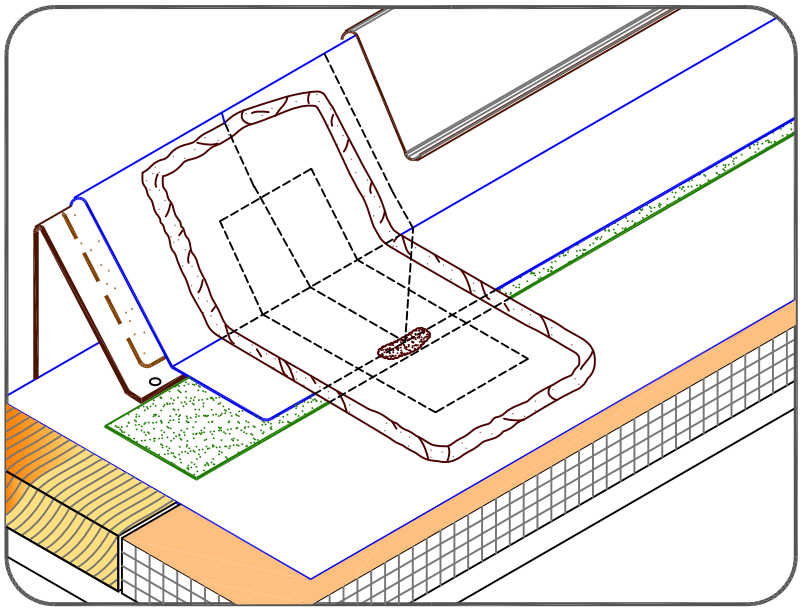
U (UNIVERSAL DETAIL)



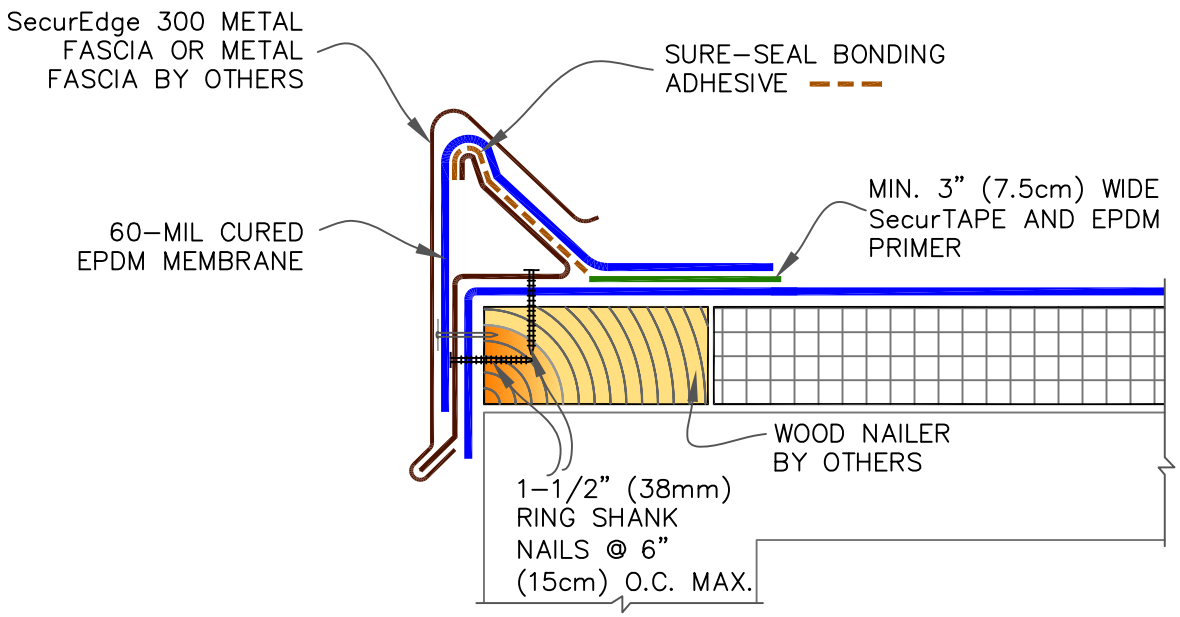
NOTES:

1. FIELD SPLICES AT THE ANGLE CHANGE SHALL BE OVERLAID WITH EPDM PRIMER AND TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. PER DETAIL U–2C.

2. WHEN AND AIR/VAPOR BARRIER IS NOT SPECIFIED, THE ROOF MEMBRANE SHALL BE ADHERED OVER PERIMETER WOOD NAILER ALONG EDGES TO PREVENT AIR INFILTRATION ALONG EDGING, REGARDLESS OF ASSEMBLY TYPE (BALLASTED, ADHERED AND MECHANICALLY FASTENED).



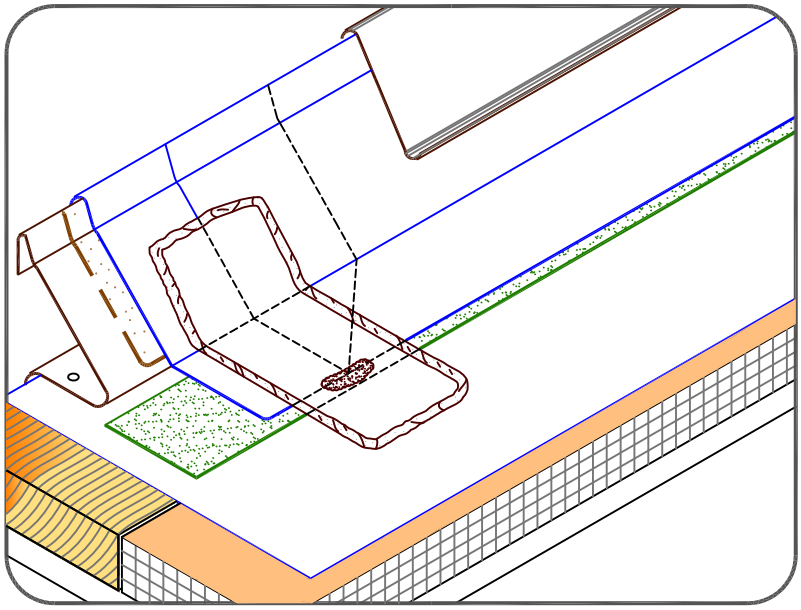
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 200	DETAIL NO. U–1A.1
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



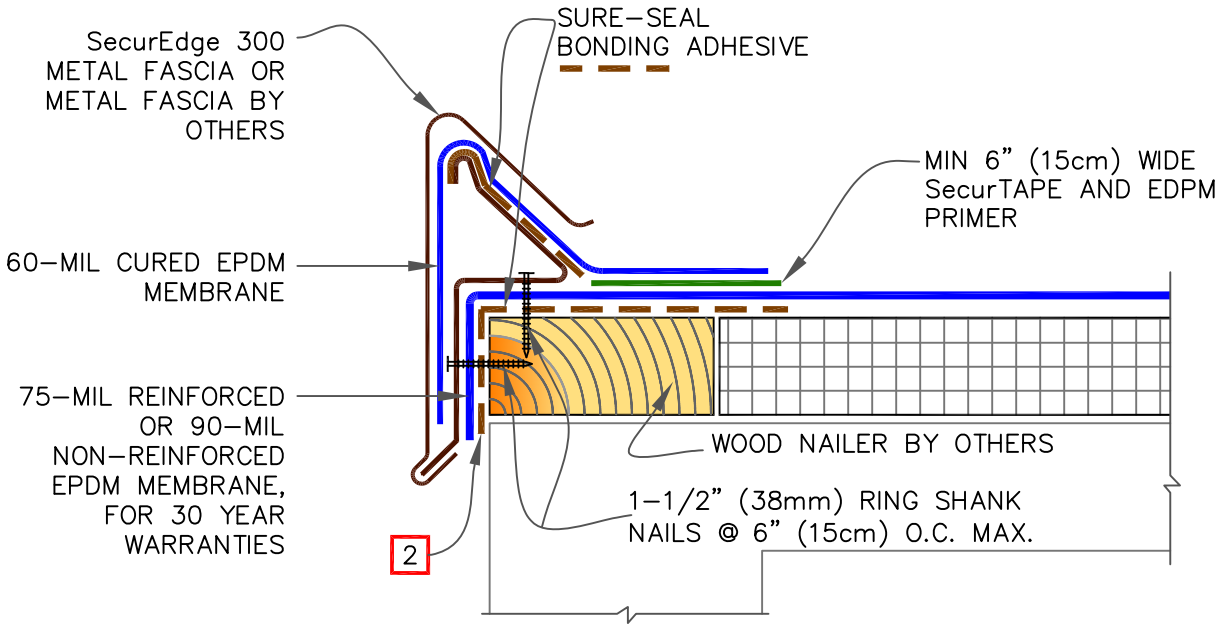
NOTE:

1. 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING, IN CONJUNCTION WITH EPDM PRIMER, MUST BE CENTERED OVER FIELD SPLICES AT THE ANGLE CHANGE.

SecurEdge 300



CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 300	EPDM	DETAIL NO. U–1B
	MAXIMUM WARRANTY: 25 YEARS		U (UNIVERSAL DETAIL)

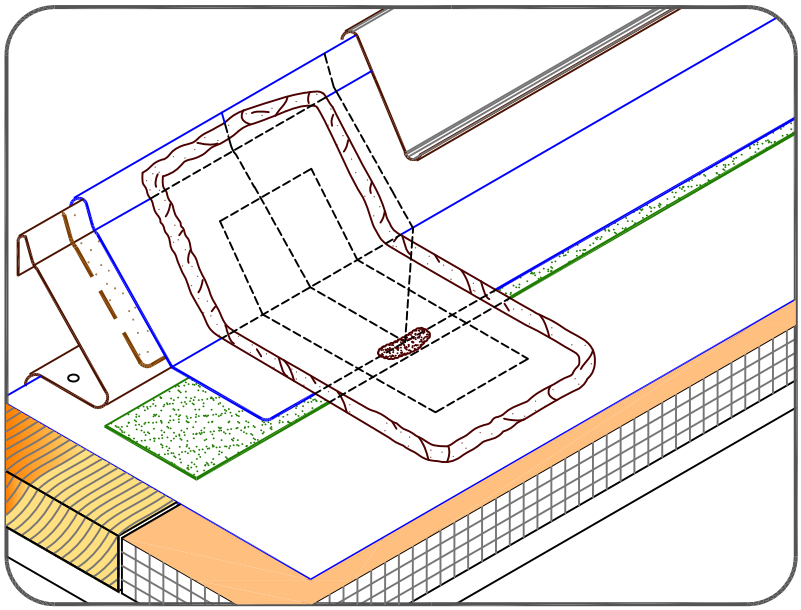


NOTES:

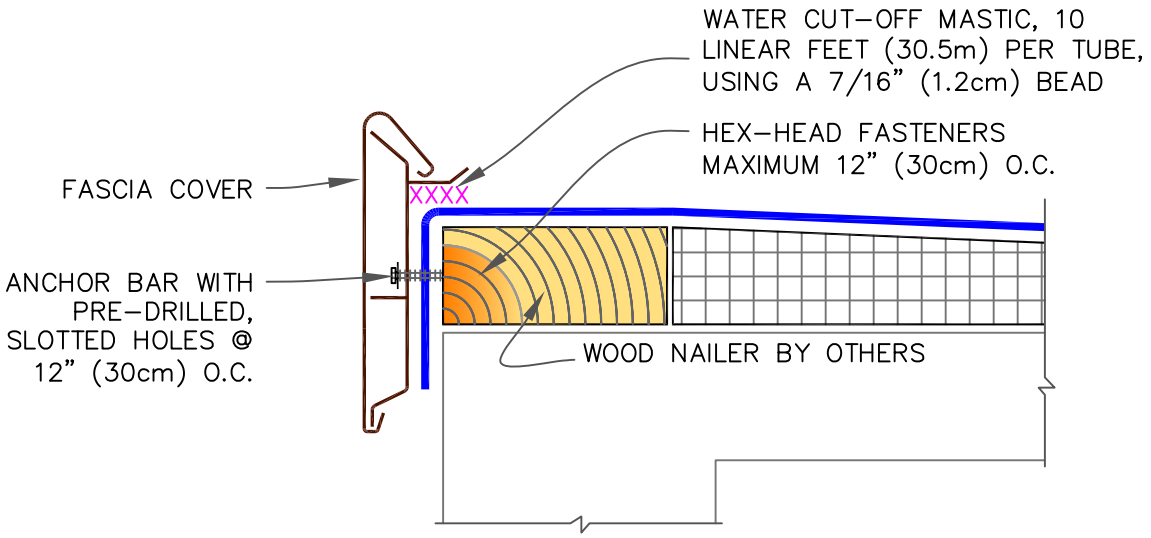
1. FIELD SPLICES AT THE ANGLE CHANGE SHALL BE OVERLAID WITH EPDM PRIMER AND 2 LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING PER DETAIL U–2C.

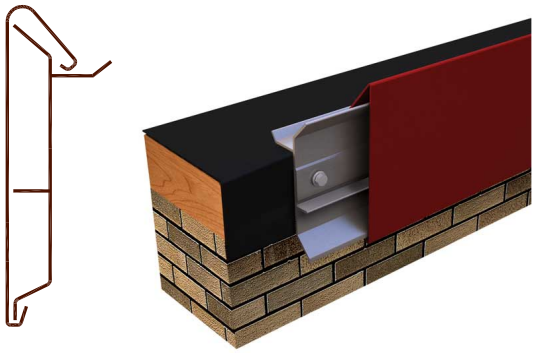
2. WHEN AIR/VAPOR BARRIER IS NOT SPECIFIED, THE ROOF MEMBRANE SHALL BE ADHERED OVER PERIMETER WOOD NAILER ALONG EDGES TO PREVENT AIR INFILTRATION ALONG EDGING, REGARDLESS OF ASSEMBLY TYPE (BALLASTED, ADHERED AND MECHANICALLY FASTENED).

SecurEdge 300



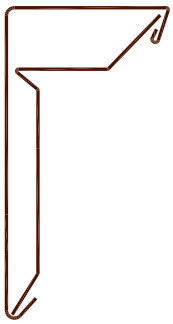
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 300	EPDM	DETAIL NO. U–1B.1
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)





SecurEdge 2000

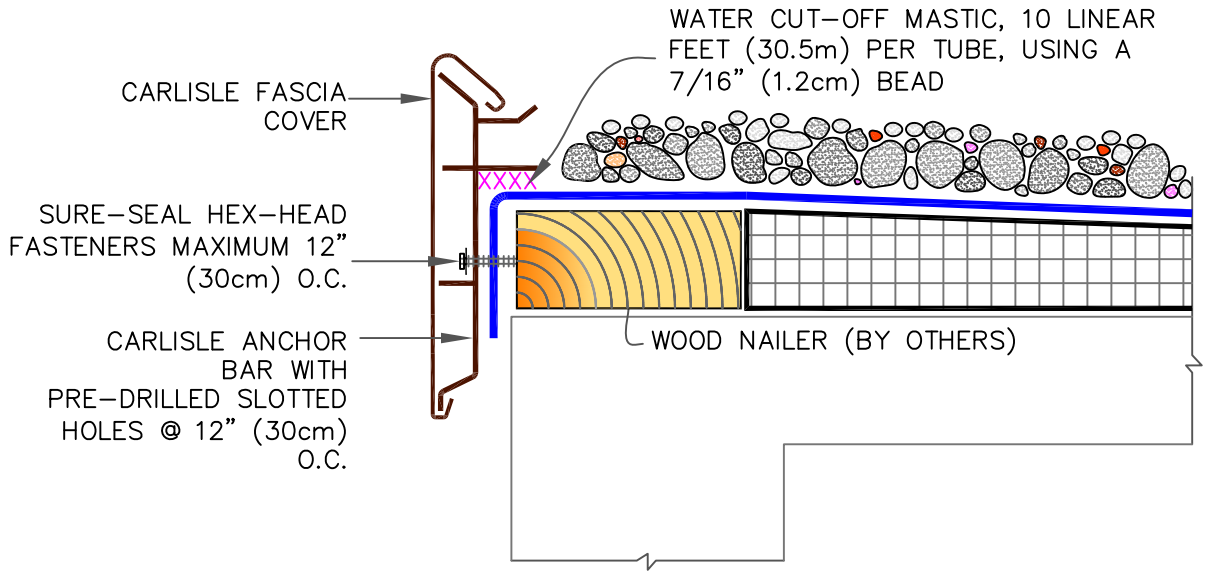
SecurEdge 3000



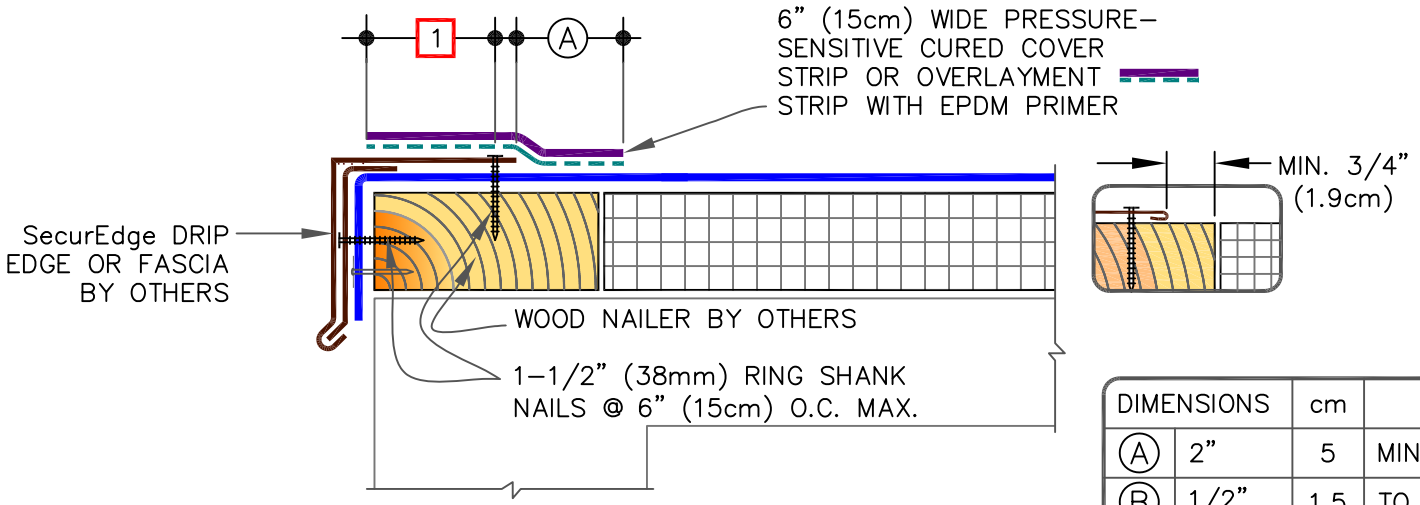
NOTES:

1. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SecurEdge MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.

2. ENSURE ROOF SLOPES AWAY FROM SecurEDGE.



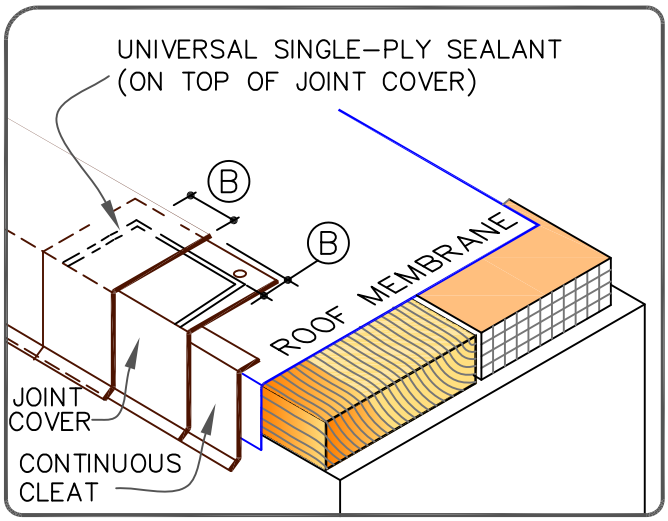
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 2000 & 3000	EPDM	DETAIL NO. U–1C
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

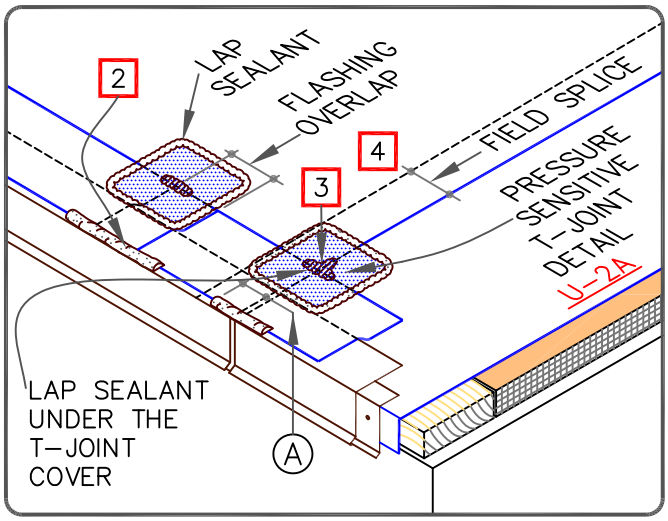


DIMENSIONS		cm	
A	2"	5	MIN.
B	1/2"	1.5	TO
	1"	2.5	

NOTES:

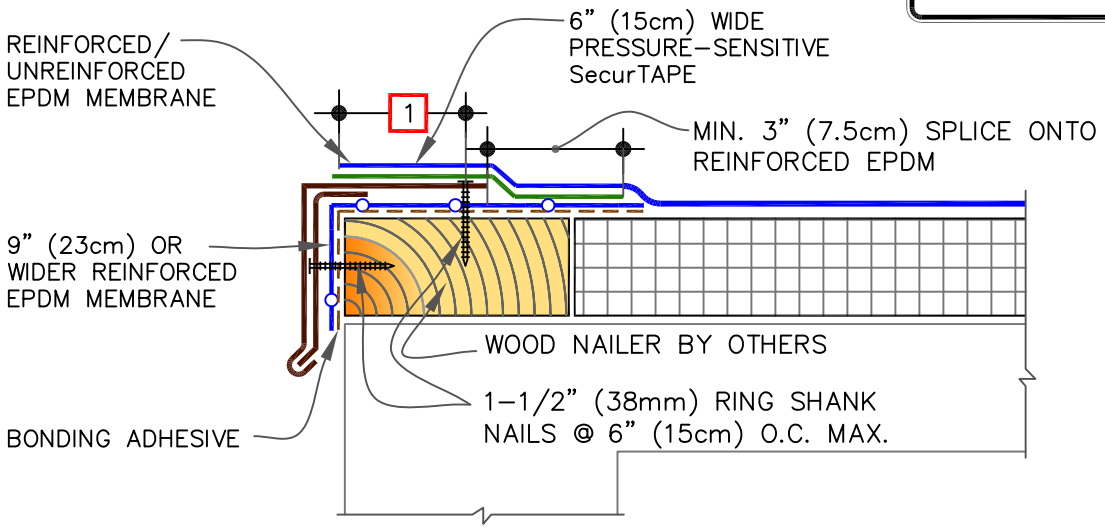
1. DECK FLANGE MUST BE TOTALLY COVERED WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.
2. LAP SEALANT MUST BE APPLIED AT FLASHING OVERLAPS AND INTERSECTIONS WITH JOINTS IN METAL EDGING.
3. T-JOINT COVER NOT NEEDED WHEN USING PS OVERLAYMENT STRIP ON MEMBRANE LESS THAN 90-MIL.
4. WHEN USING 90-MIL MEMBRANE INSTALL A 12" (30cm) T-JOINT COVER OVER THE 6" (15cm) T-JOINT COVER PER U-2B.1
5. DETAIL NOT FOR USE WITH DESIGN "B" (BALLASTED STONE ASSEMBLY).

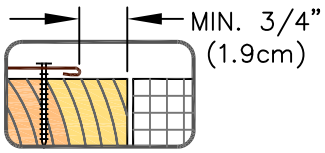




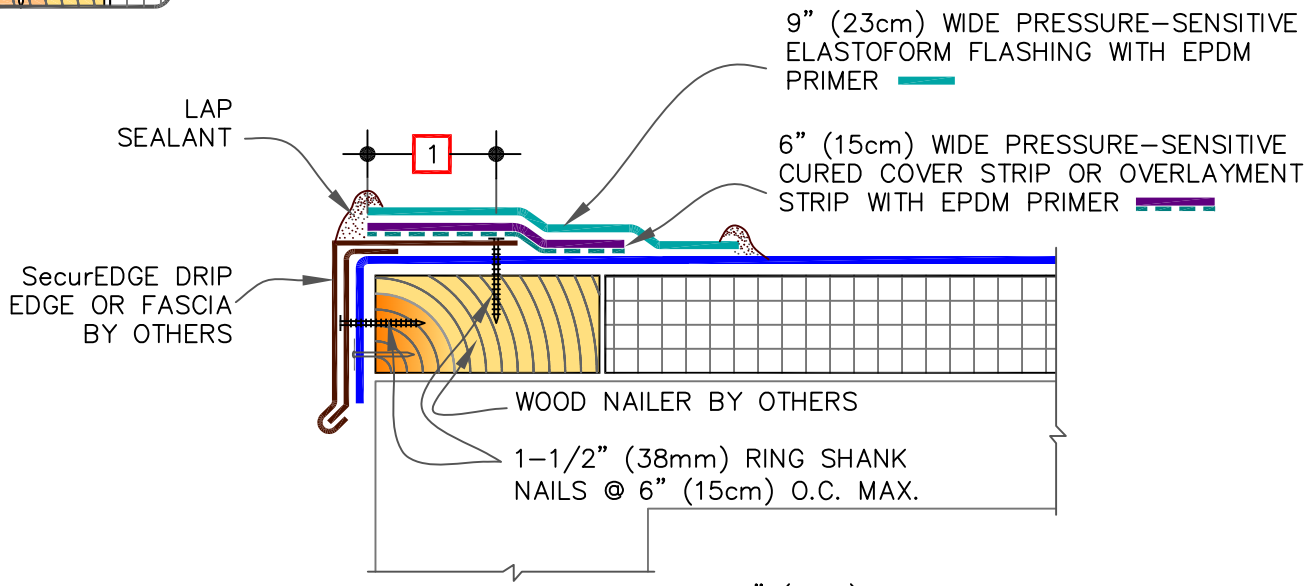
CARLISLE SYNTEC SYSTEMS	SecurEdge DRIP EDGE FASCIA	DETAIL NO. U-1D
	MAXIMUM WARRANTY: 25 YEARS	U (UNIVERSAL DETAIL)

OPTION 1





OPTION 2



NOTES:

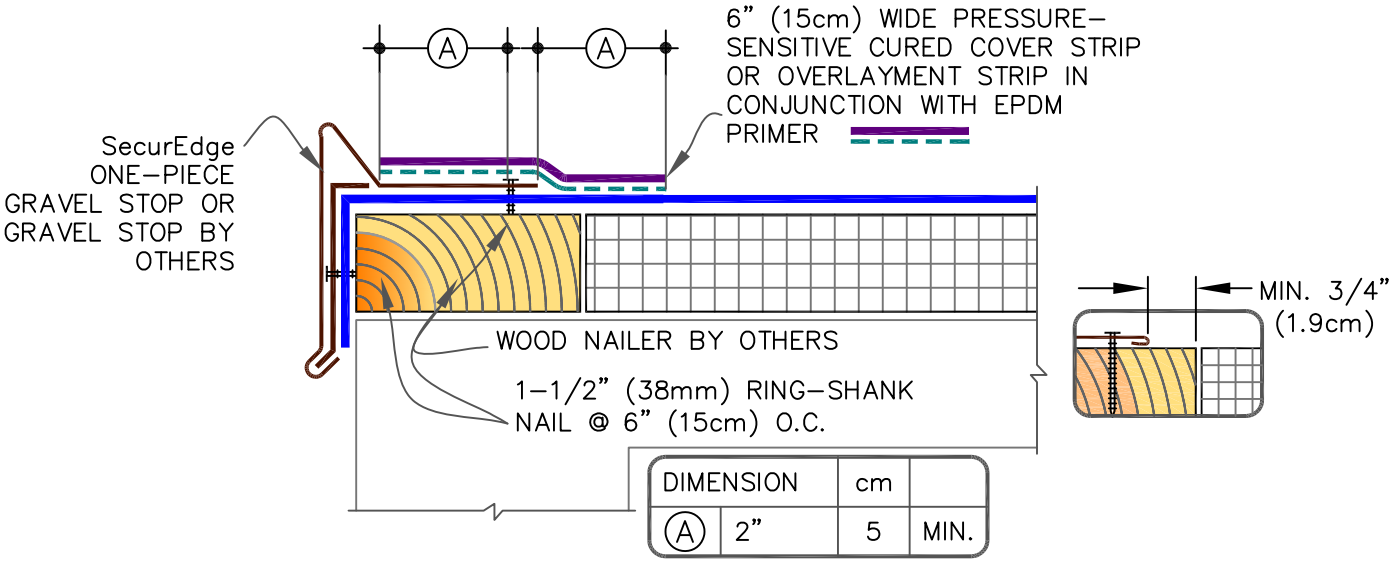
1. DECK FLANGE MUST BE TOTALLY COVERED WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.

2. LAP SEALANT MUST BE APPLIED AT FLASHING OVERLAPS AND INTERSECTIONS WITH JOINTS IN METAL EDGING.

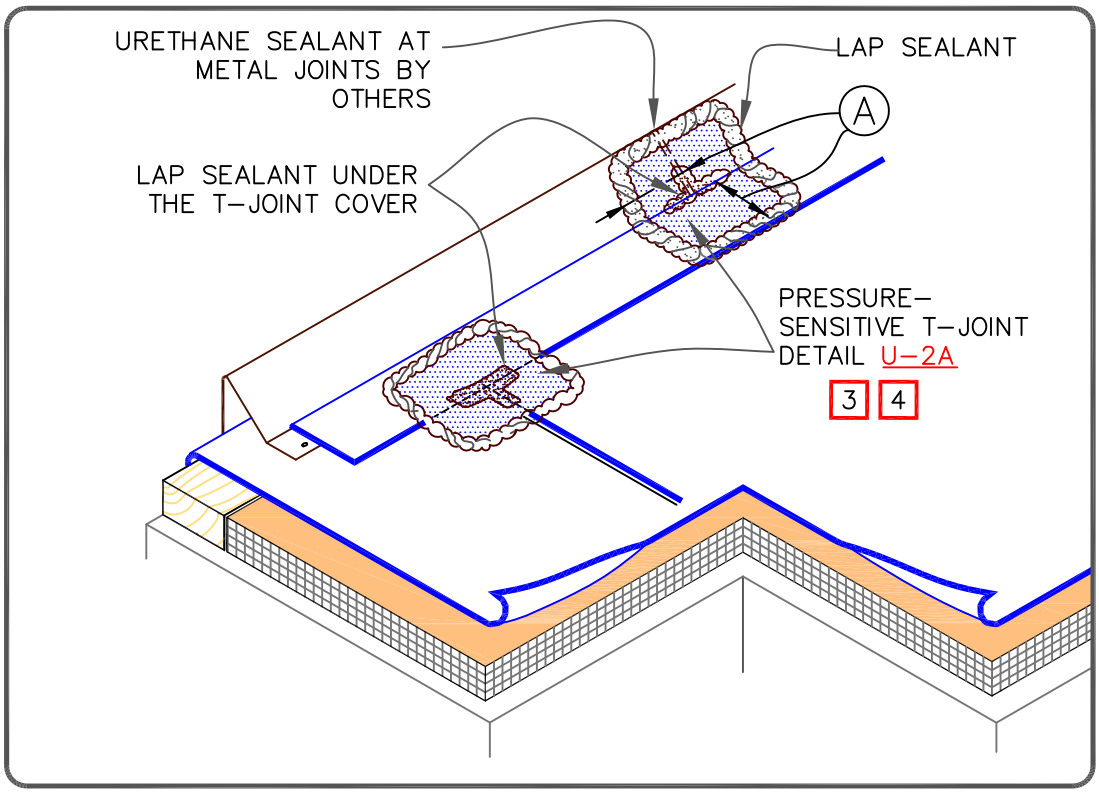
3. ALL SPLICE INTERSECTIONS MUST BE OVERLAID WITH PRESSURE-SENSITIVE T-JOINT COVERS AND SEALED WITH CONTINUOUS LAP SEALANT. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE LEADING EDGE OF THE MEMBRANE SPLICES (UNDER THE 6"X 6" (15cm X 15cm) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN ALL DIRECTIONS FROM THE SPLICE INTERSECTION.

4. DETAIL NOT FOR USE WITH DESIGN "B" (BALLASTED STONE ASSEMBLY).

CARLISLE SYNTEC SYSTEMS	SecurEdge DRIP EDGE FASCIA	EPDM	DETAIL NO. U-1D.1
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



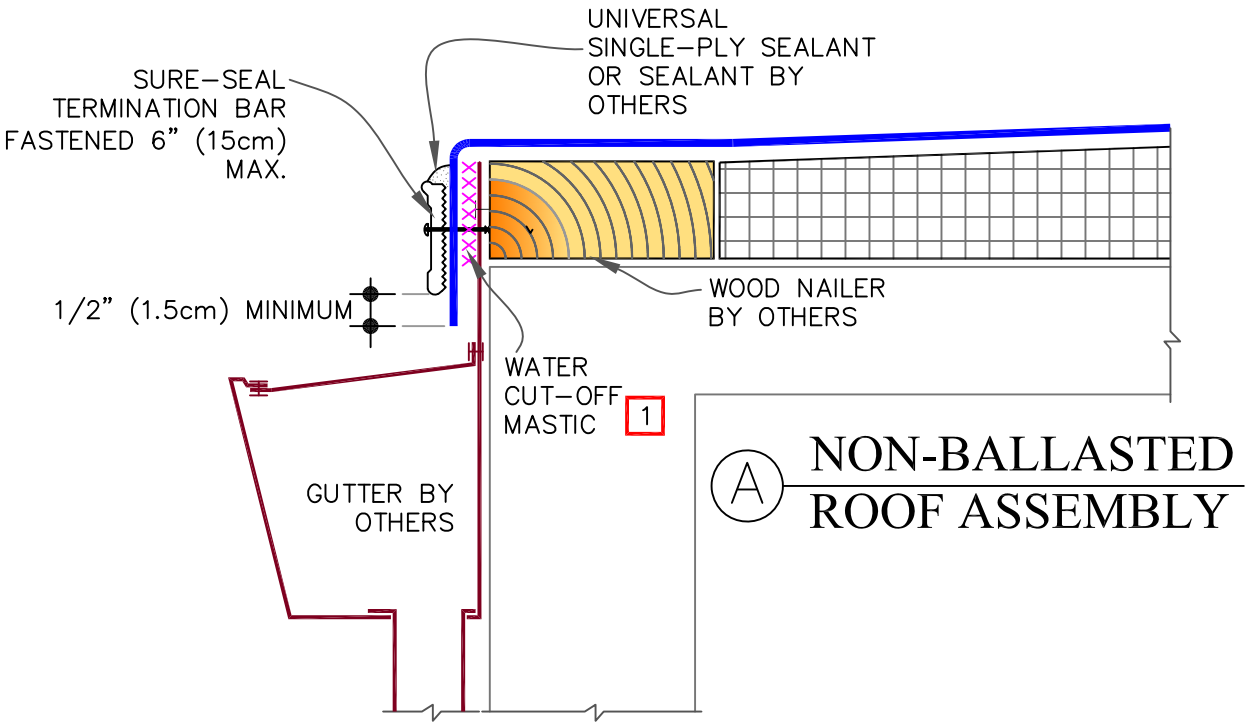
DIMENSION	cm	
A 2"	5	MIN.



NOTES:

1. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.
2. LAP SEALANT MUST BE APPLIED AT FLASHING OVERLAPS AND INTERSECTIONS WITH JOINTS IN METAL EDGING.
3. T-JOINT COVER AT SPLICE INTERSECTION NOT NEEDED WHEN USING PS OVERLAYMENT STRIP ON MEMBRANE LESS THAN 90-MIL.
4. WHEN USING 90-MIL MEMBRANE INSTALL A 12" (30cm) T-JOINT COVER OVER THE 6" (15cm) T-JOINT COVER PER U-2B.1

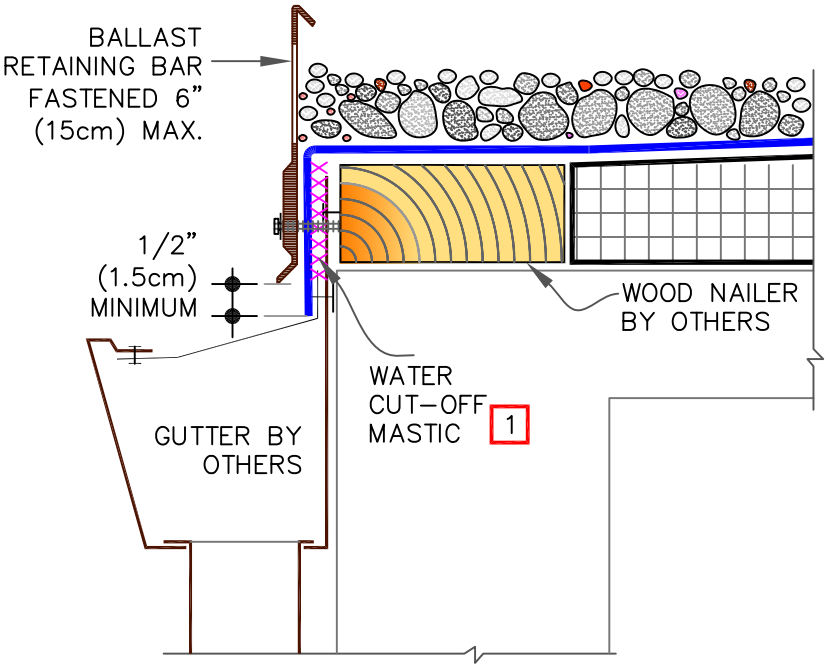
CARLISLE SYNTEC SYSTEMS	SecurEdge ONE-PIECE GRAVEL STOP	EPDM	DETAIL NO. U-1E
	MAXIMUM WARRANTY: 25 YEARS		U (UNIVERSAL DETAIL)



A NON-BALLASTED ROOF ASSEMBLY

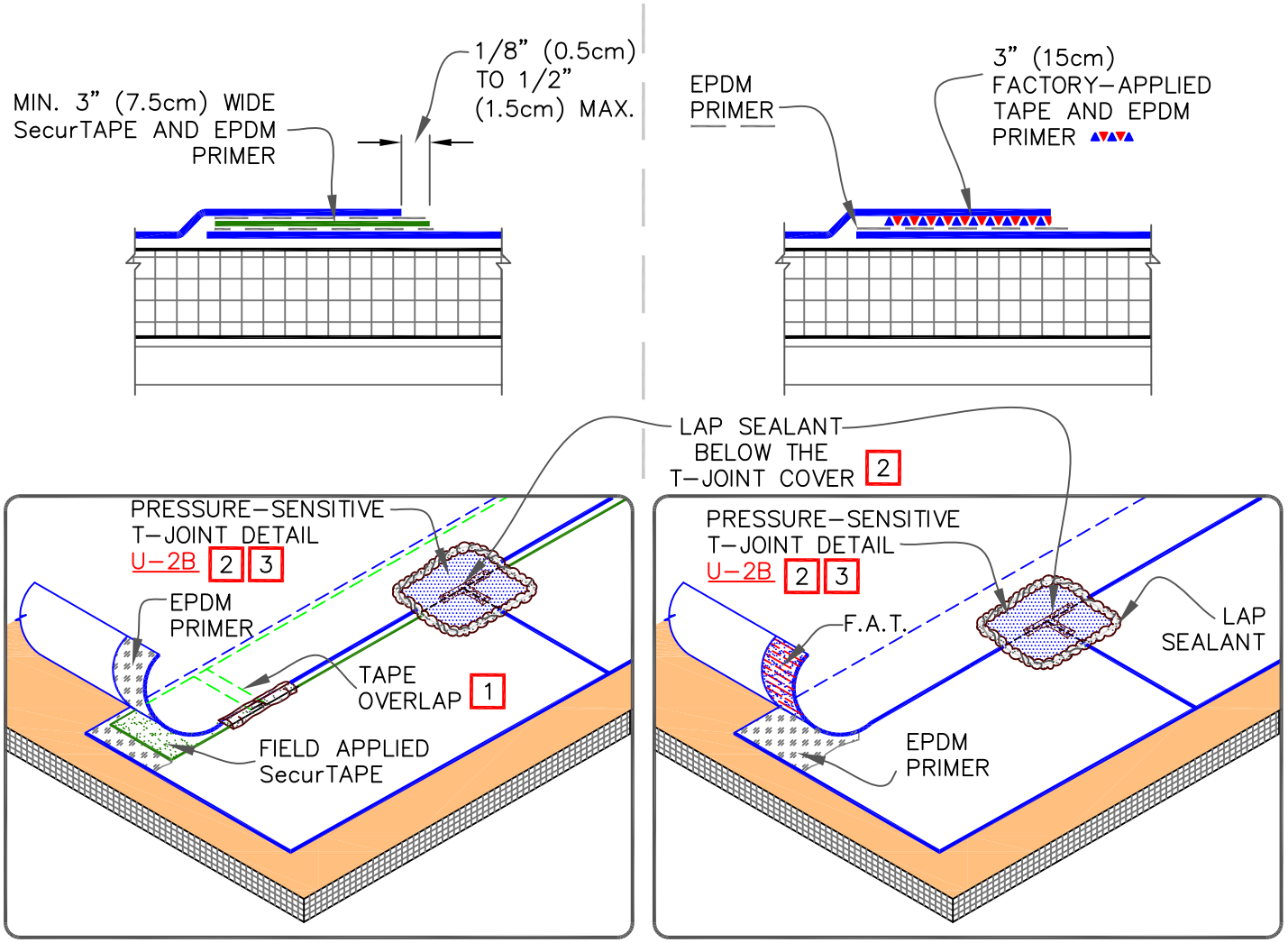
NOTES:

1. FASTENING OF METAL TERMINATION OR BALLAST RETAINING BAR MUST PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. BALLAST RETAINING BAR MUST EXTEND ABOVE GRAVEL SURFACE SUFFICIENTLY TO RETAIN GRAVEL AND PREVENT GRAVEL MIGRATION.
3. SLOTS IN BALLAST RETAINING BAR MUST BE FLUSH OR SLIGHTLY BELOW MEMBRANE LEVEL.



B BALLASTED ROOF ASSEMBLY

CARLISLE SYNTEC SYSTEMS	METAL BAR EDGE TERMINATION	EPDM	DETAIL NO. U-1F
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

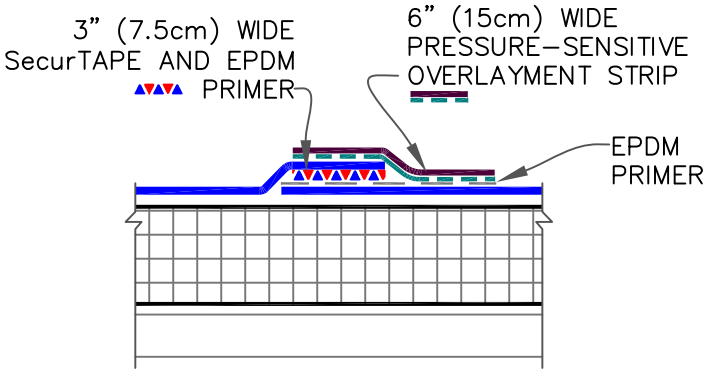


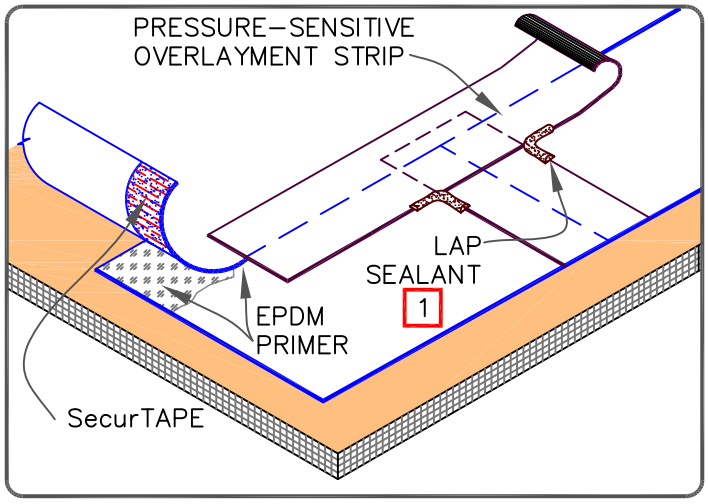
NOTES:

1. OVERLAP THE ENDS OF THE FIELD APPLIED SecurTAPE A MINIMUM OF 1" (2.5cm). APPLY LAP SEALANT AT TAPE OVERLAPS 2" (5cm) IN EACH DIRECTION AS SHOWN.
2. APPLY LAP SEALANT ALONG THE EXPOSED EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION AND OVERLAY WITH A 6" (15cm) T-JOINT COVER.
3. WHEN USING 90-MIL MEMBRANE, INSTALL A 12" (30cm) T-JOINT COVER CENTERED OVER THE FIRST T-JOINT COVER PER DETAIL U-2B.1.
4. LAP SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED EPDM MEMBRANE.
5. REFER TO DETAIL MF-2A FOR MECHANICALLY FASTENED SPLICES.

CARLISLE SYNTEC SYSTEMS	EPDM MEMBRANE SPLICE	EPDM	DETAIL NO. U-2A
	MAXIMUM WARRANTY: 25 YEARS		U (UNIVERSAL DETAIL)

OPTION 1

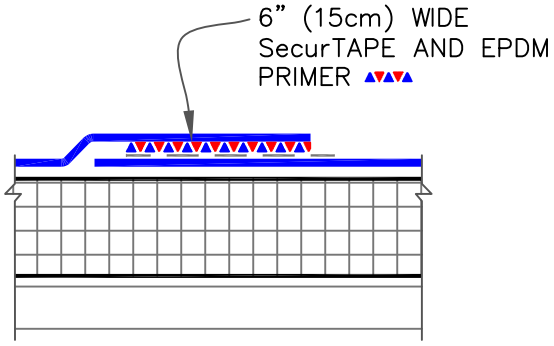


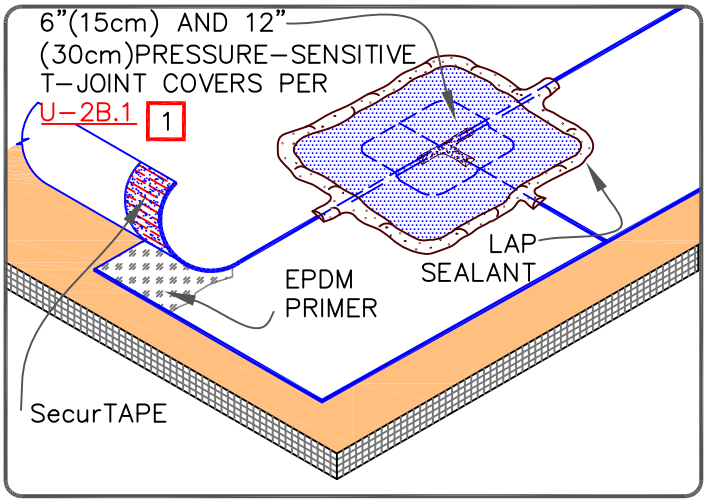


NOTES:

1. APPLY LAP SEALANT AT ALL INTERSECTIONS BETWEEN PRESSURE-SENSITIVE OVERLAYMENT STRIP.
2. REFER TO DETAIL MF-2A.1 FOR MECHANICALLY-FASTENED SPLICES.

OPTION 2



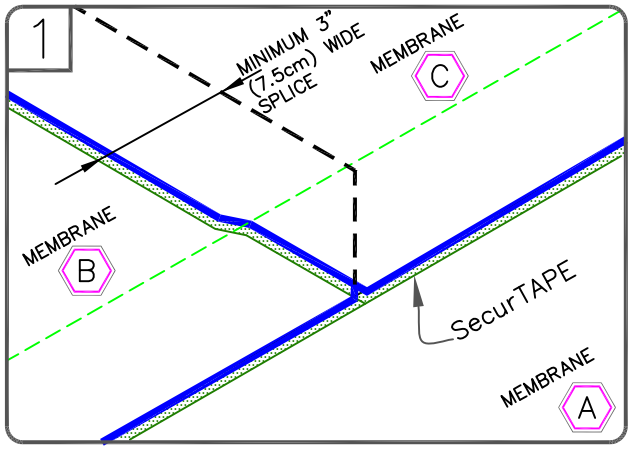


F.A.T. (FACTORY APPLIED SecurTAPE)

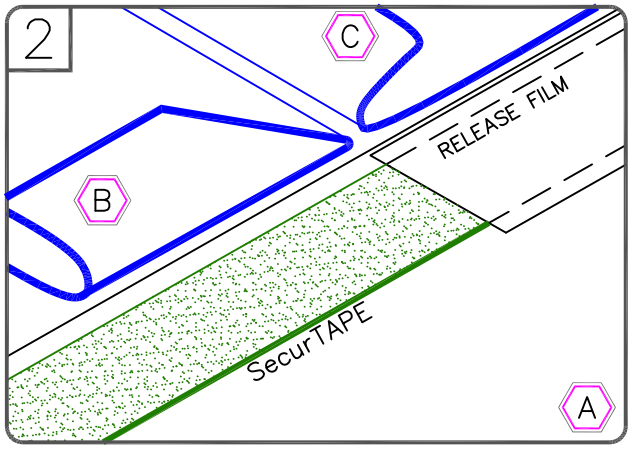
NOTE:

1. APPLY LAP SEALANT ALONG THE EXPOSED EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION AND OVERLAY WITH A 6" (15cm) T-JOINT COVER. INSTALL A 12" (30cm) T-JOINT COVER CENTERED OVER THE FIRST T-JOINT COVER PER DETAIL U-2B.1.

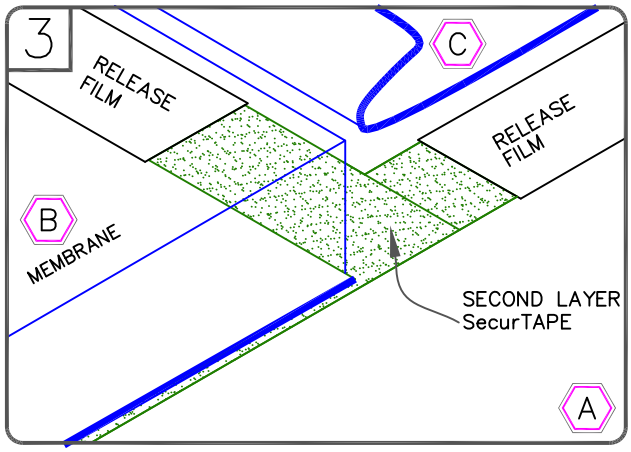
CARLISLE SYNTEC SYSTEMS	EPDM MEMBRANE SPLICE	DETAIL NO. U-2A.1
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



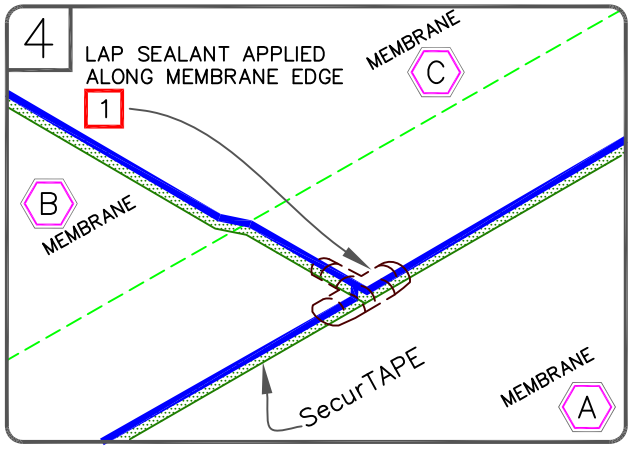
POSITION MEMBRANE TO ALLOW AN APPROXIMATE 4" (10cm) OVERLAP. MARK THE BOTTOM SHEET WITH AN INDELIBLE MARKER 1/2" (1.5cm) FROM THE EDGE OF THE TOP SHEET AS SHOWN. THE PRE-MARKED LINE ON THE MEMBRANE EDGE CAN ALSO BE USED AS A GUIDE.



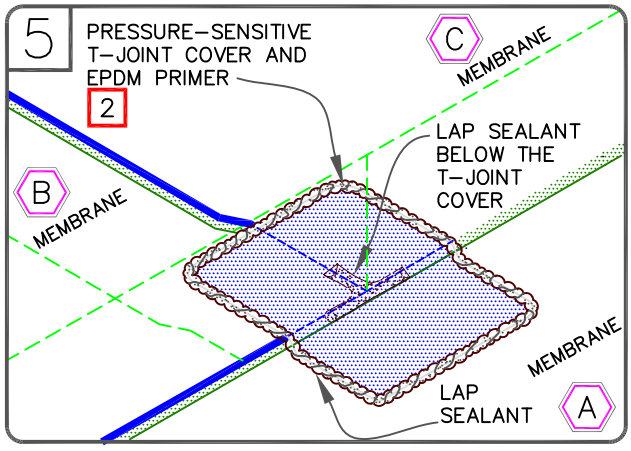
FOLD SHEETS BACK AS SHOWN. APPLY EPDM PRIMER TO THE SPLICE AREA ON BOTH SURFACES AND ALLOW TO FLASH-OFF. APPLY SecurTAPE WITH RELEASE FILM ALIGNED WITH MARKED LINE.



SPLICE SHEET B TO SHEET A AND APPLY SECOND PIECE OF SecurTAPE BETWEEN SHEET B AND C. TRIM RELEASE FILM AS SHOWN.



SPLICE SHEET C TO SHEET A AND B, PRESS TOP SHEET ONTO BOTTOM SHEET USING HAND PRESSURE TOWARDS THE OUTER EDGE OF THE SPLICE AND ROLL THE SPLICE AREA WITH A 2" (5cm) WIDE STEEL ROLLER.

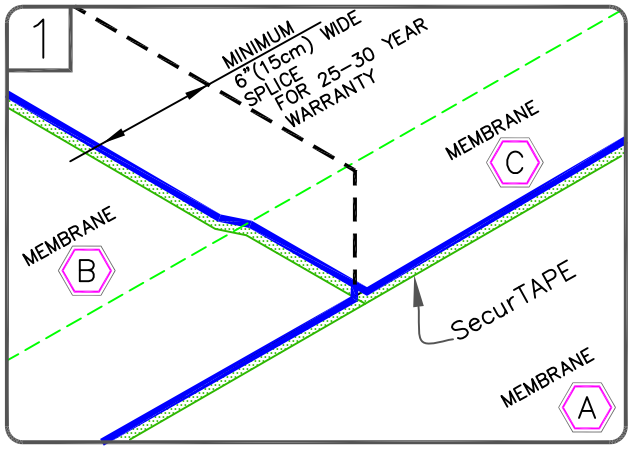


APPLY PRESSURE-SENSITIVE T-JOINT COVER OR 6" (15cm) WIDE SECTION OF PRESSURE-SENSITIVE ELASTOFORM FLASHING CENTERED OVER THE INTERSECTING POINT OF THE LEADING EDGES OF THE FIELD SPLICE INTERSECTION AS SHOWN.

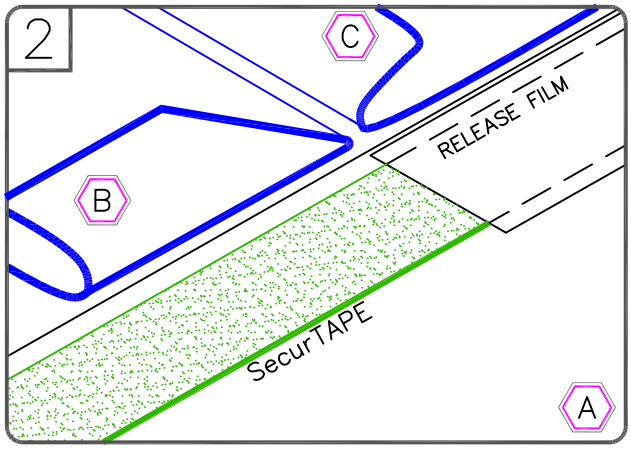
NOTES:

1. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE BELOW THE 6" (15cm) T-JOINT COVER, COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.
2. APPLY LAP SEALANT AT CUT EDGES OF REINFORCED MEMBRANE AND TAPE OVERLAPS. REFER TO DETAIL U-2A.
3. REFER TO DETAIL U-2B.1 WHEN USING 90-MIL MEMBRANE.

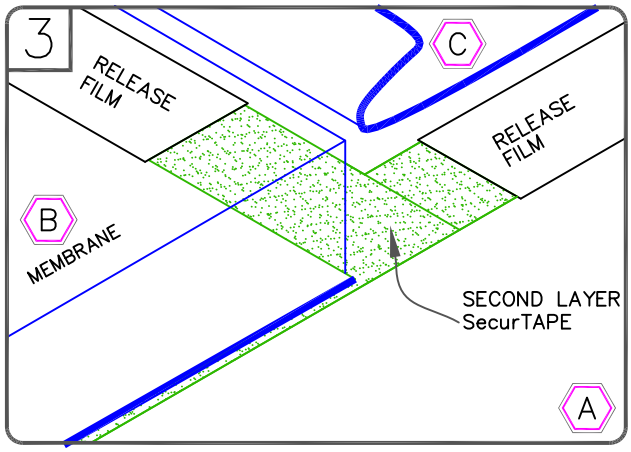
CARLISLE SYNTEC SYSTEMS	EPDM MEMBRANE SPLICE INTERSECTION	DETAIL NO. U-2B
	MAXIMUM WARRANTY: 25 YEARS	U (UNIVERSAL DETAIL)



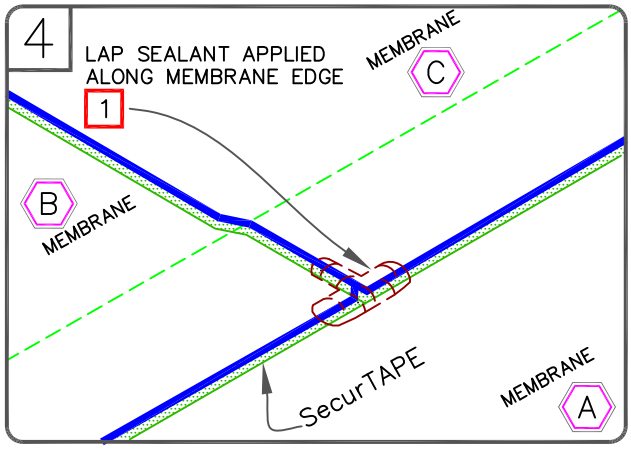
POSITION MEMBRANE TO ALLOW AN APPROXIMATE 7" (17.5cm) OVERLAP. MARK THE BOTTOM SHEET WITH AN INDELIBLE MARKER 1/2" (1.5cm) FROM THE EDGE OF THE TOP SHEET AS SHOWN. THE PRE-MARKED LINE ON THE MEMBRANE EDGE CAN ALSO BE USED AS A GUIDE.



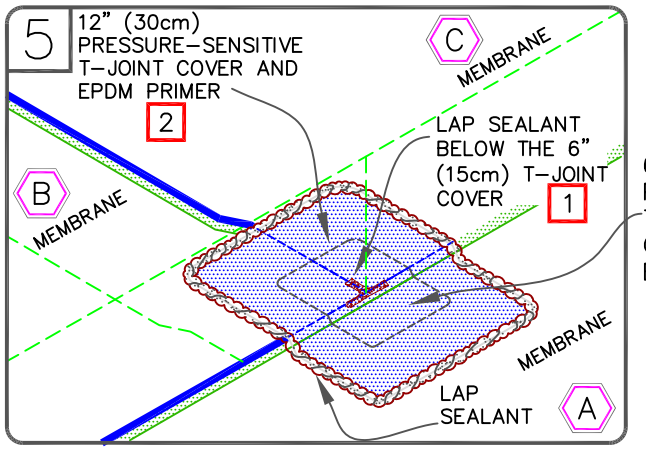
FOLD SHEETS BACK AS SHOWN. APPLY EPDM PRIMER TO THE SPLICE AREA ON BOTH SURFACES AND ALLOW TO FLASH-OFF. APPLY SecurTAPE WITH RELEASE FILM ALIGNED WITH MARKED LINE.



SPLICE SHEET B TO SHEET A AND APPLY SECOND PIECE OF SecurTAPE BETWEEN SHEET B AND C. TRIM RELEASE FILM AS SHOWN.



SPLICE SHEET C TO SHEET A AND B, PRESS TOP SHEET ONTO BOTTOM SHEET USING HAND PRESSURE TOWARDS THE OUTER EDGE OF THE SPLICE AND ROLL THE SPLICE AREA WITH A 2" (5cm) WIDE STEEL ROLLER.



APPLY 6" (15cm) PRESSURE-SENSITIVE T-JOINT COVER AND 12" (30cm) PRESSURE-SENSITIVE T-JOINT COVER OR PRESSURE-SENSITIVE ELASTOFORM CENTERED OVER THE INTERSECTING POINT OF THE LEADING EDGES OF THE FIELD SPLICE INTERSECTION AS SHOWN.

NOTES:

1. APPLY LAP SEALANT ALONG THE EDGES OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (15cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.
2. APPLY LAP SEALANT AT CUT EDGES OF REINFORCED MEMBRANE AND TAPE OVER LAPS.

CARLISLE SYNTEC SYSTEMS

EPDM MEMBRANE SPLICE INTERSECTION (30 YEAR WARRANTY OR 90-MIL MEMBRANE)

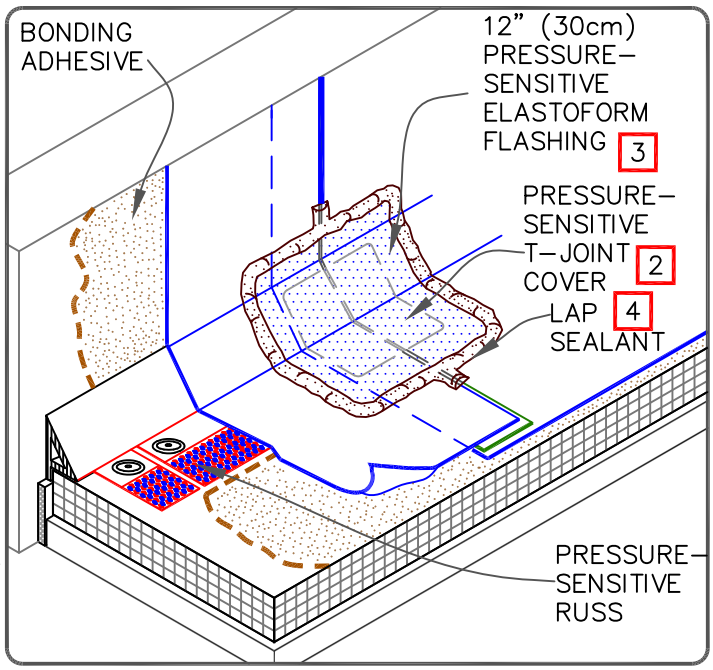
MAXIMUM WARRANTY: 30 YEARS

EPDM

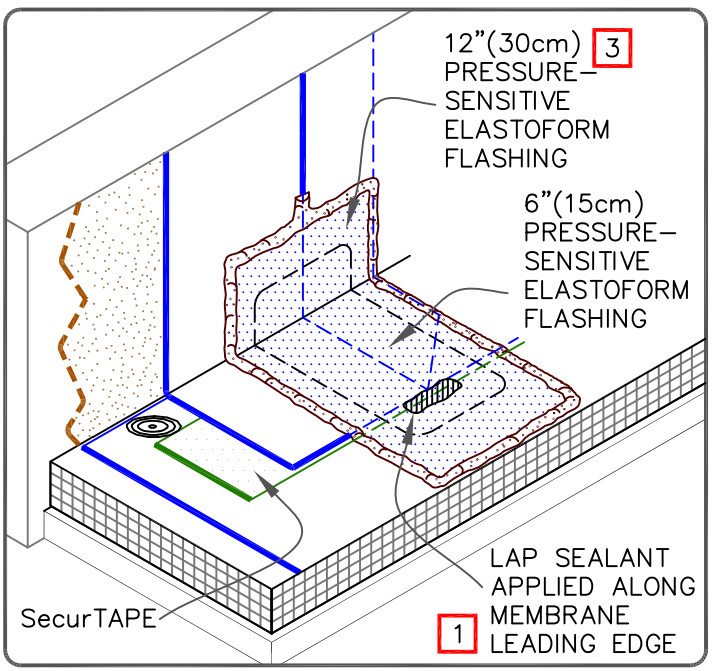
DETAIL NO. U-2B.1

U (UNIVERSAL DETAIL)

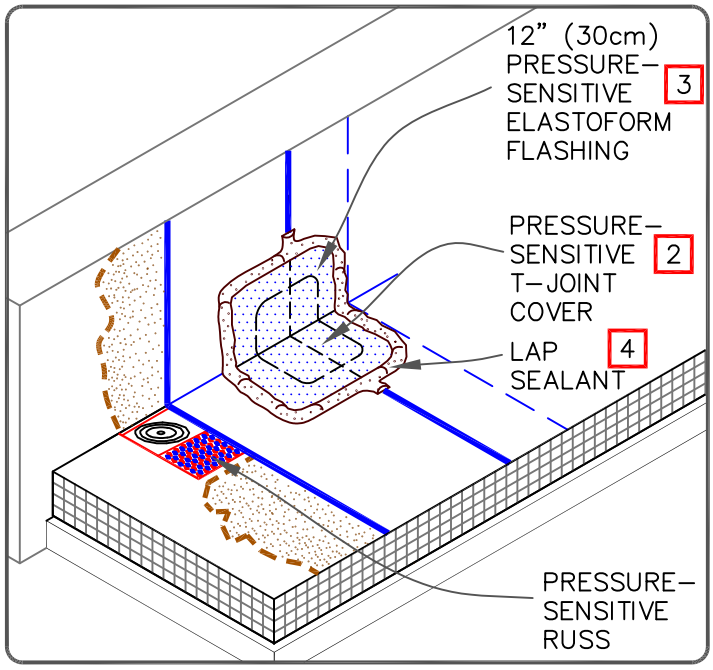
CONTINUOUS WALL FLASHING



SEPARATE WALL FLASHING



CONTINUOUS WALL FLASHING



NOTES:

1. APPLY LAP SEALANT ALONG THE LEADING EDGE OF THE MEMBRANE SPLICE (UNDER THE PRESSURE-SENSITIVE ELASTOFORM FLASHING) COVERING THE EXPOSED SPLICE TAPE APPROXIMATELY 1/2" (1.5cm) BEYOND THE SPLICE EDGE.

2. PRESSURE-SENSITIVE T-JOINT COVER OR 6" (15cm) WIDE PRESSURE-SENSITIVE FLASHING, IN CONJUNCTION WITH EPDM PRIMER, MUST BE CENTERED OVER FIELD SPLICES AT THE ANGLE CHANGE.

3. PROJECTS WITH 30-YEAR WARRANTY OR WHEN USING 90-MIL MEMBRANE REQUIRE FIELD SPLICES TO BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6" (15cm) WIDE COVERED WITH A 12" (30cm) WIDE TOP LAYER. BOTH LAYERS SHALL BE CENTERED.

4. SEAL EXPOSED LAYER WITH LAP SEALANT.

CARLISLE SYNTEC SYSTEMS

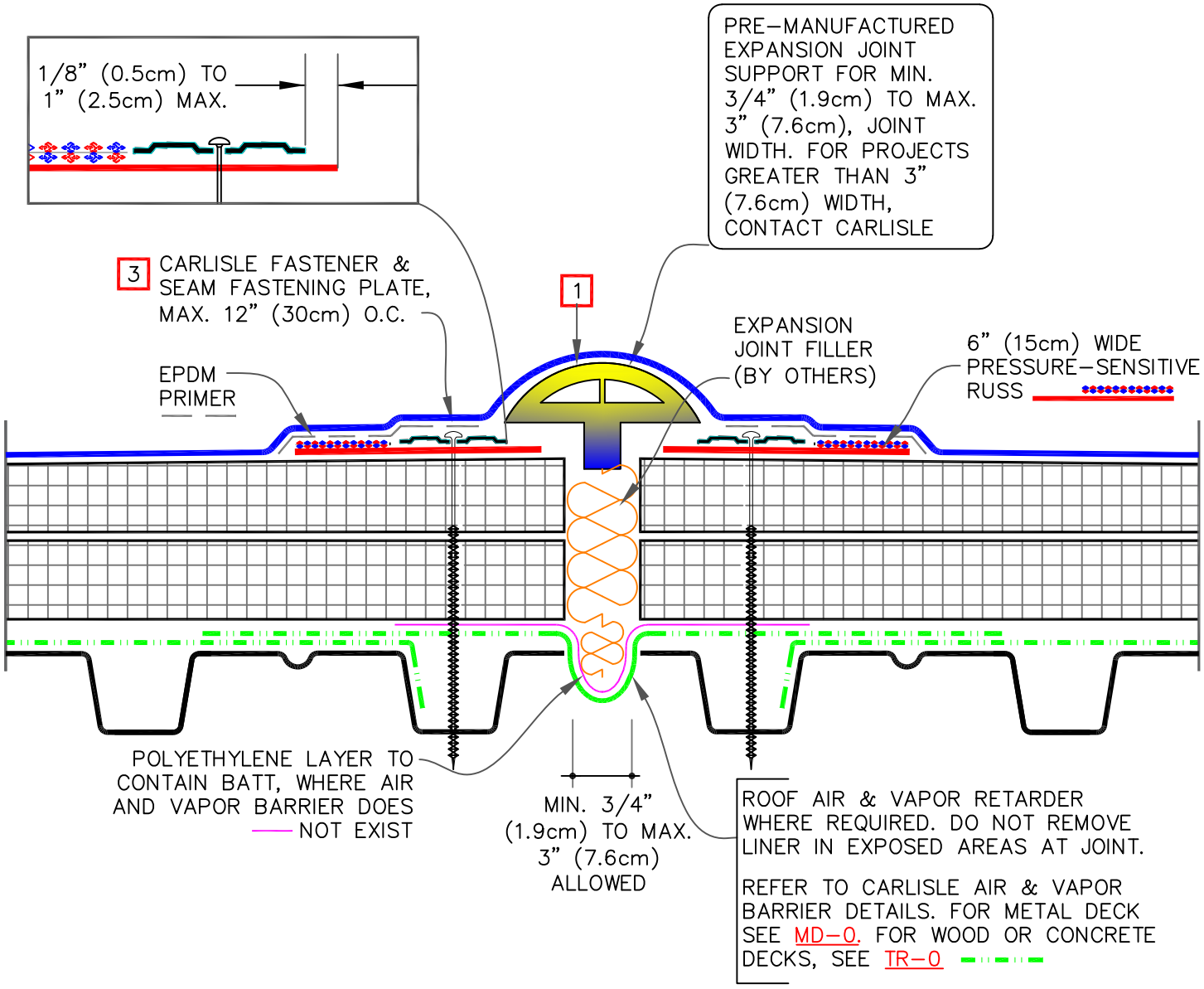
EPDM MEMBRANE SPLICES AT ANGLE CHANGE

MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO. U-2C

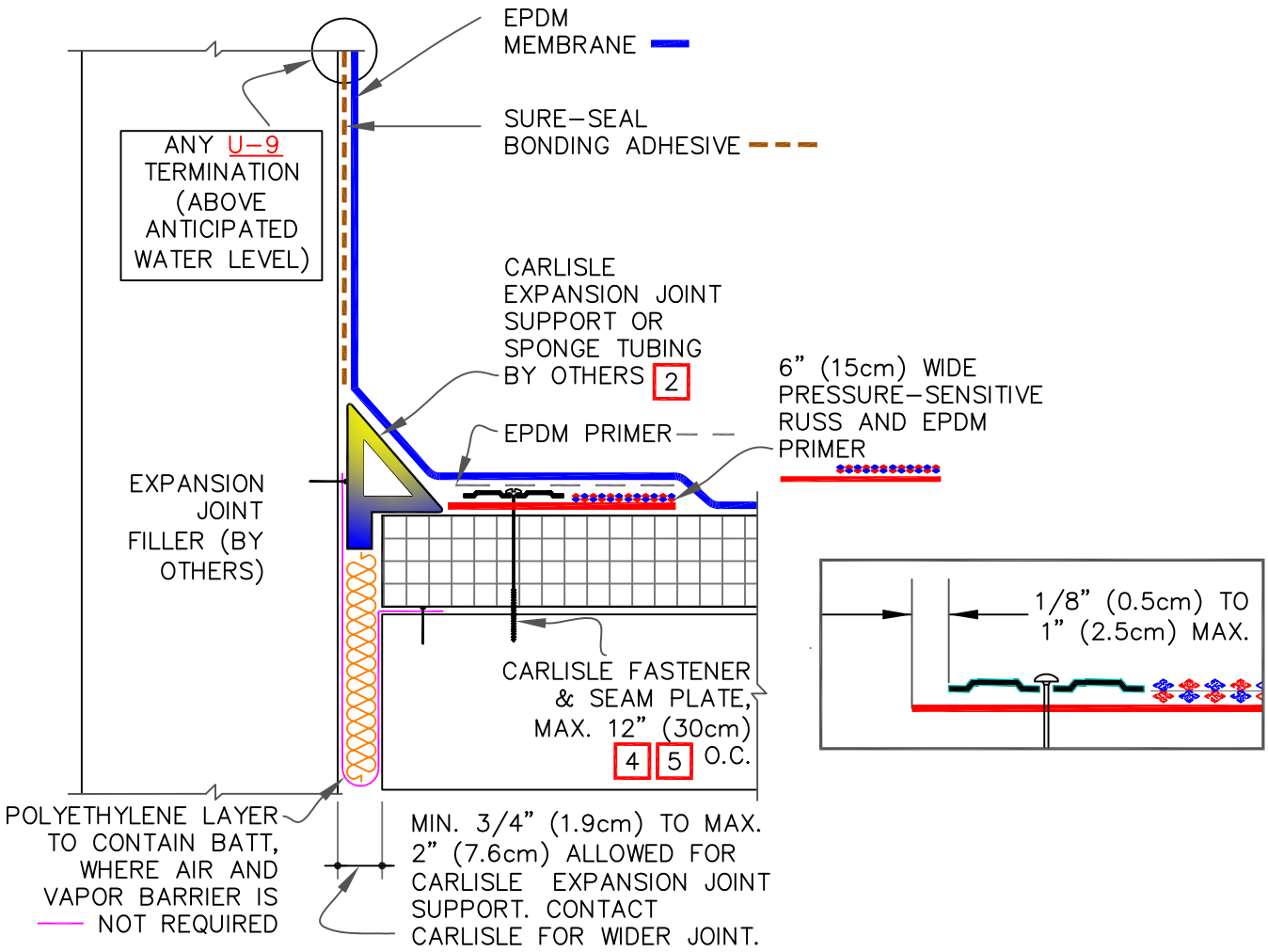
U (UNIVERSAL DETAIL)



NOTES:

1. MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. FOR EXPANSION JOINT INTERSECTIONS AND INTERSECTIONS BETWEEN EXPANSION JOINTS TO WALL OR EDGING, USE TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING WITH SECOND LAYER 3" (7.5cm) LARGER THAN PREVIOUS LAYER IN ALL DIRECTIONS.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED ON MECHANICALLY FASTENED SYSTEMS OVER STEEL DECKS.

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK ROOF EXPANSION JOINT MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. U-3A U (UNIVERSAL DETAIL)



NOTES:

1. ALL OUTSIDE AND INSIDE CORNERS REQUIRE TWO COMPLETE CORNER APPLICATIONS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING AS PER DETAILS U-15D.1 OR U-15G.1.

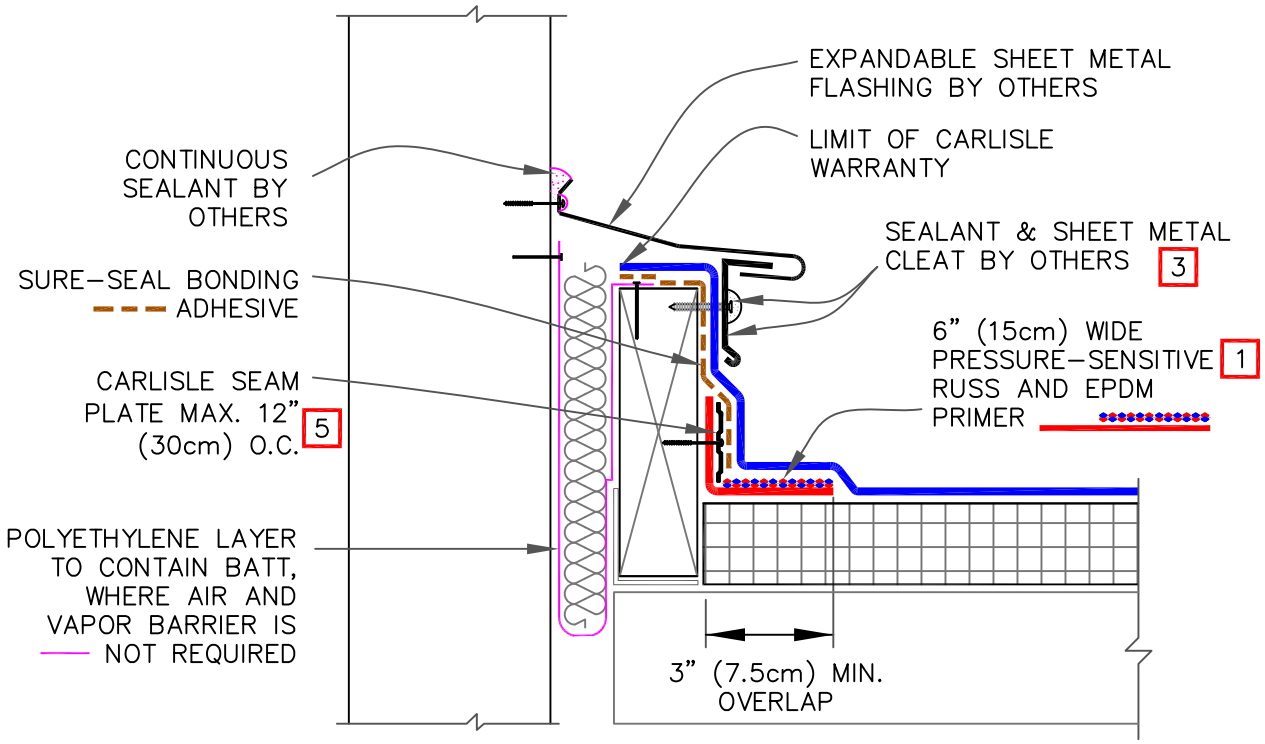
2. ROOF MEMBRANE SHALL BE LOOSE-LAID OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

3. USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.

4. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED ON MECHANICALLY FASTENED SYSTEMS OVER STEEL DECKS.

5. MAXIMUM 6" (15cm) FASTENER SPACING FOR WARRANTY WIND SPEEDS GREATER THAN 90 MPH OR WARRANTIES EXCEEDING 20 YEARS.

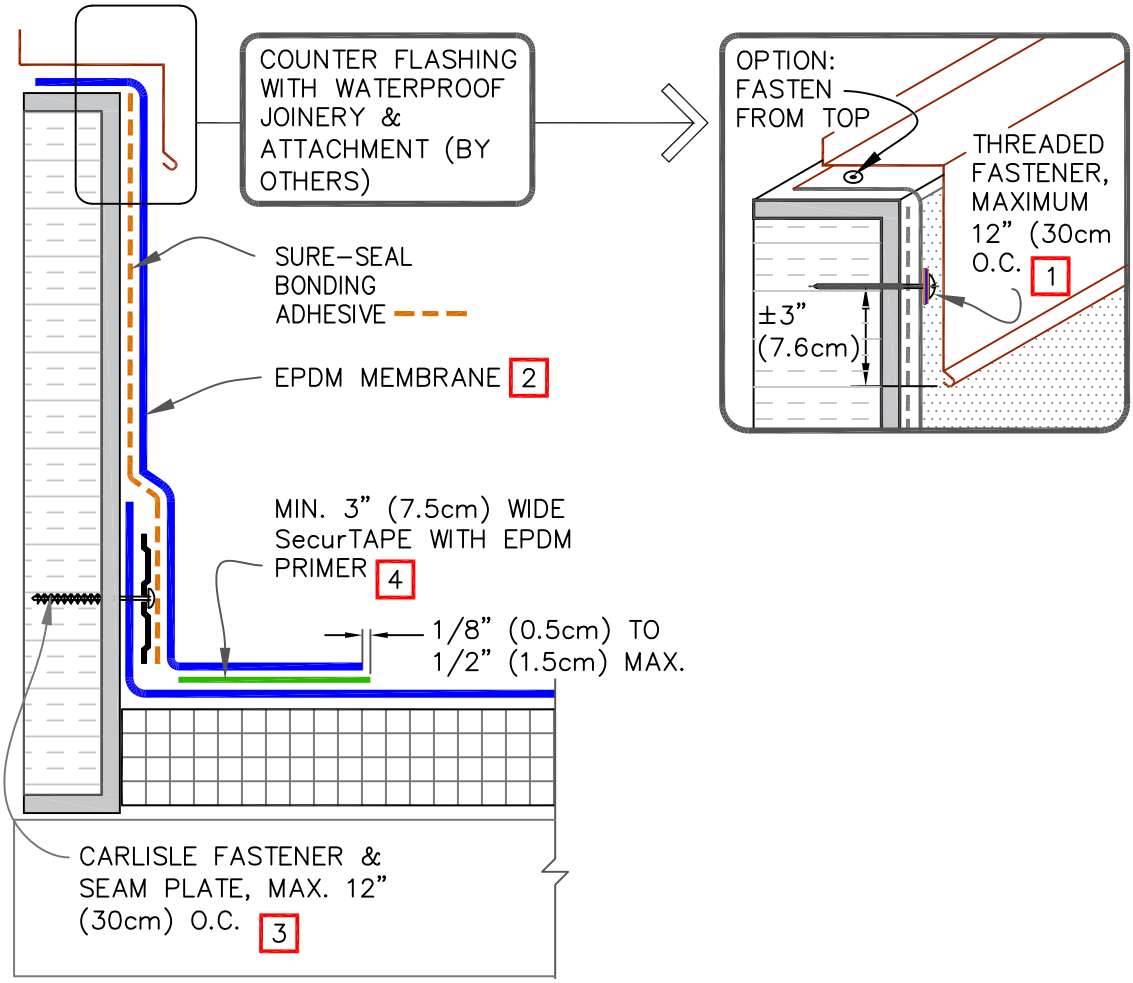
CARLISLE SYNTEC SYSTEMS	DECK-TO-WALL EXPANSION JOINT	EPDM	DETAIL NO. U-3B
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



NOTES:

1. PRESSURE-SENSITIVE RUSS MAY BE INSTALLED INTO THE STRUCTURAL DECK. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED ON MECHANICALLY-FASTENED ROOFING SYSTEMS OVER STEEL DECKS.
2. USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.
3. SEAL FASTENERS BY APPLYING WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING, OR USING EPDM WASHERS, OR CAULKING THE FASTENERS HEAD.
4. ALL OUTSIDE AND INSIDE CORNERS REQUIRE TWO COMPLETE CORNER APPLICATIONS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING AS PER DETAILS U-15D.1 OR U-15G.1.
5. MAXIMUM 6" (15cm) FASTENER SPACING FOR WARRANTY WIND SPEEDS GREATER THAN 90 MPH OR WARRANTIES EXCEEDING 20 YEARS.

CARLISLE SYNTEC SYSTEMS	SHEAR/EXPANSION JOINT	EPDM	DETAIL NO. U-3C
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



NOTES:

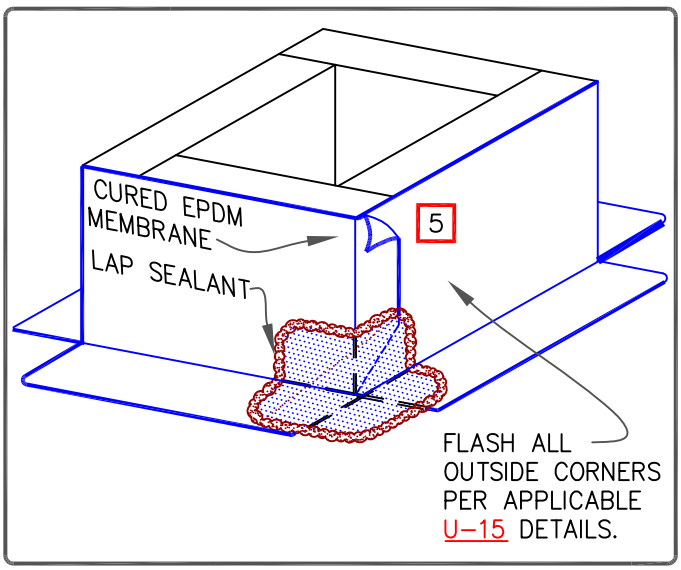
1. IN CASE THE THREADED FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING OR SEAL THE FASTENER HEADS WITH SEALANT.

2. LAP SEALANT IS REQUIRED ON CUT-EDGES OF REINFORCED MEMBRANE.

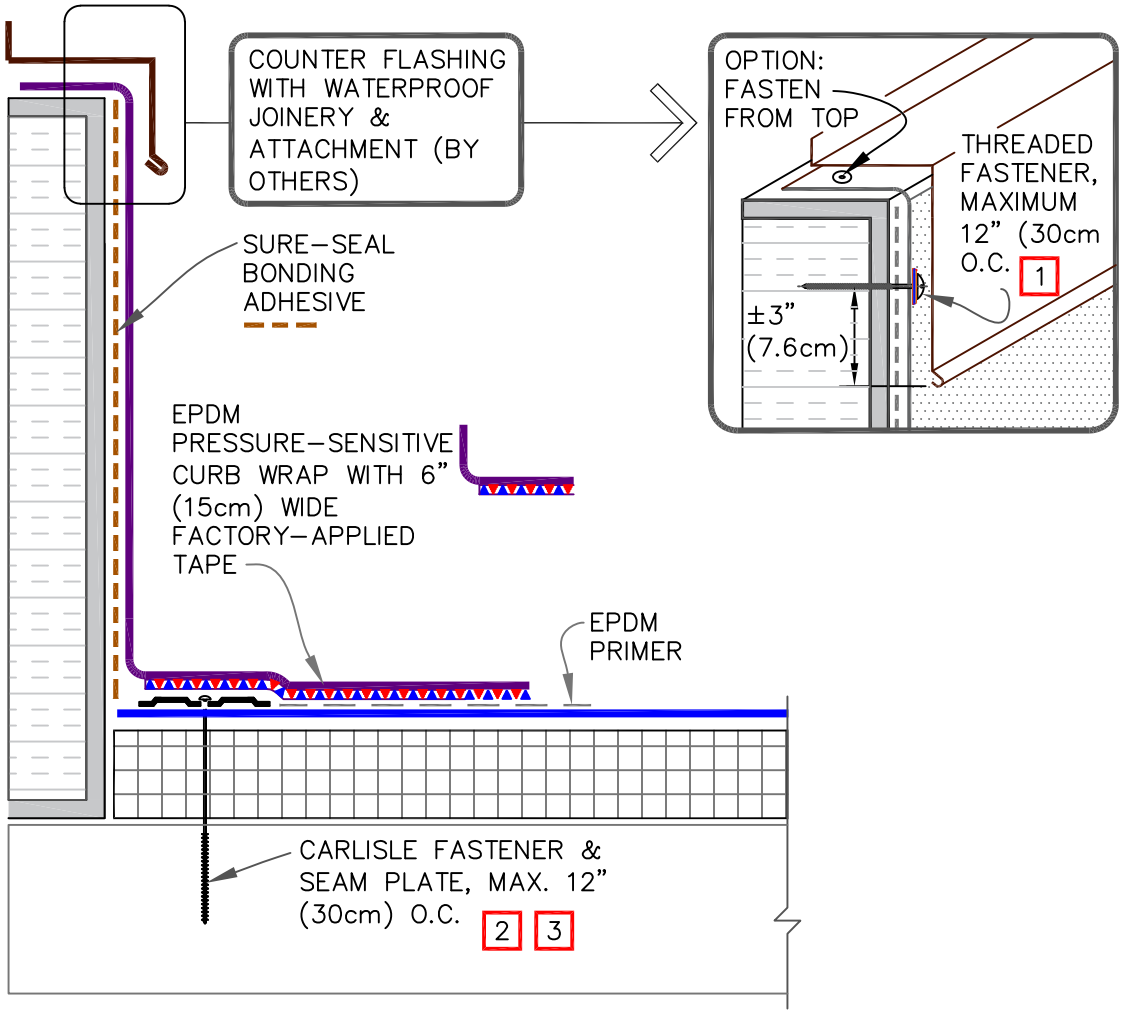
3. SEAM PLATES AND FASTENERS MAY BE INSTALLED INTO THE STRUCTURAL DECK AND THEN HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED FOR MECHANICALLY-FASTENED ROOFING SYSTEMS OVER STEEL DECKS.

4. MEMBRANE SPLICES SHALL INCORPORATE 3" (7.6cm) WIDE SecurTAPE FOR PROJECTS WITH 25-YEAR AND 6" (15.2cm) FOR 30-YEAR WARRANTIES.

5. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.

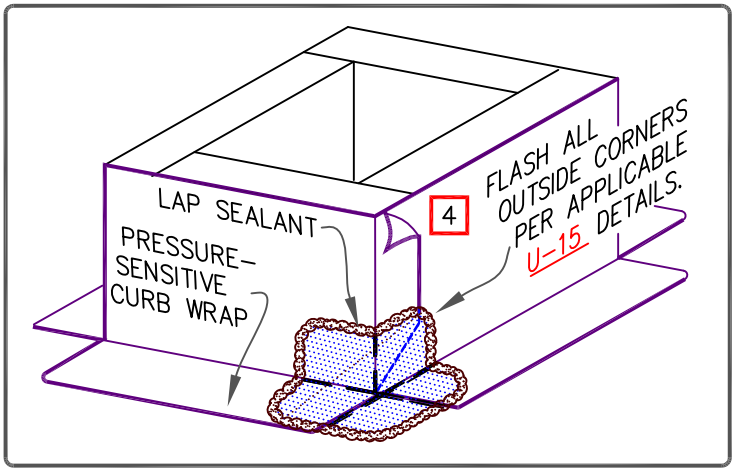


CARLISLE SYNTEC SYSTEMS	CURB FLASHING – EPDM MEMBRANE	DETAIL NO. U-5A
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)

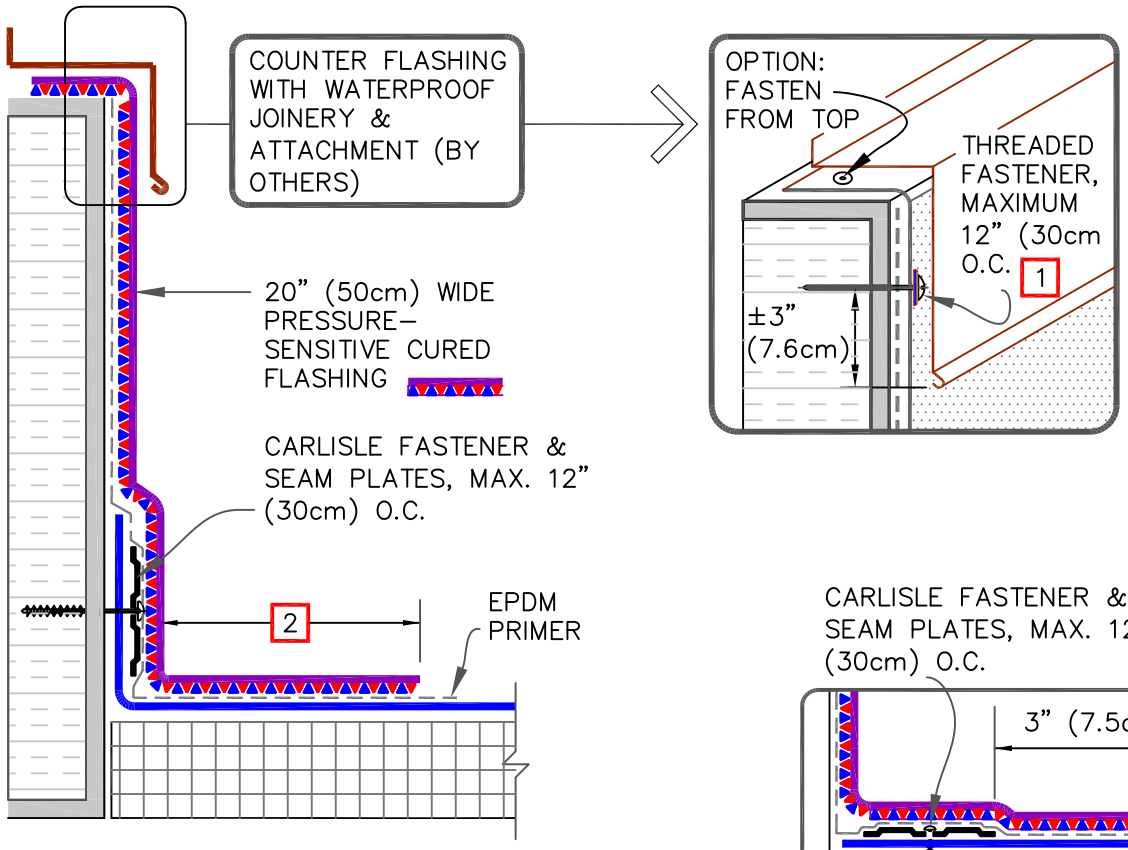


NOTES:

1. IN CASE THE THREADED FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING OR SEAL THE FASTENER HEADS WITH SEALANT.
2. SEAM PLATES AND FASTENERS MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED FOR MECHANICALLY FASTENED SYSTEMS OVER STEEL DECKS.
4. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.

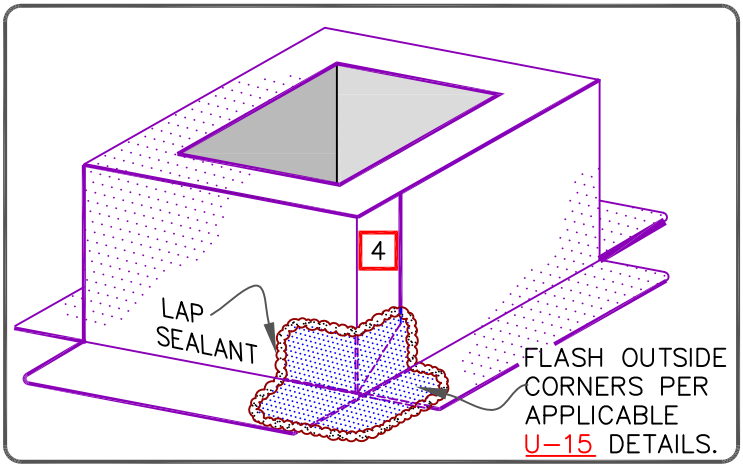


CARLISLE SYNTEC SYSTEMS	CURB FLASHING – PRESSURE-SENSITIVE CURB WRAP WITH 6" TAPE MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. U-5B U (UNIVERSAL DETAIL)



NOTES:

1. IN CASE THE THREADED FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING OR SEAL THE FASTENER HEADS WITH SEALANT.
2. 3" (7.5cm) FOR UP TO 25 YEARS AND 6" (15cm) FOR 30 YEARS WARRANTY.
3. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED FOR MECHANICALLY-FASTENED ROOFING SYSTEMS OVER STEEL DECKS.
4. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.



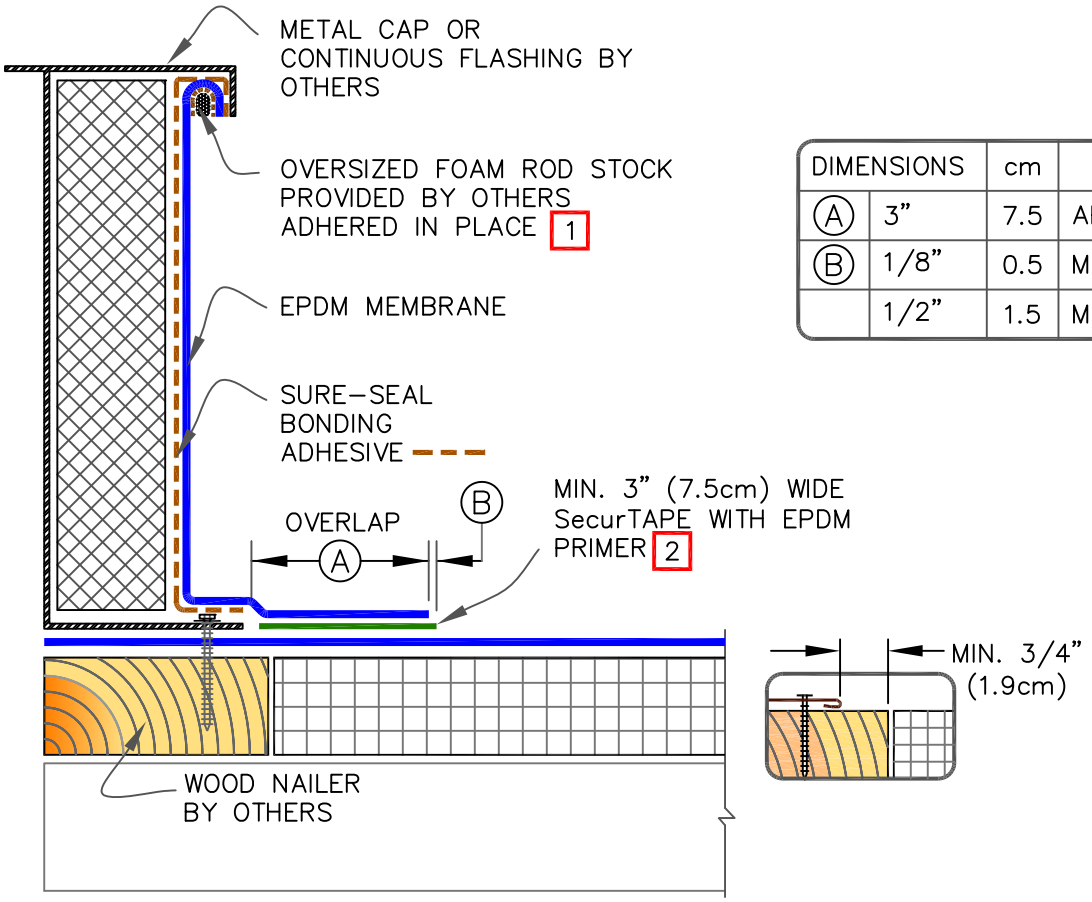
CARLISLE SYNTEC SYSTEMS

CURB FLASHING – WITH 20" PRESSURE-SENSITIVE CURED FLASHING

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-5C

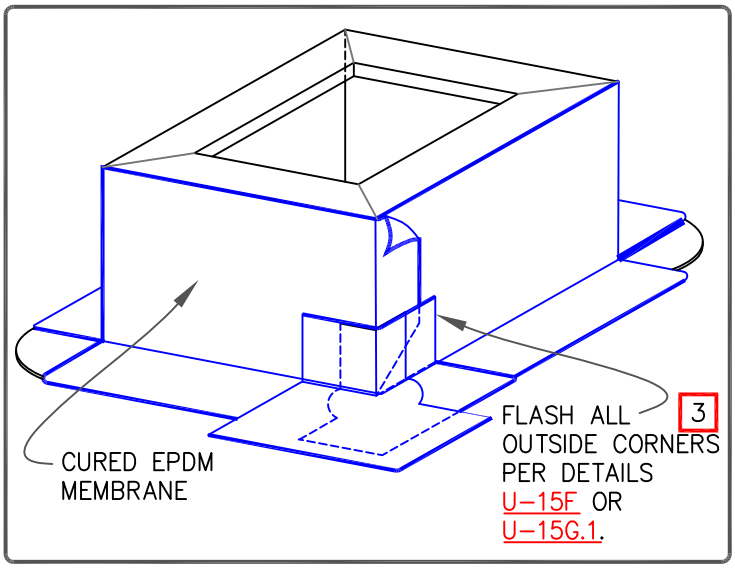
U (UNIVERSAL DETAIL)



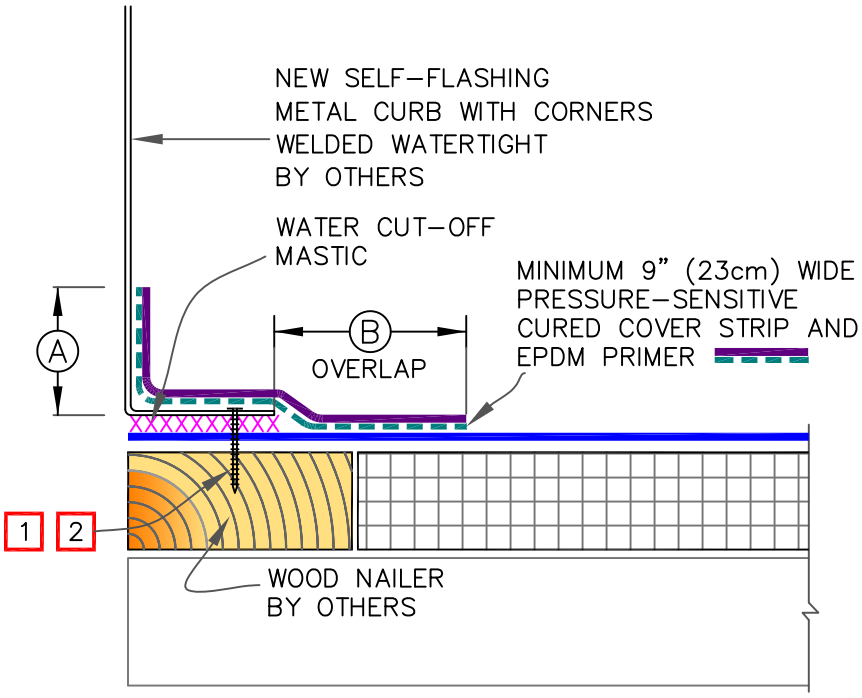
DIMENSIONS		cm	
A	3"	7.5	APPROX.
B	1/8"	0.5	MIN.
	1/2"	1.5	MAX.

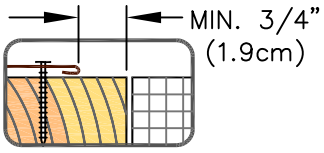
NOTES:

1. LENGTH OF ROD STOCK IS LIMITED TO 4' (1.2m). USE INDIVIDUAL SECTIONS OF ROD STOCK FOR LONGER DIMENSIONS.
2. MEMBRANE SPLICES SHALL INCORPORATE 3" (7.6cm) WIDE SecurTAPE FOR PROJECTS WITH 25-YEAR AND 6" (15.2cm) FOR 30-YEAR WARRANTIES.
3. WHEN METAL FLANGE IS ON TOP OF MEMBRANE USE DETAIL U-15F (20 YEAR) OR U-15G.1 (25/30 YEAR) TO ACHIEVE SUFFICIENT COVERAGE AT THE CORNERS.
4. DETAIL IS NOT ACCEPTABLE FOR VIBRATING ROOF TOP UNITS.

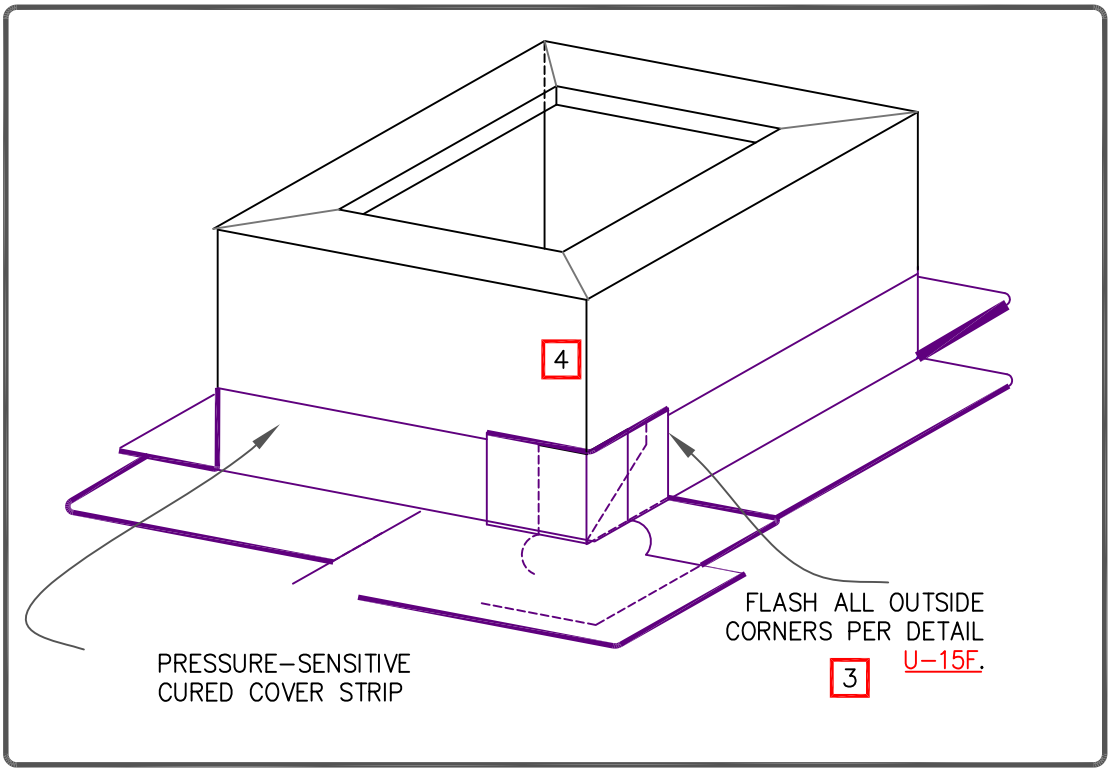


CARLISLE SYNTEC SYSTEMS	SELF-FLASHING CURB, ROOF HATCH OR SKYLIGHT	DETAIL NO. U-5D
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)





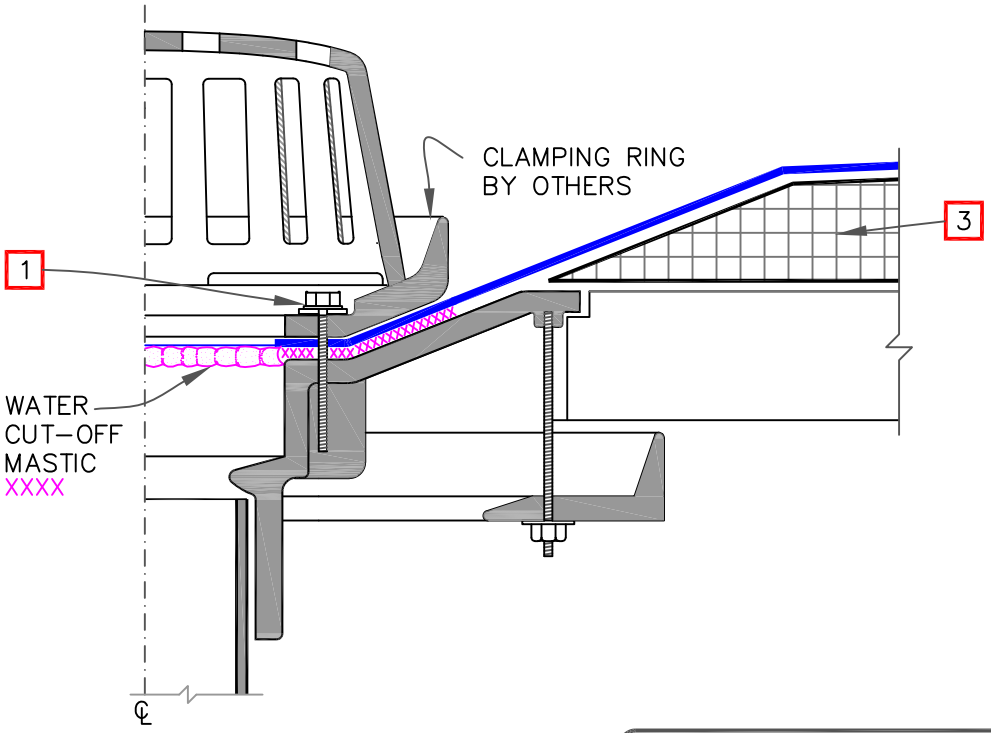
DIMENSIONS		cm	
A	2"	5	MIN.
B	3"	7.5	APPROX.



NOTES:

1. CONSULT THE RESPECTIVE MANUFACTURER OF THE SELF-FLASHING METAL CURB FOR PROPER SECUREMENT.
2. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION.
3. USE DETAIL U-15F TO ACHIEVE SUFFICIENT COVERAGE OF METAL FLANGE AT CORNERS.
4. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, USE DETAIL U-2C FOR EPDM MEMBRANE SPLICES AT ANGLE CHANGES.

CARLISLE SYNTEC SYSTEMS	NEW SELF-FLASHING METAL CURB	EPDM	DETAIL NO. U-5E
	MAXIMUM WARRANTY: 25 YEARS		U (UNIVERSAL DETAIL)



NOTES:

1. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.

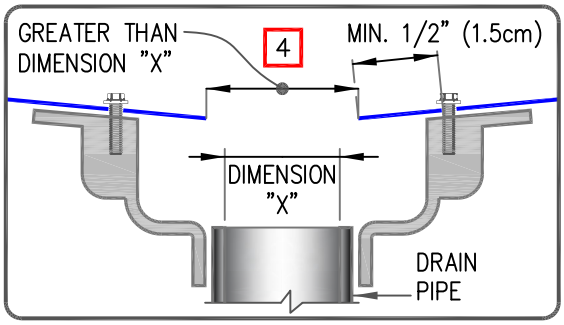
2. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.

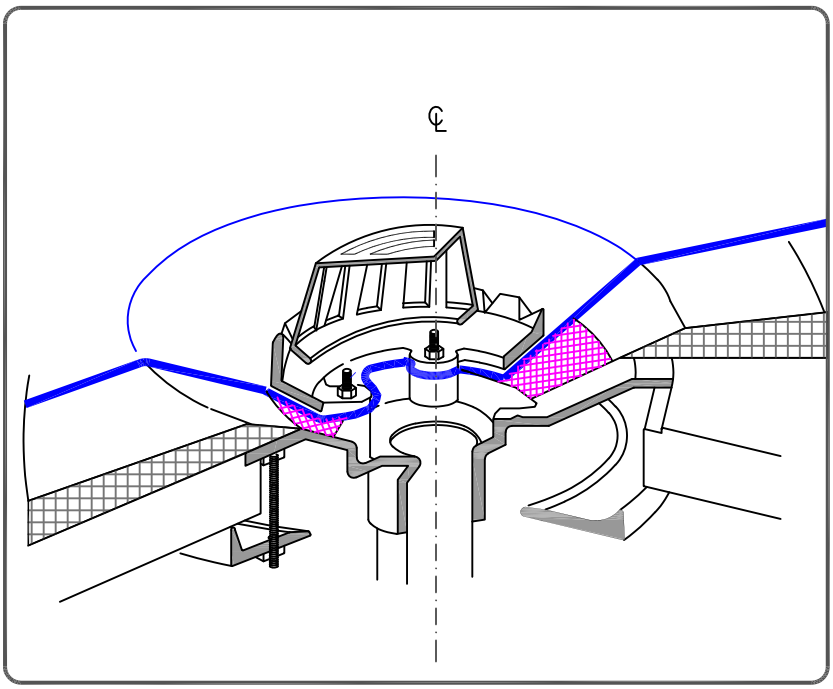
3. INSULATION TAPER SHALL NOT BE GREATER THAN 6" (15cm) IN 12" (30cm) HORIZONTAL. REINFORCED EPDM IS LIMITED TO A TAPER LESS THAN 3" (7.5CM) PER FOOT. IF GREATER USE DETAIL U–6B.

4. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.

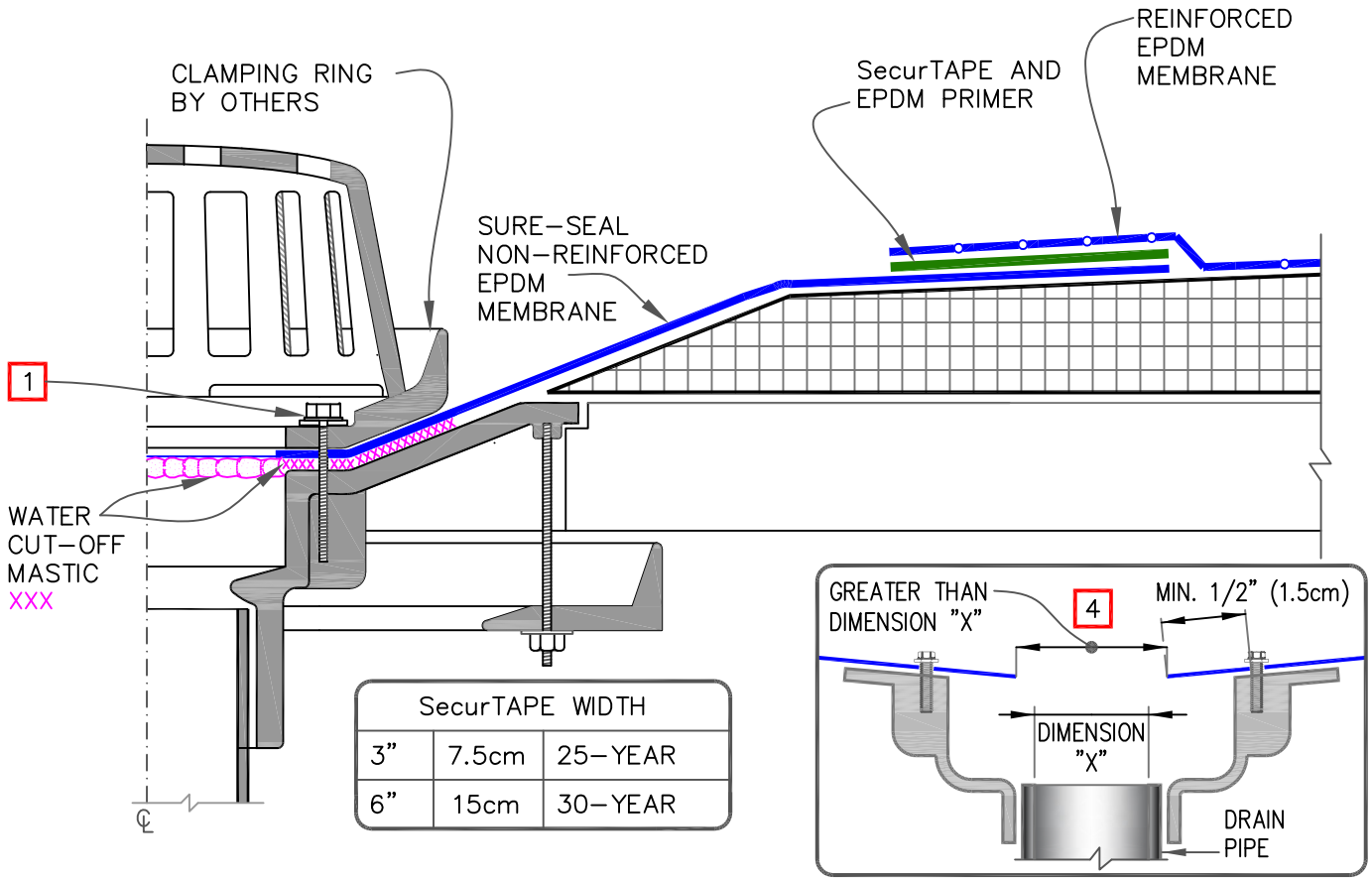
5. FIELD SPLICES MUST BE LOCATED AT LEAST 6" (15cm) OUTSIDE THE DRAIN SUMP.

6. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.





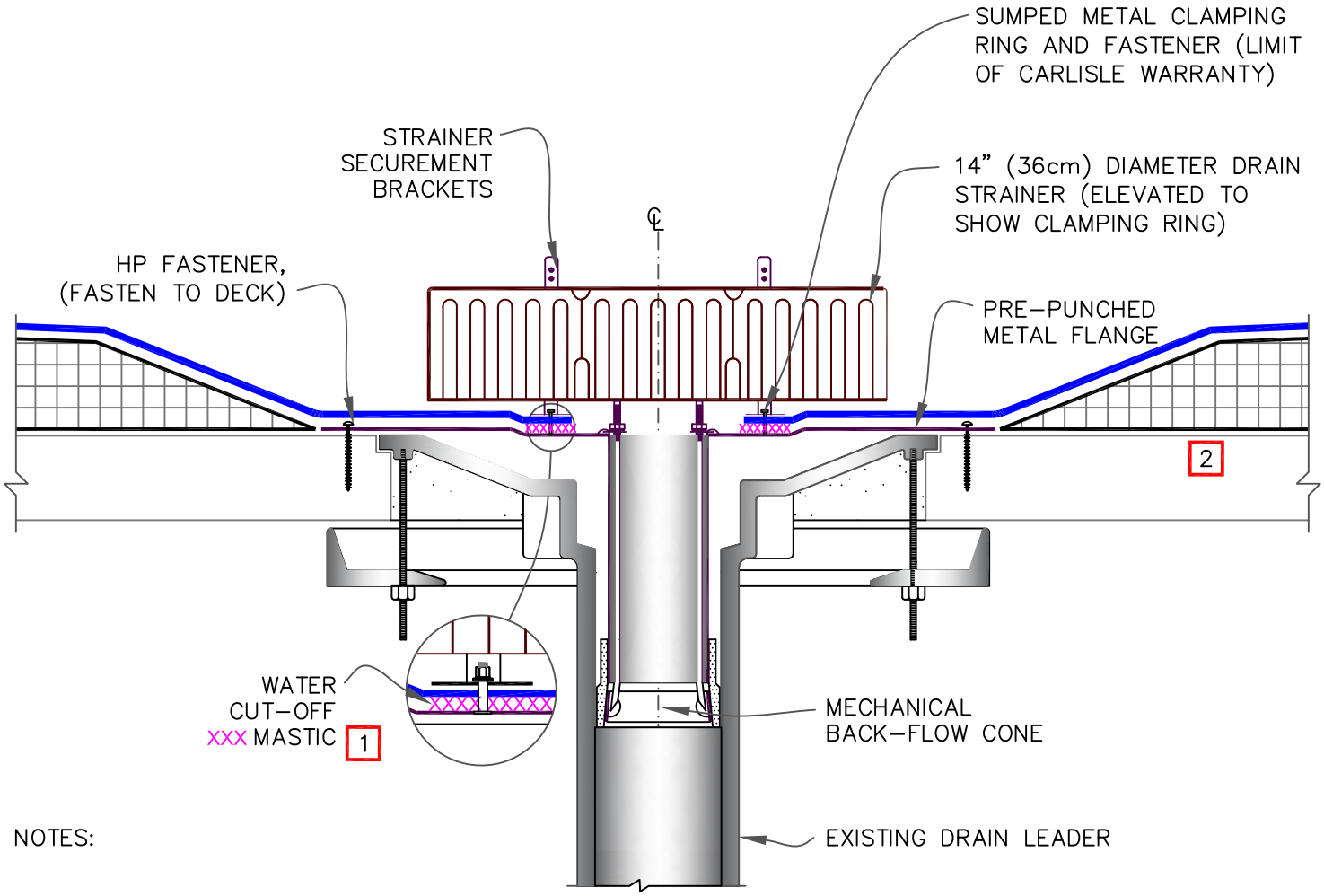
CARLISLE SYNTEC SYSTEMS	ROOF DRAIN	DETAIL NO. U–6A
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



NOTES:

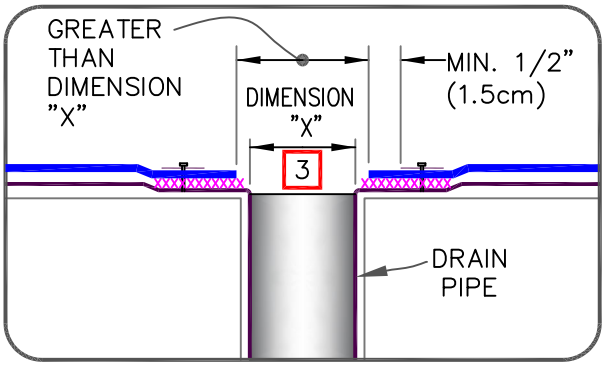
1. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
3. USE DETAIL MF-6B FOR MECHANICALLY-FASTENED SYSTEMS.
4. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
6. FIELD SPLICES MUST BE LOCATED AT LEAST 6" (15cm) OUTSIDE THE DRAIN SUMP.
7. CARLISLE RECOMMENDS THE DRAIN TARGET SPLICE BE SHINGLED
   - 7.1. CUT A SQUARE HOLE IN THE FIELD SHEET TO BE AT LEAST 6" (15cm) OUTSIDE THE DRAIN SUMP
   - 7.2. APPLY PRIMER AND SecurTAPE TO THE BOTTOM OF THE FIELD SHEET
   - 7.3. PRIME THE TARGET PIECE OF NR EPDM
   - 7.4. MATE THE TARGET TO THE TAPE
   - 7.5. APPLY BONDING ADHESIVE TO ADHERE FIELD AND TARGET MEMBRANE TO THE SUBSTRATE

CARLISLE SYNTEC SYSTEMS	ROOF DRAIN – REINFORCED FIELD SHEET WITH SUMP EXCEEDING 3" PER FOOT	EPDM	DETAIL NO. U-6B
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

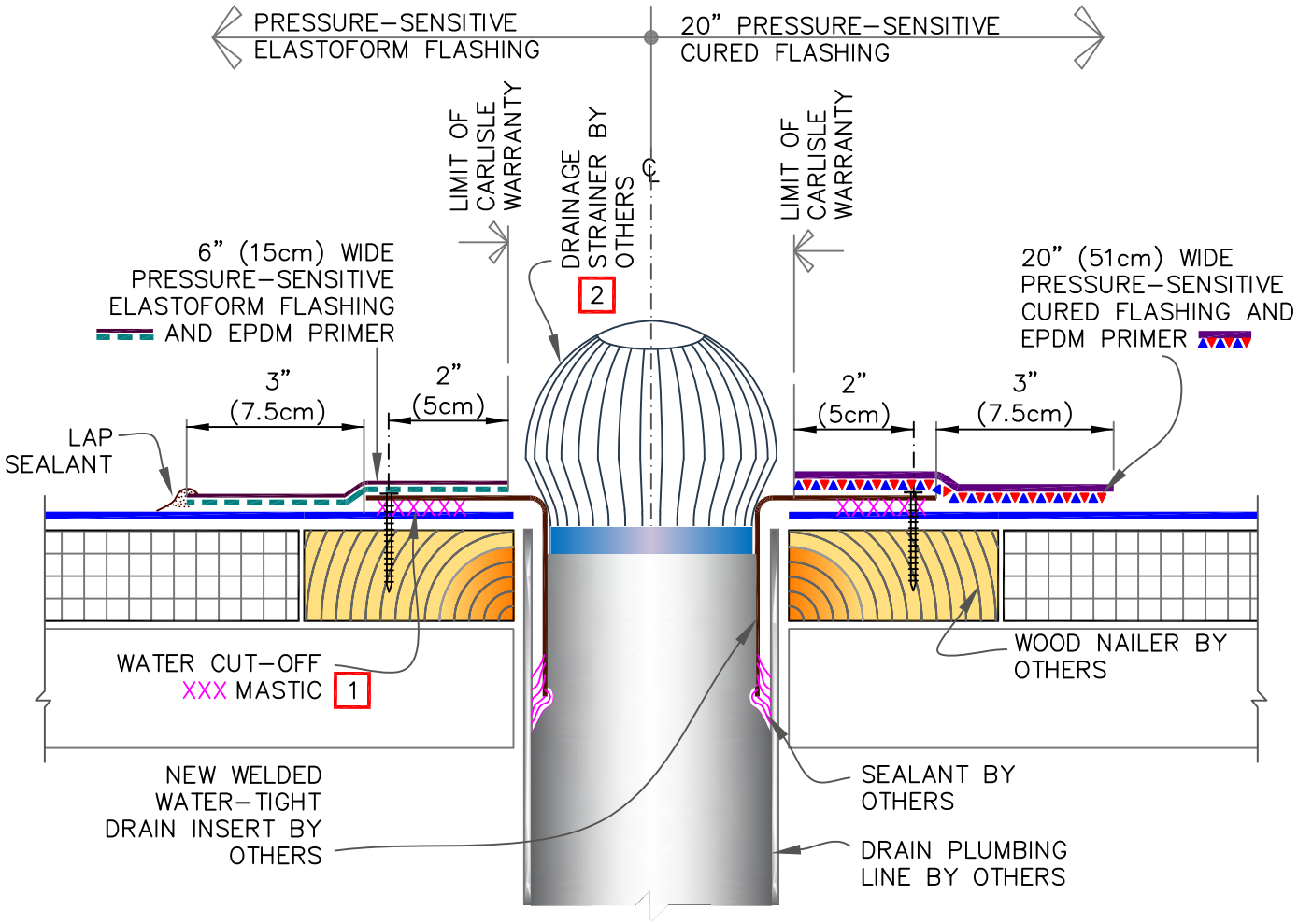


NOTES:

1. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. INSULATION TAPER SHALL NOT BE GREATER THAN 6" (15cm) IN 12" (30cm) HORIZONTAL.
3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
4. FIELD SPLICES MUST BE LOCATED AT LEAST 6" (15cm) OUTSIDE THE DRAIN SUMP.
5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



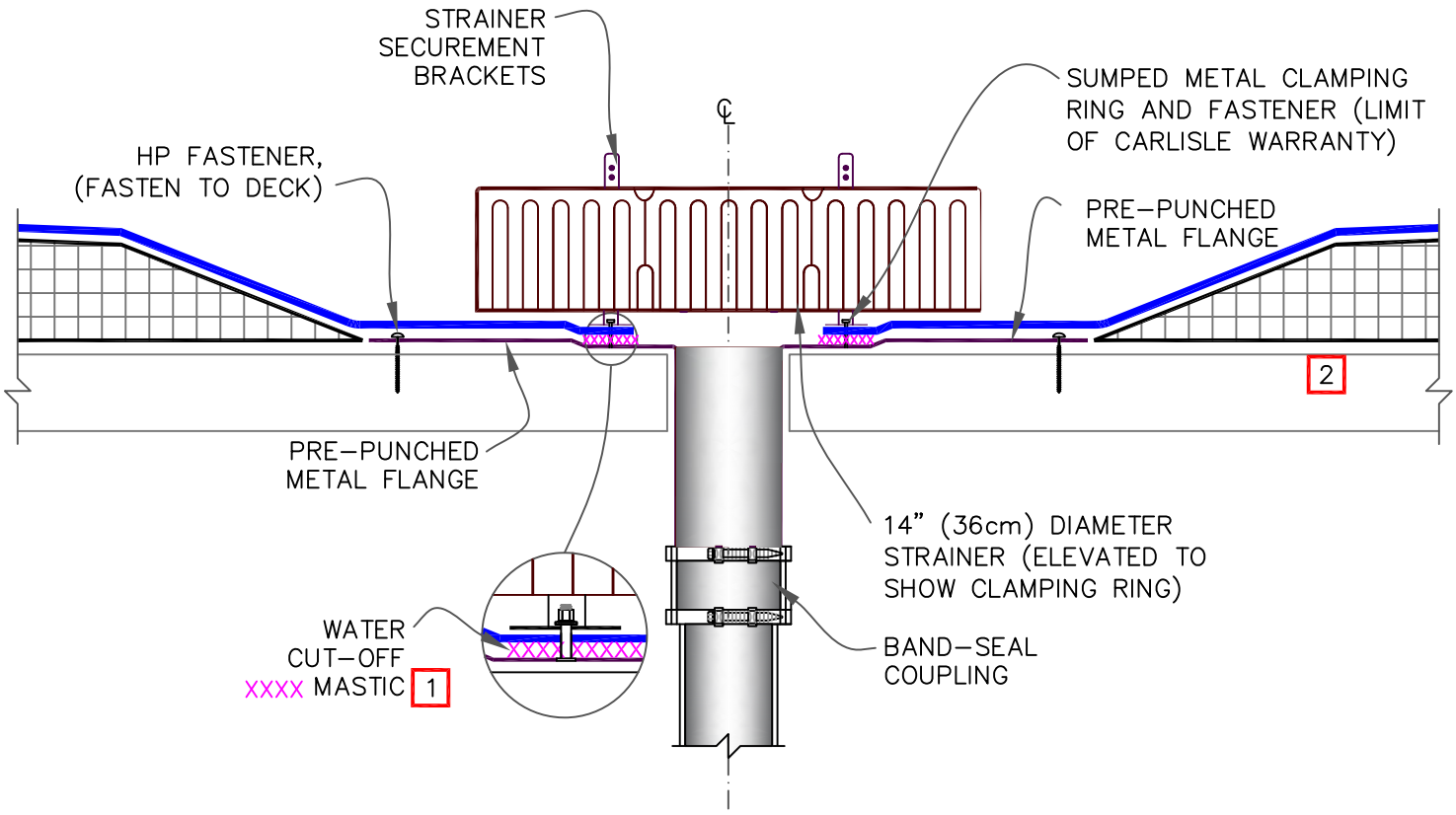
CARLISLE SYNTEC SYSTEMS	SURE-SEAL INSERT DRAIN	DETAIL NO. U-6C
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



NOTES:

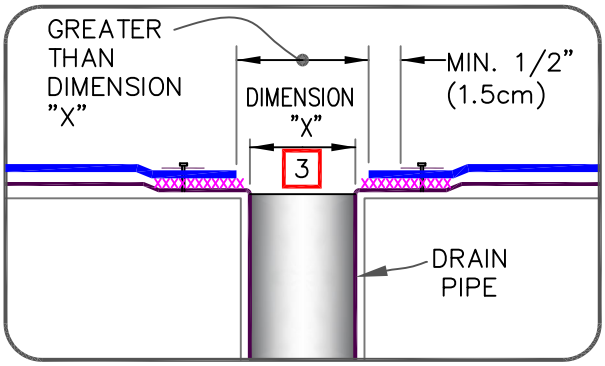
1. WATER CUT–OFF MASTIC MUST BE UNDER CONSTANT COMPRESSION.
2. CONSULT SPECIFIER OR APPLICABLE CODES FOR ADEQUATE DRAINAGE STRAINER TO AVOID PONDING WATER. DO NOT RESTRICT WATER FLOW.
3. FOR PROJECTS WITH 30–YEAR WARRANTIES, THE DRAIN INSERT FLANGE MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE FLASHING. THE BOTTOM LAYER SHALL BE 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM OR CURED COVER STRIP COVERED WITH A 9" (23cm) WIDE TOP LAYER OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. SEAL TOP LAYER WITH CONTINUOUS LAP SEALANT.

CARLISLE SYNTEC SYSTEMS	INSERT DRAIN THROUGH DECK	EPDM	DETAIL NO. U–6D
	MAXIMUM WARRANTY: 30 YEARS. SEE NOTE 3		U (UNIVERSAL DETAIL)



NOTES:

1. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. INSULATION TAPER SHALL NOT BE GREATER THAN 6" (15cm) IN 12" (30cm) HORIZONTAL.
3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
4. FIELD SPLICES MUST BE LOCATED AT LEAST 6" (15cm) OUTSIDE THE DRAIN SUMP.
5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

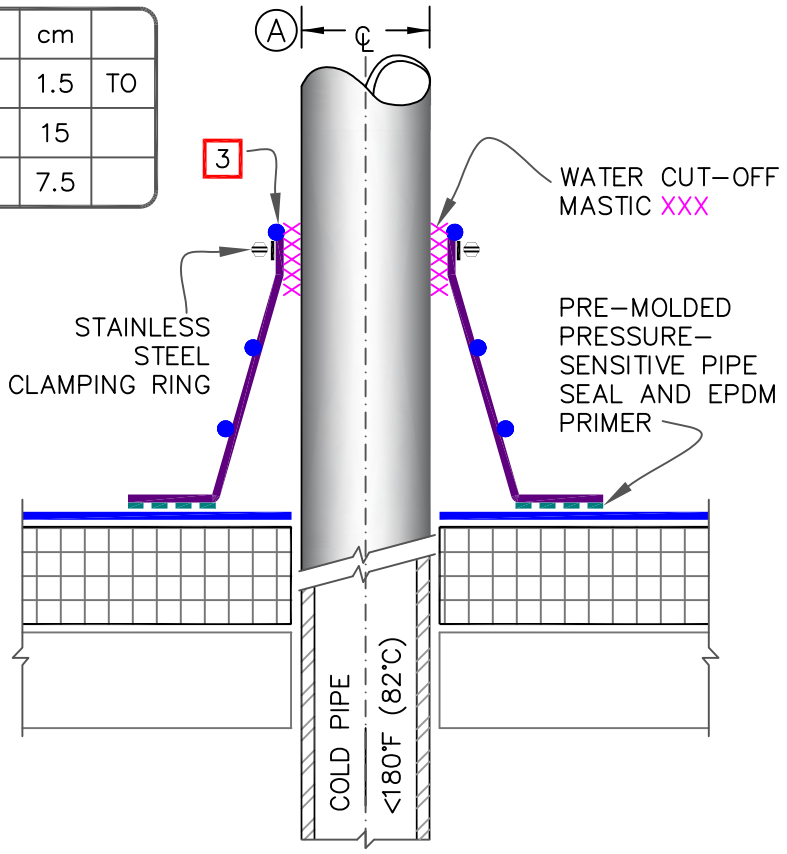


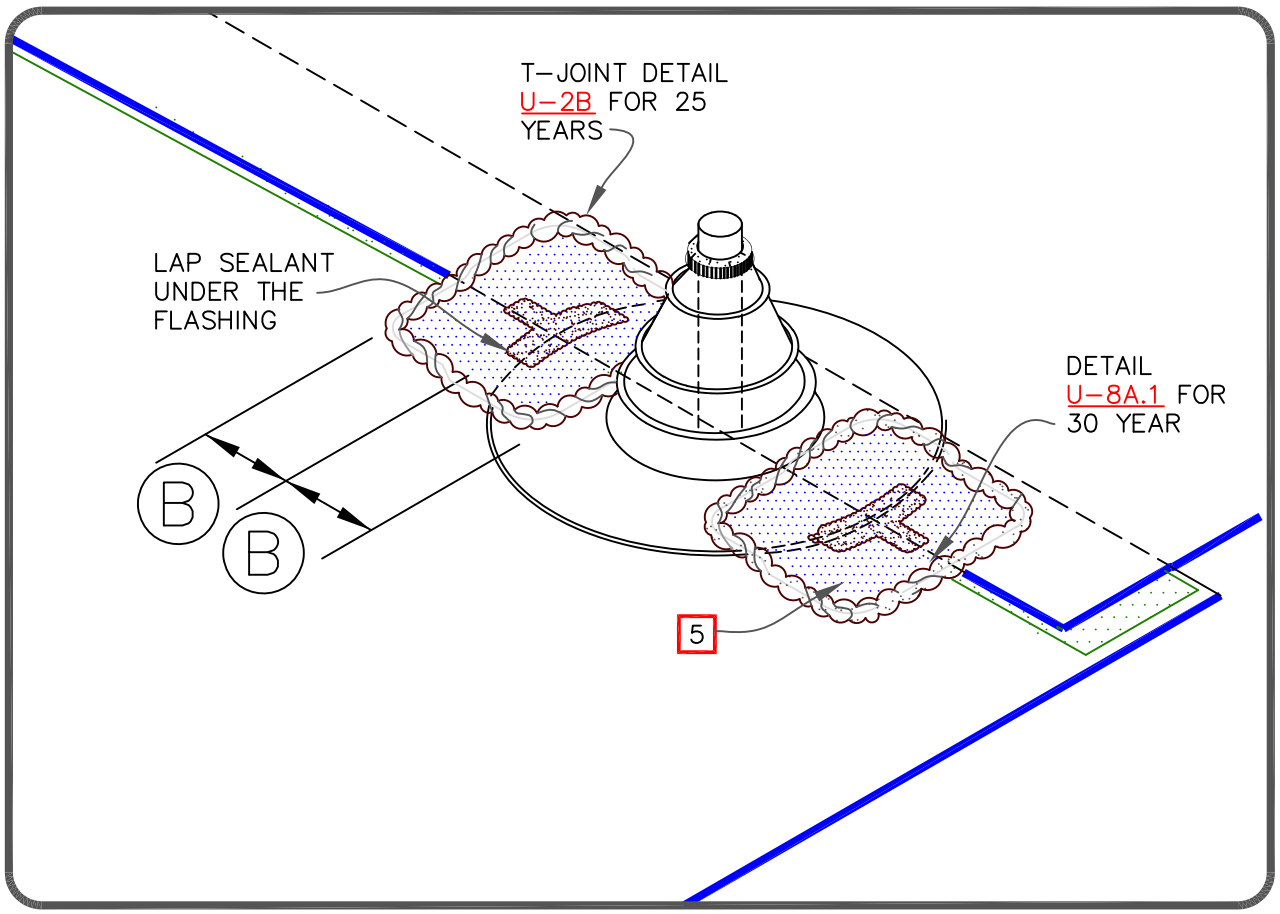
CARLISLE SYNTEC SYSTEMS	SURE-SEAL ADD-ON DRAIN	DETAIL NO. U-6E
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE–SENSITIVE PIPE SEAL.
2. TEMPERATURE OF PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. PRE–MOLDED PIPE FLASHING MUST HAVE RIB INTACT AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE PRESSURE–SENSITIVE PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
5. USE DETAIL U–8A.1 WHEN PIPE BOOT INTERSECTS A SPLICE ON 30–YEAR WARRANTY.
6. ON MECHANICALLY–FASTENED ROOFING SYSTEMS, REFER TO DETAIL MF–8A.

DIMENSIONS		cm	
Ⓐ	1/2"	1.5	TO
	6"	15	
Ⓑ	3"	7.5	





CARLISLE SYNTEC SYSTEMS

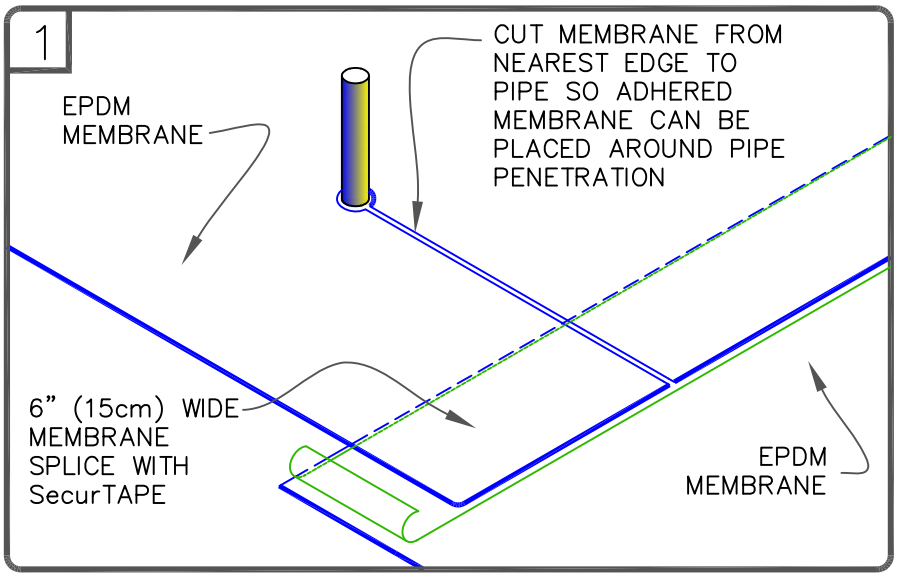
PRESSURE–SENSITIVE PIPE SEAL

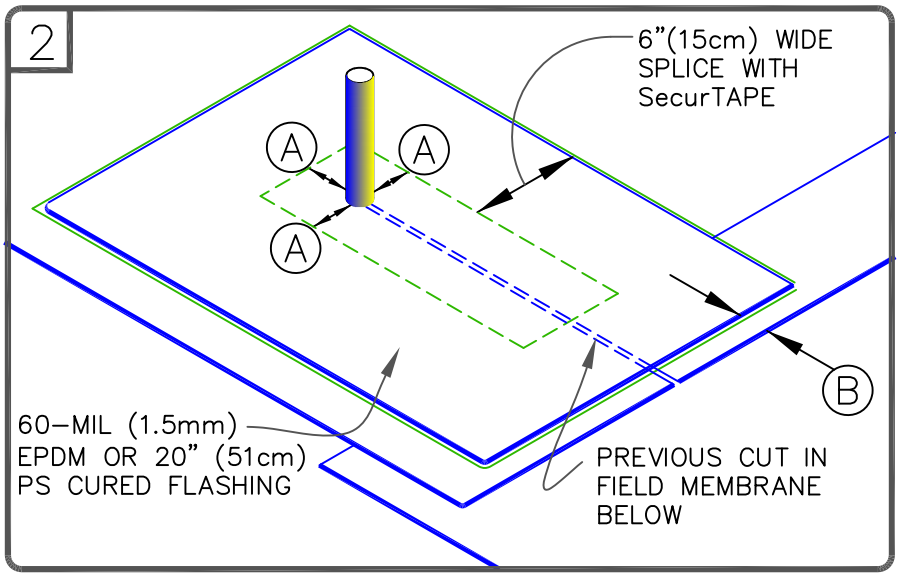
MAXIMUM WARRANTY: 30 YEARS

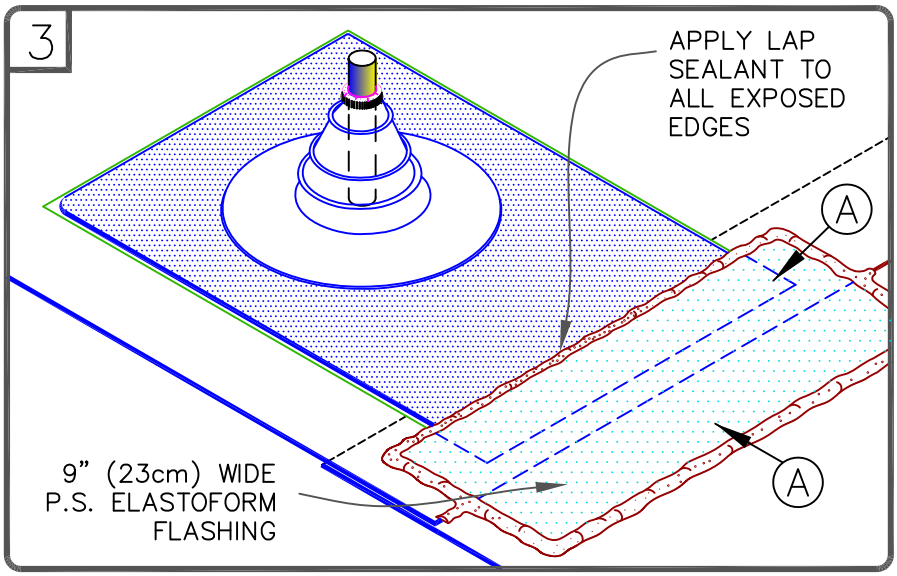
DETAIL NO.

U–8A

U (UNIVERSAL DETAIL)







NOTES:

1. THIS DETAIL FOR USE WHEN A RELIEF CUT OR MEMBRANE SPLICE IS PRESENT AT THE PIPE SEAL. USE DETAIL U-8A WHEN NO CUT OR SPLICE IS PRESENT.
2. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE-SENSITIVE PIPE SEAL.
3. PIPE SEAL MUST HAVE INTACT RIB AT TOP EDGE, REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE MOLDED PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
5. ON MECHANICALLY FASTENED ROOFING SYSTEMS REFER TO DETAIL MF-8A.1.

DIMENSIONS		cm	
(A)	3"	7.5	MIN.
(B)	1"	2.5	MIN.

CARLISLE SYNTEC SYSTEMS

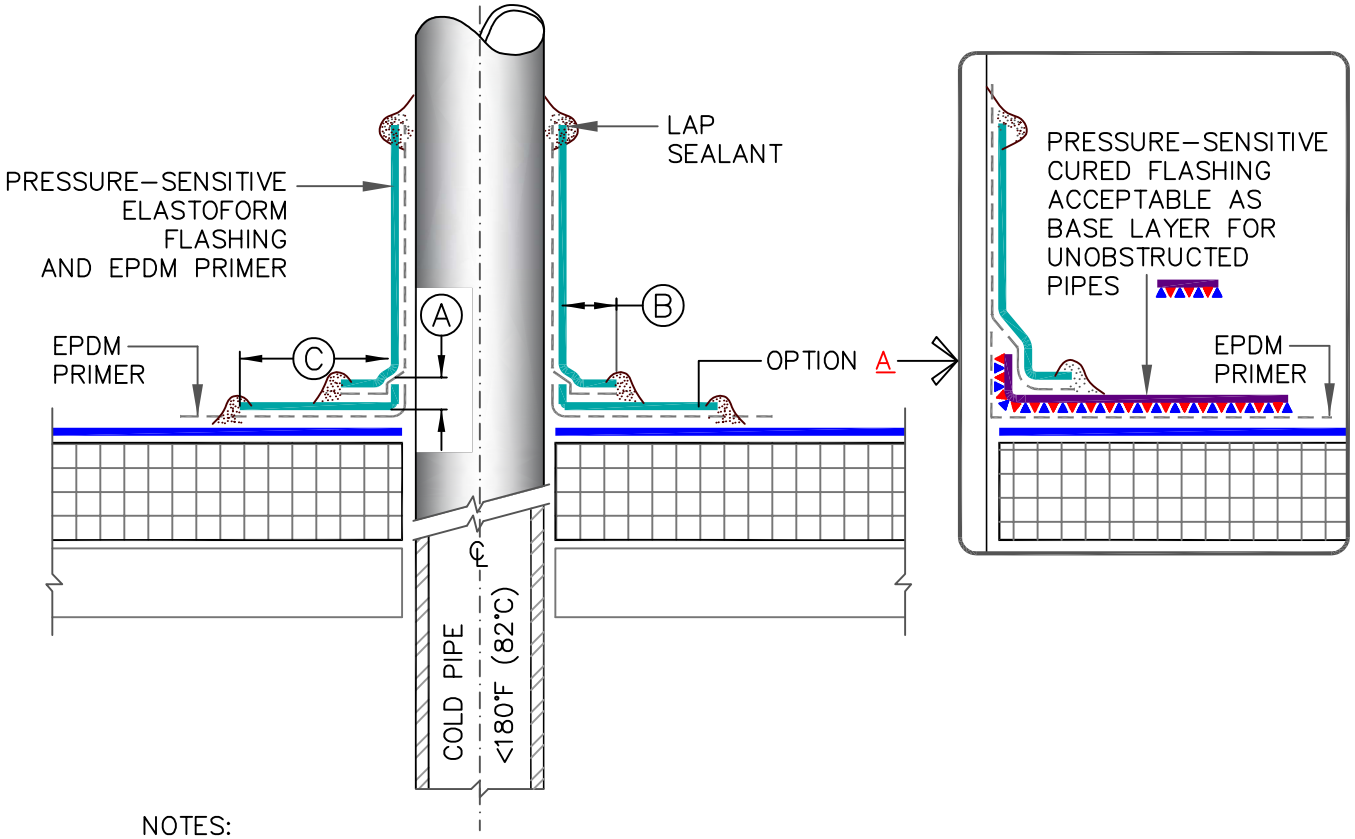
PRESSURE-SENSITIVE PIPE SEAL WITH 90-MIL MEMBRANE OR 30-YEAR WARRANTY

MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO. U-8A.1

U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD–FABRICATED FLASHING.
2. TEMPERATURE OF PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. ACCEPTABLE WITH SQUARE OR RECTANGULAR STRUCTURAL TUBING WITH ROUNDED CORNERS UP TO 12"(30cm). USE DETAIL U–5 IF GREATER THAN 12" (30cm).
4. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM OR CURED FLASHING.
5. ON MECHANICALLY FASTENED ROOFING SYSTEMS. REFER TO DETAIL MF–8B.
6. MEMBRANE SECUREMENT IS REQUIRED AROUND ALL ROUND PIPE PENETRATIONS GREATER THAN 18" (46cm) IN DIAMETER.

DIMENSIONS		cm	
Ⓐ	1/2"	1.5	MIN.
Ⓑ	1"	2.5	MIN.
Ⓒ	3"	7.5	MIN.

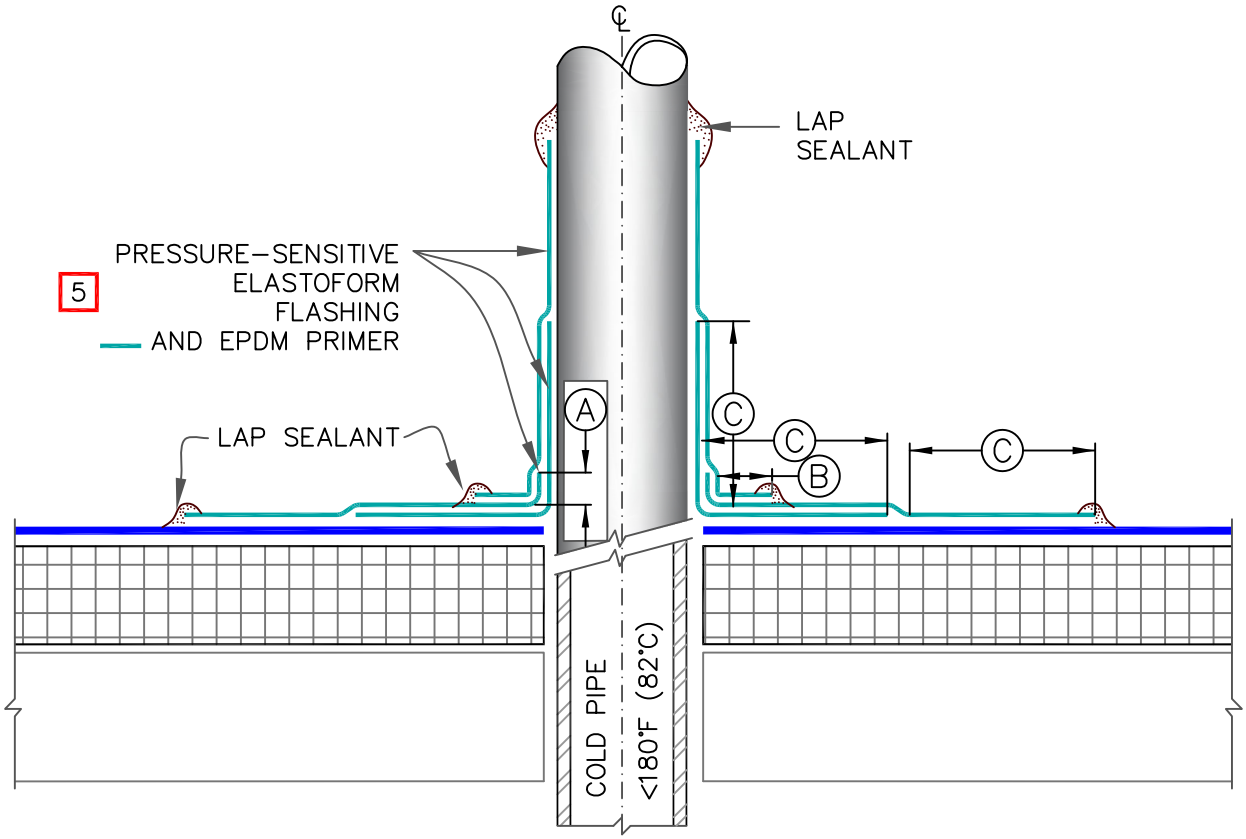
CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PIPE WRAP

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. U–8B

U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD–FABRICATED FLASHING.
2. TEMPERATURE OF PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. PIPE FLASHING MAY BE USED WITH SQUARE OR RECTANGULAR STRUCTURAL TUBING WITH ROUNDED CORNERS.
4. FOR STRUCTURAL STEEL TUBING GREATER THAN 12" (30cm) ACROSS, USE DETAIL(S) U–5.
5. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.
6. ON MECHANICALLY FASTENED ROOFING SYSTEMS, REFER TO DETAIL MF–8B.1.
7. MEMBRANE SECUREMENT IS REQUIRED AROUND ALL ROUND PIPE PENETRATIONS GREATER THAN 18" (46cm) IN DIAMETER.

DIMENSIONS		cm	
Ⓐ	1/2"	1.5	MIN.
Ⓑ	1"	2.5	MIN.
Ⓒ	3"	7.5	MIN.

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PIPE WRAP

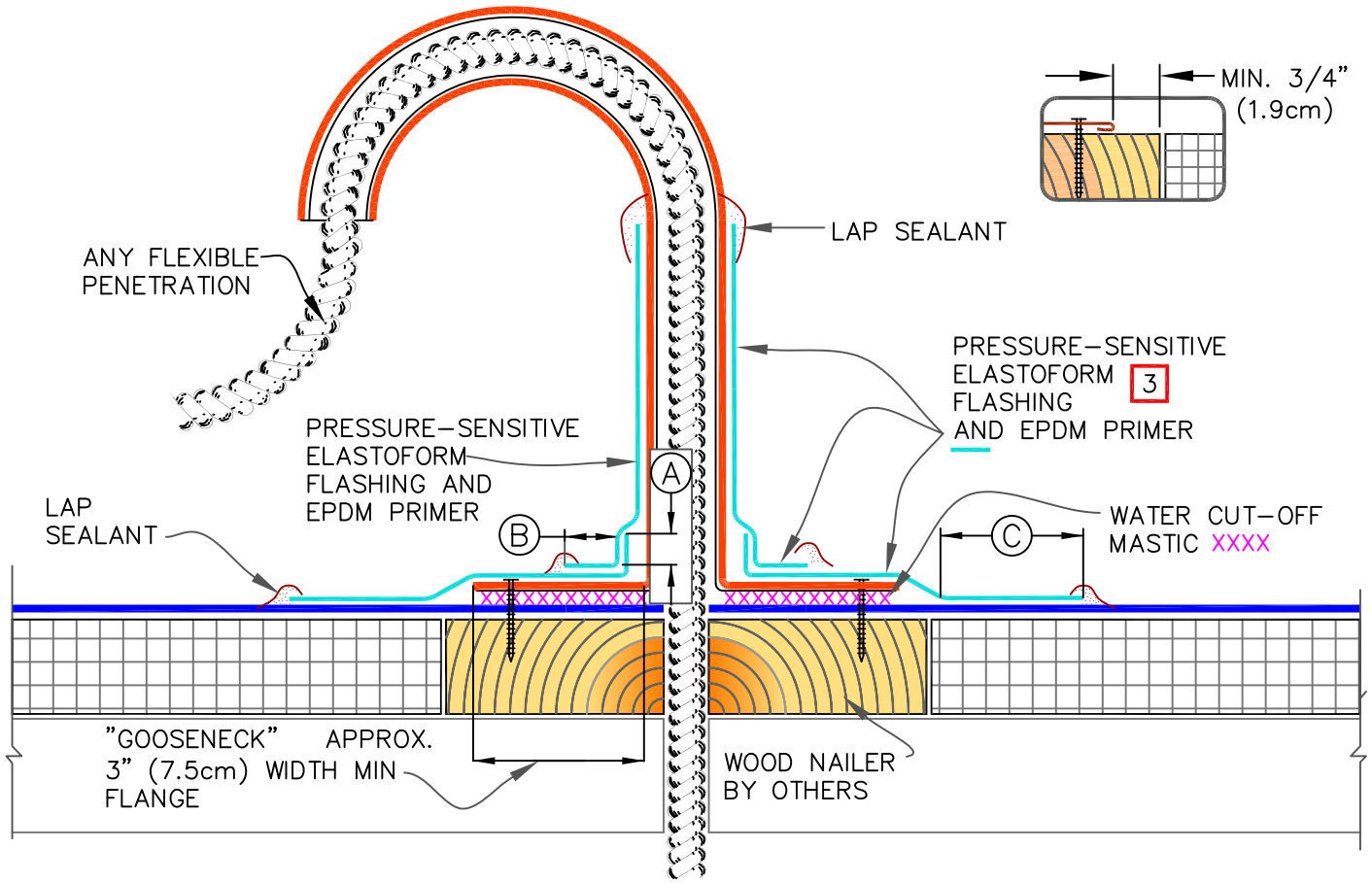
MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO.

U–8B.1

U (UNIVERSAL DETAIL)

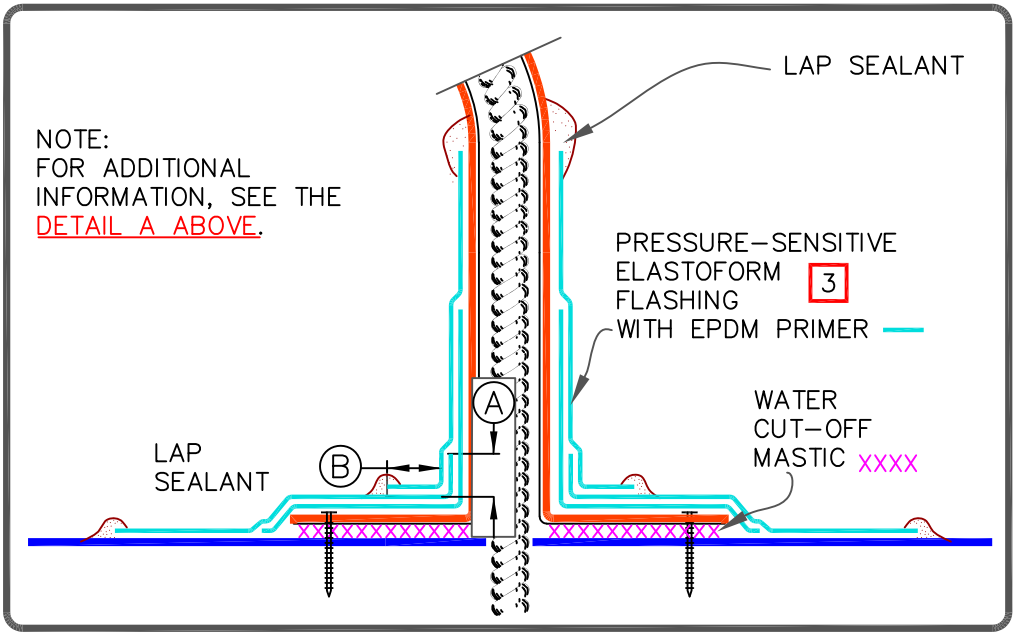


A UP TO 20-YEAR WARRANTY

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD–FABRICATED PIPE SEAL.
2. TEMPERATURE OF PENETRATION MUST NOT EXCEED 180°F (82°C).
3. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.

DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	1"	2.5	MIN.
C	3"	7.5	MIN.



B UP TO 30-YEAR WARRANTY

CARLISLE SYNTEC SYSTEMS

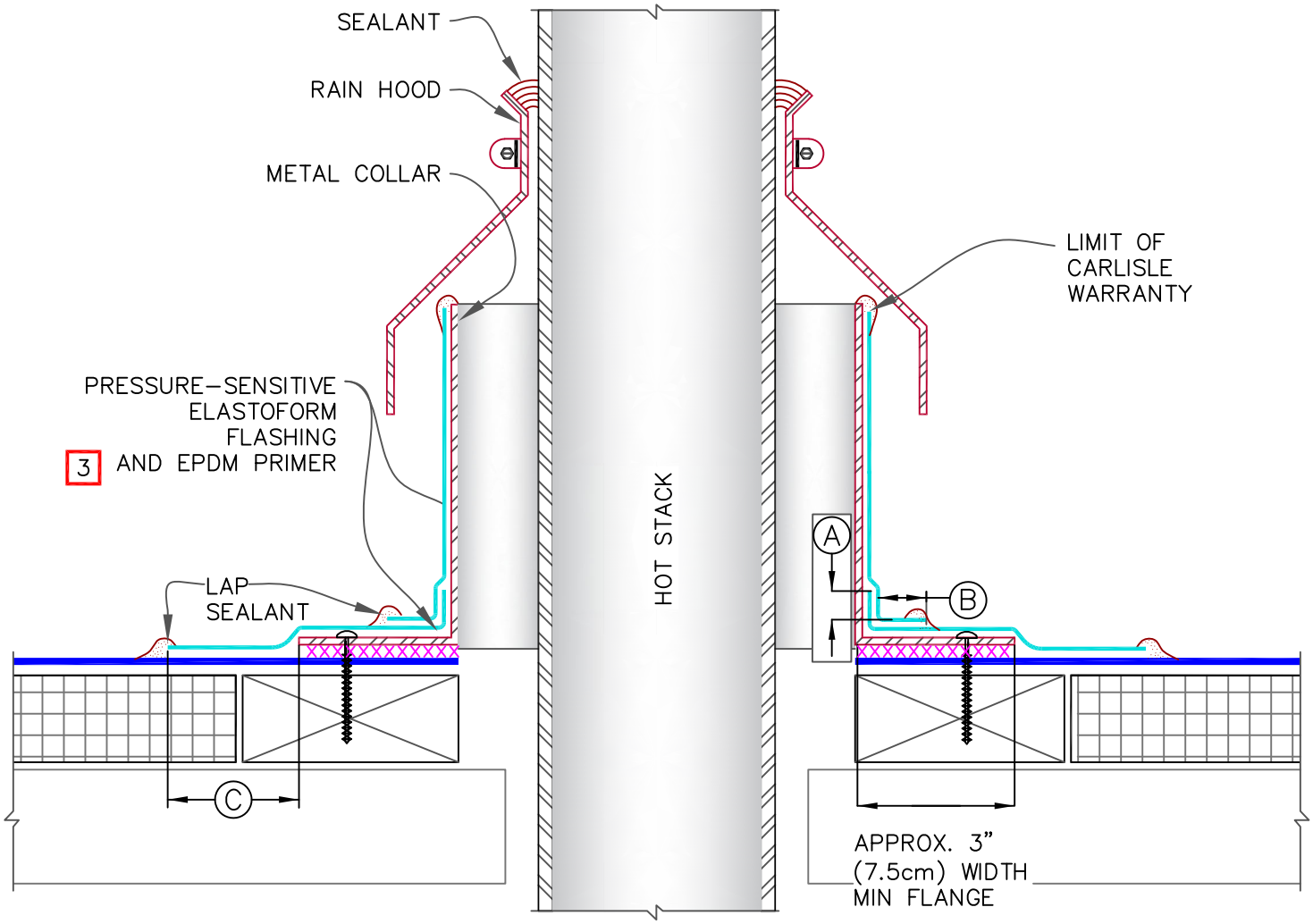
FLEXIBLE PENETRATION

MAXIMUM WARRANTY: SEE EACH DETAIL

DETAIL NO.

U–8C

U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF METAL COLLAR MUST NOT EXCEED 180°F (82°C).
3. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.

DIMENSIONS		cm	
Ⓐ	1/2"	1.5	MIN.
Ⓑ	1"	2.5	MIN.
Ⓒ	3"	7.5	MIN.

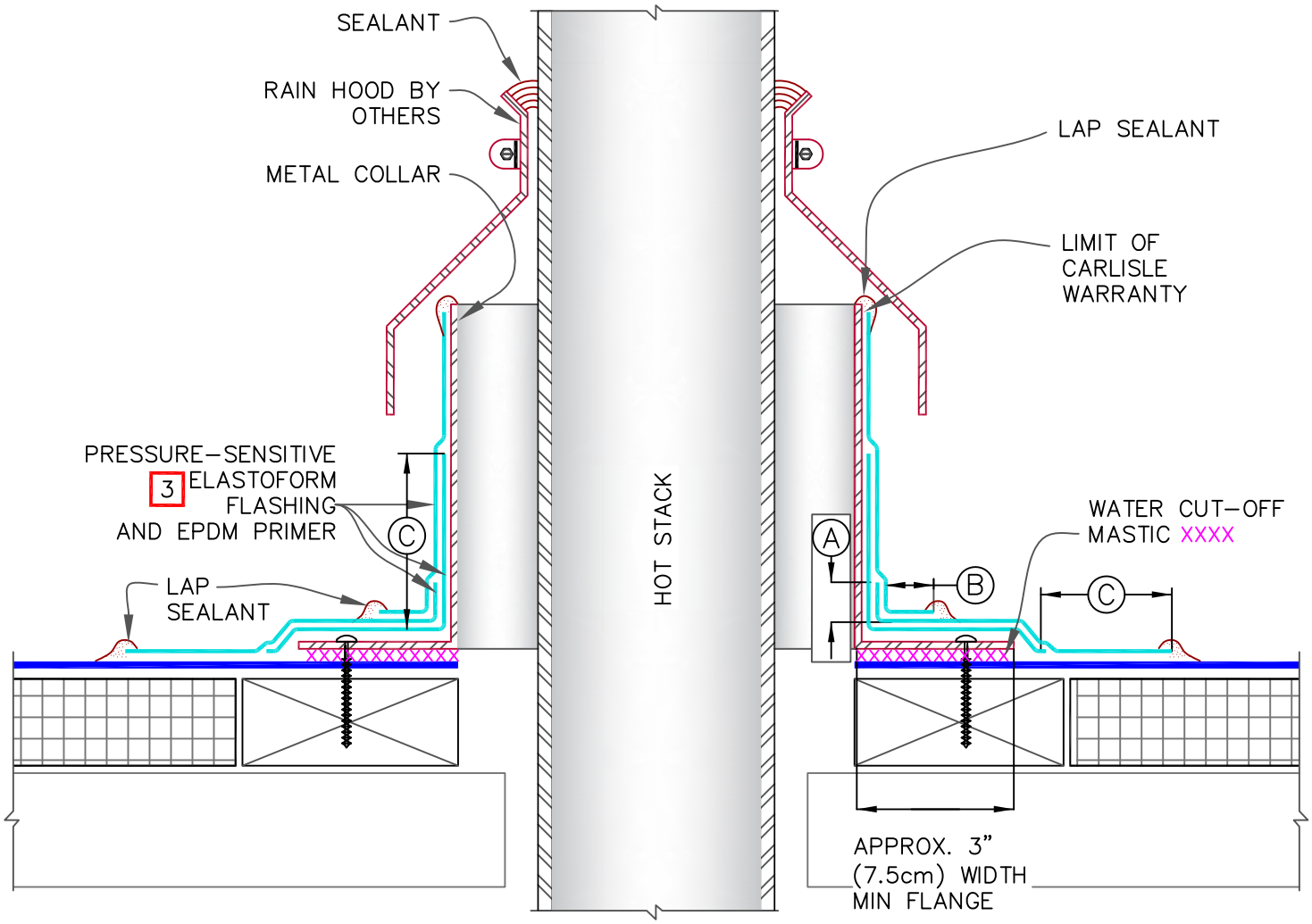
CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED HOT STACK

MAXIMUM WARRANTY: 25 YEARS

DETAIL NO. U–8D

U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF METAL COLLAR MUST NOT EXCEED 180°F (82°C).
3. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.

DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	1"	2.5	MIN.
C	3"	7.5	MIN.

CARLISLE SYNTEC SYSTEMS

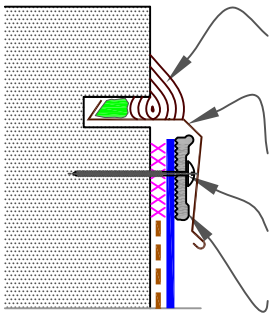
FIELD FABRICATED HOT STACK

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–8D.1

U (UNIVERSAL DETAIL)

9A MECHANICAL TERMINATION WITH COUNTER FLASHING



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

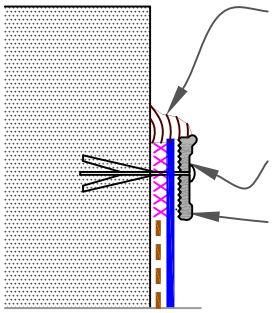
METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

THREADED FASTENERS OR CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 30 YEARS | **SEE INSET A**

9B MECHANICAL TERMINATION



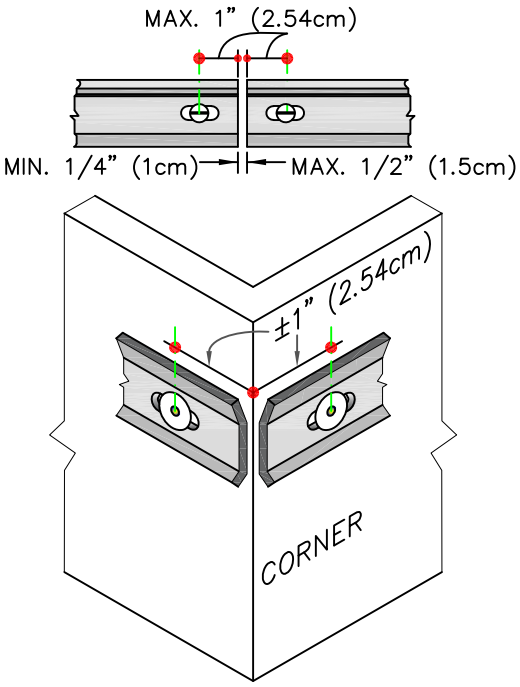
CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 20 YEARS | **SEE INSET A**

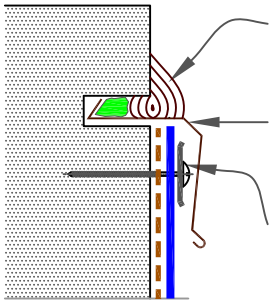
INSET A



NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. DETAIL 9D MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

9C COUNTER FLASHING TERMINATION



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

FASTEN MEMBRANE @ 12" (30cm) O.C. MAX. USE GALVANIZED WASHERS, MIN. 1", (2.54cm) DIAMETER

NOTE:

1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER–FLASHING, USE EPDM WASHERS, APPLY WATER CUT–OFF MASTIC UNDER THE COUNTER–FLASHING OR CAULK THE FASTENER HEADS.

WARRANTY UP TO 10 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT–OFF MASTIC– MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 1 OF 3)

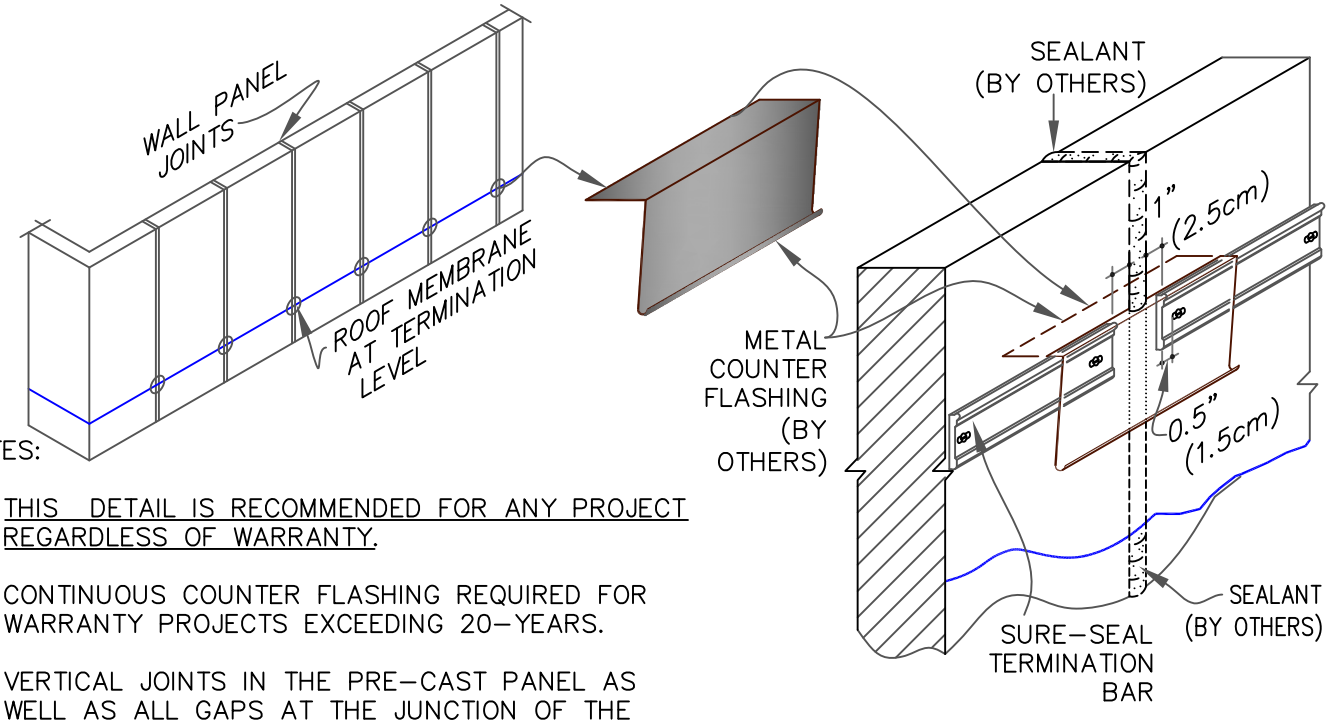
WARRANTY AS NOTES FOR EACH DETAIL

EPDM

DETAIL NO. U–9

U (UNIVERSAL DETAIL)

9D MECHANICAL TERMINATION AT VERTICAL JOINTS



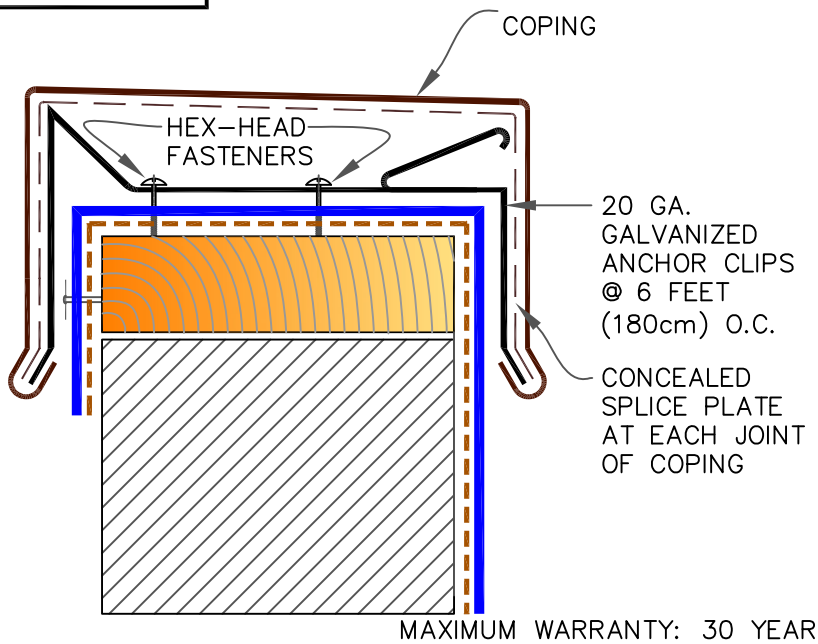
NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.

9E SecurEdge 200 & 300 COPINGS

NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. REFER TO 3D DETAIL ON DETAIL U-9F.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.



MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

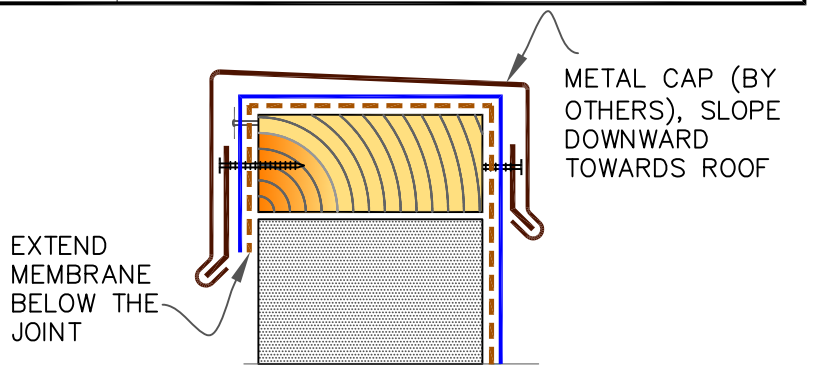
MEMBRANE TERMINATIONS (PAGE 2 OF 3)

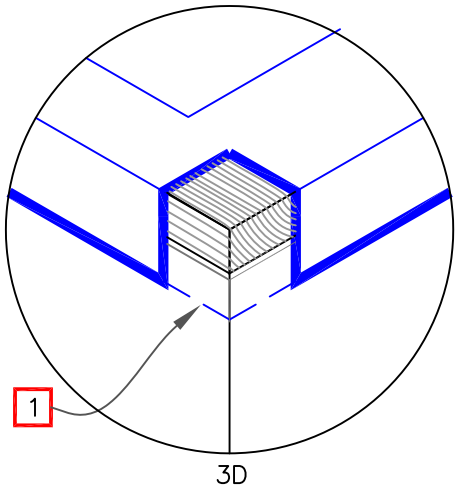
WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. U-9

U (UNIVERSAL DETAIL)

9F SHEET METAL COPING (BY OTHERS)

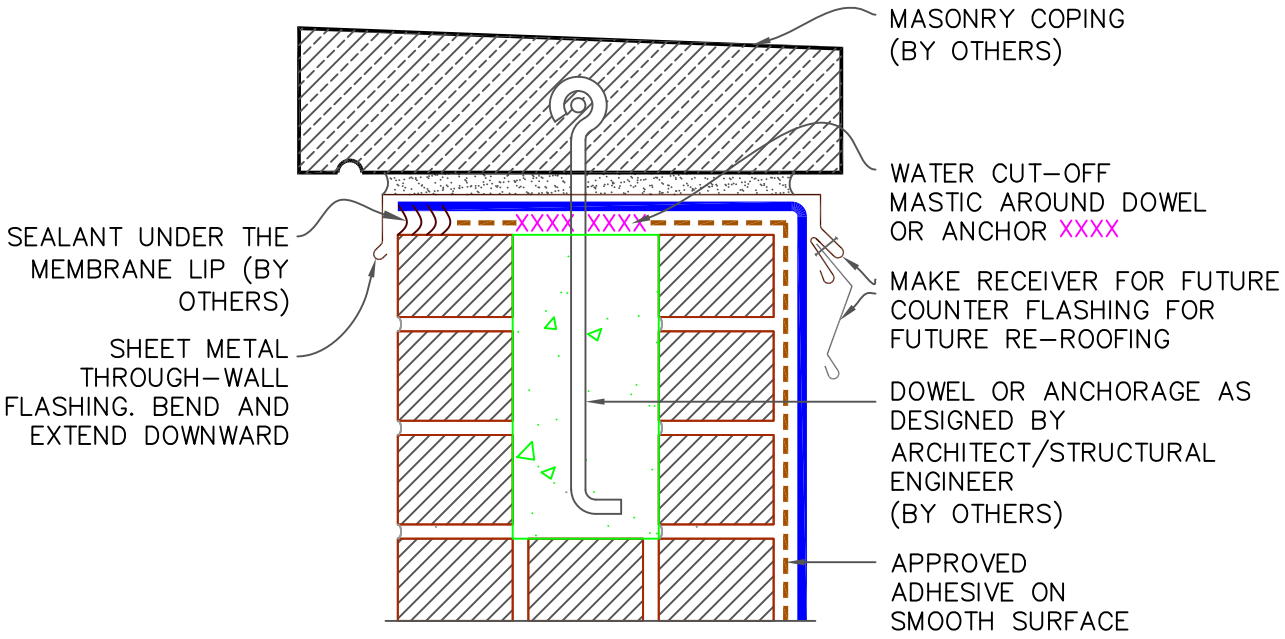




NOTES:

1. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE.
2. WARRANTY AS PROVIDED (BY OTHERS).

9G MASONRY COPINGS (BY OTHERS)



MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE	XXX WATER CUT–OFF MASTIC– MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

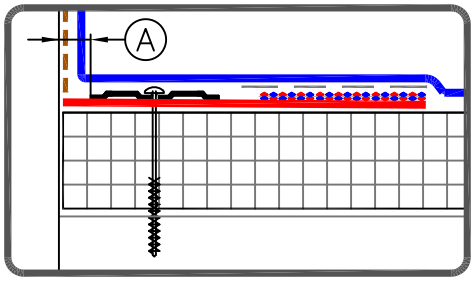
MEMBRANE TERMINATIONS (PAGE 3 OF 3)

MAXIMUM WARRANTY: 30 YEARS

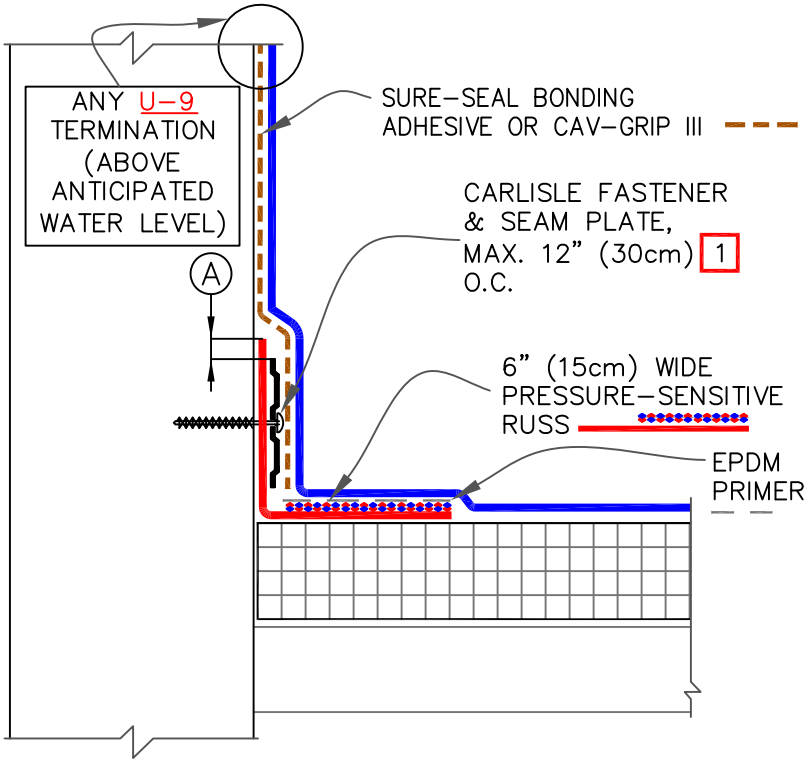
EPDM

DETAIL NO. U–9

U (UNIVERSAL DETAIL)



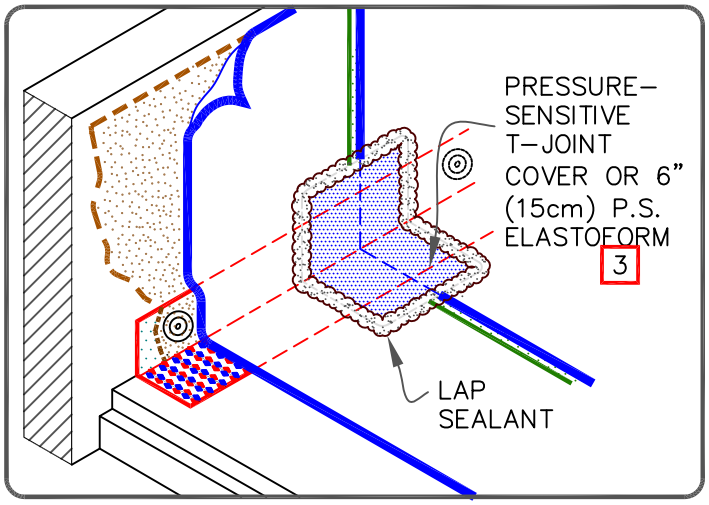
OPTIONAL: SEAM PLATE/FASTENER MAY BE INSTALLED INTO THE STRUCTURAL DECK UP TO 6" (15cm) FROM ANGLE CHANGE.



DIMENSION		cm
A	1/8"-1"	0.5-2.5

NOTES:

1. FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ADHERED SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS ON MECHANICALLY FASTENED SYSTEMS.
2. PROJECTS WITH 30-YEAR WARRANTY OR WHEN USING 90-MIL MEMBRANE. REFER TO DETAIL U-2C.
3. FOR CORNERS AND RUSS APPLICATION REFER TO DETAILS U-15A OR U-15B.



CARLISLE SYNTEC SYSTEMS

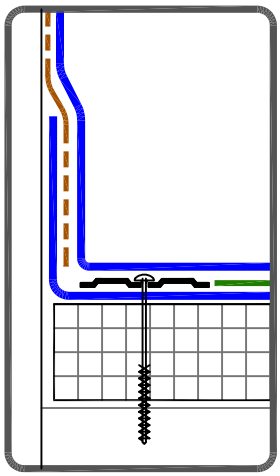
PARAPET / CURB WITH CONTINUOUS MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

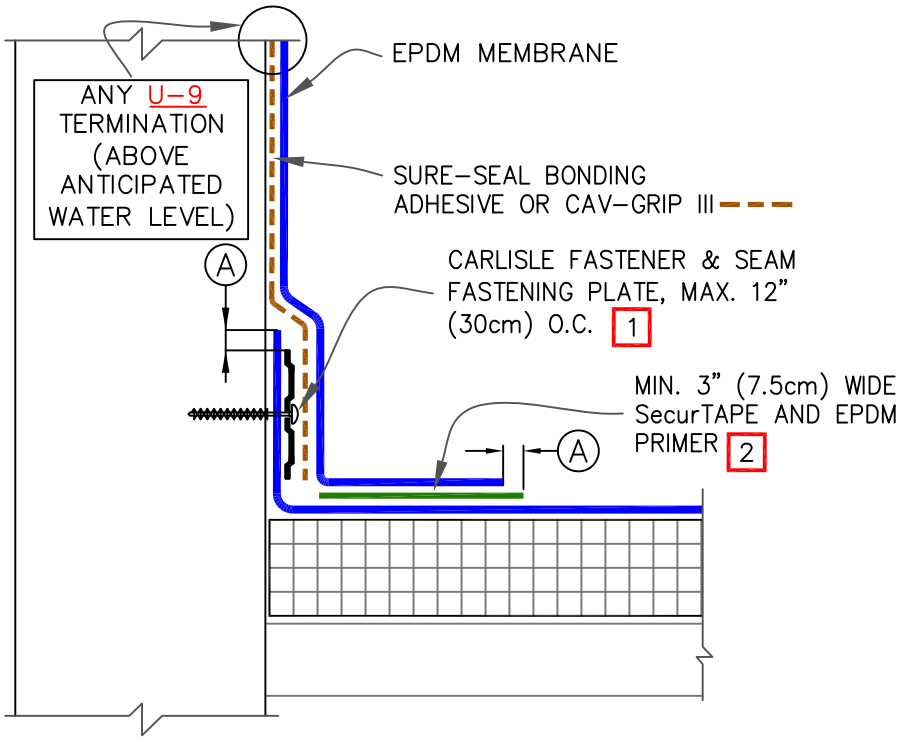
EPDM

DETAIL NO. U-12A

U (UNIVERSAL DETAIL)



OPTIONAL: SEAM PLATE/FASTENER MAY BE INSTALLED INTO THE STRUCTURAL DECK UP TO 6" (15cm) FROM ANGLE CHANGE.



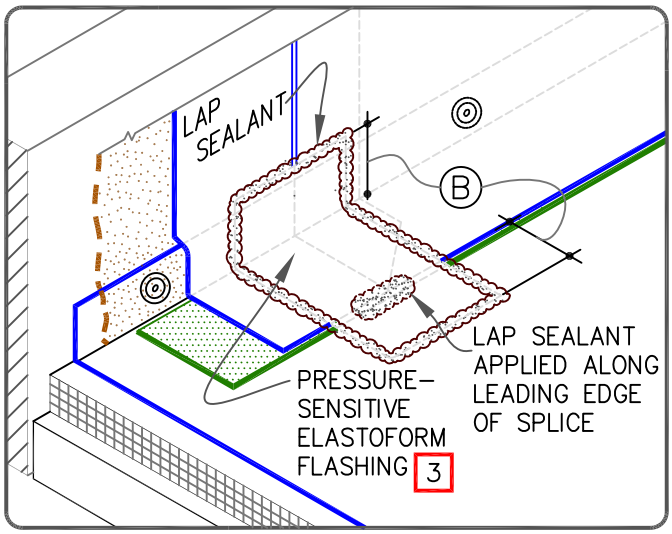
DIMENSIONS		cm	
A	1/8"	0.5	TO
	1/2"	1.5	MAX.
B	3"	7.5	

NOTES:

1. FASTENERS AND PLATES ARE REQUIRED AT 6"(15cm) O.C. FOR ADHERED SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS ON MECHANICALLY FASTENED SYSTEMS.

2. USE 6" (15cm) WIDE SecurTAPE FOR 30-YEAR WARRANTY. LAP SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED MEMBRANE.

3. PROJECTS WITH 30-YEAR WARRANTY OR WHEN USING 90-MIL MEMBRANE, REFER TO DETAIL U-2C.



CARLISLE SYNTEC SYSTEMS

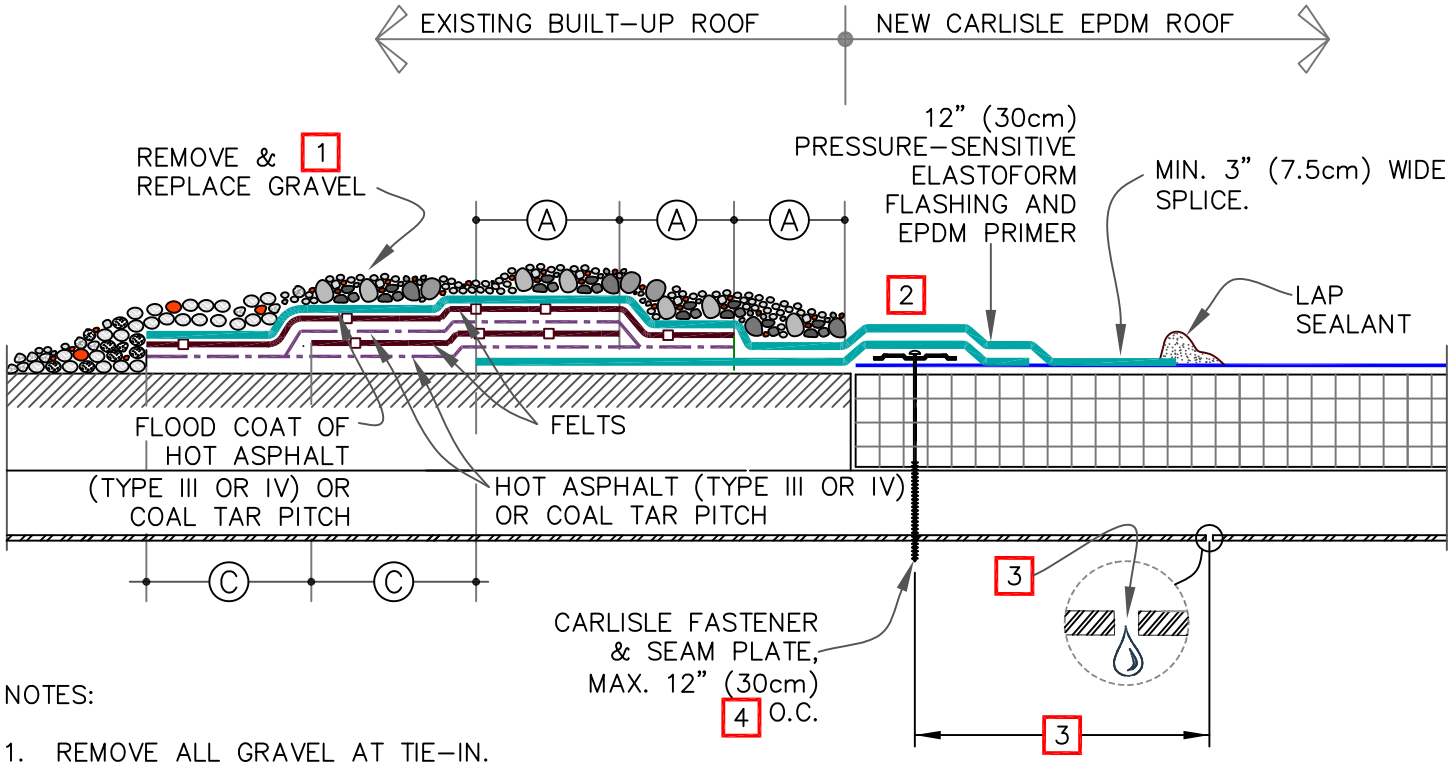
PARAPET / CURB WITH SEPARATE MEMBRANE FLASHING

MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO. U-12B

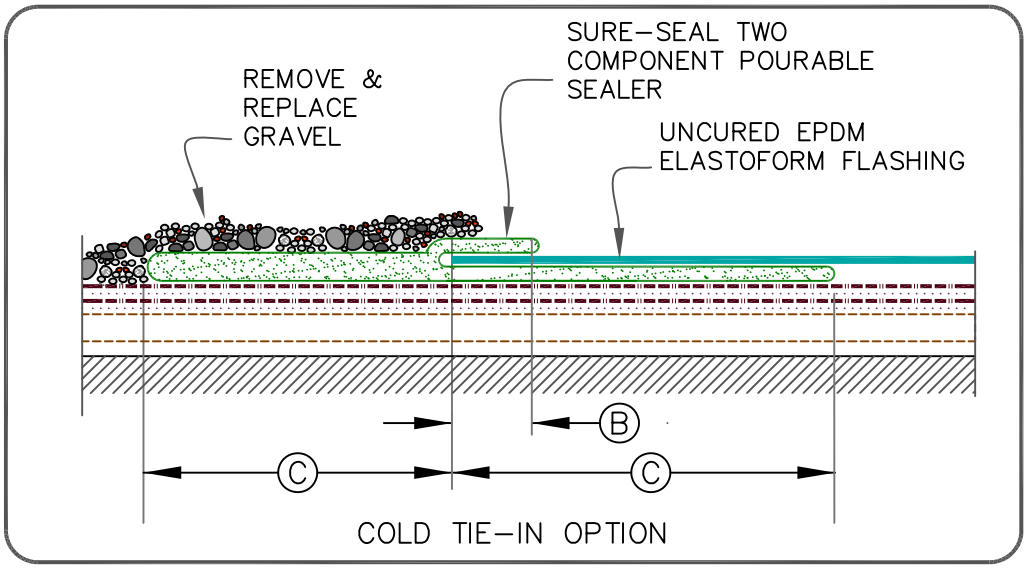
U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. SPLICE TWO PIECES OR MORE OF ELASTOFORM OR PRESSURE-SENSITIVE ELASTOFORM TOGETHER TO ACHIEVE DESIRED WIDTH.
3. IF FLUTES ARE PERPENDICULAR TO THE TIE-IN DRILL A 3/8" (1cm) DIAMETER WEEP HOLE ON THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER TO THE TIE-IN 6" (15cm) FROM THE SEAM FASTENING PLATE.
4. ON MECHANICALLY FASTENED SYSTEMS, HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.
5. IF WATER PONDS OR FLOWS OVER TIE-IN FROM BUR SURFACE, USE DETAIL U-13B.
6. ON BALLASTED SYSTEMS, USE CONCRETE PAVERS TO PREVENT BALLAST MIGRATION.

DIMENSIONS		cm	
A	5"	13	MIN.
B	2"	5	± 1/2" (1.5cm)
C	6"	15	



COLD TIE-IN OPTION

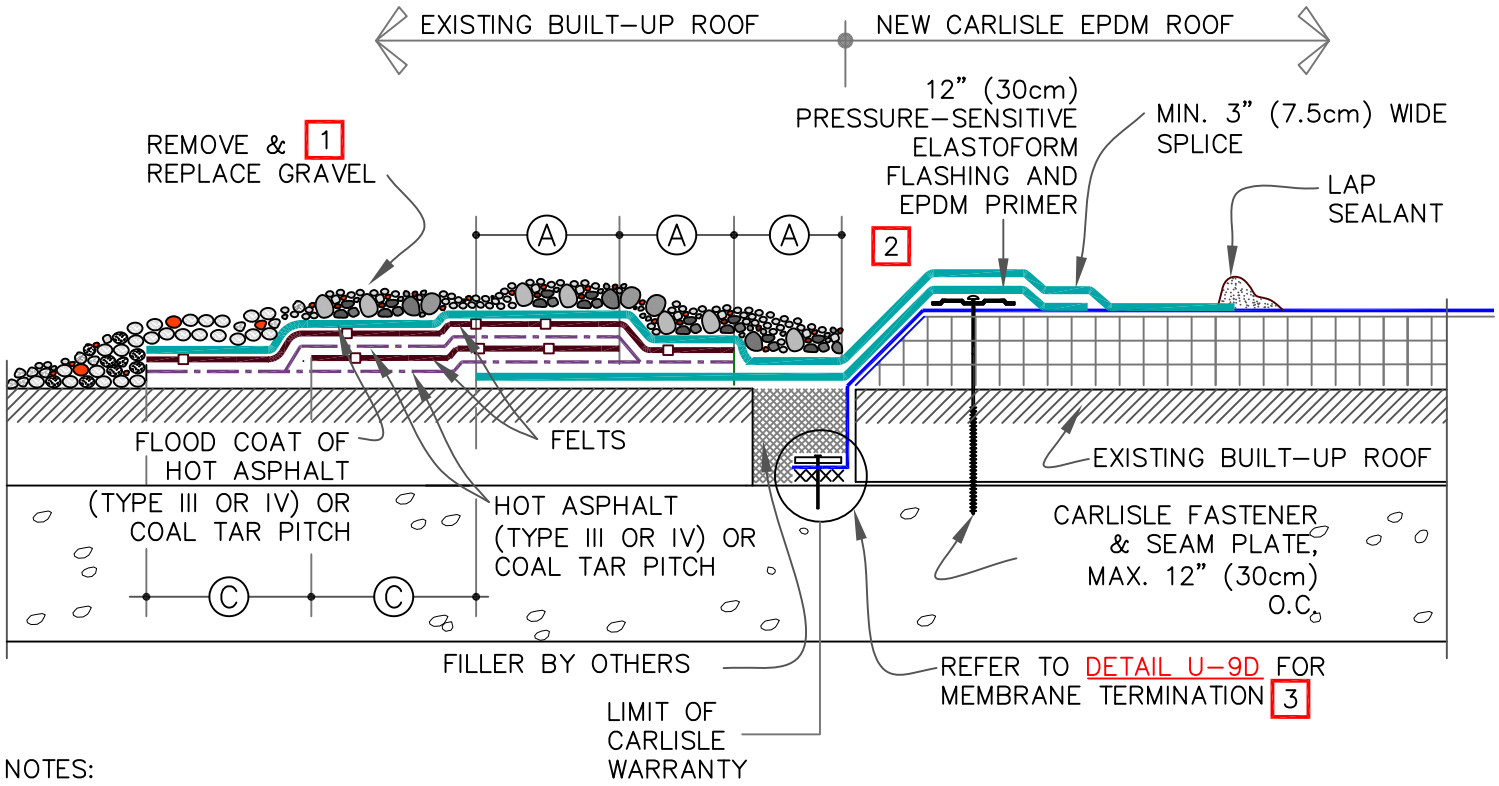
CARLISLE SYNTEC SYSTEMS

BUILT-UP ROOFING TIE-IN OVER STEEL ROOF DECK

MAXIMUM WARRANTY: 30 YEARS

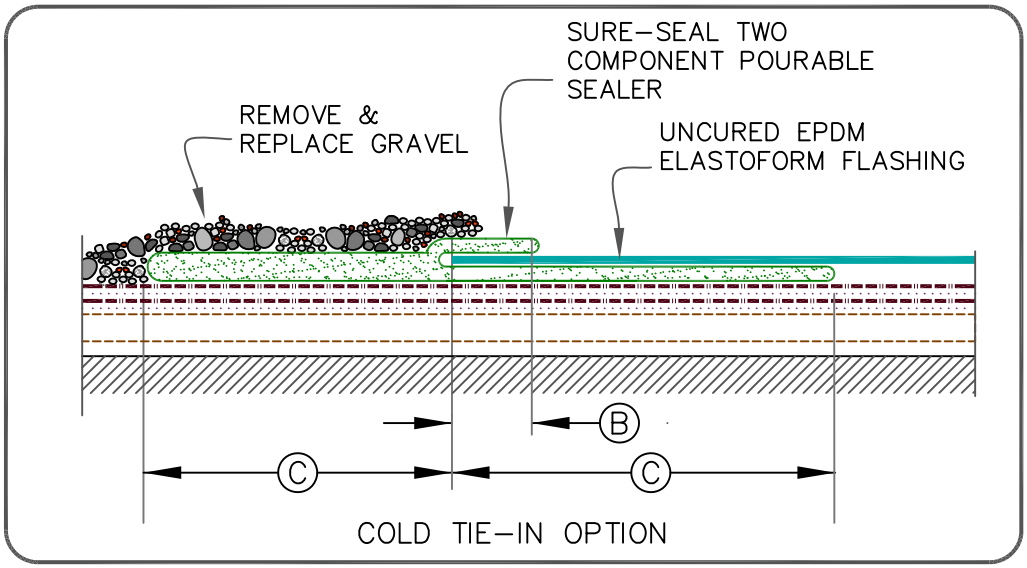
DETAIL NO. U-13A

U (UNIVERSAL DETAIL)



NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. SPLICE TWO PIECES OF ELASTOFORM OR PRESSURE-SENSITIVE ELASTOFORM TOGETHER TO ACHIEVE DESIRED WIDTH.
3. WATER CUT-OFF MUST BE UNDER CONSTANT COMPRESSION.
4. CARLISLE IS NOT RESPONSIBLE FOR DAMAGE TO THE BUILT-UP ROOF OR STRUCTURAL DECK RESULTING FROM PONDED WATER; THIS DETAIL APPLIES TO RE-ROOFING WHEN A TEAR-OFF IS NOT SPECIFIED AND WAS DESIGNED TO PREVENT MIGRATION OF WATER INTO THE NEW ROOFING SYSTEM.
5. ON BALLASTED SYSTEMS, USE CONCRETE PAVERS TO PREVENT BALLAST MIGRATION.



DIMENSIONS		cm	
Ⓐ	5"	13	MIN.
Ⓑ	2"	5	± 1/2" (1.5cm)
Ⓒ	6"	15	

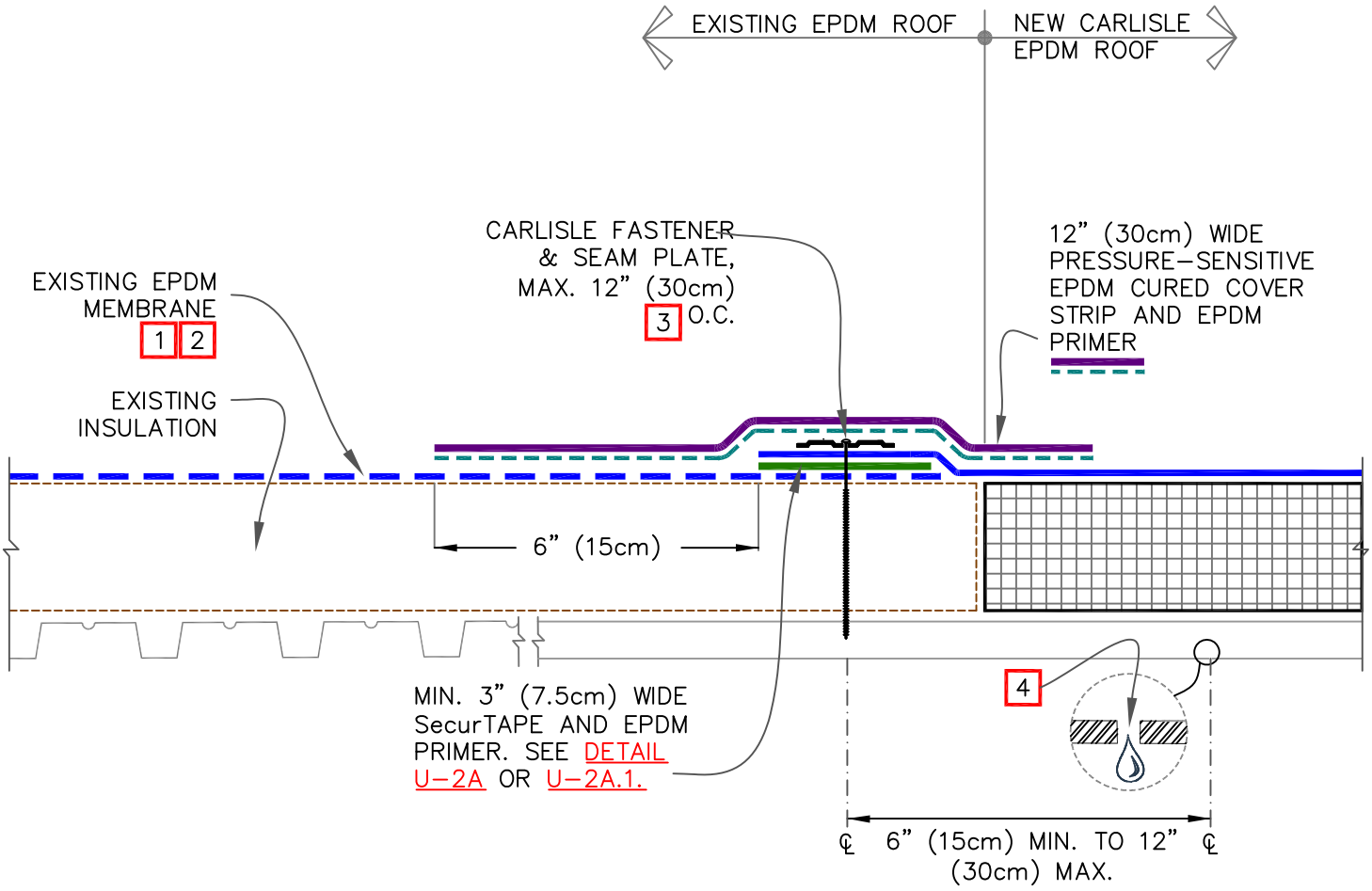
CARLISLE SYNTEC SYSTEMS

BUILT-UP ROOFING TIE-IN OVER CONCRETE ROOF DECK

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-13B

U (UNIVERSAL DETAIL)



NOTES:

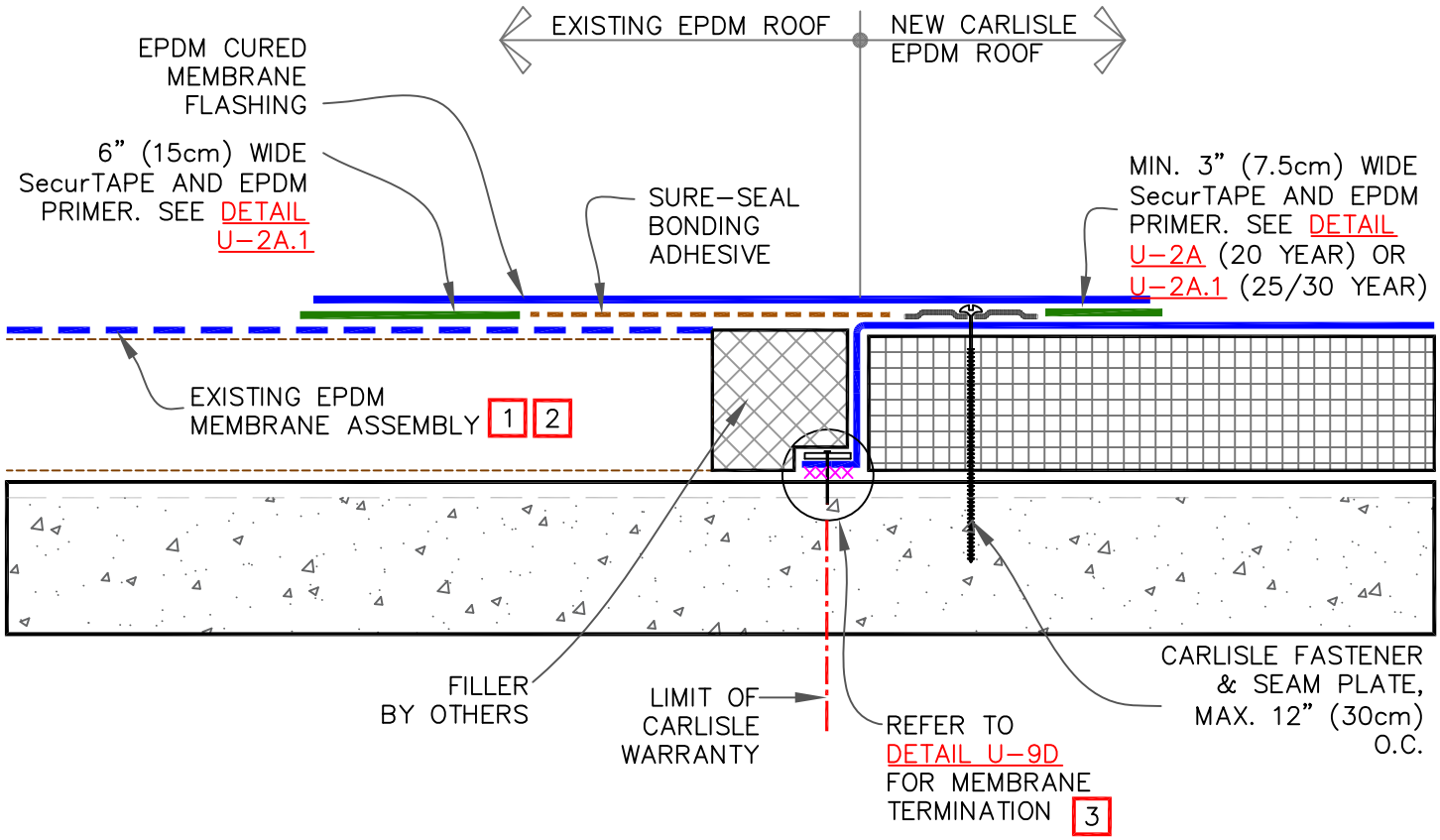
1. CONTACT MANUFACTURER OF EXISTING EPDM MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN AND TO NOT VOID EXISTING WARRANTY.

2. PRIOR TO SPLICING, CLEAN EXISTING EPDM MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.

3. ON MECHANICALLY FASTENED SYSTEMS, HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.

4. IF FLUTES ARE PERPENDICULAR TO THE TIE-IN DRILL A 3/8" (1cm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (15cm) MINIMUM TO 12" (30cm) MAXIMUM FROM THE SEAM FASTENING PLATE.

CARLISLE SYNTEC SYSTEMS	TIE-IN TO EXISTING EPDM MEMBRANE	DETAIL NO. U-13C
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



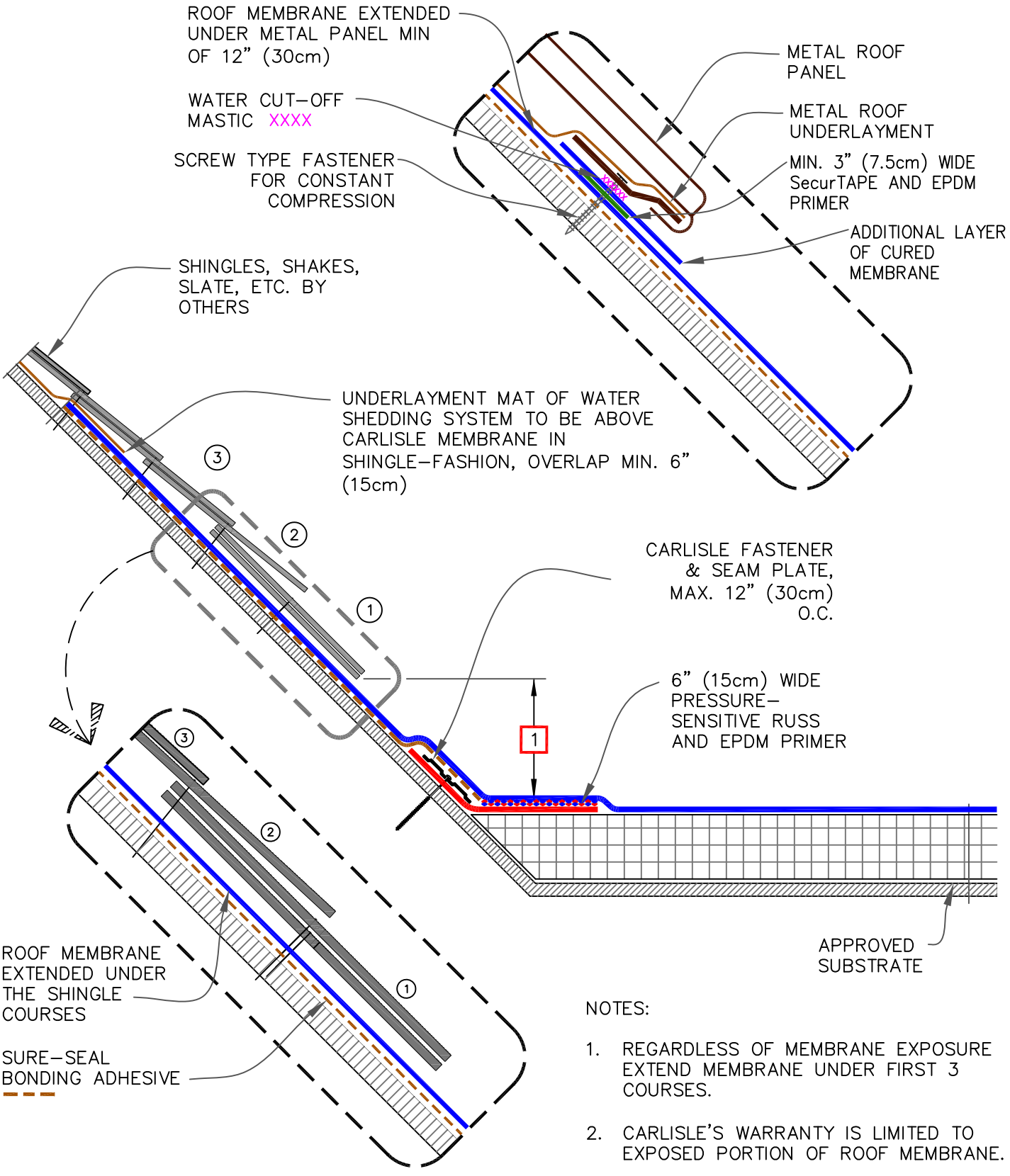
NOTES:

1. CONTACT MANUFACTURER OF EXISTING EPDM MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN AND TO NOT VOID EXISTING WARRANTY.

2. PRIOR TO SPLICING, CLEAN EXISTING EPDM MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY.

3. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION. WHEN RE-ROOFING OVER PRE-CAST CONCRETE, APPLY LIBERAL BEAD OF WATER CUT-OFF MASTIC IN THE JOINTS TO PREVENT MOISTURE MIGRATION.

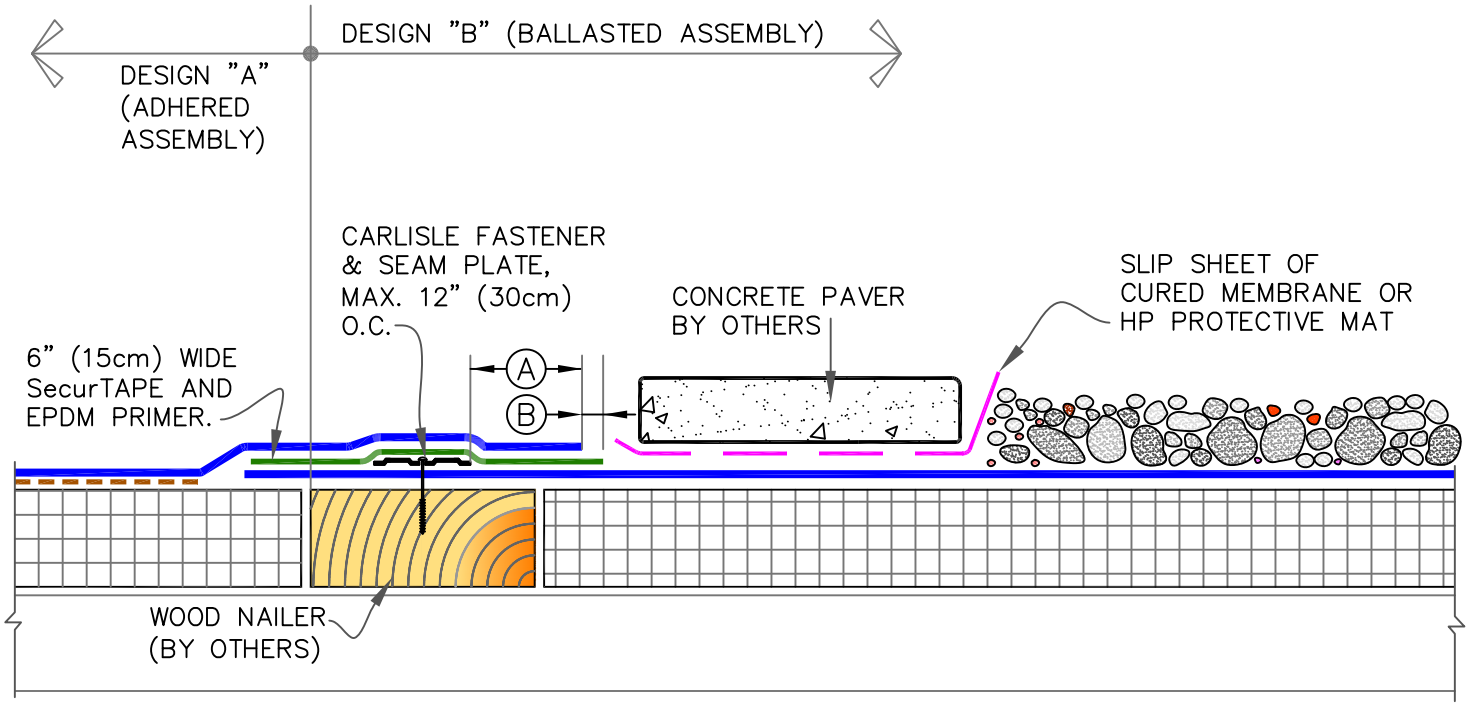
CARLISLE SYNTEC SYSTEMS	EPDM TIE-IN OVER CONCRETE DECK	DETAIL NO. U-13D
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



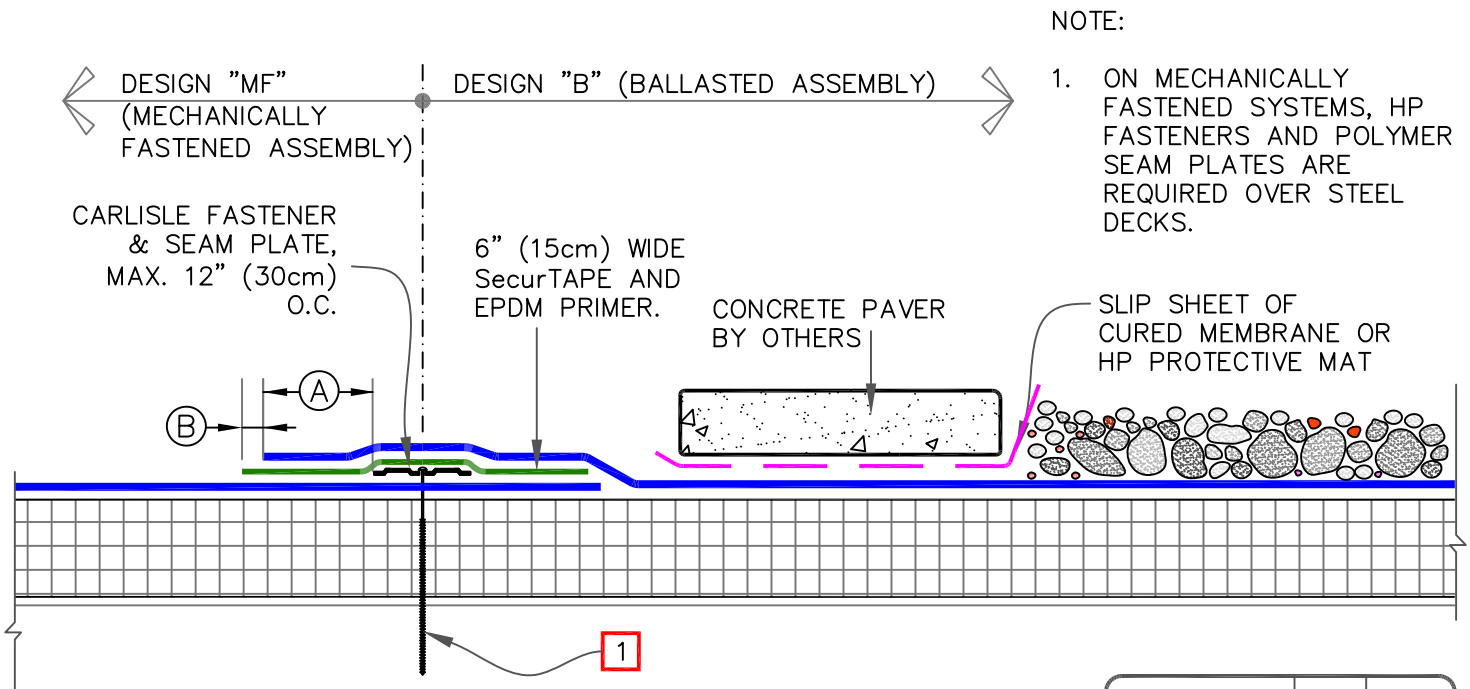
NOTES:

1. REGARDLESS OF MEMBRANE EXPOSURE EXTEND MEMBRANE UNDER FIRST 3 COURSES.
2. CARLISLE'S WARRANTY IS LIMITED TO EXPOSED PORTION OF ROOF MEMBRANE.

CARLISLE SYNTEC SYSTEMS	TIE-IN SHINGLED OR METAL PANEL ROOF	DETAIL NO. U-13E
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



A BALLASTED TO ADHERED TIE-IN



NOTE:

1. ON MECHANICALLY FASTENED SYSTEMS, HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED OVER STEEL DECKS.

B BALLASTED TO MECHANICALLY FASTENED TIE-IN

DIMENSIONS		cm	
A	2"	5	MIN.
B	1/8"	0.5	MIN.
	1/2"	1.5	MAX.

CARLISLE SYNTEC SYSTEMS

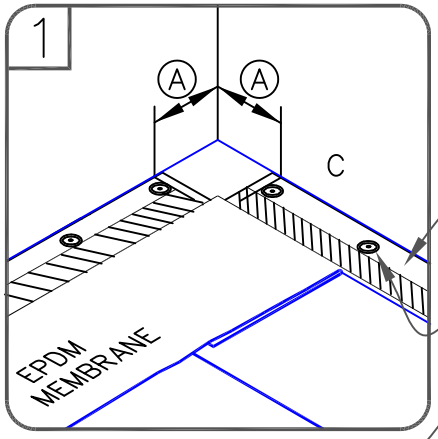
TIE-IN BETWEEN BALLASTED TO NEW ADHERED OR MECHANICALLY FASTENED ROOF

MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO. U-13F

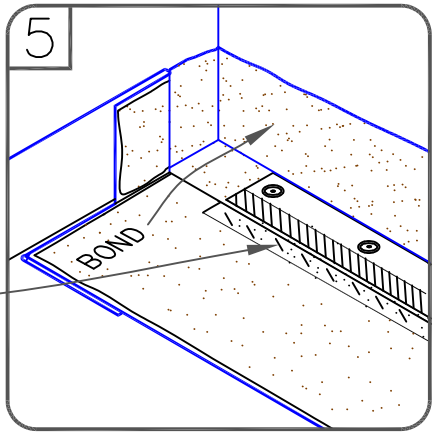
U (UNIVERSAL DETAIL)

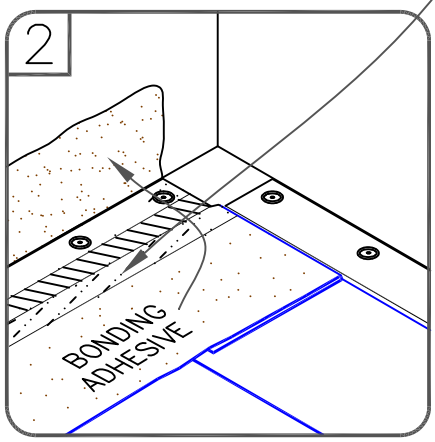


6" (15cm) WIDE PRESSURE-SENSITIVE RUSS (MAY BE FASTENED INTO VERTICAL SUBSTRATE)

CARLISLE SEAM PLATE & FASTENER.

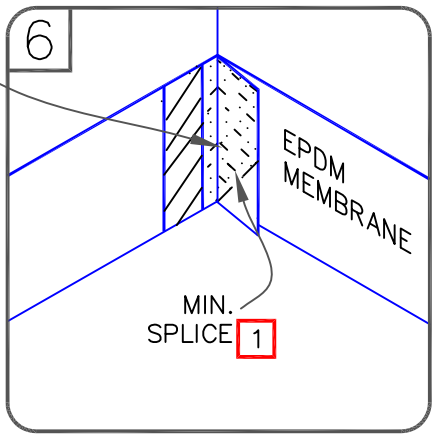
EPDM PRIMER

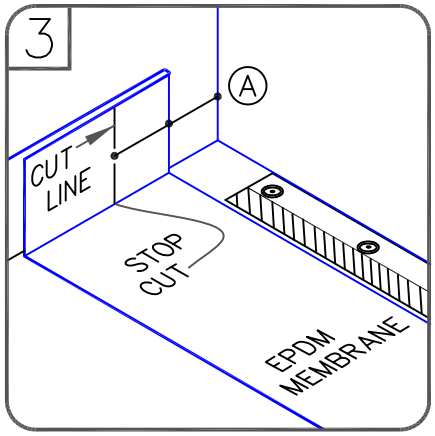




CUT 45° AND APPLY EPDM PRIMER/SecurTAPE

DIMENSIONS		cm	
A	6"	15	TO
	9"	23	

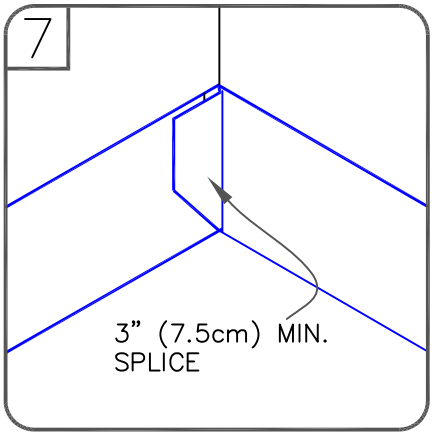


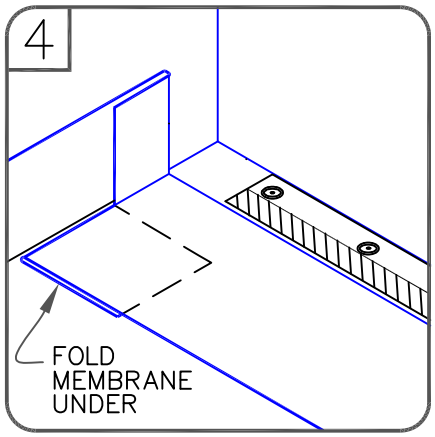


NOTES:

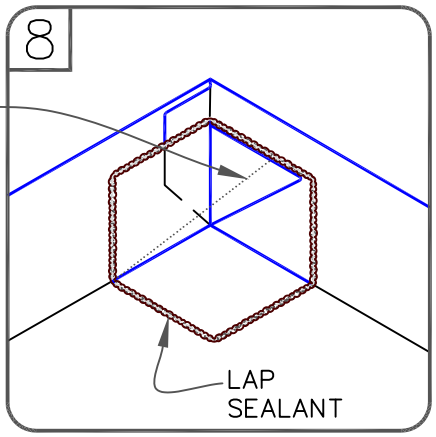
1. MINIMUM SPLICE WIDTH:
   1.1. 3" (7.5cm) UP TO 20 YEAR WARRANTIES
   1.2. 6" (15cm) FOR 25/30 YEAR WARRANTIES

2. REFER TO DETAIL U-15C (20 YEAR) OR U-15D.1 (25/30 YEAR) FOR INSIDE CORNER INSTALLATION REQUIREMENTS.





PIG EAR ON OPPOSITE WALL



CARLISLE SYNTEC SYSTEMS

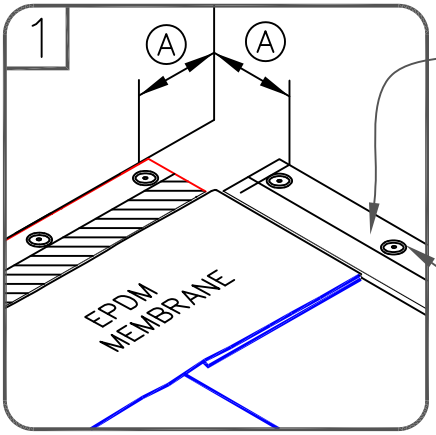
INSIDE CORNER WALL FLASHING WITH RUSS (OPTION 1)

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-15A

U (UNIVERSAL DETAIL)

1

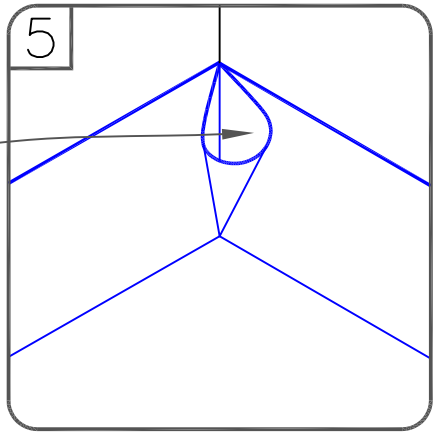


6" (15cm) WIDE PRESSURE–SENSITIVE RUSS (MAY BE FASTENED INTO VERTICAL SUBSTRATE)

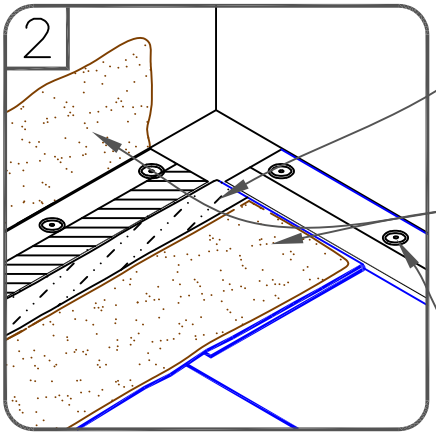
FORM PIG EAR WITH CONTINUOUS MEMBRANE AT CORNER AS SHOWN

CARLISLE SEAM PLATE & FASTENER.

5



2



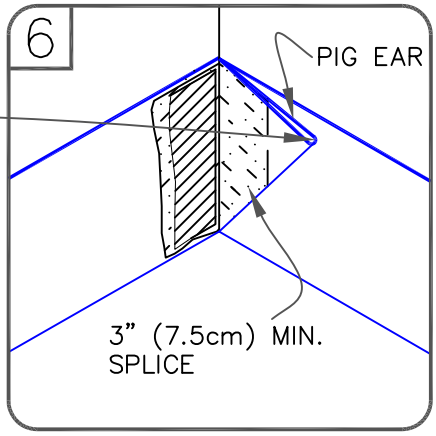
EPDM PRIMER

CUT & REMOVE EXCESSIVE MEMBRANE

SURE–SEAL BONDING ADHESIVE

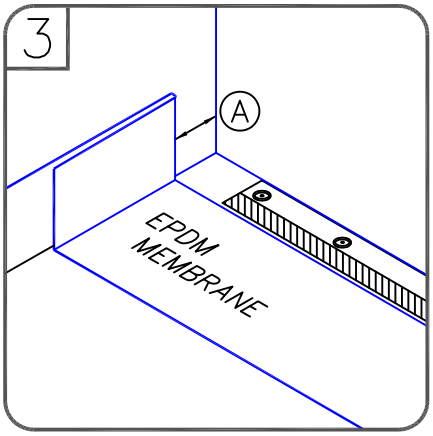
CARLISLE SEAM FASTENING PLATE & FASTENER.

6

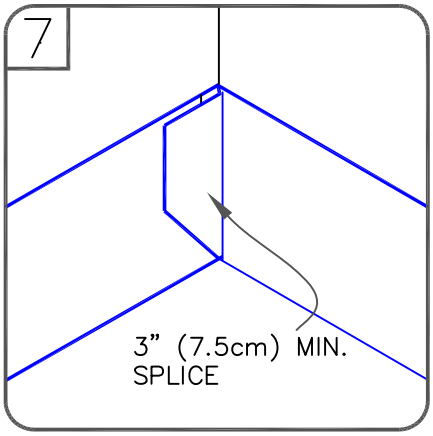


DIMENSIONS		cm	
Ⓐ	6"	15	TO
	9"	23	

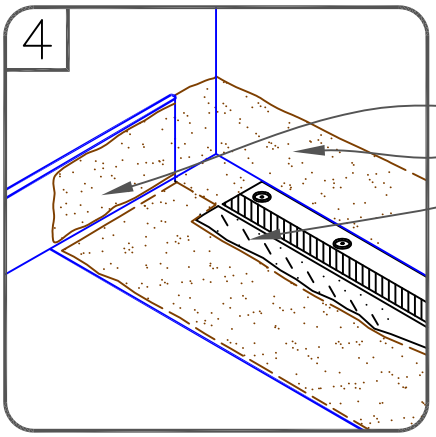
3



7



4

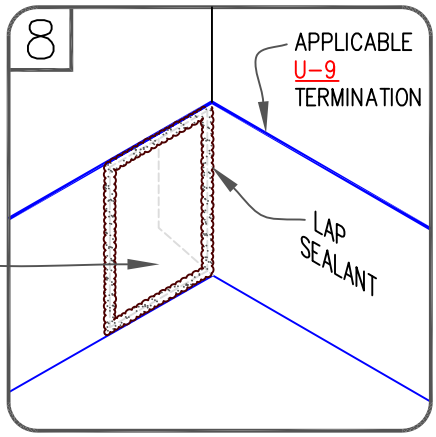


SURE–SEAL BONDING ADHESIVE

EPDM PRIMER

6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING AND EPDM PRIMER

8



CARLISLE SYNTEC SYSTEMS

INSIDE CORNER WALL FLASHING WITH RUSS (OPTION 2)

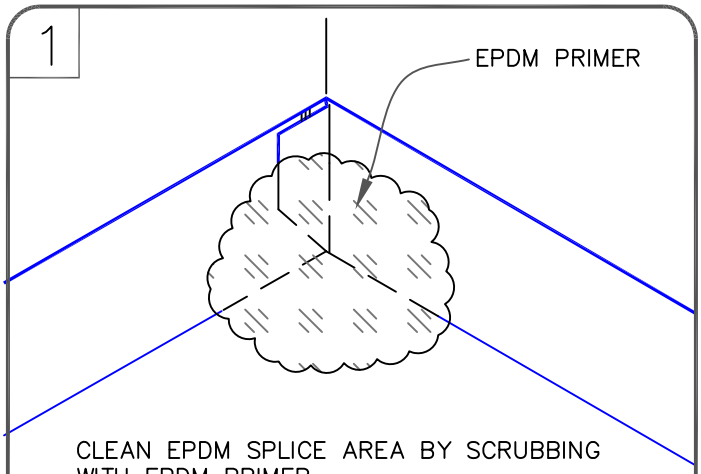
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

U–15B

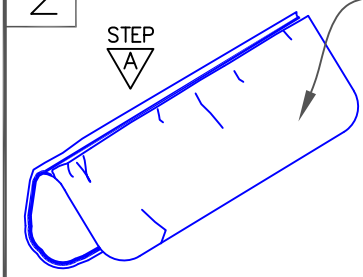
U (UNIVERSAL DETAIL)

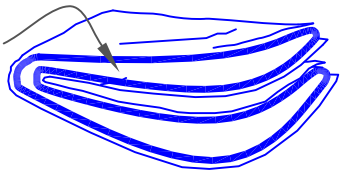
1



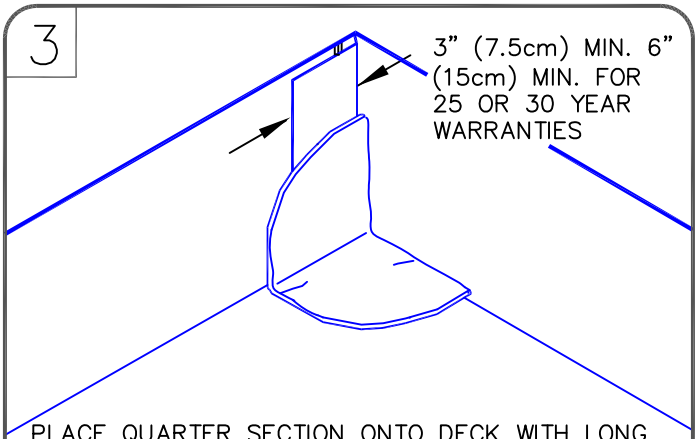
CLEAN EPDM SPLICE AREA BY SCRUBBING WITH EPDM PRIMER.

2



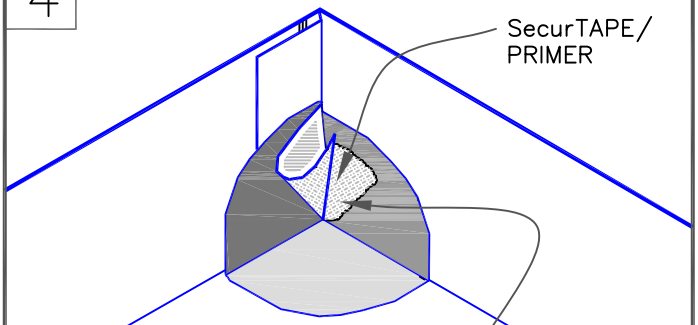


3



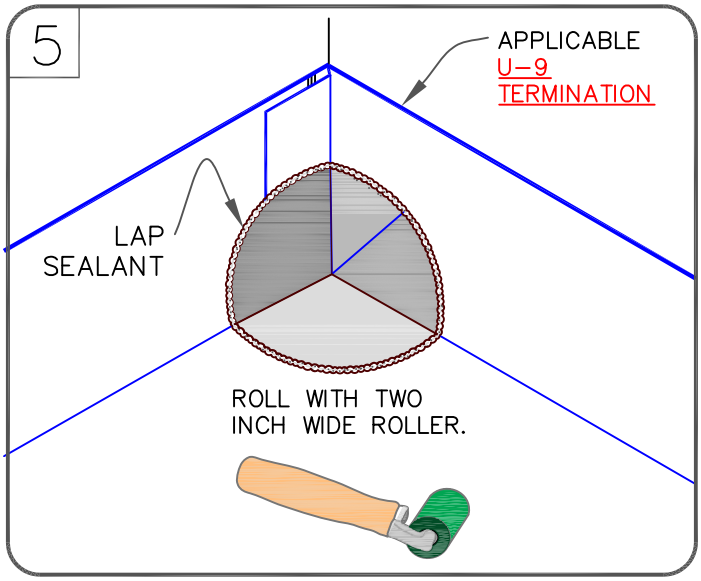
PLACE QUARTER SECTION ONTO DECK WITH LONG FOLDED SIDE FACING THE WALL. REMOVE REMAINING RELEASE PAPER. PRESS FIRMLY AND PROCEED WITH SECOND QUARTER GOING UP THE VERTICAL WALL BY PRESSING FIRMLY INTO CORNER.

4



FORM A PIG EAR. APPLY PRIMER/SecurTAPE TO THE PIG EAR AND ADHERE TO THE WALL.

5



NOTES:

1. PRE-CUT 7" X 9" CORNER OR 9" X 9" PRESSURE SENSITIVE ELASTOFORM.
2. FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES OR WHEN USING 90-MIL MEMBRANE, INSTALL A 6" T-JOINT COVER PRIOR TO INSTALLING A 12" T-JOINT COVER. SEAL TOP LAYER WITH CONTINUOUS LAP SEALANT. PER DETAIL U-15D.1
3. A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING IN COLDER TEMPERATURES.

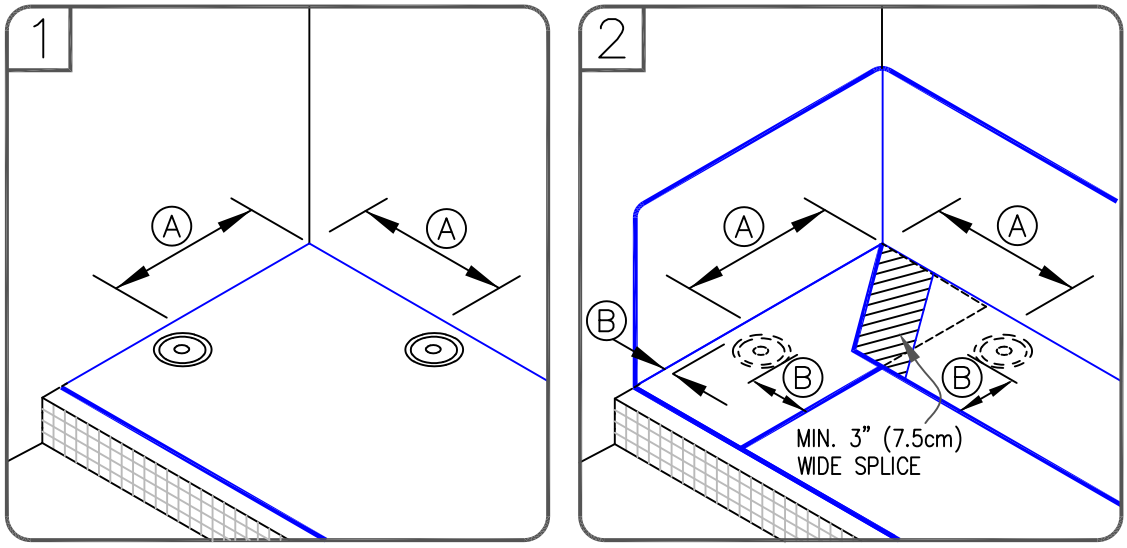
CARLISLE SYNTEC SYSTEMS

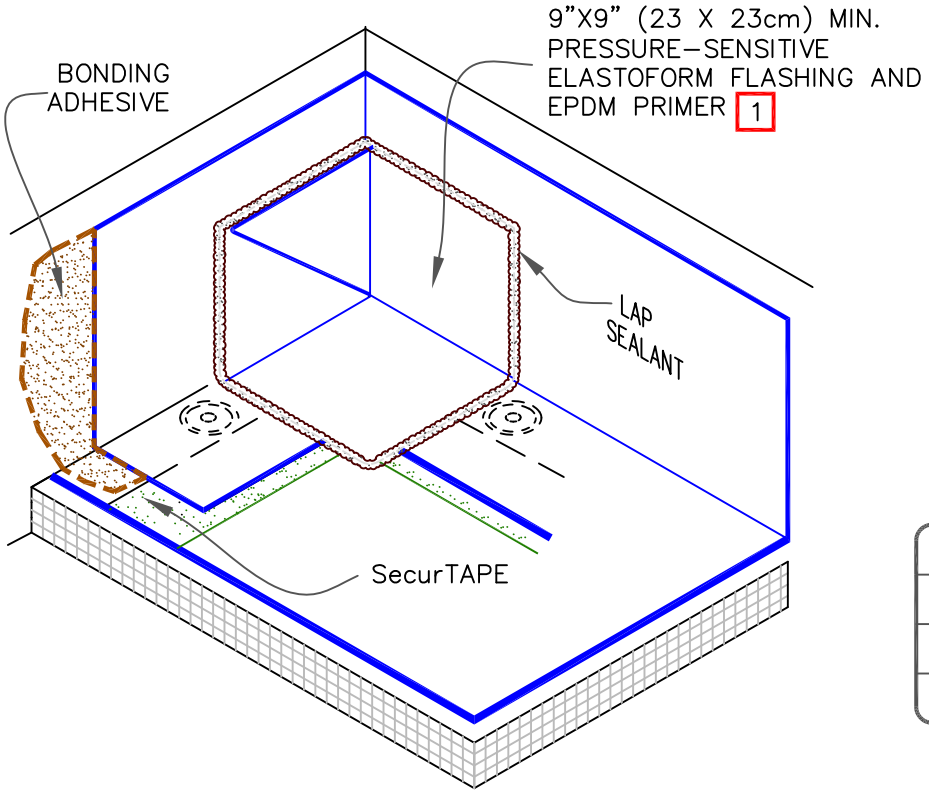
INSIDE CORNER WITH CONTINUOUS EPDM WALL FLASHING

MAXIMUM WARRANTY: 20 YEARS. SEE NOTE 2

DETAIL NO. U-15C

U (UNIVERSAL DETAIL)





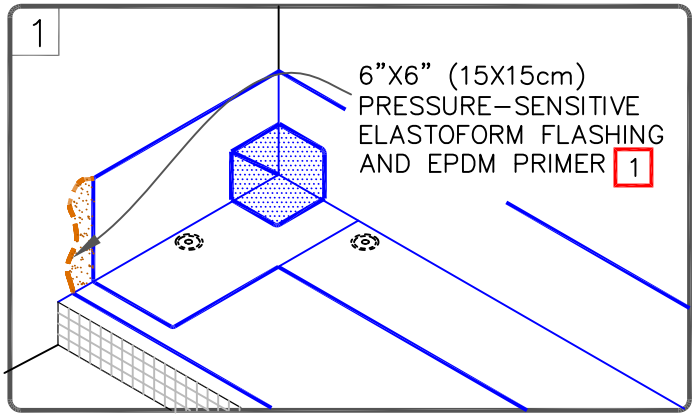
DIMENSIONS		cm	
A	6"	15	TO
	9"	23	
B	3"	7.5	

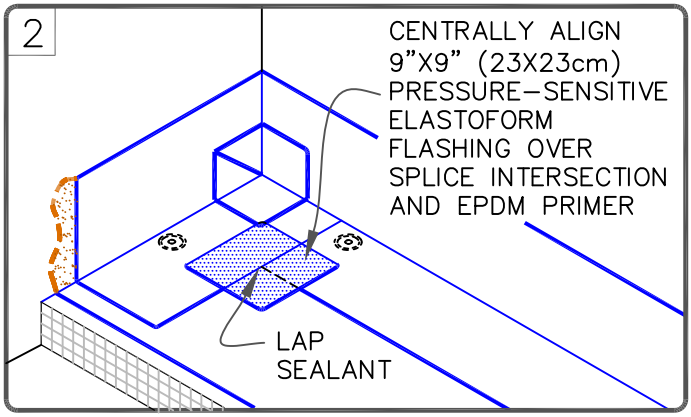
NOTES:

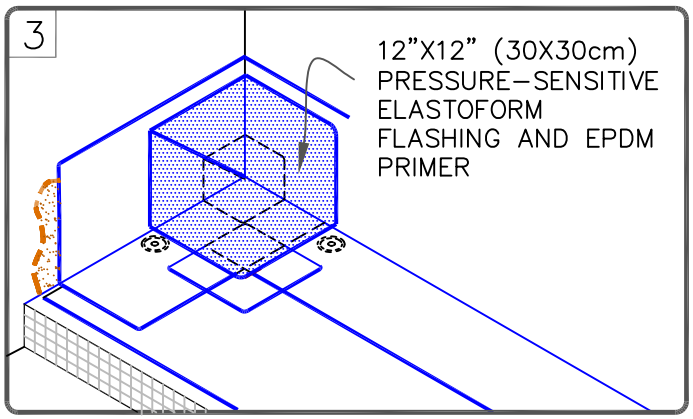
1. A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING IN COLDER TEMPERATURES.

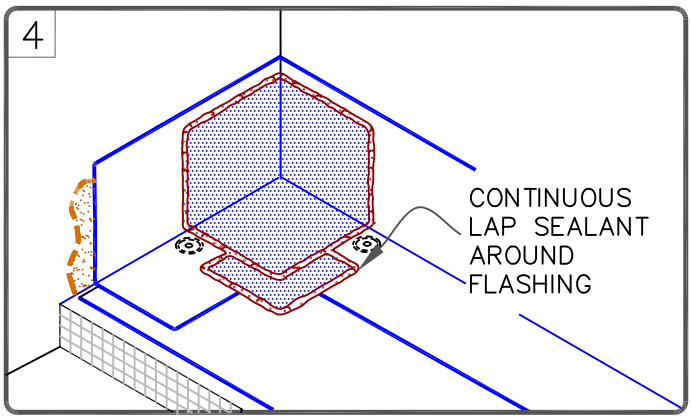
2. FOR PROJECTS WITH 25 & 30-YEAR WARRANTIES OR WHEN USING 90-MIL MEMBRANE, REFER TO DETAIL U-15D.1 FOR REQUIRED FLASHING ENHANCEMENTS.

CARLISLE SYNTEC SYSTEMS	INSIDE CORNER WITH SEPARATE EPDM WALL FLASHING	EPDM	DETAIL NO. U-15D
	MAXIMUM WARRANTY: 20 YEARS. SEE NOTE 2		U (UNIVERSAL DETAIL)







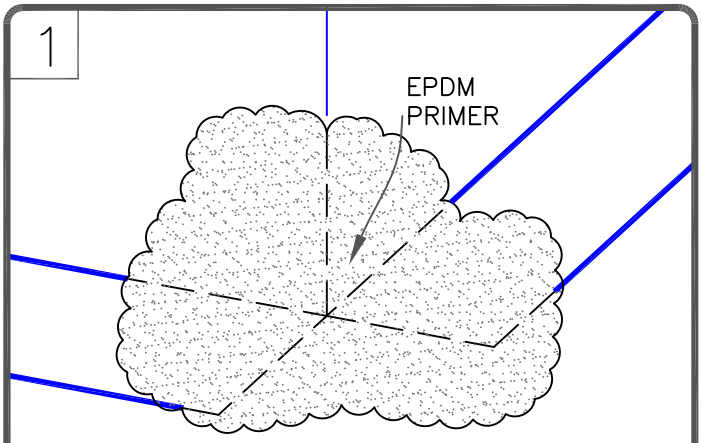


NOTES:

1. A 7"X9" (17.5cm X 23cm) PRESSURE-SENSITIVE PRE-CUT INSIDE/OUTSIDE CORNER MAY BE CUT DOWN TO 6" X 6" (7.5cm X 7.5cm).
2. A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING IN COLDER TEMPERATURES.
3. APPLY PRIMER AND SecurTAPE TO ADHERE PIG EAR TO THE WALL.

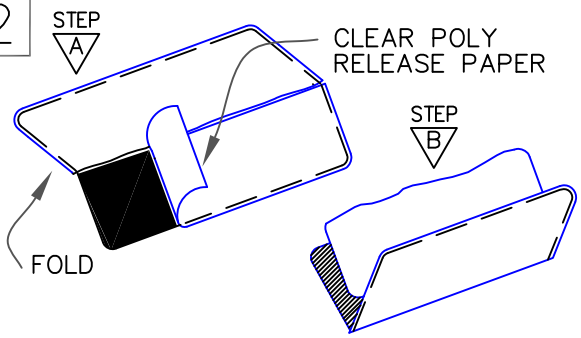
CARLISLE SYNTEC SYSTEMS	INSIDE CORNER FLASHING FOR PROJECTS WITH 90-MIL MEMBRANE OR 30 YEAR WARRANTIES	EPDM	DETAIL NO. U-15D.1
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

1



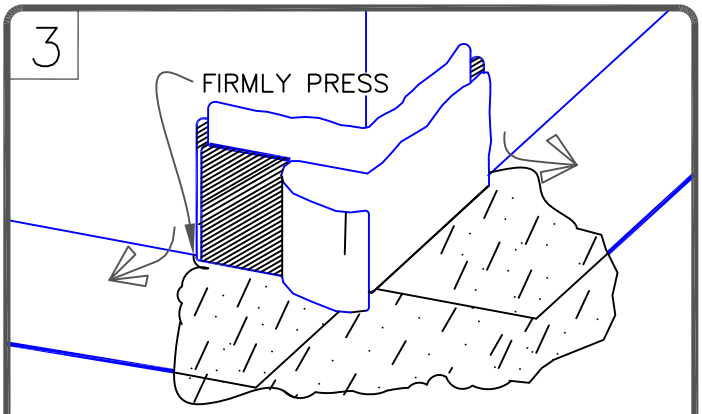
CLEAN EPDM SPLICE AREA PRIOR TO APPLYING EPDM PRIMER.

2



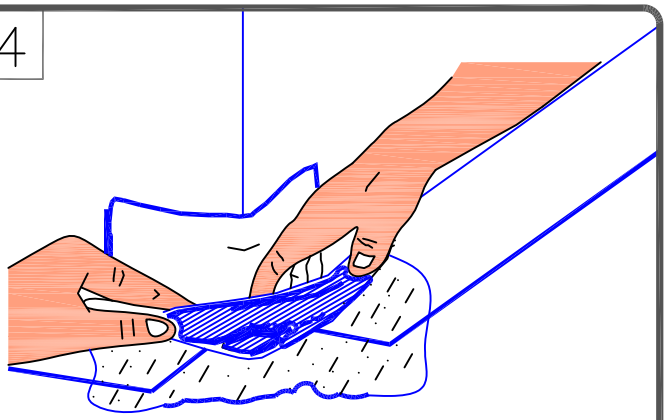
PRIOR TO PLACEMENT OF SURE-SEAL CORNER, PEEL OFF THE BLUE POLY RELEASE FILM AND HEAT THE FLASHING SIDE WITH A HEAT GUN. RE-APPLY THE POLY LOOSELY. FOLD THE FLASHING IN HALF.

3



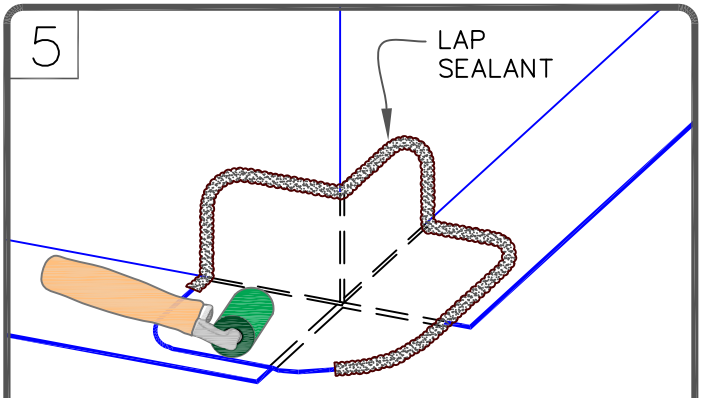
PLACE SURE-SEAL INSIDE/OUTSIDE CORNER AS SHOWN AND REMOVE RELEASE PAPER. PRESS FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING AGAINST THE VERTICAL SURFACE.

4



PLACE FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING ONTO THE DECK FLANGE BY PRESSING THE FLASHING AGAINST THE HORIZONTAL SURFACE.

5



ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGE.

NOTE:

1. FOR PROJECTS WITH 25 & 30-YEAR WARRANTIES OR WHEN USING 90-MIL MEMBRANE, REFER TO DETAIL U-15G.1 FOR REQUIRED FLASHING ENHANCEMENTS.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH PRE-CUT PRESSURE-SENSITIVE CORNER

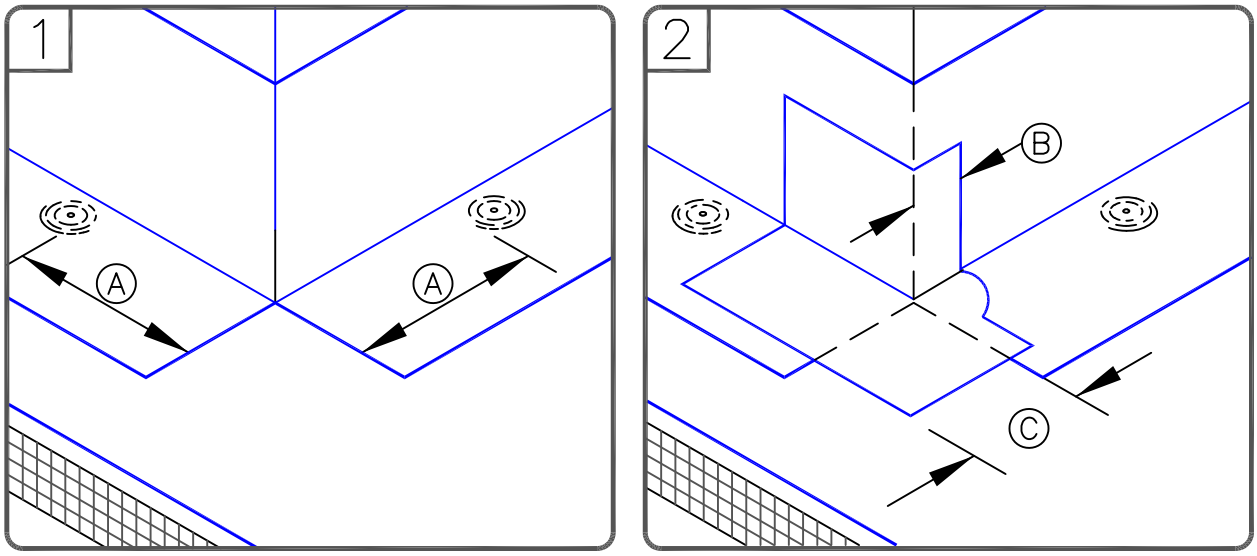
MAXIMUM WARRANTY: 20 YEARS. SEE NOTE 1

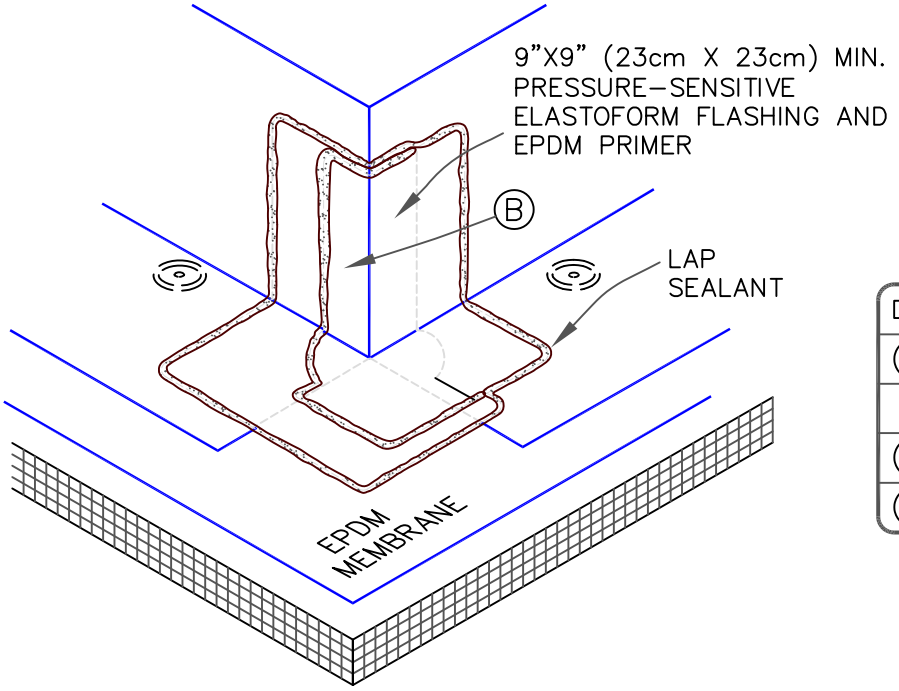
EPDM

DETAIL NO.

U-15E

U (UNIVERSAL DETAIL)





DIMENSIONS		cm	
A	6"	15	TO
	9"	23	
B	2"	5	MIN.
C	3"	7.5	MAX.

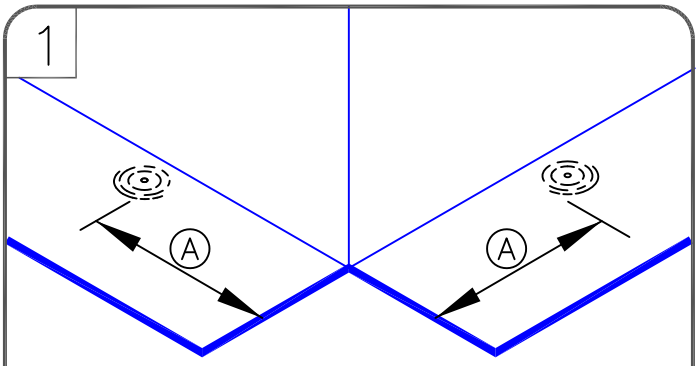
NOTES:

1. A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING IN COLDER TEMPERATURES.

2. FOR PROJECTS WITH 30-YEAR WARRANTY OR WHEN USING 90-MIL MEMBRANE, REFER TO DETAIL U-15G.1 FOR REQUIRED FLASHING ENHANCEMENTS.

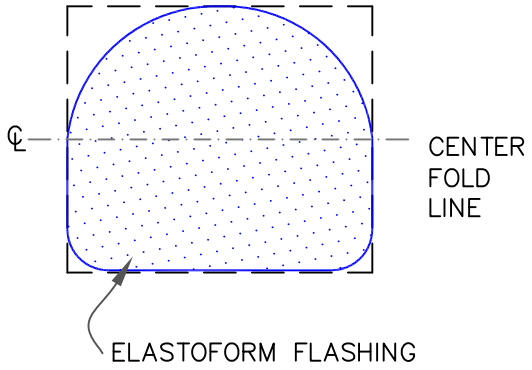
CARLISLE SYNTEC SYSTEMS	OUTSIDE CORNER WITH PRESSURE-SENSITIVE ELASTOFORM FLASHING (2 PIECE)	EPDM	DETAIL NO. U-15F
	MAXIMUM WARRANTY: 25 YEARS		U (UNIVERSAL DETAIL)

1



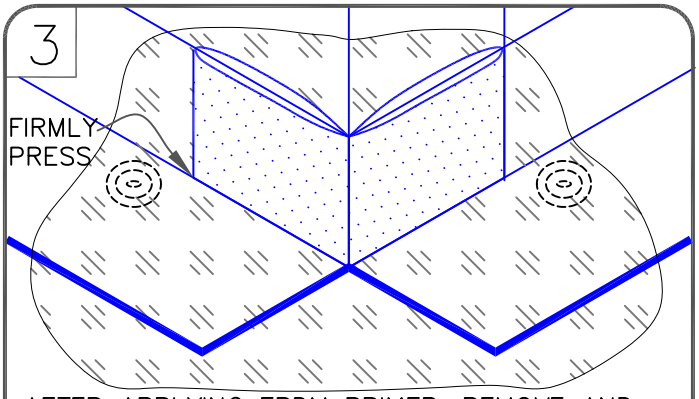
FASTEN MEMBRANE AND FLASH CURB OR WALL WITH CURED EPDM MEMBRANE FOLLOWING STANDARD PROCEDURES USING BONDING ADHESIVE and SecurTAPE.

2



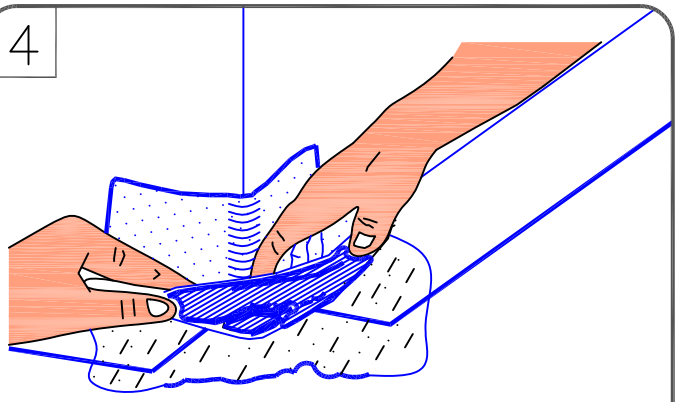
CUT A 9"x9" (23cm x 23cm) SECTION OF PRESSURE–SENSITIVE ELASTOFORM FLASHING AND MAKE ROUNDED CORNERS AS SHOWN.

3



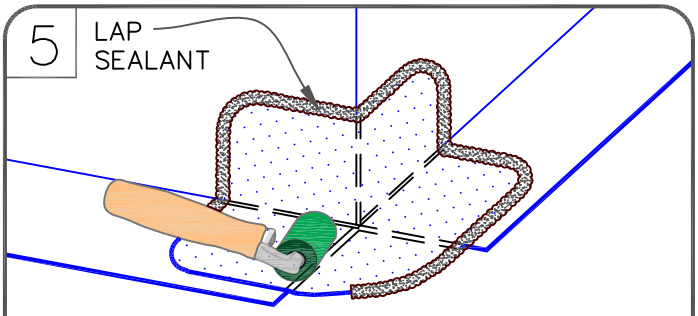
AFTER APPLYING EPDM PRIMER, REMOVE AND REPLACE POLY BACKING. FOLD FLASHING IN HALF WITH ROUNDED PORTION TURNED UP. CENTER FLASHING ON CORNER AND FIRMLY PRESS AGAINST VERTICAL SURFACE.

4



ROLL AND CREASE FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY ROLL FLASHING ONTO THE DECK MEMBRANE.

5



AFTER ADHERING, ROLL WITH A TWO INCH WIDE STEEL HAND ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES.

DIMENSIONS		cm	
Ⓐ	6"	15	TO
	9"	23	

NOTES:

1. FOR PROJECTS WITH 25 & 30–YEAR WARRANTIES OR WHEN USING 90–MIL MEMBRANE, REFER TO DETAIL U–15G.1 FOR REQUIRED FLASHING ENHANCEMENTS.

2. A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING IN COLDER TEMPERATURES.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH PRESSURE–SENSITIVE ELASTOFORM FLASHING (1 PIECE)

MAXIMUM WARRANTY: 20 YEARS. SEE NOTE 1

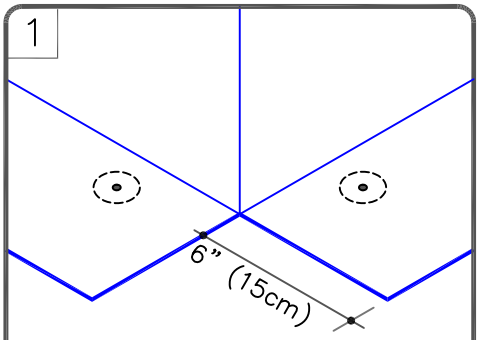
EPDM

DETAIL NO.

U–15G

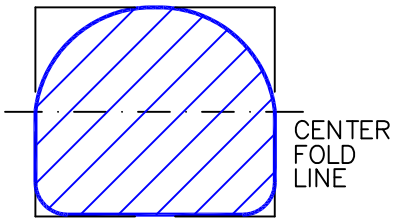
U (UNIVERSAL DETAIL)

1



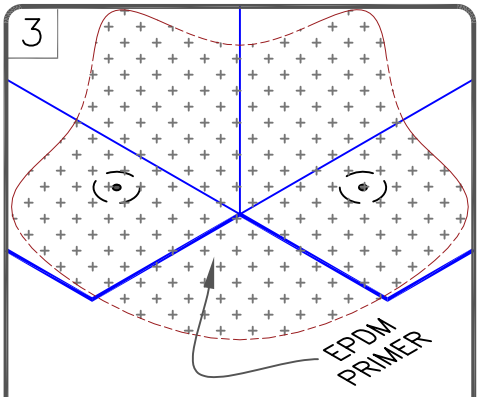
FASTEN MEMBRANE AND FLASH CURB OR WALL WITH CURED EPDM MEMBRANE FOLLOWING STANDARD PROCEDURES.

2



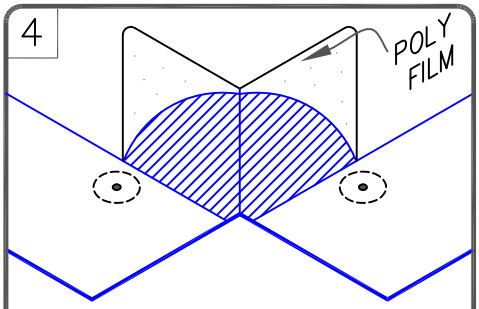
USE PRE–CUT T–JOINT COVERS OR CUT A 6"x6" (15X15cm) & 12"x12" (30X30cm) SECTION OF PRESSURE– SENSITIVE ELASTOFORM FLASHING AND ROUND CORNERS

3



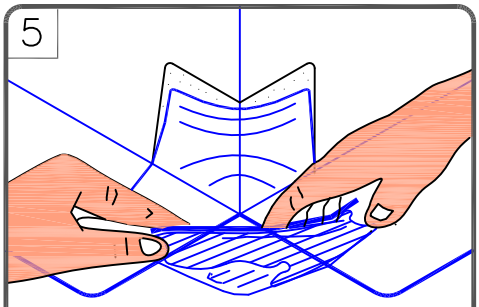
CLEAN EPDM SPLICE AREA WITH WEATHERED MEMBRANE CLEANER PRIOR TO APPLYING EPDM PRIMER

4



REMOVE & REPLACE POLY BACKING ON FLASHING. FOLD FLASHING IN HALF WITH ROUNDED PORTION TURNED UP. CENTER ON CORNER & FIRMLY PRESS AGAINST VERTICAL SURFACE

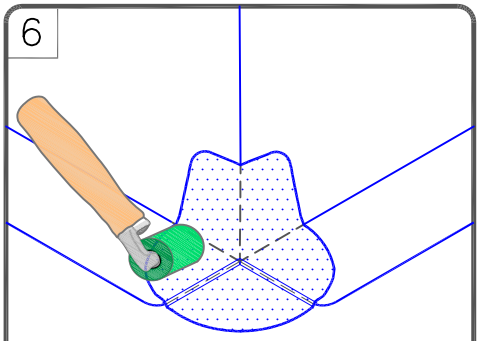
5



ROLL & CREASE FLASHING TIGHTLY INTO ANGLE CHANGE & FIRMLY ROLL FLASHING ONTO THE DECK MEMBRANE

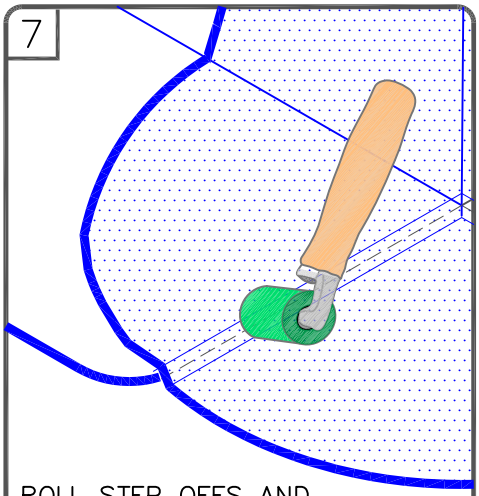
USE HEAT GUN TO WARM THE FLASHING IN COLD WEATHER

6



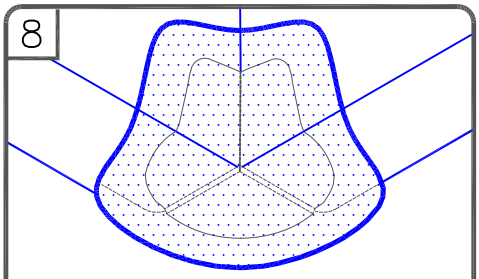
ROLL WITH A TWO INCH WIDE STEEL HAND ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES

7



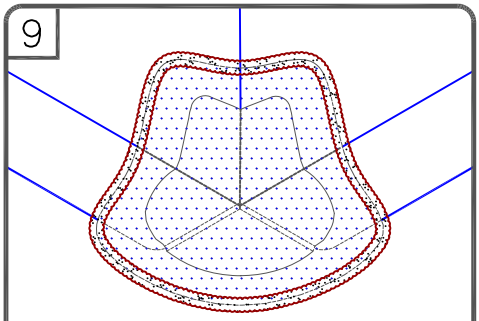
ROLL STEP OFFS AND ANGLE CHANGES

8



APPLY EPDM PRIMER TO SPLICE AREA. INSTALL THE 12"X12" (30cmX30cm) SECTION OF PRESSURE– SENSITIVE ELASTOFORM FLASHING CENTERED OVER PREVIOUSLY APPLIED FLASHING.

9



SEAL ALL EDGES WITH LAP SEALANT AS SHOWN

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER FLASHING FOR PROJECTS WITH 90–MIL MEMBRANE OR 30 YEAR WARRANTIES

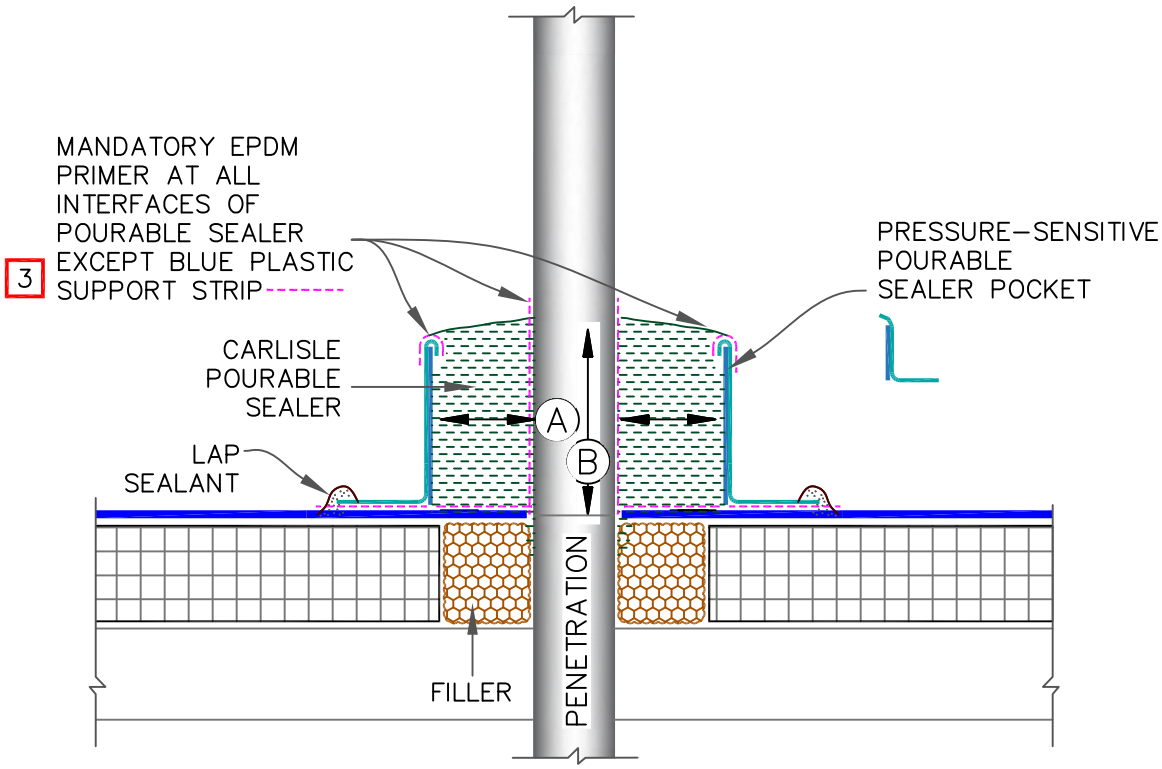
MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO.

U–15G.1

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE–SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY–FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF–8A) REGARDLESS OF SIZE OR DIAMETER.
8. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

CARLISLE SYNTEC SYSTEMS

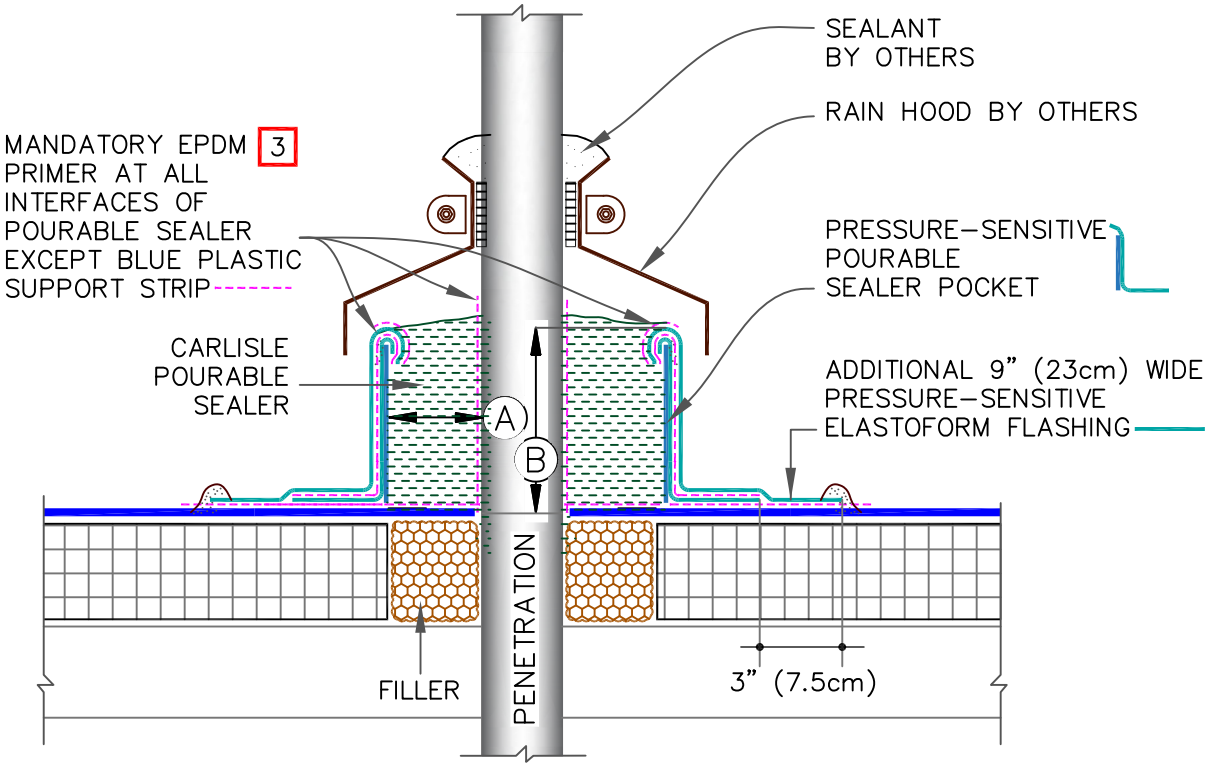
PRESSURE–SENSITIVE POURABLE SEALER POCKET

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.

U–16A

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE OR DIAMETER.
8. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

CARLISLE SYNTEC SYSTEMS

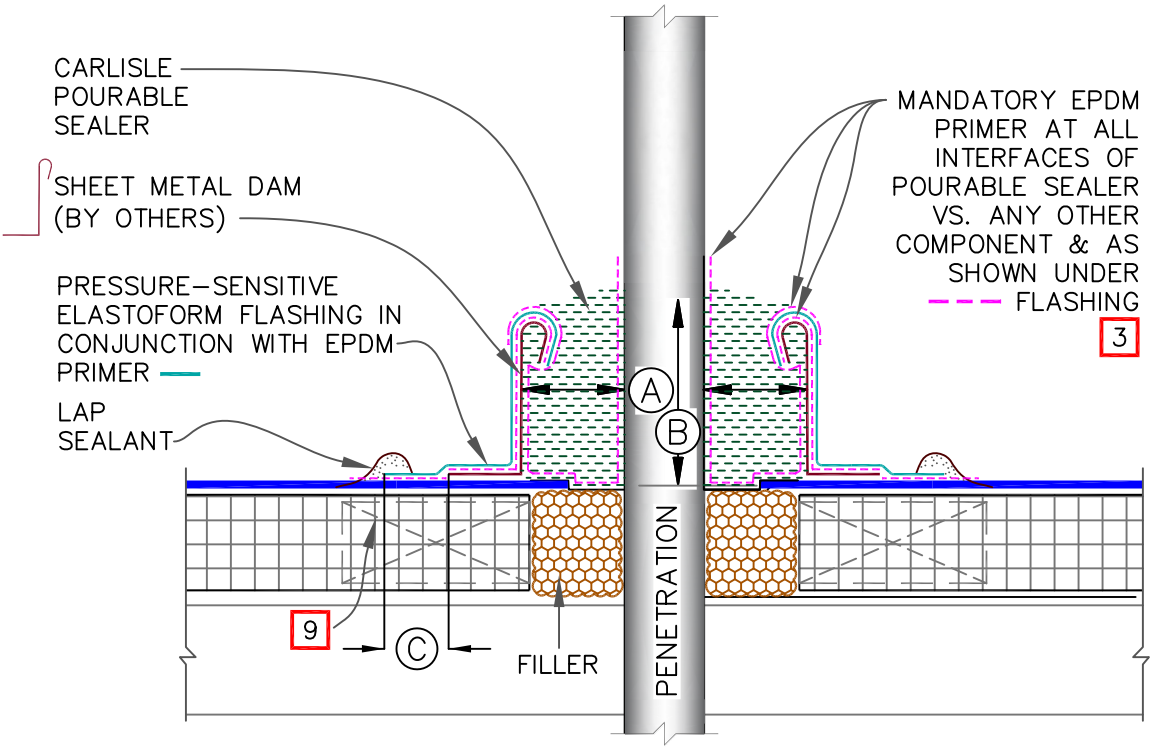
PRESSURE-SENSITIVE POURABLE SEALER POCKET

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

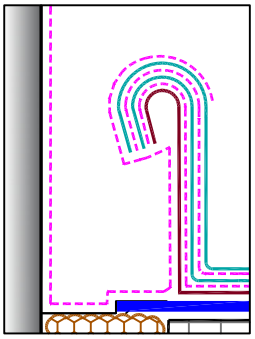
U-16A.1

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE AND DIAMETER, UNLESS WOOD NAILERS ARE PRESENT.
8. DECK FLANGE MUST BE CONTINUOUS WITH ROUNDED CORNERS.
9. WHEN ANY ONE SIDE OF THE FIELD FABRICATED POURABLE SEALER POCKET EXCEEDS 12" (30cm), USE WOOD BLOCKING TO ANCHOR SHEET METAL.
10. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER VS. ANY OTHER COMPONENT & AS SHOWN UNDER FLASHING

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.
C	3"	7.5	

CARLISLE SYNTEC SYSTEMS

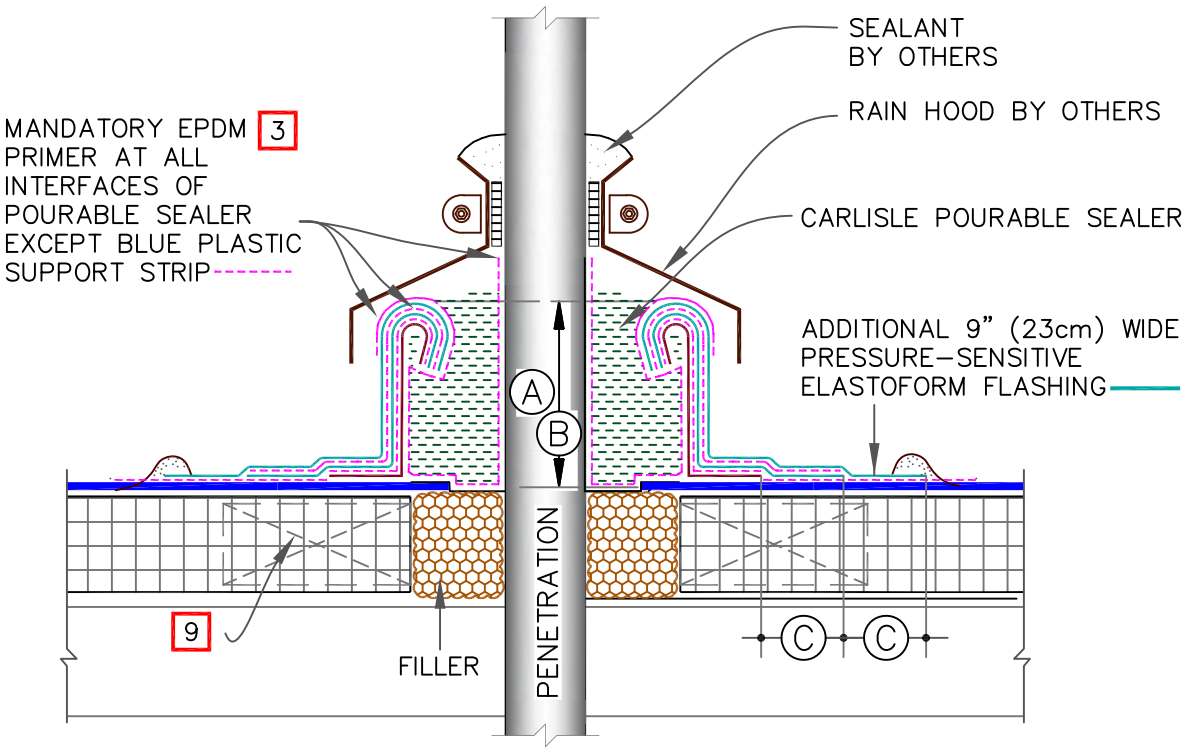
FIELD FABRICATED POURABLE SEALER POCKET

MAXIMUM WARRANTY: 20 YEARS

EPDM

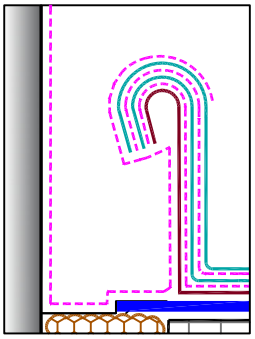
DETAIL NO. U-16B

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE AND DIAMETER, UNLESS WOOD NAILERS ARE PRESENT.
8. DECK FLANGE MUST BE CONTINUOUS WITH ROUNDED CORNERS.
9. WHEN ANY ONE SIDE OF THE FIELD FABRICATED POURABLE SEALER POCKET EXCEEDS 12" (30cm), USE WOOD BLOCKING TO ANCHOR SHEET METAL.
10. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER VS. ANY OTHER COMPONENT & AS SHOWN UNDER FLASHING

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.
C	3"	7.5	

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED POURABLE SEALER POCKET

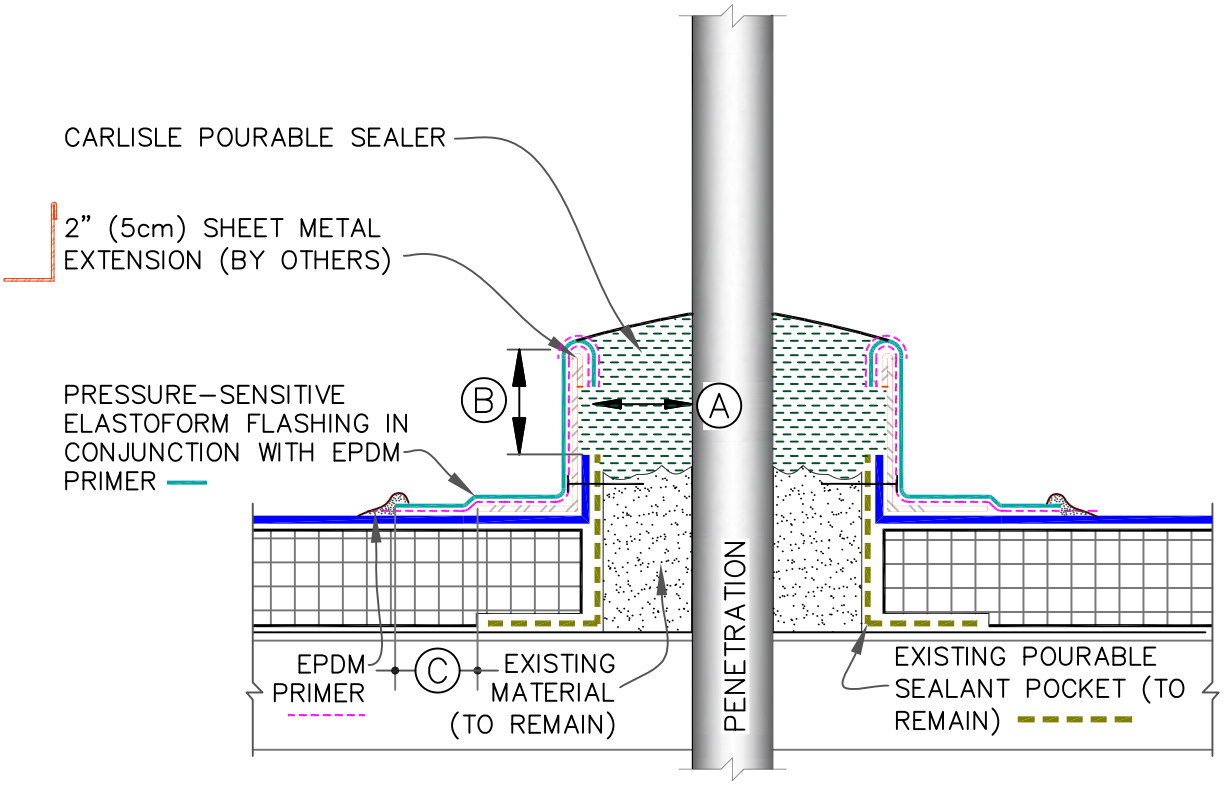
MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO.

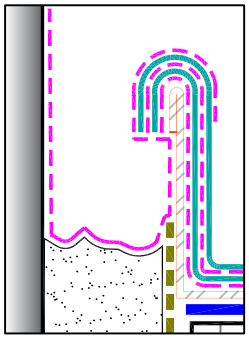
U-16B.1

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING.
6. SHAPE METAL DAM TO FIT EXISTING PITCH POCKET.
7. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
8. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE OR DIAMETER.
9. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.
C	3"	7.5	

CARLISLE SYNTEC SYSTEMS

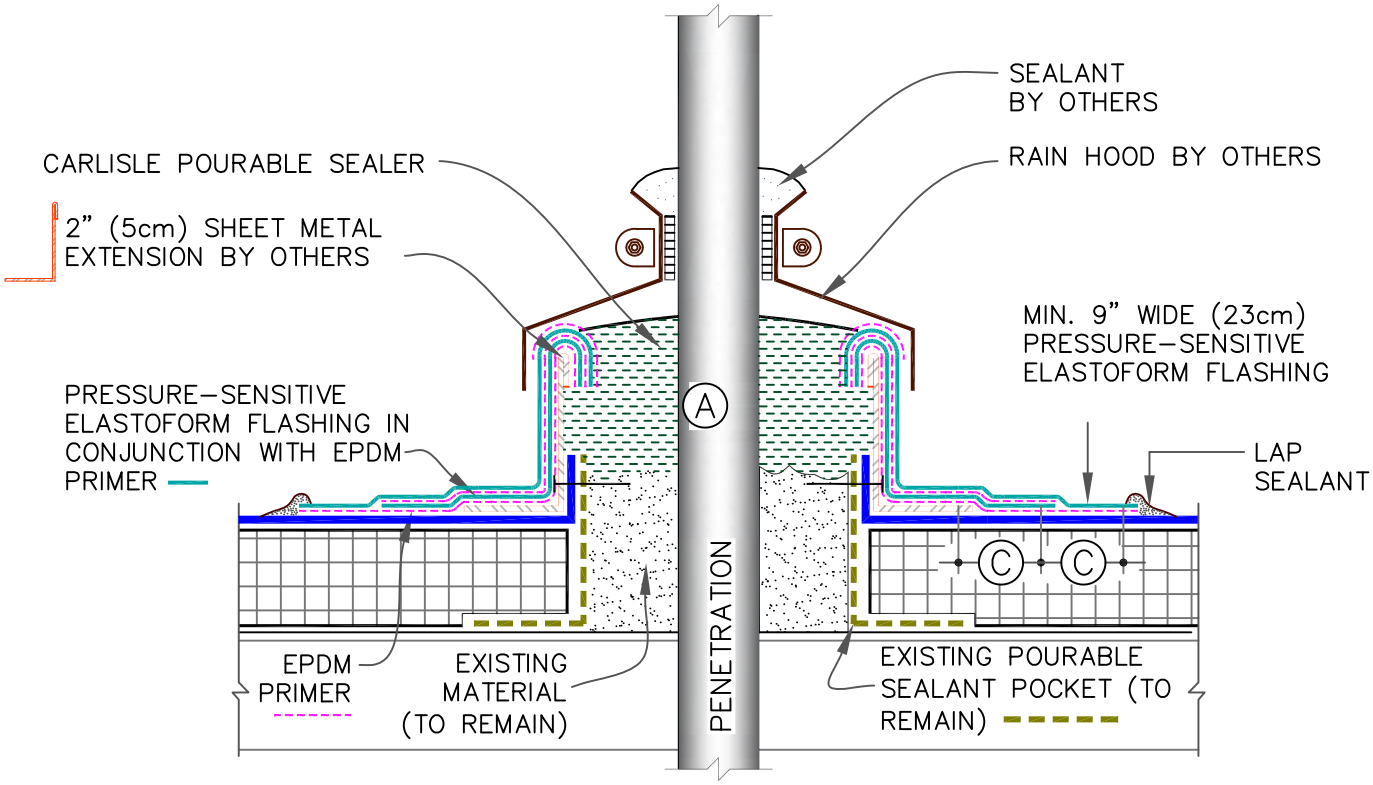
EXTENDED POURABLE SEALER POCKET

MAXIMUM WARRANTY: 20 YEARS

EPDM

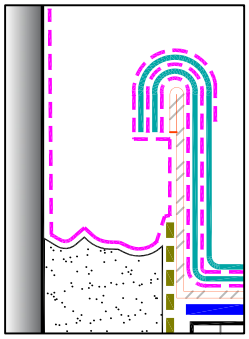
DETAIL NO. U-16C

U (UNIVERSAL DETAIL)



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. ALL SURFACES MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING.
6. SHAPE METAL DAM TO FIT EXISTING PITCH POCKET.
7. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
8. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE OR DIAMETER.
9. MINIMUM 1" (2.5cm) CLEARANCE REQUIRED BETWEEN PENETRATIONS.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.
C	3"	7.5	

CARLISLE SYNTEC SYSTEMS

EXTENDED POURABLE SEALER POCKET

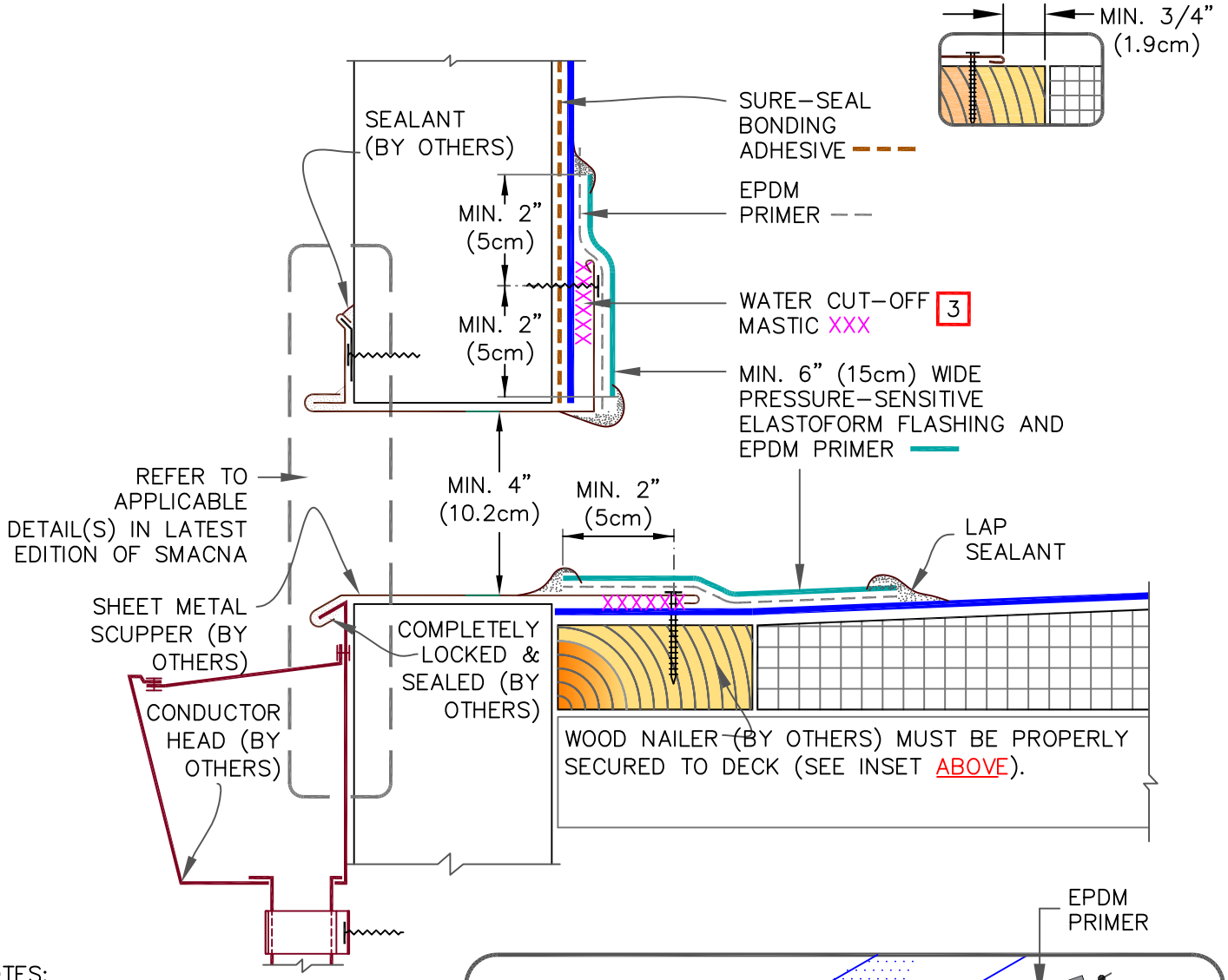
MAXIMUM WARRANTY: 30 YEARS

EPDM

DETAIL NO.

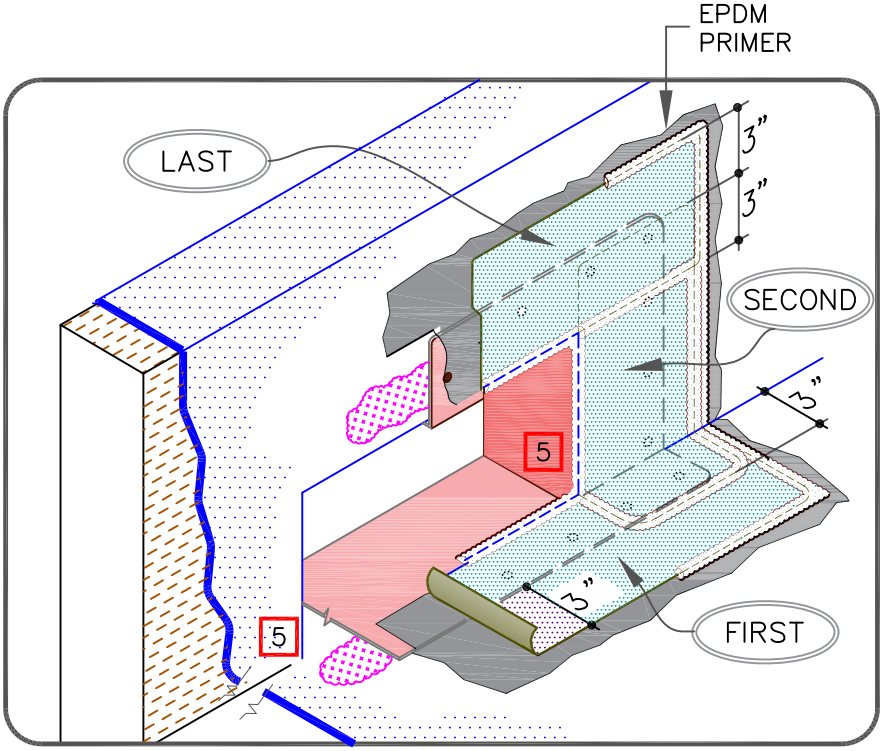
U-16C.1

U (UNIVERSAL DETAIL)



NOTES:

1. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS. SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
2. INSTALL U-15 CORNERS IF SCUPPER BOX DOES NOT HAVE A CONTINUOUS FLANGE.
3. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. CLEAN METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; AND ALLOW TO DRY.
5. SCUPPERS WITHOUT A CONTINUOUS WATERTIGHT DESIGN MUST BE FLASHED IN PER DETAIL U-15 OUTSIDE CORNER.



CARLISLE SYNTEC SYSTEMS

SCUPPER: SINGLE LAYER FLASHING

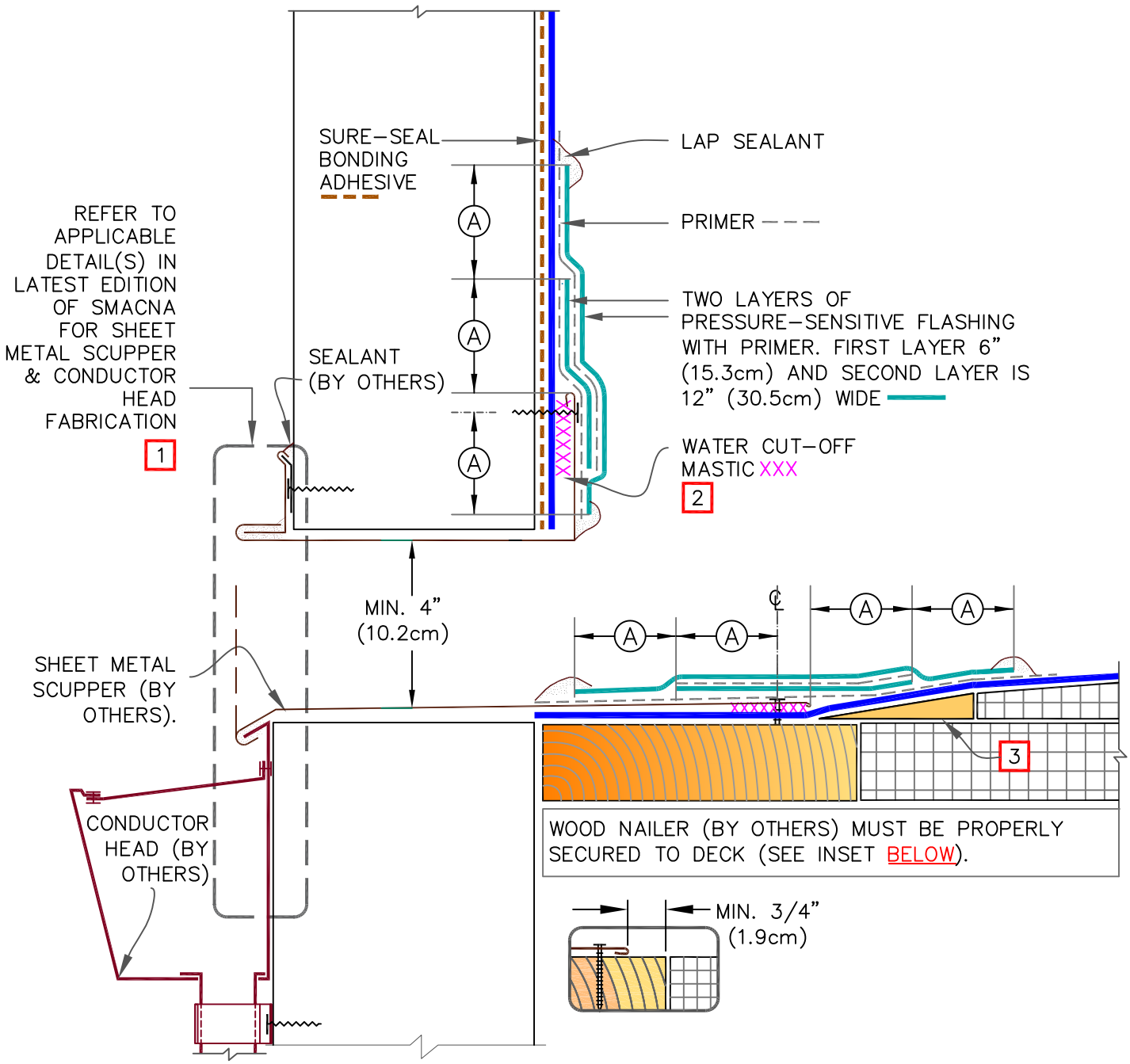
MAXIMUM WARRANTY: 25 YEARS

EPDM

DETAIL NO.

U-18A

U (UNIVERSAL DETAIL)



NOTES:

1. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS AIR & WATER-TIGHT.
2. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
3. TAPERED EDGE STRIP BY HUNTER OR CANT STRIP, AS REQUIRED & SET IN ADHESIVE OR SHAVE THE EDGES OF TAPERED INSULATION.

DIMENSIONS		cm	
(A)	2"	5	MIN.
(B)	3"	7.6	MIN.

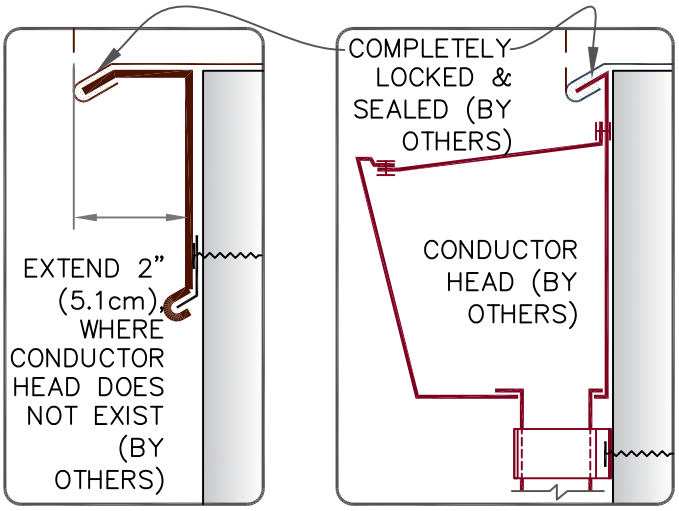
CARLISLE SYNTEC SYSTEMS

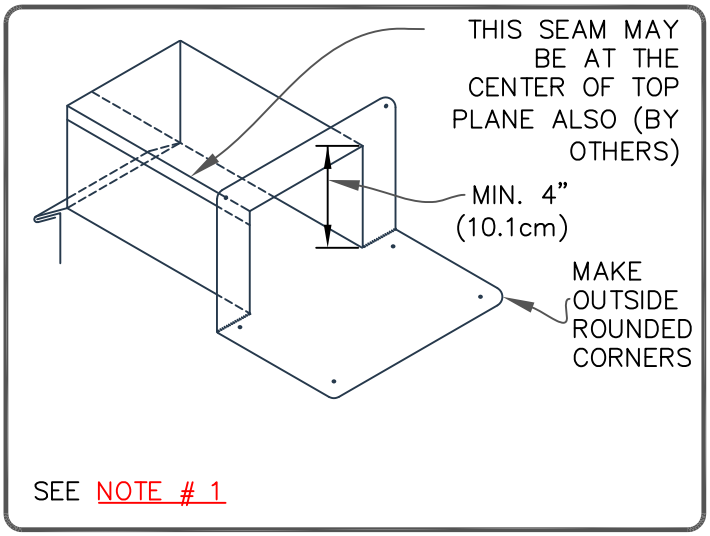
SCUPPER: DOUBLE LAYERS FLASHING
PAGE 1 OF 2

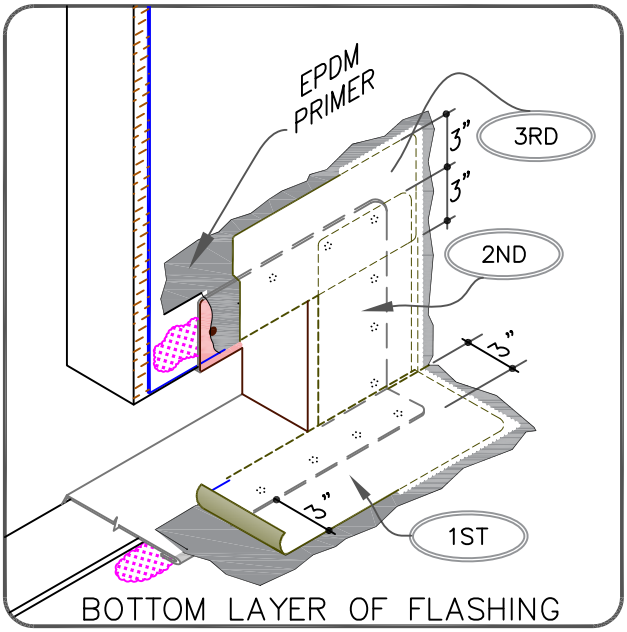
MAXIMUM WARRANTY: 30 YEARS

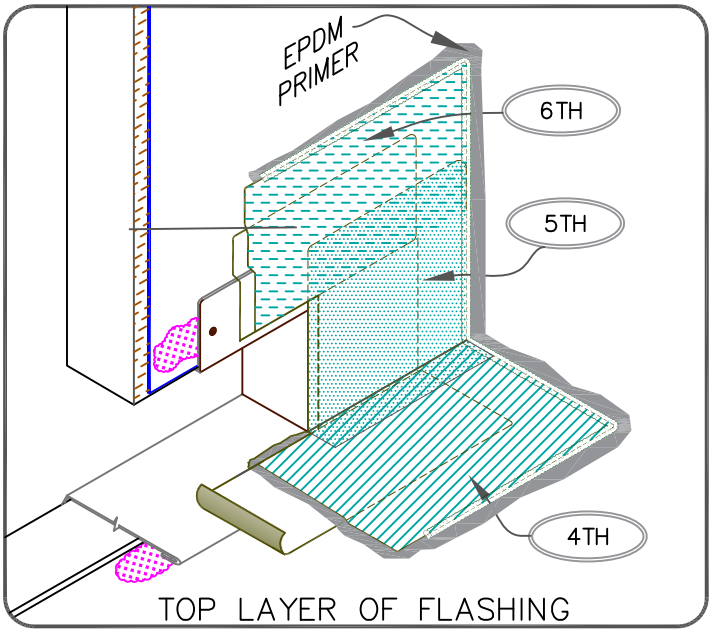
EPDM

DETAIL NO.
U-18A.1
U (UNIVERSAL DETAIL)

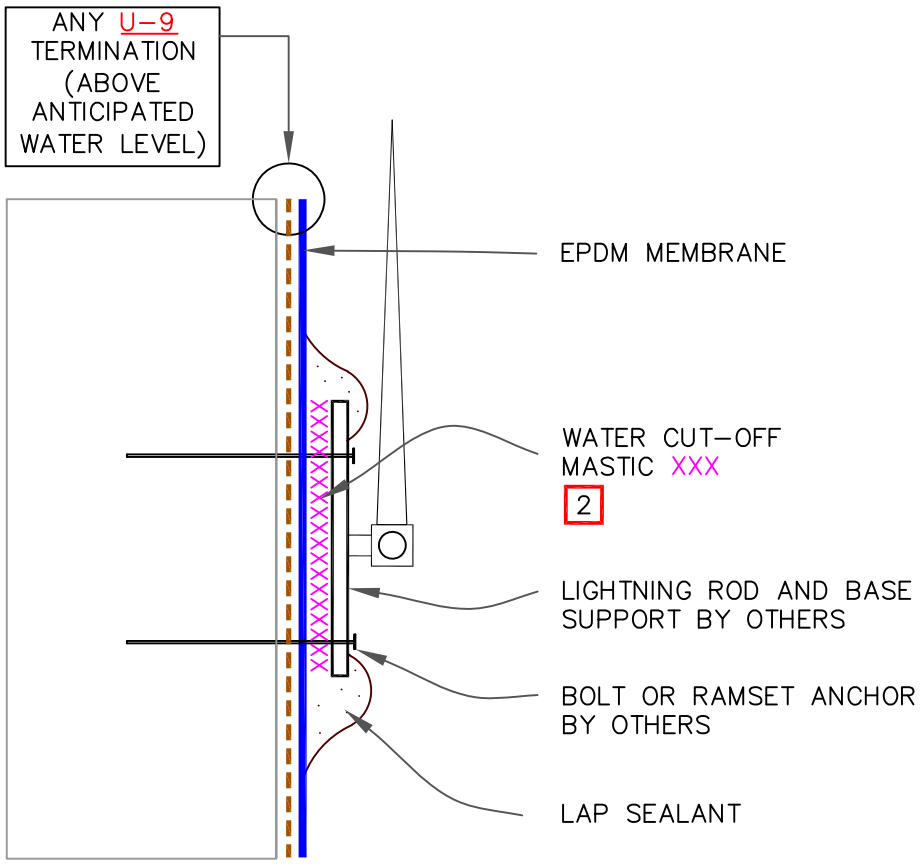








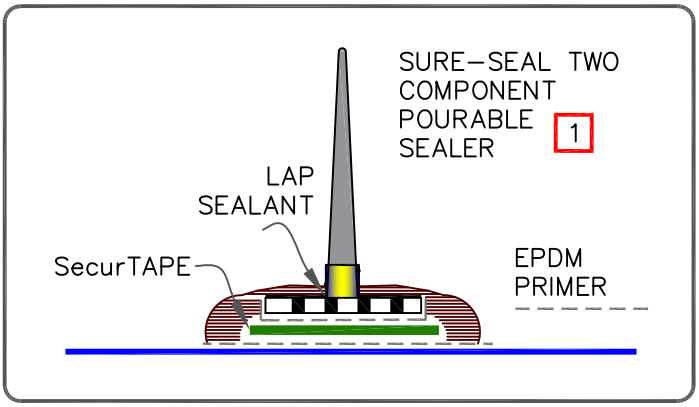
CARLISLE SYNTEC SYSTEMS	SCUPPER: DOUBLE LAYERS FLASHING PAGE 2 OF 2	EPDM	DETAIL NO. U–18A.1
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



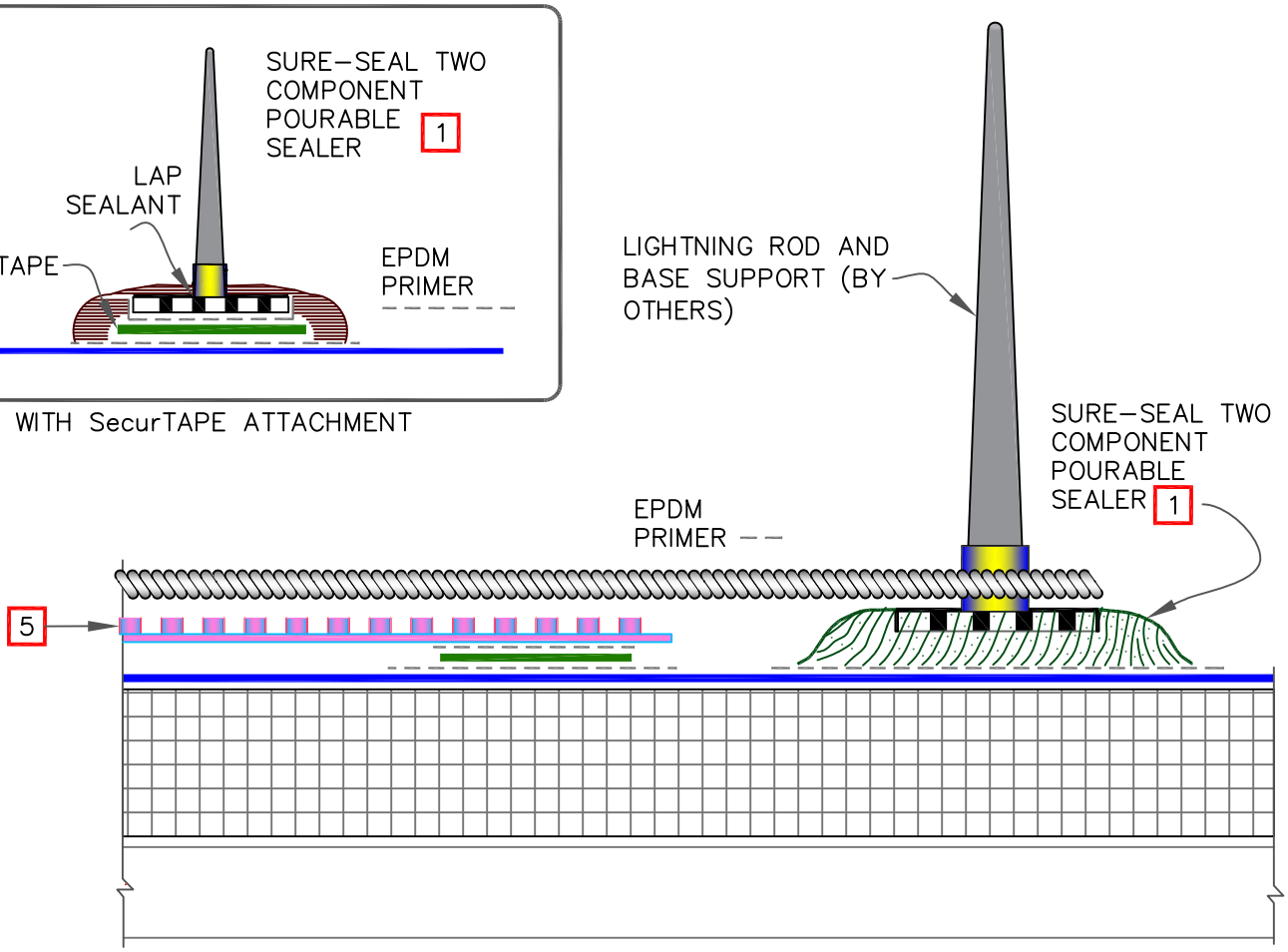
NOTES:

1. DETAIL MAY BE USED FOR ANY FASTENER PENETRATION (E.G., ACCESS LADDER, ANCHOR SUPPORT TO PARAPET).
2. WATER CUT-OFF MASTIC MUST BE UNDER CONSTANT COMPRESSION.
3. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.
4. DETAIL UNACCEPTABLE FOR HORIZONTAL APPLICATIONS ON ROOF DECK.

CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT PARAPET (VERTICAL ATTACHMENT)	EPDM	DETAIL NO. U-20A
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



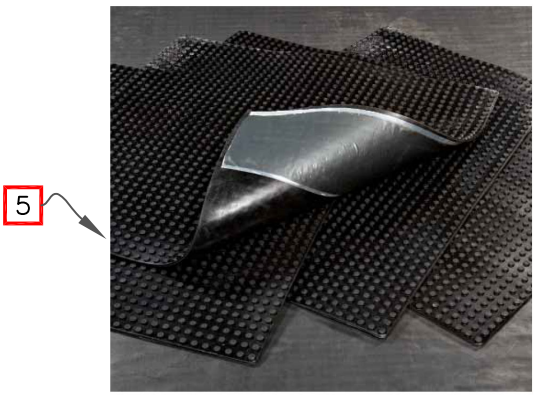
OPTION WITH SecurTAPE ATTACHMENT



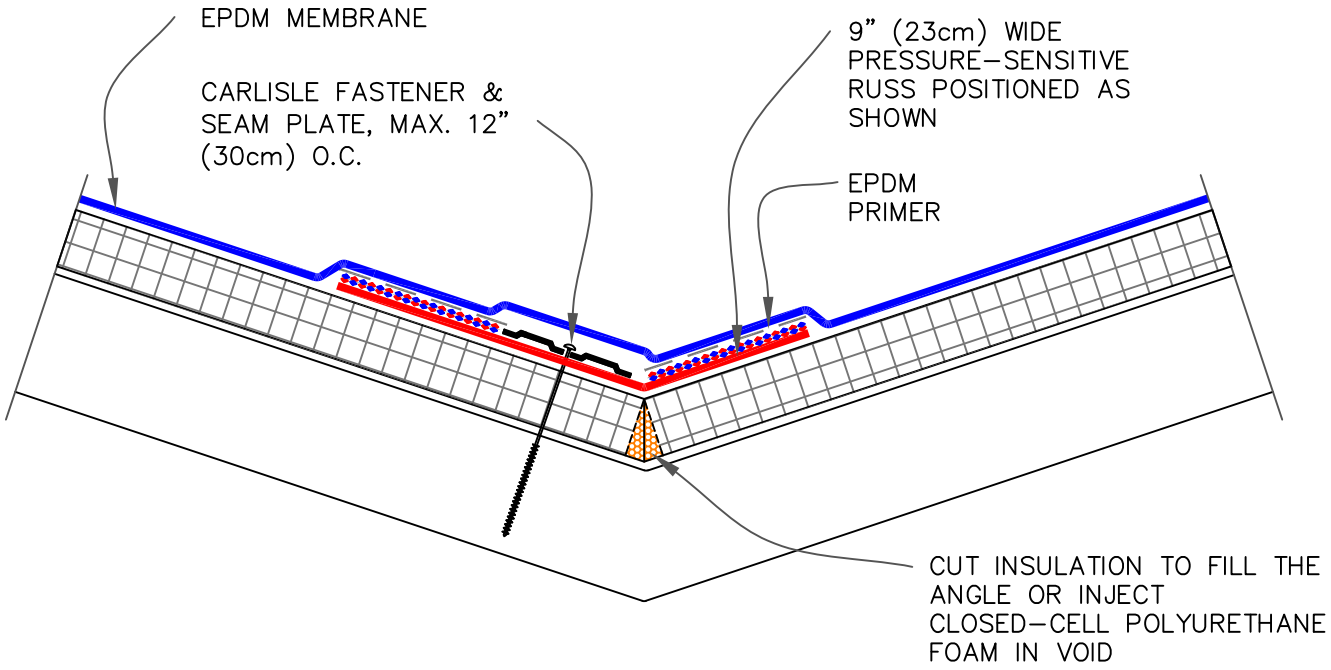
EXAMPLE: BRAIDED WIRE IN CERTAIN COUNTRIES

NOTES:

1. SURE-SEAL TWO COMPONENT POURABLE SEALER WITH EPDM PRIMER, OR UNIVERSAL SINGLE-PLY SEALANT.
2. CLEAN EXPOSED MEMBRANE WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.
3. PRIOR TO THE APPLICATION OF POURABLE SEALER, APPLY EPDM PRIMER TO THE MEMBRANE AND LIGHTNING ROD BASE ACHIEVING A VERY THIN EVEN COAT ON BOTH SURFACES. ALLOW PRIMER TO DRY UNTIL IT IS TACK FREE.
4. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.
5. PIECES OF WALKWAY PADS MAY BE INSTALLED UNDERNEATH THE BRAIDED WIRES. ENSURE, WATER FLOW IS NOT RESTRICTED AND PROVIDE PROPER GAPS.



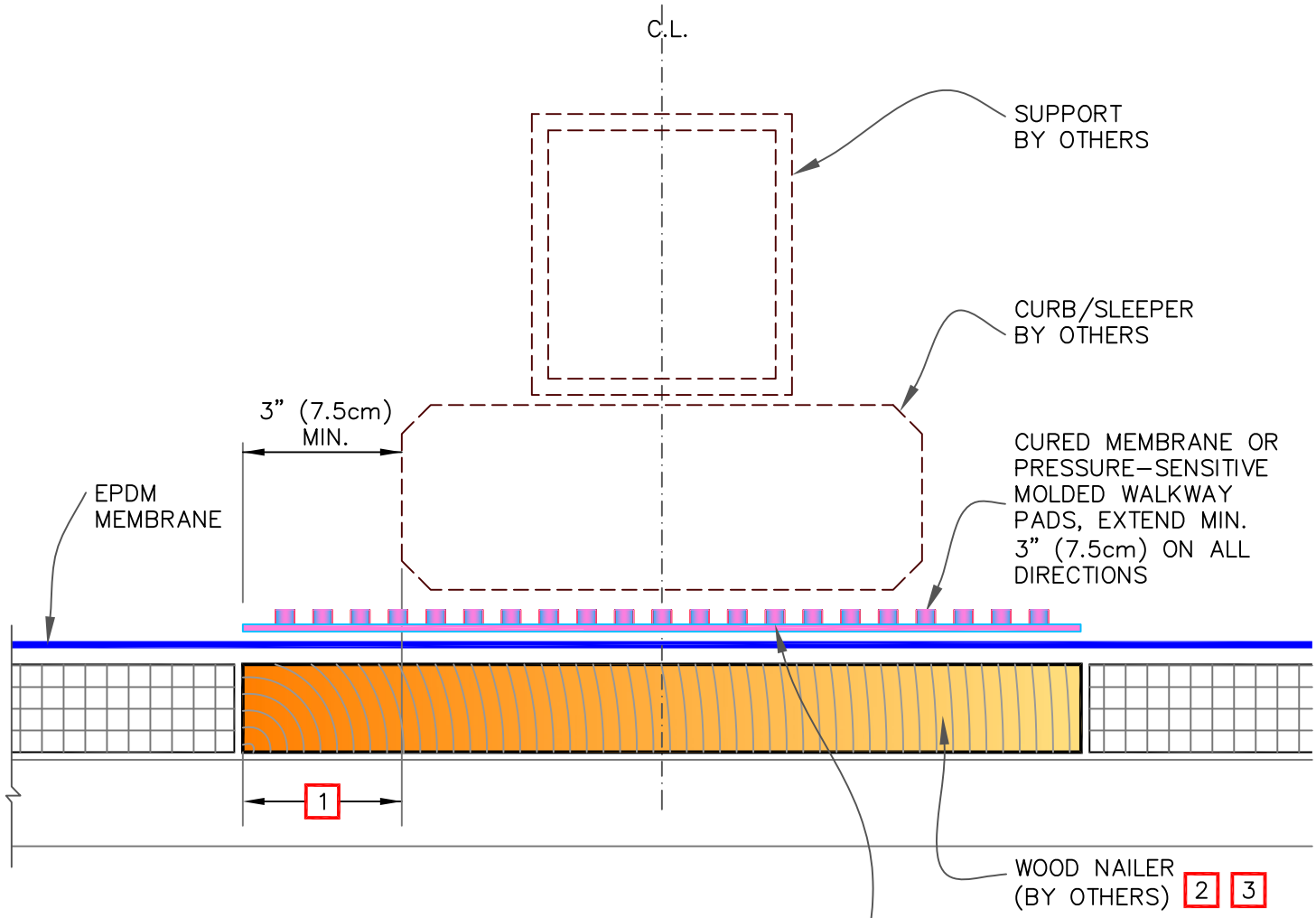
CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT DECK LEVEL	DETAIL NO. U-20B
	MAXIMUM WARRANTY: 30 YEARS	U (UNIVERSAL DETAIL)



NOTES:

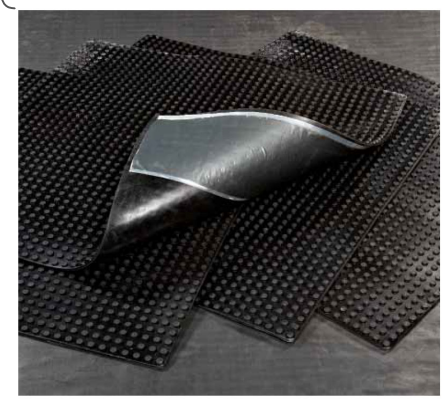
1. DETAIL FOR SURE-SEAL/SURE-WHITE ADHERED AND SURE-TOUGH MECHANICALLY-FASTENED ROOFING SYSTEMS WHEN SLOPE AT VALLEY EXCEEDS 2" (5cm) IN ONE HORIZONTAL FOOT.
2. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, HP FASTENERS AND POLYMER SEAMS ARE REQUIRED OVER STEEL DECKS.
3. EPDM PRIMER MUST BE APPLIED TO BACK SIDE OF DECK MEMBRANE PRIOR TO COMPLETING SPLICE TO PRESSURE-SENSITIVE RUSS.

CARLISLE SYNTEC SYSTEMS	VALLEY	EPDM	DETAIL NO. U-22
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

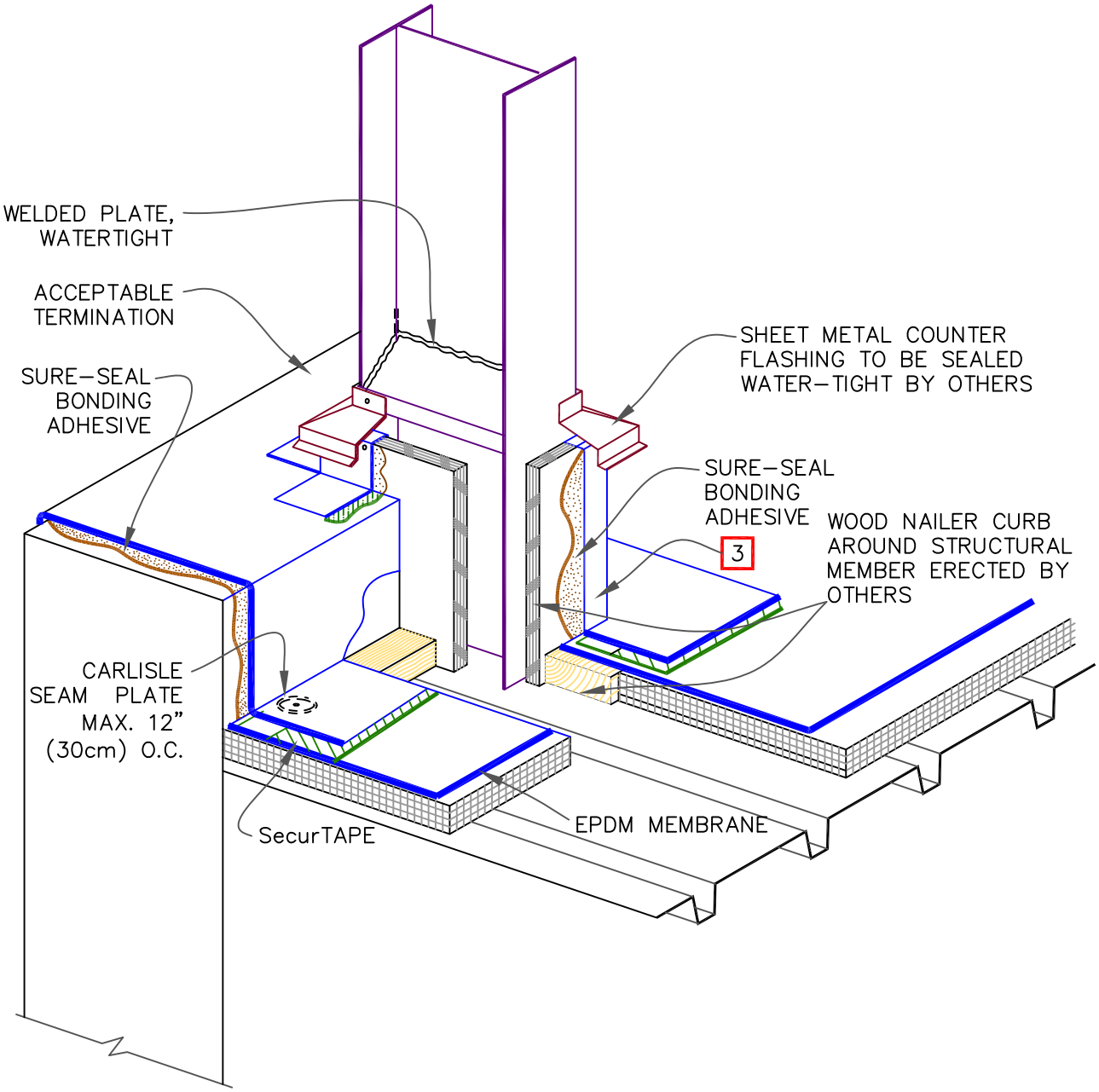


NOTES:

1. SLEEPER MUST BE LARGE ENOUGH TO SUPPORT WEIGHT OF EQUIPMENT WITHOUT INDENTING INSULATION. EXTEND WOOD NAILER OUT AS REQUIRED BY STRUCTURAL ENGINEER TO DISTRIBUTE SUBJECT LOAD OR AT LEAST EXTEND OUT MIN. 3" (7.5cm).
2. ENSURE SCREW/ANCHOR HEADS IN TOP SURFACE OF WOOD BLOCKING ARE RECESSED TO PROTECT MEMBRANE.
3. WOOD NAILERS REQUIRED IF WEIGHT OF SLEEPER MAY INDENT OR DAMAGE INSULATION.
4. CONSULT STRUCTURAL ENGINEER AND/OR SPECIFIER TO AVOID WATER PONDING DUE TO DECK DEFLECTION.



CARLISLE SYNTEC SYSTEMS	SLEEPER	EPDM	DETAIL NO. U-24
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)



NOTES:

1. FOR PARAPET FLASHING, REFER TO DETAIL(S) U-12.
2. FOR CURB FLASHING, REFER TO DETAIL(S) U-5.
3. FOR CORNER APPLICATION, REFER TO DETAIL(S) U-15.

CARLISLE SYNTEC SYSTEMS	I-BEAM PENETRATION	EPDM	DETAIL NO. U-30
	MAXIMUM WARRANTY: 30 YEARS		U (UNIVERSAL DETAIL)

Sure-Weld® TPO
Roofing Systems

Sure-Weld®
Mechanically Fastened and Adhered Roofing Systems

TABLE OF CONTENTS
July 2024

Note: In addition to information listed in this section Specifiers and Authorized applicators should reference Spec Supplement and Design Reference Sections for other pertinent information.

CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO
Roofing Systems

Sure Weld®
Mechanically Fastened and Adhered Roofing Systems

July 2024

The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing system 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 Adhered and Mechanically Fastened TPO Membrane Roofing Systems. 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.

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

Part I – GENERAL

1.01 Description

A. Mechanically Fastened Systems (Sure-Weld)

1. The **Sure-Weld Mechanically Fastened Roofing System** incorporates 12', 10' or 8' wide, white, tan or gray in 45, 60 or 80-mil thick scrim-reinforced, Sure-Weld Thermoplastic Polyolefin (TPO) membrane field sheets (also available in special colors in 60-mil thick, maximum 10' wide sheets). The Spectro-Weld™ Mechanically Fastened Roofing System incorporates 10' or 6' wide, white, 60 or 80-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane field sheets. Insulation is mechanically fastened to an acceptable roof deck. Sure-Weld perimeter sheets (6' used with 10' and 12' wide field sheets; 4' used with 8' wide field sheets) are installed along building edges and field membrane sheets are mechanically fastened to the roof deck with the appropriate Carlisle fasteners and fastening plates. Adjoining sheets of Sure-Weld membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld. Membrane fastening requirements are outlined in Warranty Tables in Paragraph 1.05 of this Specification.

   NOTE: The **Sure-Weld Mechanically Fastened** Roofing System may be specified using over an existing standing seam, flat seam or corrugated metal roof (mechanically fastened systems incorporate membrane securement into the structural purlins). **Refer to the Metal Retrofit Roofing System Specification**, published separately, for applicable requirements.

B. Adhered Roofing Systems (Sure-Weld / Sure-Weld SAT™)

1. The **Sure-Weld Adhered Roofing System** incorporates maximum 16' wide white, gray or tan 45, 60 or 80-mil thick scrim-reinforced Sure-Weld Thermoplastic Polyolefin (TPO) membrane and special colors in 60-mil thick, 5' and 10' wide sheets). The Spectro-Weld™ Adhered Roofing System incorporates 10' wide, white, 60 or 80-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane field sheets. Carlisle Insulation is mechanically fastened to the roof deck or secured with Flexible FAST™ Adhesive, OlyBond 500 BA, or OlyBond Spot Shot Adhesive and the membrane is fully adhered to the insulation with the appropriate Sure-Weld Bonding Adhesive. Adjoining sheets of membrane are overlapped approximately 2" and joined together with a minimum 1-1/2" wide heat weld.

2. The **Sure-Weld SAT™ (Self Adhering Technology) membrane** is a heat-weldable single-ply thermoplastic polyolefin (TPO) sheet available in 10' and 12' wide, (white, tan or gray) 60 or 80-mil thick reinforced TPO

membrane laminated to an elastomeric pressure-sensitive adhesive.

1.02 General Design Considerations

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

A. The maximum roof slope for Mechanically Fastened Roofing Systems is 18" in one horizontal foot. There are no maximum slope restrictions for the application of the Adhered Roofing System.

B. The mechanically fastened roofing system is **not acceptable** for installations on steel decks lighter than 22 gauge unless the steel deck is used in conjunction with lightweight concrete and a minimum of 360 pounds pullout per fastener is achieved with HP-X Fasteners into the steel deck below. An Adhered Roofing System may be specified or refer to the Metal Retrofit Roofing System Specification, published separately for other roofing options.

C. Certain petroleum based products, chemicals, and waste products may not be compatible with this roofing system. Contact Carlisle for verification of compatibility and recommendations concerning an acceptable roofing assembly.

D. Metal-Edge Systems and Copings should be designed in compliance with Section 1504.5 of the International Building Code and shall be tested in accordance with ANSI/SPRI ES-1.

E. Concentrated loads from rooftop equipment may cause deformation of insulation/underlayment and possible damage to the membrane if proper protection is not provided. A protection course or sleepers must be specified.

F. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

G. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.

H. For information regarding CRRC (Cool Roof Rating Council) and LEED™, refer to the applicable Product Data Sheets and **Design Reference DR 07 "CRRC/LEED Information".**

I. **Construction Generated Moisture / Vapor Drive**

1. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to **Design Reference DR-01 "Construction Generated Moisture"** included in the Carlisle Technical Manual.

2. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

NOTE: If left unaddressed, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth.

J. **Drainage**

1. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.

Carlisle specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or the owner's design

professional.

2. Small incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly **should be designed to prevent ponding** of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live load and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

3. **Tapered edge strips, crickets or saddles** are recommended where periodic ponding of water may occur. When the slope of the taper exceeds 2 inches to one horizontal foot, additional membrane securement at the base of the tapered edge strip will be required.

4. Subject to code requirement, it is recommended that a minimum roof slope of 1/8" per horizontal foot be provided to serve long-term aesthetics. On New Construction projects, roof drains should be positioned in areas where maximum deflection is anticipated. Slopes greater than 1/8" per foot should be considered due to possible roof deflection.

K. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

2. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.

3. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

L. **Retrofit - Recover Projects** (when the existing roofing material is left in place)

1. The removal of existing wet insulation and membrane must be specified. The specifier shall select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.

2. Entrapment of water between old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends existing membrane be perforated to avoid potential moisture accumulation to allow for detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding non-reinforced PVC membrane).

3. If total removal of existing non-reinforced PVC membrane is not specified, existing membrane may be cut into maximum 10' x 10' sections, when the new insulation or membrane underlayment is to be mechanically fastened.

4. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

1.03 Quality Assurance

Building codes are above and beyond the intended purpose of this specification. The building **owner, owner's representative** or **Specifier** should verify 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, DORA (Directory of Roof Assemblies), Factory Mutual (FM) Approval Guide or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

A. When recovering or retrofitting an existing roof system, the addition of new insulation (type and thickness) may alter the fire performance characteristics of the assembly. Building owners or their

designated representatives shall consult the local code enforcement agency to avoid potential code violation.

B. Carlisle recommends the use of Carlisle supplied products for use with Sure-Weld 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 **expressly disclaimed** by the Carlisle warranty.

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

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

E. 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.

F. 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.

G. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent subsequent damage to the membrane roofing system.

H. The solar reflectance of this roofing product may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure the maximum solar reflectance.

I. 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. Air pressurized buildings, 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. Cold storage buildings and freezer facilities.

3. Adhered Roofing System over 250' in height for projects with warranties up to 15 years.

4. Adhered Roofing System over 100' in height for projects with warranties greater than 15 years.

5. Mechanically Fastened Roofing System projects over 100' in height regardless of warranty duration.

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

7. Mechanically Fastened systems specified with a fastener length exceeding 12 inches.

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.

Shop drawings must include:

1. Outline of roof and size
2. Deck type (for multiple deck types)
3. Location and type of **all** penetrations
4. Perimeter and penetration details
5. Key plan (for multiple roof areas) with roof heights indicated
6. Sheet width and number of perimeter sheets for Mechanically Fastened systems
7. Fastener type, length and maximum spacing (for membrane securement) for Reinforced Mechanically Fastened systems.

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".**

When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to Carlisle for revision and approval prior to inspection and warranty issuance.

D. **As-Built Projects** (roofing systems installed prior to project approval by Carlisle)

The Carlisle Authorized Applicator may supply Carlisle with an As-Built drawing for a project completed prior to Carlisle's approval. The As-Built drawings:

1. Must conform to Carlisle's most current published specifications and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.
3. Must include the items identified in Paragraph 1.04.C.

NOTE: As-Built projects are not recommended for those projects referenced in Paragraph 1.04A in order to ensure Carlisle warranty requirements have been met.

E. **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. A Total 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 total 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**.

See Tables Below for information regarding Warranted Systems and Design Criteria:

TABLE I - Minimum Membrane Thickness for Various Warranty Options Identifies minimum membrane thickness for Reinforced membranes used in adhered or mechanically fastened roofing systems.

TABLE II - Mechanically Fastened Roofing Systems – TPO Membrane Fastening Criteria - Steel/Concrete Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE III - Mechanically Fastened Roofing Systems – TPO Membrane Fastening Criteria – Plywood or OSB Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE IV - Mechanically Fastened Roofing Systems – TPO Membrane Fastening Criteria – Up to 20 Yrs - Lightweight Insulating Concrete over Steel / Gypsum / Cementitious Wood Fiber Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE V - Adhered Roofing Systems - Underlayment and Fastening Density for TPO Assemblies with Warranties Up to 20 Yrs Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

TABLE VI - Adhered Roofing Systems - Underlayment and Fastening Density for TPO SAT Assemblies with Warranties Up to 20 Yrs Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

TABLE VII - Adhered Roofing Systems - Underlayment and Fastening Density for TPO Assemblies with Warranties - 25 to 30 YR
Identifies required underlayments for adhered roofing systems with Warranties from 25 to 30 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

TABLE VIII - Adhered Roofing Systems - Underlayment and Fastening Density for TPO SAT Assemblies with Warranties – 25 to 30 YR Identifies required underlayments for adhered roofing systems with Warranties from 25 to 30 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

Table I

Mechanically Fastened or Adhered Membrane Systems
Warranty Options (9)

Warranty Duration	Sure-Weld TPO Membranes								
	Warranty Wind Speed Coverage						Minimum Membrane Thickness (2)	Additional Membrane Coverage	
	55, 72, 80 or 90 mph		100 mph		110 to 120 mph				
	Adhered	Mech. Fastened	Adhered	Mech. Fastened	Adhered	Mech. Fastened		Additional Puncture	Hail
5,10, or 15 year	√	√	√	N/A(1)	√	N/A	Sure-Weld 45-mil	See Below	See Below
20 year	√(3)	√	√	N/A	√	N/A	Sure-Weld 60-mil (4)	See Below	See Below
25 year (9)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5)	See Below	See Below
30 year (9)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5)	See Below	See Below

Notes: N/A = Not Acceptable √= Acceptable

(1) Contact Carlisle for specific requirements.
(2) All “T-Joints” must be overlaid with appropriate flashing material when using 60- or 80-mil TPO.
(3) Aqua Base 120 adhesive may be used for projects with 20 year maximum warranty and wind speed coverage up to 72 mph.
(4) Spectro-Weld OR Sure-Weld SAT TPO 60-mil membranes may be used in lieu of Sure-Weld 60-mil membrane.
(5) Spectro-Weld 80-mil membrane OR Sure-Weld SAT TPO 80-mil membrane can be used in lieu of Sure-Weld 80-mil membrane. Sure-Weld 80-mil TPO in Special Colors are limited to Warranties Up to 20 Year.
(6) Not Used.
(7) Not Used.
(8) Not Used.
(9) Enhancements may be required for certain flashing details. Published details must be referenced for applicable requirements.
(10) -Not Used.
(11) Low-VOC PVC Bonding Adhesive or CAV-GRIP PVC must be utilized.

Sure-Weld TPO Membrane
Hail
- 1” Dia. Hail Coverage requires a minimum of 60-mil TPO Adhered to cover board.
- 2” Dia. Hail Coverage requires 80-mil TPO Adhered to cover board.

Additional Design Requirement:
- Cover board (SecurShield HD, SecurShield HD Eco, SecurShield HD Plus, or StormBase Composite, DensDeck Prime, DensDeck StormX Prime or Securock – Adhered Only).

Puncture
- Minimum 80-mil TPO Adhered or Mechanically Fastened.

Table II

TPO Membrane Fastening Criteria (All Warranties)
for Mechanically Fastening Roofing Systems
22 GA. Steel Deck or Structural Concrete Only

Caution: Projects with 25 or 30 year warranties an additional perimeter sheet is required beyond those listed in the table below. Projects with 25 or 30 year warranties the use of 12' wide sheets is **NOT PERMITTED**

Peak Gust Wind Speed Warranty	Max. Building Height	Min. Number of Perimeter Sheets			Field* Membrane Width	Perimeter* Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Building Distance from Coastline					
		Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	Up to 60'	1	2	3	12' or 10'	6'	12" O.C.
					8'	4'	12" O.C.
	61' to 100'	2	2	3	10'	6'	** See Note
					8'	4'	12" O.C.
72 MPH	Up to 60'	2	2	3	12' or 10'	6'	12" O.C.
					8'	4'	12" O.C.
	61' to 100'	3	4	4	10'	6'	** See Note
					8'	4'	12" O.C.
80 MPH	Up to 60'	3	3	4	10'	6'	** See Note
					8'	4'	12" O.C.
	61' to 100'	3	4	4	10'	6'	** See Note
					8'	4'	12" O.C.
90 MPH	Up to 60'	3	4	4	10'	6'	** See Note
					8'	4'	12" O.C.
	61' to 100'	4	5	5	10'	6'	** See Note
					8'	4'	12" O.C.

*Using HP-X™ Fasteners for steel decks and HD 14-10 or CD-10 for structural concrete decks.

** Structural Concrete Decks use 12" O.C. spacing utilizing HD 14-10 or CD-10. Steel Decks use 6" O.C. utilizing HP-X Fasteners. Steel Decks use 12" O.C. spacing utilizing HP-Xtra Fasteners.

TPO Membrane Fastening Criteria
(Up to 20 Year Warranty – Up to 60' Building Height)
for Mechanically Fastening Roofing Systems
Wood (Plywood or OSB) Decks

Table III

Wood (Plywood or OSB) Decks **Peak Gust Wind Speed Warranty**	**Deck Type**	**Projected Pull-Out Values**	**Min. Number of Perimeter Sheets**			**Field Membrane Width**	**Perimeter Sheet Width**	**Fastening Density (Field & Perimeter Sheets)**
			Building Distance from Coastline					
			Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	7/16" OSB	210 lbs	2	3	3	10'	5'*	9" O.C.
			2	3	3	8'	5'*	12" O.C.
	15/32" 3-Ply Plywood	240 lbs	2	2	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3	3	10'	5'*	12" O.C.
			2	3	3	8'	5'*	12" O.C.
72 MPH	15/32" 3-Ply Plywood	240 lbs	2	3	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	2	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3	3	8'	5'*	12" O.C
80 MPH								

*Maximum duration for OSB NOT to exceed 20 Years.

TPO Membrane Fastening Criteria

Table IV **Up to 20 Yr Warranty for Mechanically Fastening Roofing Systems**
Lightweight Insulating Concrete over Steel / Gypsum / Cementitious Wood Fiber

Peak Gust Wind Speed Warranty	Building Height 50' Max.	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field & Perimeter Sheets)
		Building Distance from Coastline					
	Deck Type	Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	Lightweight Concrete over Steel Deck	2	3 (1)	N/A	12'	6'	12" O.C.
		1	2	4	10'	6'	12" O.C.(2)
		1	2	3	8'	4'	12" O.C.(3)
	Gypsum Deck or Cementitious Wood Fiber	2 (3)	3	N/A	10'	6'	9" O.C.
		2 (3)	3	4 (4)	8'	4'	12" O.C.

N/A is Not Acceptable
(1) Fastening Density must be secured 6" O.C.
(2) For Buildings 51' to 75' with 10' field sheets – Fastening Density must be increased to 9" O.C.
(3) Acceptable for Buildings up to 75' in height.
(4) Fastening Density must be increased to 9" O.C.

Additional Design Considerations (Up to 20 YR Warranty)

1-Membrane configuration and fastening density in Table above is based on HP-X Fasteners penetrating metal pan below Lightweight Insulating Concrete and for Polymer Gyptec Fasteners engaging into Gypsum and Cementitious Fiber Decks.
2-See **Design Reference DR-06 "Withdrawal Resistance Criteria"** for more information.

Table V — Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for TPO Adhered Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table
All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment*	Underlayment/Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1" (20 psi) Polyisocyanurate or 1" (20 psi) Polyisocyanurate Eco	16 (10)	12" (5)(6)	6" (5)	Carlisle Drip Edge, SecurEdge™ 200
	1-1/2" (20 psi) Polyisocyanurate or 1-1/2" (20 psi) Polyisocyanurate Eco	10			
	2" (20 psi) Polyisocyanurate or 2" (20 psi) Polyisocyanurate Eco	8			
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	12			
	1/4" DensDeck Prime or 1/4" Securock	12			
80 MPH	1/2" SecurShield HD Plus (2)	8	12" (5)(6)(7)	6" (5)(7)	Carlisle Drip Edge, SecurEdge 200 (11)
	1/2" HP Recovery Board (1)	16			
	2" SecurShield HD Composite	6			
	1/2" DensDeck Prime or 1/2" Securock (1)	8			
	1-1/2" (25-psi) Polyisocyanurate or 1-1/2" (25 psi) Polyisocyanurate Eco	10			
	2" (25 -psi) Polyisocyanurate or 2" (25 psi) Polyisocyanurate Eco	8			
90 MPH	1/2" DensDeck Prime or 1/2" Securock (1) or 1/2" EcoStorm VSH (1)	12	6"(9)	6"(7)(8)	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000.
	1/2" SecurShield HD, 1/2" SecurShield HD Eco (2), 1-1/2" (20-psi) SecurShield Polyiso or 1-1/2" (20-psi) SecurShield Eco	16			
	1/2" SecurShield HD Plus (2)	12			
	2" (20-psi) SecurShield Polyiso, 2" (20-psi) SecurShield Eco or 2" SecurShield HD Composite	8			
	1-1/2" StormBase (OSB/Polyiso Composite)	8			
	1-1/2" Insulfoam HD Composite	16			
100 MPH	2" (25-psi) SecurShield Polyiso or 2" (25-psi) SecurShield Eco	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000.
110 MPH	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (1)	16	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (2)				
120 MPH	5/8" DensDeck Prime or 5/8" Dens Deck StormX Prime or 5/8" Securock (1)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	17			
	1/2" SecurShield HD Plus (2)	24			
	2" SecurShield HD Composite	16			

FS = Full Spray or Ribbons @ 4" O.C.
***For Direct Application over Wood Decks and Lightweight Cellular Concrete, Refer to Roof Deck & Substrate Criteria Table.**
(1) For steel decks (new or tear-off) cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(2) 1/2" SecurShield HD and SecurShield HD Eco limited to 90 mph. 1/2" SecurShield HD Plus limited

to 120 mph.
(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(5) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(6) Steel Decks - Field & Perimeter @ 6" O.C.
(7) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(9) Gravel Surface BUR – FS
(10) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40’.
(11) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.

Table V - Additional Design Considerations (Up to 20 YR Warranty)

1 – Refer to Table I paragraph 1.05 for warranty options
available with various membrane thickness.
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5 - For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
6 - See DR-05 for insulation fastening patterns.

* Projects where building height exceeds 100', shall be submitted to Carlisle for review.

Table VI — Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for TPO SAT Adhered Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1” (20 psi) Polyisocyanurate or 1” (20 psi) Polyisocyanurate Eco	16 (10)	12" (3)(4)	6" (3)	Carlisle Drip Edge, SecurEdge 200
	1-1/2" (20 psi) Polyisocyanurate or 1-1/2” (20 psi) Polyisocyanurate Eco	10			
	2"(20 psi) Polyisocyanurate or 2”(20 psi) Polyisocyanurate Eco	8			
	1/2” SecurShield HD or 1/2” SecurShield HD Eco (2)	12			
	1/4” DensDeck Prime or 1/4” Securock				
	2” (1.25 lb/density) Insulfoam SP*				
80 MPH	1/2" DensDeck Prime or 1/2” Securock (1)	8	12" (3)(4)(6)	6' (3)(7)	Carlisle Drip Edge, SecurEdge (10)
	1/2” SecurShield HD or 1/2” SecurShield HD Eco (2)	16			
	1/2” SecurShield HD Plus (2)	8			
	2" SecurShield HD Composite	6			
	1-1/2" (25-psi) Polyisocyanurate or 1-1/2” (25 psi) Polyisocyanurate Eco	10			
	2" (25 -psi) Polyisocyanurate or 2” (25 psi) Polyisocyanurate Eco	8			
	2” (1.25 lb/density) Insulfoam SP**	16	6" (3)(4)(6)	6" (3)(6)	
	1-1/2” Insulfoam HD Composite*	12	12” (8)	6” (6)(7)	
90 MPH	1/2” DensDeck Prime or 1/2” Securock (1)	12	6” (8)	6” (6)(7)	Carlisle Drip Edge (11), SecurEdge 200 (11)(12) or SecurEdge 2000 or 3000.
	1/2” SecurShield HD , 1/2” SecurShield HD Eco, 1-1/2” (20-psi) SecurShield Polyiso or 1-1/2” (20-psi) SecurShield Eco (2)	16			
	1/2” SecurShield HD Plus (2) or 1/2” EcoStorm VSH	12			
	1-1/2” StormBase (OSB/Polyiso Composite)	8			
	2” (20-psi) SecurShield Polyiso, 2” (20-psi) SecurShield Eco or 2” SecurShield HD Composite	8			
	1-1/2” Insulfoam HD Composite	16			
100 MPH	5/8" DensDeck Prime or 5/8” DensDeck StormX Prime or 5/8” Securock (1)	16	FS	FS	Carlisle Drip Edge (11), SecurEdge 200 (11)(12) or SecurEdge 2000 or 3000.
	1/2" SecurShield HD Plus (2)				
	1-1/2” StormBase (OSB/Polyiso Composite) or 1/2” EcoStorm VSH				
	2" (25-psi) SecurShield Polyiso, 2” (25-psi) SecurShield Eco or 2” (25-psi)				
	2” SecurShield HD Composite				

FS = Full Spray or Ribbons @ 4" O.C.
(1) For steel decks (new or tear-off) cover boards must be installed over a min. 1" thick approved Carlisle Insulation.

(2) 1/2" SecurShield HD and SecurShield HD Eco limited to 90 mph. 1/2” SecurShield HD Plus limited to 120 mph.
(3) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(4) Steel Decks - Field & Perimeter @ 6" O.C.
(5) Gypsum Decks – Bead Spacing @ 6" O.C.
(6) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(7) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Gravel Surface BUR – FS
(9) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40’.
(10) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(11) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(12) Membrane securement is required at the base of the SecurEdge 200 waterdam.
*Maximum warranty available 20 year.
** Maximum warranty available 15 year.

Table VI - Additional Design Considerations (Up to 20 YR Warranty)

1 - Minimum membrane thickness 60-mil TPO SAT
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4- Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5- All “T-joints” must be overlaid with appropriate flashing material or Carlisle “T-Joint” Covers.
6 - For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
7 - See DR-05 for insulation fastening patterns.

* Projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, shall be submitted to Carlisle for review.

Table VII — Underlayment/Insulation & Required Attachment Assemblies 25 YR or 30 YR Warranty for Adhered TPO Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1" to 2" (25 psi) Polyisocyanurate or Polyisocyanurate Eco	16	6" (3)(5)	6" (5)	Carlisle Drip Edge, SecurEdge 200
	1/2" HP Recovery Board (9)				
	1/4" DensDeck Prime or 1/4" Securock				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)				
80 MPH	1-1/2" to 2" (25-psi) SecurShield Polyisocyanurate or SecurShield Eco	20	6" (4)(5)(6)	6" (5)(6)	Carlisle Drip Edge (7), SecurEdge 200 (7)(8) or SecurEdge 2000 or 3000
	1/2" DensDeck Prime or 1/2" Securock (2)	16			
	1/2" SecurShield HD Plus (2)				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	20			
90 MPH	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	24	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (2)	20			
	1/2" DensDeck Prime or 1/2" Securock (2)				
100 MPH	5/8" DensDeck Prime or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)				
	2" SecurShield HD Composite (2)				
	1/2" SecurShield HD Plus (2)	24			

FS = Full Spray or Ribbons @ 4" O.C.

(1) Hail coverage offered with substrate.
(2) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.
(3) 80-mph over structural concrete - Field & Perimeter @ 6" O.C.
(4) Cementitious Wood Fiber & Wood - FS
(5) 80-mph warranty wind speed coverage over Gypsum Decks – Adhesive Ribbon spacing shall be at 4" O.C.
(6) Carlisle HP or HP-X Fasteners must be used to secure Carlisle SecurEdge200 Metal Fascia to perimeter wood nailers.
(7) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(8) 1/2" Recovery Board limited to 55 mph.

Additional Design Considerations (25 YR or 30 YR Warranty)

1 - Minimum membrane thickness 80-mil TPO
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*.

4- Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5– All “T-Joints” must be overlaid with appropriate flashing material or Carlisle “T-Joint” Covers.
6 - For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
7 – New construction or complete tear-off of existing roofing material.
8 – See DR-05 for insulation fastening patterns.
*Projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, shall be submitted to Carlisle for review.

Table VIII — Underlayment/Insulation & Required Attachment Assemblies 25 YR or 30 YR Warranty for TPO SAT Adhered Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1" to 2" (25 psi) Polyisocyanurate or Polyisocyanurate Eco	16	6" (2)(4)	6" (4)	Carlisle Drip Edge, SecurEdge 200
	1/4" DensDeck Prime or 1/4” Securock				
	1/2" SecurShield HD or 1/2” SecurShield HD Eco (1)				
80 MPH	1-1/2" to 2" (25-psi) SecurShield Polyisocyanurate or SecurShield Eco	20	6" (3)(4)(5)	6" (4)(5)	Carlisle Drip Edge (6), SecurEdge 200 (6)(7) or SecurEdge 2000 or 3000
	1/2" DensDeck Prime or 1/2” Securock (1)	16			
	1/2" SecurShield HD Plus (1)				
	1/2" SecurShield HD or 1/2” SecurShield HD Eco (1)	20			
90 MPH	1/2" SecurShield HD or 1/2” SecurShield HD Eco (1)	24	FS	FS	Carlisle Drip Edge (6), SecurEdge 200 (6)(7) or SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (1)	20			
	1/2" DensDeck Prime or 1/2” Securock (1)				
100 MPH	5/8” DensDeck Prime or 5/8” DensDeck StormX Prime or 5/8” Securock (1)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2” StormBase (OSB/Polyiso Composite) or 1/2” EcoStorm VSH (1)				
	2” SecurShield HD Composite (1)				
	1/2” SecurShield HD Plus (1)	24			

FS = Full Spray or Ribbons @ 4" O.C.

(1) Hail coverage offered with substrate.
(2) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.
(3) 80-mph over structural concrete - Field & Perimeter @ 6" O.C.
(4) Cementitious Wood Fiber & Wood - FS
(5) 80-mph warranty wind speed coverage over Gypsum Decks – Adhesive Ribbon spacing shall be at 4” O.C.
(6) Carlisle HP or HP-X Fasteners must be used to secure Carlisle SecurEdge200 Metal Fascia to perimeter wood nailers.
(7) Membrane securement is required at the base of the SecurEdge 200 waterdam.

Table VIII - Additional Design Considerations (25 YR or 30 YR Warranty)

1 - Minimum membrane thickness 80-mil TPO SAT
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4- Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5– All “T-Joints” must be overlaid with appropriate flashing material or Carlisle “T-Joint” Covers.
6– New construction or complete tear-off of existing roofing material.
7 - For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
8 - See DR-05 for insulation fastening patterns.

* Projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, shall be submitted to Carlisle for review.

Table IX Minimum Perimeter Width For Insulation Attachment For All Warranties

Width of Perimeter	Building Height
4 feet	25 feet
8 feet	26 to 50 feet
12 feet	51 to 75 feet
16 feet	76 to 100 feet
24 feet	Greater than 100 feet

Note: This Table is for reference for Carlisle System Warranties and does not replace FM requirements for FM insured projects.

B. **Access for warranty service**

It shall be the owner's responsibility to expose the membrane in the event that warranty service is required when access is impaired. Such impairment includes, but is not necessarily limited to:

1. Design features, such as window washer systems, which require the installation of traffic surface units in excess of 100 pounds per unit.

2. Any equipment, ornamentation, building service units and other top surfacing materials which are not defined as part of this specification.

3. Photovoltaic and Mounting systems or other Rooftop equipment that does not provide Carlisle with reasonable access to the membrane system for purposes of warranty investigation and related repairs.

4. Severely ponded conditions.

CAUTION: APPLICATIONS SUCH AS WALKING DECKS, TERRACES, PATIOS OR AREAS SUBJECTED TO CONDITIONS NOT TYPICALLY FOUND ON ROOFING SYSTEMS WILL **NOT** BE ELIGIBLE FOR A MEMBRANE SYSTEM WARRANTY.

C. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.06 Job Conditions

A. On phased roofing, temporary closures should be provided to prevent moisture infiltration. When a temporary roof is specified, Carlisle 725-TR in conjunction with CCW-702, CCW 702 LV or CAV-GRIP III Low-VOC Adhesive/Primer may be used. Refer to Product Section Part II for additional product information and **Specification Supplement G-08.**

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

C. On projects at high altitudes (6,000' and above) rapid flash-off (drying) of Adhesives will occur due to low atmospheric pressure.

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

E. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, the following criteria should be considered by the specifier:

   a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

   c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.

2. When a vapor retarder is specified, Carlisle 725TR Air and Vapor Barrier may be used. Refer to Part II "Products" for necessary information and **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier" for** product Installation.

F. 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 Factory Mutual'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.

G. When any of the Roofing Systems are specified on a portion of a roof, tie-ins to existing roofing membranes will be required. Depending on the type of the existing roofing system, the tie-in method will vary. Total isolation between two roofing systems or weep holes may be required to address moisture migration from one roofing system to the other. Prior to the selection of any tie-in detail, ensure the selected detail will not restrict drainage.

H. On new construction projects, located in colder climates, special consideration should be given to construction practices and the possible migration of hot, humid air and moisture generated during construction. Refer to Paragraph 1.02 I and **Design Reference DR-01 "Construction Generated Moisture".**

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 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 (4° C), outside storage boxes should be provided on the roof

for temporary storage of liquid adhesives and sealants. Adhesive and sealant containers should be rotated to maintain their temperature above 40° F (4° C). Refer to Product Data Sheets for individual products for temperature restrictions.

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

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

G. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store bundles flat and upright with the bottom of the bundles elevated (2" or more) above the finished surface.

H. Slit the insulation bundle packaging vertically down the center of the two short sides to prevent moisture accumulation within the package. Completely cover the bundle with a waterproof tarp and secure to prevent wind damage and/or displacement.

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 Membranes

A. Sure-Weld Membranes

1. General

   a. Sure-Weld TPO Membrane meets or exceeds the requirements of ASTM D6878-17, standard specification for Thermoplastic Polyolefin Based Sheet Roofing. In addition to the physical properties listed below, refer to the Sure-Weld Membrane Product Data Sheets for Cool Roof Rating Council (CRRC), ENERGY STAR and LEED™ radiative properties as well as U.S.E.P.A. Toxic Leachate Testing and dynamic puncture resistance.

   b. The Sure-Weld TPO membrane (white and tan) meets the ENERGYSTAR requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of 0.79 (white) and 0.71(tan) and a 3-year aged reflectance of 0.70 (white) and 0.64 (tan). The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of 0.90 (white) and 0.86 (tan) and a 3-year aged emittance of 0.86 (white) and 0.87 (tan) were achieved.

   c. The Spectro-Weld TPO membrane (white) meets the ENERGY STAR requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of 0.88 and a 3-year aged reflectance of 0.75. The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of 0.89 and a 3-year aged emittance of 0.90 were achieved.

   d. The Sure-Weld TPO membrane (white) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.90 was achieved and an SRI (solar reflectance index) of 99 was calculated using ASTM E1980.

   e. The Spectro-Weld TPO membrane (white) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.89 was achieved and an SRI (solar reflectance index) of 111 was calculated using ASTM E1980.

2. Sure-Weld 45 or 60-mil thick Reinforced Thermoplastic Polyolefin (TPO) membrane, Sure-Weld SAT (Self-Adhering Technology) 60 or 80-mil thick Reinforced Thermoplastic Polyolefin (TPO) membrane and Sure-Weld 80-mil thick Reinforced EXTRA™ Thermoplastic Polyolefin (TPO) conforms to the following physical properties. Sure-Weld SAT (white, tan or gray) membrane is available in 10' and 12' wide by 50' or 100' long

rolls and Sure-Weld Standard / HS membrane available in field sheets in rolls 16', 12', 10' or 8' wide by 100' long. Perimeter membrane sheets are available in widths of 6' (used with 12' and 10' wide field sheets) or 4' (used with 8' wide field sheets) by 100' long. Sure-Weld Membrane is available in white, gray or tan. Special Color TPO membrane is available in 5 colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) in 60-mil field sheets in rolls 5' or 10' wide by 100' long and 80-mil field sheets in 10' wide by 100' long. Special Color TPO is a special order product and may require a lead time.

OPTION: 60- or 80-mil Sure-Weld TPO (white, tan or gray) reinforced membrane is available with an optional APEEL Protective Film. APEEL Protective Film can be left in place for up to 90 days without affecting the integrity of the film, guarding the TPO membrane's surface from scuffs and dirt accumulation during installation. Durable and easy to remove, APEEL Protective Film improves aesthetics and long-term reflectivity. Available 4', 6', 8', 10' and 12' widths by 100' long rolls. Some sizes and colors of Sure-Weld SAT with APEEL require a minimum order of 200 squares and 2-3 week lead time. Also available, APEEL 6" Cover Tape, allowing 100% coverage of the TPO surface. APEEL Cover Tape rolls are 1,640 feet long.
OPTION: 45-, 60-, or 80-mil Sure-Weld TPO in 10' and 12' wide (white, tan or gray) reinforced membrane is available with an optional SeamShield protective film. A factory applied protective film applied to both the top and bottom lap area of TPO sheets, serving as a safeguard for the welded areas of the TPO sheet throughout the installation process. It eliminates the use of Weathered Membrane Cleaner and is removed just prior to seam welding.

Note: Sure-Weld HS and Special Color TPO Membrane is specially formulated with higher fire retardancy to accommodate steep slope roof conditions.

PHYSICAL PROPERTY	ASTM D6878 Requirement	45-mil Std & HS	60-mil Std & HS	60-mil SAT or Spectro-Weld	80-mil EXTRA or Spectro-Weld
Tolerance on nominal thickness, % ASTM D751 test method	+15, -10	± 10	± 10	± 10	± 10
Thickness over scrim, in. (mm) ASTM D6878 optical method, average of 3 areas	0.012 min. (0.305)	0.018 typical (0.457)	0.024 typical (0.610)	0.024 typical (0.610)	0.034 typical (0.864)
Breaking strength, lbf (kN) ASTM D751 grab method	220 (976 N) min.	225 (1.0) min. 320 (1.4) typ.	250 (1.1) min. 360 (1.6) typ.	250 (1.1) min. 360 (1.6) typ.	350 (1.6) min. 425 (1.9) typ.
Elongation break of reinforcement, % ASTM D751 grab method	15 min.	15 min. 25 typ.	15 min. 25 typ.	15 min. 25 typ.	15 min. 25 typ.
Tearing strength, lbf (N) ASTM D751 proc. B 8 by 8 in.	55 (245) min.	55 (245) min. 130 (578) typ.	55 (245) min. 130 (578) typ.	55 (245) min. 130 (578) typ.	55 (245) min. 130 (578) typ.
Brittleness point, °F (°C) ASTM D2137	-40 (-40) max.	-40 (-40) max. -50 (-46) typ.	-40 (-40) max. -50 (-46) typ.	-40 (-40) max. -50 (-46) typ.	-40 (-40) max. -50 (-46) typ.
Linear dimensional change, % ASTM D1204, 6 hours at 158 °F	± 1 max.	± 1 max. -0.2 typ.	± 1 max. -0.2 typ.	± 0.5 max. -0.2 typ.	± 1 max. -0.2 typ.
Ozone resistance, no cracks 7X ASTM D1149, 100 pphm, 168 hrs	Pass	Pass	Pass	Pass	Pass
Water absorption resistance, mass % ASTM D471 top surface only 166 hours at 158 °F water	± 3.0 max.	3.0 max. 2.0 typ.	3.0 max. 2.0 typ.	4.0 max. 2.0 typ.	3.0 max. 2.0 typ.
Factory seam strength, lbf /in. (kN/m) ASTM D751 grab method	66 (290) min.	66 (290) min.	66 (290) min.	66 (290) min.	66 (290) min.
Field seam strength, lbf /in. (kN/m) ASTM D1876 tested in peel	No requirement	25 (4.4) min. 50 (8.8) typ.	25 (4.4) min. 60 (10.5) typ.	25 (4.4) min. 60 (10.5) typ.	40 (7.0) min. 70 (12.3) typ.
Water vapor permeance, Perms ASTM E96 proc. B	No requirement	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.
Puncture resistance, lbf (kN) FTM 101C, method 2031 (see supplemental section)	No requirement	250 (1.1) min. 325 (1.4) typ.	300 (1.3) min. 350 (1.6) typ.	300 (1.3) min. 350 (1.6) typ.	400 (1.8) min. 450 (2.0) typ.
Properties after heat aging ASTM D573, 670 hrs at 240 °F					
Breaking strength, % retained	90 min.	90 min.	90 min.	90 min.	90 min.
Elongation reinf., % retained	90 min.	90 min.	90 min.	90 min.	90 min.
Tearing strength, % retained	60 min.	60 min.	60 min.	60 min.	60 min.
Weight change, %	± 1.0 max.	± 1.0 max.	± 1.0 max.	± 1.0 max.	± 1.0 max.

2.03 Insulations/Underlayments

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.

2. Multiple layers of insulation are recommended with all joints staggered between layers.

3. For minimum recommended R-Values, previously published by American Society of Heating and Air-Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.

4. For Insulation fastening pattern and densities refer to Carlisle Applicable Details and **Design Reference DR-05 "Insulation Fastening Patterns"**.

5. Carlisle Insulation/underlayment must be specified for all Total System Warranty projects or when the insulation is to be covered by the Carlisle Warranty. Any of the Carlisle Insulation/Underlayment may be specified subject to design restrictions included with each table.

B. **Carlisle Polyisocyanurate**

Table B1	**Polyisocyanurate** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
Carlisle InsulBase Polyisocyanurate, Carlisle InsulBase Eco, Carlisle InsulBase HD Eco	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle InsulBase NH Polyisocyanurate	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle SecurShield Polyisocyanurate, Carlisle SecurShield Eco	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield NH Polyisocyanurate	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield HD Composite Polyisocyanurate (SS HD)	2"	C1289, Type IV, Grade 2 or 3	√	√	N/A
Carlisle StormBase Composite (OSB)	1.5"	C1289, Type V, Grade 2 or 3	√	√	N/A
Design Restrictions					
- Extended Warranty, those with longer duration, higher wind speed, or puncture coverage, may require the use of a cover board over Polyiso Insulation, refer to Warranty Tables in Paragraph 1.04 for applicable requirements. - Maximum Flute Spanability shall be limited to 2-5/8" when 1" Minimum Polyiso Insulation is to be used. - Minimum thickness of insulation board may be restricted by wind speed coverage and warranty duration, refer to Tables V and VI in Paragraph 1.05. - The use of HD Polyiso Composite roof insulation is not recommended for Ballasted Applications. *1.5" minimum for adhered systems. 1" minimum for mechanically fastened systems or as a base layer for adhered.					
Notes: N/A = Not Acceptable √ = Acceptable					

SecurShield HD is listed in Paragraph E4 below.

a. **Carlisle InsulBase Polyisocyanurate –** A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available.

b. **Carlisle InsulBase Eco –** A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to glass-reinforced felt (GRF) facers, meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. UL and FM approved for direct application over steel decks, polyiso provides the highest R-value per inch of any commercially available insulation product.

c. **Carlisle InsulBase HD Eco –** A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2” thick, 4’ x 4’ and 4’ x 8’ panels with an R-value of 2.5. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

d. **Carlisle InsulBase NH Polyisocyanurate** - A foam core insulation board covered on both sides with a glass-reinforced felt meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from ½” to 4 inches. InsulBase NH contains zero halogenated flame retardants.

e. **Carlisle SecurShield Polyisocyanurate –** A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

f. **Carlisle SecurShield Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to high performance coated glass facers (CGF). ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi), available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. Ideal for use in adhered membrane systems. Achieves a UL Class A fire rating direct to combustible deck.

g. **Carlisle SecurShield NH Polyisocyanurate** - A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from ½ inch to 4 inches. SecurShield NH contains zero halogenated flame retardants.

h. **Carlisle SecurShield HD Composite Polyisocyanurate** – Composite insulation panel comprised of 1/2-inch high-density (109 psi max) Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type IV, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 2” to 4.5”. 4’ x 4’ panels are also available.

i. **Carlisle StormBase Polyisocyanurate Composite (OSB)** – Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt facer and laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 1-1/2” to 4”.

C. **EPS: Expanded Polystyrene**

Table C1	**EPS: Expanded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
InsulFoam I	1”	C578 Type I	N/A	N/A	√
InsulFoam VIII	.75”	C578 Type VIII	N/A	N/A	√
InsulFoam II	.75"	C578 Type II	N/A	N/A	√
InsulFoam IX	.75"	C578 Type IX	N/A	N/A	√
InsulFoam HD Composite (SecurShield HD)	1.5”	C578 Type (I, VIII, II, or IX)	√	√	N/A
InsulLam (Various Cover Boards)	1.5"	C578 Type (I, VIII, II. or IX)	√	N/A	N/A
InsulFoam SP	1"	C578 Type VIII	√ (1)	√	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2” SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - (1) Adhered assemblies using Sure-Seal SAT or Sure-Tough SAT.					
Notes: N/A = Not Acceptable √ = Acceptable					

R-Tech Fanfold Recover Board is listed in Paragraph E4 below.

1. **InsulFoam I –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type I. Nominal density of 1.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

2. **InsulFoam VIII –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type VIII. Nominal density of 1.25 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from ¼” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

3. **InsulFoam II –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type II. Nominal density of 1.5 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

4. **InsulFoam IX –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type IX. Nominal density of 2.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

5. **InsulFoam HD Composite –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 1/2” thick SecurShield HD. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

6. **InsulLam –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB),1/2” DensDeck Prime, 1/2” Securock, or 1/2" HP Recovery Board. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

7. **InsulFoam SP –** A closed-cell lightweight expanded polystyrene (EPS) with a factory-laminated fiber glass facer. Nominal density of 1.25 lbs/cubic ft (pcf), and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or ballasted membranes. Can also be used in Adhered systems using Sure-Seal or Sure-Tough SAT Membranes.

D. **XPS: Extruded Polystyrene –** Available through Carlisle is dimensionally stable with high thermal and low water absorption performance capability. XPS is available in varying compressive strengths thicknesses and sizes. Refer to specific product data sheets for physical properties and additional technical information.

Table D1	**XPS: Extruded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
Thermapink 18	.75"	Refer to Product Data Sheet	N/A	N/A	√
Thermapink 25	1"	Refer to Product Data Sheet	N/A	N/A	√
Foamular 400	1"	Refer to Product Data Sheet	N/A	N/A	√
Dow Styrofoam Deckmate Plus	1"	Refer to Product Data Sheet	N/A	N/A	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2" SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - Refer to related products listed in **Spec Supplement P-01 "Related Products"** for other products which may be suitable for use. Carlisle must be contacted for specific requirements. Notes: N/A = Not Acceptable √ = Acceptable					

1. **Thermapink 18 or 25 Extruded Polystyrene**
2. **Foamular 400 Extruded Polystyrene**
3. **Dow Styrofoam Deckmate Plus Extruded Polystyrene**

E. **Carlisle Vacuum Insulated Panel (VIP)**

Table E1 **Vacuum Insulated Panel (VIP)** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
Carlisle Optim-R VIP	*1.6"	C1484	√	N/A
Design Restrictions				
*2.6” minimum for total installed system including an additional 2 layers of 1/2” SecurShield HD panels; 1 layer on top and 1 layer on bottom of Optim-R. For adhered systems only. Note: Optim-R VIP cannot be cut or punctured.				
Notes: N/A = Not Acceptable √ = Acceptable				

1. **Optim-R Vacuum Insulated Panel (VIP) –** a high R-Value vacuum insulated panel (VIP) used to provide a low-profile solution when height restrictions exist, such as windows, doors, equipment curbs, etc. Provides an R-38 insulating value in a 2.6” system thickness with up to 35% infill (non-VIP material). Available in 23.6” x 23.6” and 23.6” x 47.2” board sizes.

F. **Cover Boards / Slip Sheets**

Table F1	**Cover Boards** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
SecurShield HD, SecurShield HD Eco	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
SecurShield HD Plus	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
InsulBase HD, InsulBase HD Eco	.5"	C1289-06, Type II, Class 1, Grade 3	N/A	√	N/A
Securock Cover Board	.25"	Refer to Product Data Sheet	√	√	N/A
EcoStorm VSH	.5"	Refer to Product Data Sheet	√	√	N/A
HP Recovery Board	.5"	C208 Grade 2	√	√	√
DensDeck StormX Prime	.625"	C1177	√	√ (1)	N/A
DensDeck Prime	.25"	C1177	√	√ (1)	N/A
DensDeck	.25"	C1177	N/A	√ (1)	N/A
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√	√
HP Protection Mat	6 oz	Refer to Product Data Sheets	N/A	√	√

Design Restrictions

- HP Recovery Board and R-Tech Fanfold not recommended for direct use over Type B and F steel decks.
- Securock Cover Board, HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or DensDeck may not be used directly over New or Existing Lightweight Insulating Concrete Decks OR Structural Concrete.
- Due to some warranty restrictions, DensDeck Prime, DensDeck StormX Prime and DensDeck not recommended for use directly over existing roofing membrane without prior written approval from Carlisle. Contact Carlisle for specific requirements.
- R-Tech Fanfold primarily for use in existing roof re-covers applications or directly over structural or lightweight insulating concrete.
- HP Protection Mat may be used for Ballasted systems over Lightweight Insulating Concrete with a Maximum Warranty duration of up to 15 years. To be used for Mechanically fastened on new construction projects with Lightweight Insulating Concrete, Fiber Cement or Gypsum Deck a Maximum Warranty duration of up to 15 years.

(1) Permitted with roofs with slopes greater than 2" per foot for compliance with external fire codes, refer to UL listings or contact Carlisle.
(2) Acceptable for some roof system designs, Contact Carlisle for recommendations.

Notes: N/A = Not Acceptable √ = Acceptable

1. **SecurShield HD** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer meeting ASTM C1289, Type II, Class 4, Grade 1, for use as a cover board or recover board. Available 1/2" thick 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

   Features Ready Flash, a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

2. **SecurShield HD Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of ½" high-density, closed-cell polyisocyanurate foam core bonded to a premium performance coated glass facer (CGF) specifically designed for use as a cover board, meeting ASTM C1289, Type II, Class 4, Grade 1. Provides 5 times the R-value at one-fifth the weight of traditional gypsum cover boards. Achieves a UL Class A fire rating direct to combustible deck. Available in 1/2" thick, 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

3. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer, meeting ASTM C1289, Type II, Class 4, Grade 1. Specifically designed for use as a cover board or recover board. Available 1/2" thick 4' x 4' (6.5 lbs) and 4' x 8' panel (13 lbs) with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4' x 8' board.

4. **InsulBase HD** – a closed-cell polyisocyanurate foam core insulation board covered on both sides with glass-reinforced felt (GRF) facer meeting ASTM C 1289, Type II, Class 1, Grade 3. The product is available in 4' x 4' and 4' x 8' standard sizes with a thickness of one-half inch with an R-value of 2.5. ASTM C1289, Type II, Class 1, Grade 3.

5. **InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting

ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2" thick, 4' x 4' and 4' x 8' panels with an R-value of 2.5.. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

6. **Securock Cover Board –** A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier. Available in 1/4" to 5/8" thick and 4' x 4' or 4' x 8' size boards. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

7. **EcoStorm VSH Cover Board –** an engineered composite building material made from a proprietary blend of plastic and cellulose fiber sourced from post-industrial and post-consumer waste streams. EcoStorm VSH is a durable, extremely moisture and mold resistant building material with a core that does not disintegrate or delaminate in the presence of water. Available in 1/2" thick and 4' x 8' size board.

8. **DensDeck StormX Prime** – a reinforced gypsum cover board with an enhanced, moisture-resistant core and coated glass mat facers on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. DensDeck StormX Prime is extremely durable and is approved for use in assemblies meeting FM's Very Severe Hail (VSH) Classification. Available in 5/8" thickness and 4' x 4' or 4' x 8' size boards.

9. **DensDeck Prime** – gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

10. **DensDeck Cover Board** – gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

11. **R-Tech FanFold Recover Board –** Closed-cell lightweight expanded polystyrene (EPS) with polymeric laminated faces which meets ASTM C 578, while metallic side used with EPDM. Available in thicknesses of 3/8" to 3/4" with coverage 4' x 50' (2 squares). 4' x 8' units are also available.

12. **HP Protection Mat –** A nominal 6-oz per square yard UV resistant polypropylene needle punched fabric used either above the membrane as a slip-sheet for ballast or as an underlayment to the membrane. Available 15' x 300' roll (4500 square foot) weighing 0.06 lbs per square foot.

2.04 RELATED MATERIALS

A. **Sure-Weld Flashing (for use with Sure-Weld Adhered, Mechanically Fastened and Self Adhered Membrane Assemblies)**

1. **Sure-Weld Flashing:** Sure-Weld **non-reinforced flashing** is available in rolls **12" and 24" wide by 50' long**. Flashing is used for inside/outside corners and field fabricated pipe flashings when the use of pre-molded or pre-fabricated accessories is not feasible. In addition, **45-mil by 6" wide by 100' long**, **60-mil by 6" wide by 100' long, 9" wide by 50' long and 80-mil by 9" wide by 50' long** Sure-Weld **reinforced membrane** is available for overlaying fasteners and fastening plates.

2. **Sure-Weld Pressure-Sensitive Cover Strip:** A nominal 30-mil thick non-reinforced TPO membrane laminated to nominal 30-mil thick cured synthetic rubber pressure-sensitive adhesive used in conjunction with TPO Primer or Low-VOC TPO Primer to strip in flat metal flanges (i.e., drip edges). Available in rolls 6" wide by 100' long in colors of white, gray or tan. Not for use on 25—year or 30-year Warranty projects.

3. **Sure-Weld TPO Reinforced Overlayment Strip:** A heat-weldable, reinforced thermoplastic polyolefin membrane. It is available in 45-mil 6" x 100' and 60-mil 6" x 100' and 9" x 50' rolls in colors of white, gray or tan. It can be used to cover end laps on FleeceBACK and SAT TPO systems and to strip in flat metal flanges on details such as TPO coated drip edges, gravel stops, and scuppers.

4. **APEEL Cover Tape:** A 6"-wide, 1,640' long roll of APEEL Protective Film used to protect areas of Sure-Weld TPO membranes where APEEL Protective Film has been removed (around details) or was not factory applied (seams). APEEL Cover Tape allows contractors to keep 100 percent of the TPO surface clean during installation and is applied using the APEEL Cover Tape Applicator.

5. **Sure-Weld TPO Pressure-Sensitive RUSS:** A nominal 6" and 10" wide, 45-mil thick reinforced TPO membrane with nominal 3" wide 35-mil thick cured synthetic rubber pressure-sensitive tape adhesive laminated along one edge on 6" wide RUSS and along both edges on 10" wide RUSS. Used in conjunction with TPO Primer or Low-VOC TPO Primer. 6" wide RUSS is used as a base membrane securement along walls, curbs, etc.; 10" wide RUSS is used to form perimeter sheets on Mechanically Fastened Systems.

6. **Sure-Weld TPO T-Joint Covers:** A 60-mil thick injection molded TPO flashing formed into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60, 72, and 80-mil TPO systems and on 45-mil systems where step-offs have not been properly sealed. Packaged in boxes of 100. Available in white, tan or gray.

7. **Yellow Pressure-Sensitive (PS) Warning Strip**: A nominal 30-mil-thick non-reinforced TPO flashing laminated to a nominal 30-mil-thick, fully cured synthetic rubber Pressure-Sensitive adhesive and is available in 6" wide by 100' long rolls. Yellow Pressure-Sensitive Warning Strip can be applied to EPDM, TPO or Hypalon roofing systems to provide a visual warning of an impending hazard (i.e. roof edge, deep drain sump, skylight).

8. **Sure-Weld TPO Contour Rib Profile:** Used to obtain the appearance of standing seam metal roofing with the performance of a TPO single-ply membrane. The Contour Rib Profile measures 1-1/4" tall and 1-3/4" wide, including the welding flanges, while the vertical profile is a substantial 3/8" thick. The profile has a continuous 1/8" diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8" fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray and tan, as well as Special Colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) in 10' lengths and packaged 20 per carton.

9. **Pre-Molded Accessories:**

   a. **Inside Corners**: A pre-molded corner flashing for inside corners. Available in white, gray or tan; 60-mil thick.

   b. **Outside Corners**: A one-piece injection molded corner flashing used for flashing outside corners. Available in white, gray or tan; 60-mil thick.

   c. **TPO Curb Wrap Corners**: A prefabricated flashing made of 60-mil thick reinforced Sure-Weld Detail membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height. Four sizes are

available to fit curbs up to 6' by 6' in size. One curb requires 4 corners for a complete installation. TPO Curb Corners are packaged in boxes containing twelve corners. Custom sizes are available as a special order product requiring lead time.

d. **TPO Universal Corners:** a pre-molded flashing for use in a variety of corner details, including inside and outside corners. Available in white, gray and tan and are 60-mil thick.

e. **Pipe Flashings**: A pre-molded white, gray or tan pipe flashing used for pipe penetrations. Available for 3/4" –8" diameter pipes with clamping rings included.

f. **Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Weld Detail Membrane for pipes 1" – 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Custom sizes are available as a special order product requiring lead time.

g. **TPO Square Tubing Wraps**: A prefabricated flashing made of 60-mil thick reinforced Sure-Weld Detail membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration. Available for 3", 4", 5" and 6" square tubing.

h. **Molded TPO Sealant Pocket**: A pre-fabricated, interlocking, 2-piece, injection molded, flexible pocket with a rigid polypropylene vertical wall and pre-formed deck flanges. Pockets can be adjusted from 11.5" to 7.5" in length by 6" in width by following the cutting lines molded into the pocket. Used in conjunction with White One-Part Pourable Sealer for waterproofing pipe clusters or other odd shaped penetrations. Available in white, gray or tan.

i. **Pre-fabricated Sealant Pocket**: A two-piece, pre-fabricated sealant pocket that utilizes reinforced 60-mil TPO membrane and coated metal to form a rigid, oversized sealant pocket with a weldable horizontal deck flange. Available in 12" (total volume of 1.87 gallons). Packaged 2 per carton and available in white only. Refer to the applicable Technical Data Bulletin for dimensions and installation instructions. Custom sizes are available as special order product.

j. **Sealant Pocket Extension Legs**: Designed for use with the TPO Molded Sealant Pocket and the Pre-Fabricated Sealant Pocket to extend the length in increments of 10". Fabricated from 60-mil thick reinforced TPO membrane and TPO coated metal. Can be used full length, cut to size for customized lengths or welded to each other for extra long applications. Packaged 10 legs per carton and available in white only.

B. PRIMERS, ADHESIVES, SEALANTS AND CLEANERS

Refer to Product Data Sheets for material coverage rates and proper usage. Prior to the use of any of the products listed below, consult the Safety Data Sheets for applicable cautions and warnings.

1. Sure-Weld Products

a. **Sure-Weld Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Low-VOC Bonding Adhesive for TPO:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single-Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft2 per gallon finished surface. Available in 5 gallon pails**. This product does not comply with certain counties in the State of California which have additional restrictions on solvents.**

c. **Low-VOC Bonding Adhesive 1168:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft2 per gallon finished surface. Available in 5-gallon cans. **This product**

complies with all counties in the State of California which have additional restrictions on solvents.

d. **Aqua Base 120 Bonding Adhesive:** A semi pressure-sensitive, water based adhesive used as a two-sided contact adhesive. Coverage rate is 120 square feet per gallon finished surface (applied to membrane and substrate). Refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for Warranty limitations and other considerations.

e. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: priming unexposed asphalt prior to applying Flexible FAST Adhesive, adhering Sure-Weld TPO membrane, horizontally, for the field of the roof, and for adhering Sure-Weld FleeceBACK and Sure-Weld TPO membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application; 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per #40 cylinder and 2,000 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.

f. **Cut-Edge Sealant:** A clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.

g. **Water Cut-Off Mastic:** Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).

h. **Universal Single-Ply Sealant:** A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white or gray in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.

i. **White One-Part Pourable Sealer**: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 122 cubic inches of volume within a sealant pocket.

j. **Weathered Membrane Cleaner:** Used to prepare membrane for heat welding that has been exposed to the elements or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

k. **TPO Primer:** A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS.

l. **TPO Low-VOC Primer:** A solvent-based, low solids primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS. This Low-VOC product is ideal for use in states where environmental issues are a concern.

m. **CAV-PRIME Low VOC Primer:** A solvent-based, one-step primer for one-step priming of TPO surfaces prior to the application of Factory-Applied Tape, Coverstrip, SecurTape and all other pressure-sensitive products.

2.05 Fastening Components

A. Securement Strips (RUSS)

1. **Sure-Weld Pressure-Sensitive RUSS** (Reinforced Universal Securement Strip): A 6" or 10" wide, nominal 45-mil thick reinforced TPO membrane STRIP with a nominal 35-mil thick cured TPO splice tape adhesive laminated along one or both edges. (3" wide Factory-Applied TAPE laminated along one edge for the 6" wide RUSS and along both edges for the 10" wide RUSS.)

   a. 6" wide Pressure-Sensitive RUSS is used horizontally or vertically at the base of walls, curbs, etc., in conjunction with Seam Fastening Plates below the Sure-Weld TPO deck membrane for additional membrane securement. Available in rolls 100' long, 2 per carton.

   b. 10" wide Pressure-Sensitive RUSS is utilized for perimeter membrane securement along the center of field sheets to form perimeter membranes. Available in rolls 100' long, 1 per carton

B. **Fasteners**

The following Table illustrates criteria for fastening of Carlisle Insulation with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Insulation Fastening Criteria

Deck Type	Carlisle Fasteners (1)	Min. Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel or Lightweight Insulating Concrete over Steel	ASAP or InsulFast™	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10	1"	Note (2)	7/32"
	HD 14-10	1"	Note (2)	3/16"
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP, ASAP or InsulFast	Min. 1" (3)	N/A	N/A
Cementitious Wood Fiber	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (4)	N/A
Gypsum	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (2)	7/16", 1/2" or 9/16" (5)

Notes: N/A = Not Applicable

(1) For Adhered Systems, only 3" diameter insulation fastening plates can be used for insulation attachment.
(2) The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most cementious wood fiber decks do not require pre-drilling; however, Carlisle should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.

(5) Pilot hole size may be varied to maximize pullout resistance.

All Fasteners listed below can be used with Sure-Weld Roofing Systems. Refer to the applicable specification for specific requirements.

1. **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. It is used on minimum 22 gauge steel decks or minimum 15/32" CDX plywood decks. It is also designed to offer an optimum combination of driving performance, back-out and corrosion resistance with excellent pullout performance.

2. **HP-Xtra Fastener:** An oversized diameter #22 (.315") steel, threaded fastener used in conjunction with Piranha Xtra Plates for membrane securement into minimum 22 gauge steel or wood decks on Mechanically Fastened Roofing Systems.

3. **HP Fastener:** A threaded E-coat square head fastener **for insulation attachment only**. Used into steel, wood plank, minimum 15/32" thick plywood or minimum 7/16" thick oriented strand board (OSB).

4. **Pre-Assembled ASAP Fastener**: Carlisle's InsulFAST Fastener pre-assembled with a 3" diameter plastic plate used for **insulation attachment only** on Adhered and Mechanically Fastened Roofing Systems. Installed using OMG Roofing Products Fastening Tool.

5. **InsulFast Fastener**: A threaded Phillips drive fastener used with Carlisle Insulation Plates for **insulation attachment** to steel or wood decks.

6. **CD-10 Fastener:** A hammer-driven, non-threaded E-Coat fastener for use with structural concrete decks rated 3,000 psi or greater.

7. **HD 14-10 Concrete Fastener:** A #14 threaded fastener with a #3 Phillips drive used for minimum 3,000 psi concrete decks.

8. **Polymer Gyptec Fastener:** A glass-filled nylon auger fastener designed for securing insulation and/or membrane to specialty decks such as cement wood fiber or gypsum.

9. **Lite-Deck Fastener:** A deep, coarse threaded fastener used to secure insulation to gypsum and cementitious wood fiber decks in conjunction with Lite-Deck Plates.

C. **Fastening Plates**

1. **Piranha Plate**: A 2-3/8" diameter metal barbed fastening plate used with Carlisle HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement. This plate can be used for membrane or insulation securement on Mechanically Fastened Roofing Systems.

2. **Piranha Xtra Plate**: A 2-3/8" diameter metal barbed fastening plate with an oversized hole for use with Carlisle HP-Xtra Fasteners for membrane securement on Mechanically Fastened Roofing Systems.

3. **Seam Fastening Plate**: A 2" diameter metal plate used for insulation attachment on Mechanically Fastened Systems or membrane securement at angle changes on Adhered Systems in conjunction with the appropriate Carlisle Fastener.

4. **Insulation Fastening Plate**: A nominal 3-inch metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

5. **SecurFast Insulation Fastening Plates:** A nominal 2-7/8" hexagon metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

6. **Accutrac Insulation Plates:** A nominal 3" square, recessed or flat bottomed, metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener. Flat bottom plate is used with manufactured Philips Head fasteners only.

2.06 Insulation Securement Adhesive

A. **Flexible FAST Adhesive:** A spray (full coverage) or bead-applied, two-component polyurethane, construction grade, low-rise expanding foam adhesive used for attaching approved insulations to compatible roof decks or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.

B. **Flexible FAST Dual Tank:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. FAST Dual Tanks utilize an HFO blowing agent. HFO (hydrofluoroolefin) blowing agents are widely recognized as the next-generation environmentally friendly blowing agent, replacing their HFC (hydrofluorocarbon) predecessor. When extruded at 12" on center the coverage rate is 3,500 to 3,700 sq.ft. per set of Dual Tanks.

C. **Flexible FAST Dual Cartridge and 5-gallon Jug Adhesive:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. When extruded at 12" on center the coverage rate is 400-600 sq.ft. per carton of Dual Cartridges or 2,000-2,500 sq.ft. per set of 5-gallon Jug Adhesive.

D. **OlyBond 500 Bag in a Box** – A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates. Packaged in 5-gallon boxes of Part A and Part B formulations that are applied using a mechanical dispenser system. Applied in 1/2" to 3/4" beads or ribbons at the rate of 1 gallon per 150-250 square feet for 12" o.c. bead spacing. Perimeter bead spacing patterns and acceptable insulation and deck types are listed in the applicable Product Data Sheet.

E. **OlyBond 500 BA Spot Shot** - A two-component, polyurethane construction grade, low-rising expanding adhesive designed for bonding insulation to various substrates. Applied in 1/2" to 3/4" beads or ribbons using a portable 1:1 applicator (oversized, dual-cartridge caulking gun). Refer to the Product Data Sheet for bead spacing with reference to building height.

2.07 Vapor/Air Barrier

A. **General**

If insulation is to be adhered to the vapor retarder with Flexible FAST Adhesive, the vapor retarder must be compatible and shall be fully adhered to the substrate. Available products include Carlisle's VapAir Seal 725TR Air and Vapor Barrier, VapAir Seal MD Air and Vapor Barrier and spray or roller applied butyl coatings. Installation requirements for Carlisle's VapAir Seal 725TR Air and Vapor Barrier are identified in **Spec Supplement G-08**

"Application Procedures for Carlisle's VapAir Seal 725TR Air and Vapor Barrier/Temporary Roof" and Carlisle's VapAir Seal MD Air and Vapor Barrier are identified in **Spec Supplement G-12 "Application Procedures for Carlisle's VapAir Seal MD Air and Vapor Barrier"** in the Carlisle Technical Manual.

B. **Carlisle VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with Flexible FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

B. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23' long (460 square feet).

C. **Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application.

D. **CCW-702 Primer and 702LV Primer (Low-VOC)** - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., DensDeck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

E. **CCW-702WB** – a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, DensDeck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

2.08 Metal Accessories, Edgings, Coping, And Terminations

A. General

Products listed below can be used with any of the available Carlisle Roofing Systems. Refer to the applicable Carlisle details and installation instruction manuals for specific installation criteria.

B. Products

a. **Sure-Weld Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 40-mil 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. Coated metal is available in sheets 4' x 10' and comes packaged 25 sheets per pallet (also available packaged 10 sheets per pallet on a direct ship basis). Available in white, gray or tan. Also available in TPO Special Colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) and comes packaged 5 sheets per pallet on a direct ship basis.

b. **SecurWeld® 200/300 Drip Edge:** Pre-fabricated with TPO coated metal edging. Heat-weld membrane directly to edge. Available in sizes up to 8” fascia height and in colors: white, gray or tan.

4. **SecurEdge 200 Fascia**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI ES-1 certified.

5. **SecurEdge 2000 Standard Fascia:** An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI ES-1 certified. Also available in **SecurEdge 2000 Extended Fascia** (Up to 13” Face Height) and **Securedge 2000 Canted Fascia**.

6. **SecurEdge 3000 Roof Edge System**: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 32, 40, 50 or 63-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI ES-1 certified. Also available in **SecurEdge 3000XT Roof Edge System** (Up to 13” Face Height).

7. **SecurEdge 4000:** A two-piece assembly that includes a continuous cleat and a decorative fascia cover. Available in pre-painted Kynar 500-coated 0.40” formed aluminum and 24-gauge Galvalume steel, this product features 22-gauge pre-punched cleats with fasteners spaced at 12” on center. ANSI/SPRI ES-1 certified.

8. **Termination Bar:** A 1" wide and 98-mil thick extruded aluminum bar pre-punched 6" on center which incorporates a sealant ledge to support Universal Single-Ply Sealant or sealant by others and provide increased stability for membrane terminations.

9. **SecurEdge Term Bar Fascia:** A 1.75” wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040” aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12’ lengths for fewer joints/seams, fewer sections to handle and faster installation.

10. Refer to **Spec Supplement P-01 “Related Products”** for other edgings and coping materials.

2.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance, once a month or more, is necessary to service rooftop equipment.

1. Walkway Types

a. **Sure-Weld Heat Weldable Walkway Rolls:** Designed to protect Sure-Weld membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Weld membrane using an automated heat welder or hand held heat welder. The diamond plate tread pattern offers superior slip resistance. The walk edges are trimmed in safety yellow to better define the designated

traffic flow. Walkway Rolls are 34” wide by 50' long and are overall a nominal 180 mils thick. Available in white, tan or gray with safety yellow welding tabs along both edges.

NOTE: As an option, walkway rolls may be adhered to the membrane surface with SecurTAPE™/TPO Primer

c. **Sure-Weld TPO Crossgrip Walkway Rolls:** Manufactured from TPO and may be used in lieu of standard Sure-Weld TPO Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip TPO Walkway Rolls are effective for winds up to 55 mph. Rolls are 36” wide by 33’ long, available in white, gray and yellow.

d. **Carlisle’s Interlocking™ Rubber Pavers**: 24" X 24" X 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in black and terra cotta.

e. **Hanover Ballast and Lightweight Ballast Pavers:** The standard, 24” x 24” x 1-13/16” thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2” x 23-1/2” x 1-1/4” thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

2.10 OTHER CARLISLE ACCESSORIES

Refer to **Spec Supplement P-01 “Related Products”** for additional accessories.

Part III – EXECUTION

Prior to commencing with the installation of any of the Sure-Weld TPO Membrane Systems refer to Paragraph 1.05 “Warranty Tables” for applicable components and proper securement method suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are considered to be beyond the scope of this specification.

3.01 General

A. Safety Data Sheets (SDS) must be on location at all times during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

B. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

C. A proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.

3.02 Roof Deck/Substrate Criteria

A. Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system, as well as construction loads and live loads, in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

B. Withdrawal resistance tests are strongly suggested to determine the suitability of a roof deck. Refer to **Design Reference DR-06 “Withdrawal Resistance Criteria”** in the Carlisle Technical Manual proper procedures for

conducting pullout tests.

C. Defects in the substrate must be reported and documented to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Applicator shall not proceed with installation unless defects are corrected

D. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation. (Migrating warm air through gaps left unsealed can result in condensation and weakening of the insulation bottom facer leading to possible board dislodgement.)

E. **For all projects** (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.

F. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

G. For direct application over an acceptable roof deck/substrate or when HP Protective Mat is specified and approved by Carlisle as the membrane underlayment in accordance with the Roof Deck and Substrate Criteria Table, the substrate must be smooth, steel trowel finished (structural concrete), free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material.

H. The following chart identifies the acceptable roof decks/substrates and the minimum underlayment requirements, Tables in Paragraph 1.05 for specific acceptable underlayment types, based on warranty duration:

Roof Deck & Substrate Criteria

TPO Membrane		**Acceptable Roof Deck/Substrate**
Adhered	Mechanically Fastened	**NEW CONSTRUCTION**
Insulation	Insulation	Steel (min. 22 gauge) (1)(2), Wood Plank (3/4" min.), or Fibrous Cement
Direct Application	Insulation	Structural Concrete (min. 3000 psi)
Direct Application (5)	Direct Application (5)	Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)
Direct Application (10)	Direct Application	Lightweight Insulating Concrete
Adhered	Mechanically Fastened	**RETROFIT / NO TEAR-OFF**
Direct Application (9) (11)	Direct Application (9) (11)	Existing Smooth Surface BUR (3)(8) or Mineral Surface Cap Sheet
Insulation	Insulation	Gravel Surfaced BUR (3)(4) or Coal Tar Pitch (3)(4)(12)
Direct Application (7)(9)	Direct Application (7)(9)	Modified Bitumen (11)
Insulation	Direct Application (6)	Existing Single-Ply (11)
Complete Tear-off Required	Complete Tear-off Required	Sprayed-in-place Urethane
Adhered	Mechanically Fastened	**RETROFIT / TEAR-OFF**
Insulation	Insulation	Existing roof material removed (regardless of deck type)

Notes:
(1) Local codes must be consulted regarding thermal barrier requirements.
(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge. Refer to the Metal Retrofit Roofing System Specification, published separately, for installation options.
(3) Loose gravel must be removed to avoid entrapment of moisture.
(4) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.

(5) Maximum Warranty Duration of 20 Years.
(6) An approved underlayment is required over existing ballasted (ballast removed) single-ply systems and PVC roofing systems of any type.
(7) Direct application permitted over smooth surfaced modified bitumen. To reduce the probability of cold welds, membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where splices intersect modified bitumen field seams, 6" wide Sure-Weld Flashing must be heat welded over intersections.
(8) Existing Type III or IV smooth asphalt BUR Only.
(9) Possible staining/discoloration of the membrane may result when installing this system directly over existing smooth surfaced BUR or modified bitumen. If aesthetics are critical, an approved insulation should be specified beneath the membrane.
(10) New approved cellular lightweight insulating concrete must have a minimum compressive strength of 200 psi. Except when the lightweight concrete is poured over slotted steel decks, pressure relief vents must be installed every 2,000 square feet. Direct application is not permitted where lightweight concrete is poured over an existing roofing material. Equilibrium moisture content after hydration/curing shall not exceed 12%.
(11) Maximum warranty available 20 YR with 55 MPH peak gust wind speed coverage. Carlisle may be contacted for other warranty options.
(12) If insulation is specified to be secured to an existing coal tar pitch roof with Carlisle Flexible FAST Adhesive or hot asphalt, minimum 1.5” thick Polyisocyanurate is the required minimum thickness when white membrane is specified.

I. **On retrofit - recover projects**, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation of type specified so it is relatively flush (+/- 1/4") with the existing surface.

1. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding non-reinforced PVC membrane).

2. If total removal of existing PVC membrane is not specified, existing non-reinforced membrane may be cut into maximum 10' x 10' sections, when the new insulation or membrane underlayment is to be mechanically fastened.

3. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

7. When installing this roofing system over an existing **gravel surfaced built-up roof**, **loose gravel must be removed**. Power brooming is recommended by Carlisle to remove the loose gravel, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent insulation from bridging.

8. On retrofit projects, all existing phenolic insulation must be removed.

9. Refer to table above for other Recover/Retro-fit considerations.

J. **Vapor Retarder Installation**

For Carlisle’s Vapor Retarder refer to **Spec Supplement G-08 “Application Procedures for 725TR Air and Vapor Barrier”.** Follow the respective vapor retarder manufacturer's recommended installation procedures and the specifier's instructions for the installation of the product specified. When insulation is to be set in adhesive, verify compatibility with Carlisle when Vapor Retarder by others is specified.

K. **Wood Nailers**

a. Install wood nailers in locations that have been designated by the specifier and as approved by Carlisle. Refer to **Design Reference DR-08 “Wood Nailers and Securement Criteria”** for Wood Nailer Criteria.

b. Wood nailers are not covered by the Carlisle Warranty.

3.03 Insulation/Underlayment

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation

thickness to ensure the temperature at the vapor retarder will not fall below the dew point.

2. For new construction projects in cold climate regions, the use of vapor retarders or air barriers is strongly recommended to protect insulation from moisture generated during construction.

3. Multiple layers of insulation are recommended with all joints staggered between layers.

4. Do not install more insulation/underlayment than can be covered by membrane in the same day.

5. All insulation boards must be butted together with no gaps greater than 1/4". Gaps greater than 1/4" are not acceptable.

6. Restrictions:

   a. Carlisle Roofing Systems cannot be specified in conjunction with Phenolic Insulation.

   b. Fiberglass insulation cannot be specified even if overlaid with additional insulation or membrane underlayment.

   c. For all Thermoplastic Roofing Assemblies, the use of insulation by others is not acceptable when a Carlisle Membrane System Warranty is specified. Carlisle insulation must be used.

3.04 Insulation Attachment

A. **General**

1. Prior to proceeding with insulation securement refer to Warranty Tables, Paragraph 1.05, for attachment method and appropriate fastening density required for the specific Carlisle Warranty.

B. **Adhered Roofing Systems**

1. **Mechanical Attachment**, insulation fastening density will vary based on insulation type, thickness, and required warranty. Warranty Tables in Paragraph 1.05 should be referenced for fastening density and the appropriate Carlisle detail may be consulted to identify acceptable fastening pattern.

   a. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Refer to **Design Reference DR-05 "Insulation Fastening Patterns"** for fastening pattern reference.

   b. When insulation securement is to comply with Factory Mutual (FM) approvals, follow the requirements of the specifier concerning additional securement at the roof perimeter and corners. Also refer to **Design Reference DR-05 "Insulation Fastening Patterns" for** various fastening patterns.

   c. On Reroof/No Tear off projects with a maximum roof height of 40', any Carlisle Insulation (i.e., 1/2" SecurShield HD, HP Recovery Board, Polyisocyanurate less than 1-1/2" thick) may be secured at the minimum rate of 11 Fasteners per 4' x 8' board (5 Fasteners per 4' x 4' board).

   d. When Oriented strand board (OSB) is specified for membrane underlayment, utilize Stormbase OSB/Polyiso Composite, mechanically fastened to the deck at the rate 17 fasteners for 4 x 8 board in accordance with Carlisle Details. When positioning OSB, butt edges and stagger joints of adjacent panels.

2. **Adhesive attachment**, Carlisle Urethane Adhesive Full Spray (Flexible FAST) or Bead (Flexible FAST or Olybond) may be used. When bead adhesive is specified bead spacing will vary based on Warranty coverage, refer to Warranty Tables, Paragraph 1.05 and appropriate Carlisle Details. CAUTION: Apply adhesive bead so that the distance from the edge of the board does not exceed half the bead spacing (i.e. within 6" of bead spacing of 12" O.C.).

   a. **CAUTION: Do not apply urethane adhesives directly to un-weathered asphalt, (new or residual).**

   b. **CAUTION: Especially in cold regions on tear-off projects or new construction gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture**

could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.

c. On FM Global insured projects, consult FM Global's local representative concerning the use of adhesive to attach insulation to steel decks.

d. Check to ensure the substrate is clean, free of debris, other contaminants, and dry. Adhesive cannot be applied to a wet or a damp surface.

e. Apply Adhesive over the dry substrate area at the coverage rates indicated in **Spec Supplement G-03 "Insulation Attachment with Flexible FAST Adhesive".**

f. Allow the adhesive to rise up approximately 1/8" and develop strings prior to setting insulation boards into adhesive.

Note: String-time is measured by touching the adhesive with a splice wipe and looking for development of "strings" of adhesive as you pull the splice wipe out of the adhesive. With Flexible FAST Adhesive, string time is generally around 1-1/2 – 2 minutes after application at room temperature.

g. **Walk the boards into the adhesive and roll using the 30" wide, 150 pound segmented steel roller** to ensure full embedment. Optimal set up time should be approximately 5 to 7 minutes.

CAUTION: Walking on the boards immediately after placement in adhesive can cause slippage/movement until the adhesive has started to set up.

On roofs with a slope greater than 1/2" in 12", begin adhering insulation at the low point and work upward to avoid slippage.

A person should be designated to walk/roll-in all boards and trim/slit or apply weight as needed to ensure adequate securement.

h. Refer to **Spec Supplement G-02 "Flexible FAST Adhesive Equipment and Set-Up Requirements**" and **G-03 "Insulation Attachment with Flexible FAST Adhesive"** for application procedures and coverage rates.

3. **Alternate attachment method**, the specifier may select an alternate insulation attachment that incorporates a solid mopping of the insulation with hot asphalt (ASTM D312, Type III or IV). If the attachment method is to be covered by the Carlisle Warranty, Carlisle must be contacted for specific requirements. Upon review and acceptance by Carlisle, the maximum warranty coverage available is limited to 15 Year with maximum Peak Gust Wind Speed Coverage of 55 mph, for other warranties contact Carlisle.

a. Extruded or Expanded Polystyrene insulation are not acceptable when this alternate attachment method is specified.

b. The existing gravel surfaced built-up roof must be scraped to remove all loose gravel. Large blisters that may prevent continuous embedment of insulation must be repaired. The surface of the substrate must also be dry and clear of foreign material.

c. On coal tar pitch, when deemed compatible by the specifier, minimum 1.5" Polyisocyanurate is the required membrane underlayment when using darker heat weldable membranes (tan or gray). If Sure-Weld white membrane is used, minimum 1" thick Polyisocyanurate is required.

d. For successful attachment, proper asphalt temperatures must be maintained and the specifier's requirements concerning the installation of a base sheet (where required) and quantity of hot asphalt must be followed.

e. The maximum insulation board size shall not exceed 4' X 4'. Trim insulation boards around crickets and saddles to ensure continuous embedment.

f. Care must be exercised to prevent contamination of the top surface of the insulation. Asphalt oozing through insulation joints must be wiped from the surface. Contact with fresh asphalt can result in discoloration of the Sure-Weld membrane.

g. A grid shall be installed subdividing the roof in individual sections of 2400 square feet. Required for warranties up to 10 year with wind speed coverage up to 55mph.

h. The wood nailers are installed relatively flush with the insulation surface and the membrane is to be fastened with seam fastening plates and Carlisle HP or HP-X fasteners on 12” o.c. For wood nailer installation, refer to **Design Reference DR-08 “Wood Nailers and Securement Criteria”.**

C. **Mechanically Fastened Roofing Systems**

1. **Carlisle Fasteners and Fastening Plates are required for insulation securement**. Refer to Insulation Fastening Criteria Table in Paragraph 2.05, for appropriate fastener and deck penetration. The fastener can be used with either a 2” diameter Seam Fastening Plate or 2-3/8" diameter Pirahna/Pirahna Xtra Plates OR 3" diameter Insulation Fastening plate.

2. **Any Carlisle approved insulation or cover board** shall be mechanically fastened to the roof deck at the minimum rate of **1.25 fasteners and plates per every 8 square feet** (5 fasteners in a 4 x 8 board) for minimum 1-1/2” thick insulation and coverboards. Insulation less than 1-1/2” thick requires the use of 8 fasteners and plates in a 4’ x 8’ board (1 per 4 square feet).

   CAUTION: Carlisle Polyisocyanurate Insulation with a thickness less than 1.5" installed over an existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation.

3. Use of DensDeck, DensDeck Prime and Dens Deck StormX Prime should be limited to assemblies with slopes greater than 2” per foot to ensure compliance with external fire codes.

3.05 Membrane Placement and Securement

A. **General**

1. **Ensure** that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.

2. **Sweep** all loose debris from the substrate.

3. If aesthetics are of concern, protection should be specified to avoid discoloration of the white membrane surface resulting from adhesive residue or excess foot traffic.

4. In addition to the primary membrane securement (Bonding for Adhered and Fastening for Mechanically Fastened Assemblies), additional membrane securement is required at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope or combined slopes exceed 2" in one horizontal foot, and at other penetrations in accordance with the applicable Carlisle details. Refer to Paragraph F for additional membrane securement.

B. **Membrane Placement**

Maximum 16’ wide Sure-Weld is fully adhered or (12’ wide) mechanically fastened to an approved insulation or substrate.

1. **Position** Sure-Weld membrane over the acceptable substrate. For a mechanically fastened assembly, ensure proper number of perimeter sheets are positioned along the perimeter of the roof as outlined in Paragraph 1.05 “Warranty Tables”.

2. **Position** field sheets perpendicular to the steel deck flutes in Mechanically Fastened Applications.

3. **Place** adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum overlap width. It is recommended all overlaps be shingled to avoid bucking of water.

C. **Membrane Securement / Bonding - Adhered Roofing System**

1. **Adhere** Sure-Weld membrane to an acceptable substrate with Carlisle Bonding Adhesive. CAV-GRIP III low-VOC aerosol adhesive may be utilized with Sure-Weld TPO membranes. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Adhesive must be applied to both the membrane and the surface to which it is being bonded.

2. On projects at high altitudes (6,000' and above), rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

3. **Fold** membrane sheet back so half the underside is exposed. Sheet fold should be smooth without wrinkles or buckles.

4. **Stir** Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.

5. **Apply** Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be heat welded over adjoining sheet.

   When using **Sure-Weld Bonding Adhesive**, a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate) shall be achieved. **Apply** adhesive evenly, without globs or puddles with a plastic core, medium nap paint roller to achieve continuous coating of both surfaces. A 9-inch roller will easily fit into the 5-gallon containers.

   A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained. Backrolling is required.

   CAUTION: Due to solvent flash-off, condensation may form on freshly applied Bonding Adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of Bonding Adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat at the coverage rate which is approximately half the coverage rate stated above to the previously coated surface when conditions allow for continuing.

   NOTE: When Aqua Base 120 is specified refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for application methods and warranty requirements.

6. **Allow** adhesive to flash-off until it does not string but remains tacky to a dry finger touch.

   CAUTION: Care must be exercised to ensure proper drying. Avoid thin areas of adhesive because over drying can occur and proper adhesion may not be achieved.

7. **Roll** the coated membrane into the coated substrate while avoiding wrinkles.

8. **Brush** down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.

9. **Fold** back the unbonded half of the sheet and repeat the bonding procedures. **Apply** Bonding Adhesive to the remaining exposed underside of membrane and adjacent substrate and complete this section as described above.

10. **Install** adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch heat weld. It is recommended that all splices be shingled to avoid bucking of water.

    CAUTION: If aesthetics are of concern, protect completed sections of the roof so Bonding Adhesive will not discolor the membrane surface. Do not place Bonding Adhesive containers or their lids directly on the surface of the Sure-Weld membrane, to avoid rust stains.

D. **Membrane Securement / Fastening - Mechanically Fastened Roofing Systems**

1. Sure-Weld TPO membranes shall be mechanically attached to the structural deck with specified Carlisle Fasteners and designated Plates, for fastening densities and numbers of perimeter sheets refer to Warranty Tables, Paragraph 1.05.
2. Membrane Fastening Selection Table:

Membrane Fastener Selection

Deck Type	Carlisle Fasteners*	Carlisle Plate	Min. Penetration
Steel or Lightweight Insulating Concrete over Steel	HP-X	Piranha Plates	3/4"
	HP-Xtra	Piranha-Xtra Plates	
Structural Concrete, rated 3,000 psi or greater	CD-10	Piranha Plates	1"
	HD 14-10	Piranha Plates	
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP-X	Piranha Plates	Min. 1"
	HP-Xtra	Piranha-Xtra Plates	
Cementitious Wood Fiber	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"
Gypsum	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"

Refer to Warranty Tables in Paragraph 1.05 for fastening densities and number of perimeter sheets.
*Determine proper fastener length for deck penetration, refer to Table 2.05B.

3. On steel decks, membrane shall be positioned with seams perpendicular to the steel deck flutes. This allows the external forces on the roof assembly to be distributed between multiple steel deck panels. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual.

4. Perimeter Sheets

   The number of perimeter sheets and fastener spacing is dependent on the building height, wind zone location and warranty duration as outlined in Warranty Tables in Paragraph 1.05.

   The roof perimeter is defined as all edges of each roof section (i.e., parapets, building expansion joints at adjoining walls, penthouse walls, etc.). When multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 10'. Perimeter sheets are not required at the base of the wall at the lower level.

   Note: Expansion joints, control joints and fire walls in the field of the roof or roof ridges with slopes less than 3" to the horizontal foot are not considered as part of the roof perimeter.

   For Sure-Weld membranes, perimeter sheets can be formed by using individual 4' to 6' wide sheets or by sub-dividing 8' or 10' wide field sheet using 10" wide Pressure-Sensitive RUSS strip or row of seam fastening plates as described below.

   a. **Individual perimeter sheets** (TPO – 4', 5' or 6' wide)

      Position membrane along the perimeter of the roof over the acceptable insulation/underlayment. The perimeter membrane width from line of securement to line of securement should be approximately 3'-6" to 4'-0" wide.

   b. **RUSS - Reinforced Universal Securement Strip Method (Sure-Weld Membrane Only)**

      1) When **field sheets are positioned parallel to a roof perimeter, 10" wide Sure-Weld Pressure-Sensitive RUSS** (with 3" wide tape each side) shall be placed approximately down the center of the 8'-0", 10'-0" or 12'-0" wide Sure-Weld TPO field membrane sheets. When a RUSS divides a field sheet in half, two perimeter sheets are created.

      2) When field membrane sheets **extend perpendicular to the edge of the roof**, position the **10" wide Sure-Weld Pressure-Sensitive RUSS** beneath the membrane along the center of each field sheet

extending a distance equal to 0.4 times the building height to create perimeter sheets.

CAUTION: 6" wide Sure-Weld Pressure-Sensitive RUSS is only available with 3" wide SecurTAPE on one side and therefore cannot be used to form perimeter sheets.

c. **Fastening Plates Method**

In lieu of the RUSS securement method, position a row of seam fastening plates in the locations identified in Paragraph 4.b.1 and 4.b.2, secure plates with appropriate fastener and overlay plates with 6" wide Pressure-Sensitive Sure-Weld Cover Strip (TPO Only) overlay the plates as follows:

1) Sure-Weld Installation – Warranties Up to 20 Years - 6" wide Pressure Sensitive Sure-Weld Cover Strip or 6" wide Sure-Weld membrane centered over the plates and heat welded to the field membrane. Seal cut edges of TPO overlay with TPO Cut-Edge Sealant to seal any exposed scrim.

2) Projects with Warranties greater than 20 Years, center 6" wide section of TPO membrane (equal thickness to the deck membrane) over the plates and heat weld the field sheets. All cut edges of TPO overlay must be sealed with TPO Cut-Edge Sealant to seal any exposed scrim.

Note: Perimeter sheets can also be formed by positioning Rhinobond plates placed along the center of a field membrane (if heat induction welder is available on job-site). Refer to "Attachment I" for additional information.

d. **Building with Special Conditions:**

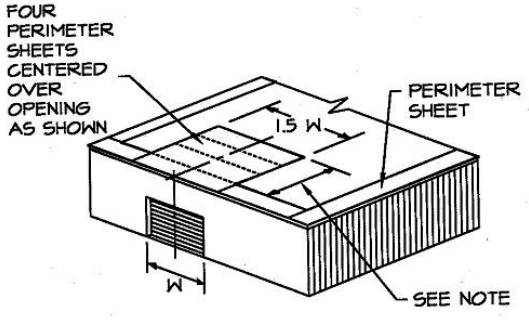
Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities) will typically require additional perimeter membrane securement, an increased fastening density or other enhancement.

e. **Buildings with large openings**

When any wall contains major openings with a combined area which exceeds 10% of the total wall area on which the openings are located, four (4) perimeter sheets (centered over the opening) must be specified as shown.

As an option to the above perimeter securement, an adhered membrane section may be used in lieu of the mechanically fastened membrane at large openings in accordance with the Carlisle Specification for the Sure-Weld Adhered Roofing System.

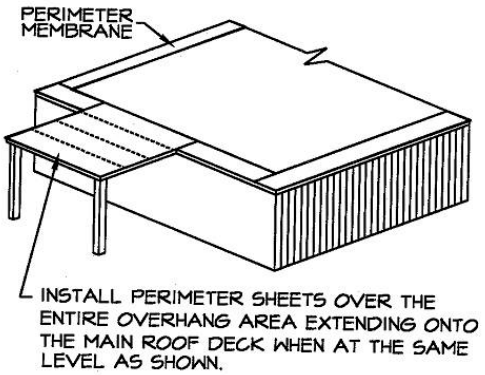
NOTE: Depth of perimeter area, noted above, shall not be less than 2.5 times the width of the opening.



f. **Buildings with overhangs**

The membrane must be specified with perimeter sheets installed over the entire overhang area extending onto the main roof deck when at the same level.

As an option, an adhered membrane section may be used in lieu of the mechanically fastened membrane at building overhangs in accordance with the Carlisle Specification for



the Sure-Weld Adhered Roofing System.

5. **Field Membrane**

   a. **Position** adjoining field membrane sheets to allow an approximate overlap of 5-1/2" at those locations where Fastening Plates are located (along the length of the membrane); at the same time overlap end roll sections (the width of the membrane) a minimum of 2".

   b. **Secure the membrane** at the approved fastening density with the required Carlisle Fastener and Fastening Plates.

   c. For installation of membrane with fullness, tighten the sheet between fasteners as follows:

      1) Unroll sheets and position.

      2) Place a fastener and plate in one end of the sheet on the appropriate fastener mark. Go to the opposite end of the sheet, pull it tight and place a fastener and plate at the appropriate mark. Place the remaining fasteners into the sheet.

      3) Proceed to weld the sheet in place and continue across the roof.

6. **Prevention of membrane distortion during windy conditions:**

   a. Unroll sheet approximately 5' and position edge of membrane with overlap line on adjacent sheet.

   b. Install fasteners along the 5' exposed edge.

   c. While the 5' of exposed membrane is being fastened, begin welding the overlapped edge using the Automatic Heat Welder.

   d. As sheet is being welded and fastened concurrently, unroll membrane. Unroll only enough membrane to stay a few feet ahead of welding and fastening process. This reduces amount of unsecured membrane to be distorted by wind.

   e. Continue this process for each adjoining sheet.

E. **SAT (Self-Adhering Technology) – Self-Adhered Roofing System (membrane bonding)**

10’ and 12’ wide Sure-Weld SAT is fully adhered to an approved insulation or substrate with Factory Applied Pressure-Sensitive Adhesive.

1. **Position** Sure-Weld SAT membrane over the acceptable substrate.

2. **Fold** membrane sheet back so half the underside is exposed.

3. **Remove** the release liner on one half of the sheet starting from the split in the liner at the middle of the sheet. The liner should be removed at an angle to reduce risk of splitting or tearing.

4. **Broom** the membrane across the sheet, onto the substrate while avoiding wrinkles. To achieve the best adhesion, the membrane should also be rolled onto the substrate with a 30” wide, 150 lb. weighted, segmented roller. When applying the Carlisle Sure-Weld SAT TPO membrane it is recommended to maintain a large curve on the leading edge of the membrane. This will help eliminate creases and bubbles that cannot be removed after the sheet is in place.

5. **Fold** back the remaining half of the sheet and repeat the above process.

F. Additional Membrane Securement

1. Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches to one horizontal foot, and at all penetrations as identified on the Carlisle details.

2. Securement may be achieved as follows:

   a. On Mechanically Fastened Roofing Systems, Carlisle's Piranha Fastening Plates are used to secure the membrane with the appropriate Carlisle Fastener at the base of walls and penetrations and flashed as shown on the applicable Carlisle detail (excluding OSB, cementitious wood fiber and gypsum decks where the required Carlisle Fastener is installed with the associated 2" diameter plate). On **Adhered Roofing Systems**, Carlisle standard 2" diameter Seam Fastening Plates may be used in lieu of Piranha Plates.

   b. Securement of the membrane shall be a maximum of 12 inches on center. Fasteners shall be positioned 6 inches minimum to 9 inches maximum from the inside or outside corner.

   c. On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

   d. After securing the membrane, flash in accordance with the appropriate detail.

3.06 Heat Welding Procedures

A. General

1. APEEL Protective Film and SeamShield Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat welding, the APEEL Protective Film can be left in place for up to 90 days.

2. Heat weld the Sure-Weld membrane sheets using the Automatic Heat Welder or Hot Air Hand Welder and silicone roller.

3. When roof slope exceeds 5" per horizontal foot, use of the Automatic Heat Welding Machine may become more difficult; use of the Hand Held Hot Air Welder is recommended.

4. **Check the surfaces** of the membrane to be heat welded to ensure they are properly prepared.

   The surfaces to be heat welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned with Weathered Membrane Cleaner. No residual dirt or contaminants should be evident.

B. Automatic and/or Hand Held Heat Welder Equipment

1. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for:

   a. Temperature Settings.
   b. Equipment Set-up.
   c. Additional Information.

C. Membrane Welding

1. Prepare the Automatic Heat Welder and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2. Position the Automatic Heat Welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

3. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap. Machine will begin moving along the seam immediately.

4. Weight plates provided on Automatic Welders must be utilized.

5. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

   CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which

could result from a tightly stretched cord).

6. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Sure-Weld membrane sheets.

   When using **60-mil or 80-mil** Sure-Weld, a **TPO "T"-Joint Cover** must be applied over all "T" joint splice intersections.

7. To remove the Automatic Heat Welder from the finished splice, disengage and pull the nozzle from the seam area, the machine will stop automatically.

8. Mark the end of the heat welded seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Heat Welder is stopped and restarted.

9. Perform a test weld, at least, at the start of work each morning and afternoon. Test welds should be made if any changes in substrate or weather conditions occur.

D. **Preventing Membrane Creeping During Welding**

1. The operator of automatic welding equipment must apply foot pressure to the membrane, keeping the membrane tight under the welder. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

E. **Test Cuts**

1. Perform a test weld at least at the start of work each morning and afternoon. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

F. **Seam Probing**

1. A cotter pin puller Carlisle TPO Seam Probe is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

G. **Seam Sealing**

1. Apply **Cut-edge Sealant** on all cut edges of the reinforced Sure-Weld membrane (where the scrim reinforcement is exposed) **after seam probing** is completed. When a 1/8" diameter bead of TPO Cut-Edge Sealant is applied, approximately 225 – 275 linear feet of coverage per squeeze bottle can be achieved.

   a) Cut-Edge Sealant is not required on vertical Sure-Weld splices.

3.07 Welding Problems/Repairs

A. A Hand Held Hot Air Welder and a 2" wide silicone roller must be used when repairing the Sure-Weld membrane. When the **entire** heat welded **seam** is to be **overlaid**, an **Automatic Heat Welder** may be used.

B. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned with Weathered Membrane Cleaner. The membrane can typically be repaired with standard cleaning methods. In cases where the standard cleaning method is not sufficient, the following procedures must be used.

1. Scrub the area to be welded with a "Scotch Brite" Pad and Weathered Membrane Cleaner.

2. Clean all residue from the area to be welded with a Splice Wipe or a clean natural fiber (cotton) rag.

3. Weld the new membrane to the cleaned area using standard welding procedures.

C. Clean all residue from the area to be welded with a Splice Wipe or clean natural fiber (cotton) rag.

D. Weld the new membrane to the cleaned area using standard welding procedures.

E. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller. Depending on conditions, a splice overlay may be required.

F. Position the hand held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

G. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test weld areas must be repaired by overlaying the damaged area with a separate piece of Sure-Weld reinforced membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

H. **Probe** all edges of the overlay once cooled to ensure a proper weld has been achieved.

I. **Seal** all cut edges of Sure-Weld Reinforced membrane with TPO Cut-Edge Sealant.

Note: The same overlay repair procedures may be used for punctures in the Sure-Weld membrane.

3.08 Flashings

For other requirements which must be complied with in order for Carlisle warranty to be issued, refer to Spec Supplement G-05 "Flashing Considerations / Metal Work".

A. **General Considerations**

1. The height of new wall flashing must extend above the anticipated water level or slush line.

2. On 15 or 20-year Warranty projects, Carlisle's Termination Bar, in conjunction with Water Cut-Off Mastic, must be specified under all metal counterflashings and surface mounted reglets.

3. To comply with various warranty options, flashing material must equal the required minimum membrane thickness but shall not be less than 60-mils thick. For projects with 25 year or greater warranties Carlisle Pre-Fabricated accessories must be used unless prohibited by a specific field condition.

4. **On retrofit projects**

   Bitumen-based roof cement and asphaltic-based flashing material, if allowed to remain in contact with the membrane, will cause severe membrane discoloration. Existing wall and curb flashing must be removed or concealed with a new acceptable substrate.

   a. The specifier must examine structural supports for rooftop equipment to determine if reasonable access to the membrane beneath the equipment is provided. Carlisle should be consulted for clarification when access to the membrane system will be restricted.

   b. When hot pipes or other similar penetrations exceed 160° F (71° C), they must be designed to incorporate an insulated metal collar and rain hood designed to maintain a surface temperature less than 160° F (71° C) (TPO).

5. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld **reinforced** membrane. Sure-Weld non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets and scuppers as well as inside and outside corners when the use of pre-molded accessories is not feasible.

6. When possible, all reinforced membrane splices are heat welded with the Automatic Heat Welder. The Hand Held Hot Air Welder should be utilized in hard to reach areas, smaller curbs, vertical splices and when using non-reinforced membrane.

   a. The new Sure-Weld membrane flashing must not conceal weep holes or cover existing throughwall flashing.

   b. Install surface mounted reglets and compression bar terminations directly to the wall surface.

7. In areas where metal counterflashing or surface mounted reglets are used as vertical terminations, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

B. **Application of Bonding Adhesive**

1. Membrane shall be adhered to vertical surfaces with Sure-Weld Bonding Adhesive. CAV-GRIP III low-VOC aerosol adhesive may be utilized with Sure-Weld TPO membranes. Bonding Adhesive shall be applied continuously, without globs or puddles.

2. **Allow** adhesive to flash-off until it is tacky but will not string or transfer to a dry finger touch.

3. Roll the membrane into the adhesive.

4. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

5. Terminate the edges of the installed membrane in accordance with Carlisle's applicable details.

6. When using TPO membrane flashing only, bonding adhesive is not required when the flashing height is 12” or less. When Carlisle termination bar is used beneath the counter-flashing, bonding adhesive can be eliminated when the flashing height is 18” or less.

C. **Walls, Parapets, Curbs, Skylights, etc.**

The flashing height must be calculated so that the membrane flashing includes a minimum 1-1/2 inch heat weld beyond the Fastening Plates.

1. Fasten at angle change as identified in Paragraph 3.05, Additional Membrane Securement, with the required Carlisle Fastener and plate.

2. Flash the fasteners/plates with a separate piece of Sure-Weld reinforced membrane; apply heat and crease the flashing into the angle change before attaching it to the vertical surface.

D. **Metal Edge Terminations**

Factory-fabricated metal edge systems must be secured to the wood nailer as specified by the manufacturer. Shop-fabricated edging must be installed in compliance with appropriate Carlisle Detail using Carlisle TPO Coated Metal in order to achieve ES-1 Compliance. Refer to the appropriate Universal Details for other flashing options and requirements.

E. **Roof Drains**

1. Sure-Weld membrane may extend into the drain sump when the slope of the sump is less than 3" to one horizontal foot.

   When the drain sump is greater than 3" to one horizontal foot, additional membrane securement must be installed.

2. Only drain strainers that have been approved by the specifier in accordance with applicable codes may be used.

F. **Sure-Weld Contour Rib Profiles**

1. The Contour Rib Profile is recommended for use with FleeceBACK® TPO adhered roofing systems.

2. The Sure-Weld Contour Rib Profiles should be positioned parallel to the laps of the installed TPO roofing system and parallel with the roof slope where possible.

3. Ensure that all welding surfaces are clean and dry. Inspect all seam areas for proper weld prior to installing Sure-Weld Contour Rib Profile.

4. Contour Rib Profile spacing can be individually determined to achieve the desired appearance.

5. Connecting multiple ribs is achieved by using fiberglass pins. Insert a pin half-way into the end of one profile.

Connect the adjoining rib by inserting the exposed end of the pin into the alignment hole. Repeat previous steps for additional TPO Contour Rib profiles.

6. Consult the Sure-Weld Contour Rib Profile installation guides for instructions on proper installation techniques.

G. **Other Penetrations**

On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

1. **Pipes, Round Supports, etc.**

   a. Flash pipes with Molded Pipe Flashings or Split Pipe Seals where their installation is possible. Molded pipe flashings cannot be cut and patched; deck flanges cannot be overlapped or installed over angle changes.

   b. Where Molded Pipe Flashings or Split Pipe Seals cannot be installed, APPLY FIELD FABRICATED PIPE FLASHING using Sure-Weld non-reinforced membrane.

2. **Flexible Penetrations** (braided cables, conduits, wires, etc.) must be enclosed in a stable “goose neck.” Apply a Split Pipe Seal or field fabricated pipe flashing to flash the goose neck.

3. **Hot pipes** that exceed 160° F (71° C) (TPO), must utilize an insulated metal collar and rain hood, flashed with a field fabricated pipe flashing.

4. For **pipe clusters** or unusually shaped penetrations, a Molded Sealant Pocket and White One Part Sealant must be utilized.

5. **Existing Roof Tie-Ins** for TPO membranes refer to applicable Carlisle details for tie-ins.

6. **Flashing of Difficult Penetrations,** refer to **Spec Supplement G-13 for “LIQUISEAL Liquid Flashing”** for additional information and specific requirements.

H. **APEEL Protective Film (Optional)**

When the optional APEEL Protective Film is utilized on TPO, remove and discard the APEEL Protective Film after the installation of the entire TPO Roofing System is complete.

I. **SeamShield Protective Film (Optional)**

When the optional SeamShield Film is utilized on TPO, remove and discard the film from both surfaces prio to selding the seam.

3.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to Spec Supplement G-06 “Roof Walkway Installation”.

3.10 Daily Seal

On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration. **Refer to Spec Supplement G-07 “Daily Seal & Clean Up”.**

SPECIFICATION ATTACHMENT
TPO/PVC ROOFING SYSTEMS

Sure-Weld TPO Mechanically Fastened Roofing Systems
Induction Welding (RhinoBond / Isoweld) Attachment Method

"Attachment I"

July 2024

This is an alternate method for securing the Carlisle's Sure-Weld (TPO) membrane and is intended to be used in conjunction with the Carlisle's Sure-Weld TPO Mechanically Fastened Specification and Details.

A. Description

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO coating. The RhinoBond or Isoweld Plates are installed with HP-X Fasteners to secure an acceptable insulation to minimum 22 gauge steel deck or minimum 15/32" thick plywood.

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

Induction Welding (Rhinobond/Isoweld) Attachment Method Limited to 30 Year Maximum Warranty and Wind Speed Coverage Up to 120 mph. Perimeter enhancements will be required on systems greater than 72 mph and/or projects over 50' in height. Contact Carlisle for requirements for enhancements.

Table I **Induction Welded - Membrane Systems Warranty Options**

Years	Sure-Weld TPO Membranes		
	Warranty Wind Speed 55, 72, 80, 90, 100, 110, or 120 mph	Minimum Membrane Thickness (1)	Additional Puncture Coverage
5,10, or 15 year	√ (2)	Sure-Weld 45-mil	Not Available
20 year	√ (2)	Sure-Weld 60-mil	Not Available
25 or 30 year	√ (2)	Sure-Weld 80-mil	Available

Notes: √= Acceptable

(1) All "T-Joints" must be overlaid with appropriate flashing material when using 60- or 80-mil TPO.
(2) Perimeter calculation is .4 x height of building. The minimum perimeter width is 8-feet up to a 20-year warranty and 16-feet for 25-30 year warranty.
(3) Perimeter enhancements required for wind speed coverage greater than 72mph and/or projects over 50' in height. Contact Carlisle for requirements.

Table II

Induction Welded – Induction Plate Density for Induction Welded Roofing Systems (Up to 20 YR Warranty)

Peak Gust Wind Speed Warranty	Max. Building Height	Minimum Perimeter Width	Induction Weld Plate Density		
			Field	Perimeter	Corners
55 MPH	Up to 50'	8’	6	8	8
72 MPH	Up to 50'	8’	6	8	8
80 MPH	Up to 50'	8’	8	10	10
90 MPH	Up to 50'	8’	8	12	12
100 MPH	Up to 50'	8’	8	12	16
110 MPH	Up to 50'	8’	10	16	16
120 MPH	Up to 50'	8’	10	16	20

Table III

Induction Welded – Induction Plate Density for Induction Welded Roofing Systems (Up to 30 YR Warranty)

Peak Gust Wind Speed Warranty	Max. Building Height	Minimum Perimeter Width	Induction Weld Plate Density		
			Field	Perimeter	Corners
55 MPH	Up to 50'	16’	8	10	10
72 MPH	Up to 50'	16’	8	10	10
80 MPH	Up to 50'	16’	10	12	12
90 MPH	Up to 50'	16’	10	12	12
100 MPH	Up to 50'	16’	10	16	20
110 MPH	Up to 50'	16’	12	16	24
120 MPH	Up to 50'	16’	12	16	24

B. Products/Heat Welding Equipment

Products listed in "Part II” of the Carlisle TPO Mechanically Fastened Roofing System Specification can be used as part of this alternate securement method in conjunction with the RhinoBond or Isoweld Welding Plates.

1. **RhinoBond or Isoweld TPO 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-X Fasteners to attach the roofing assembly and is activated using the RhinoBond or Isoweld Induction Welding Tool.

2. **RhinoBond or 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 or Isoweld 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 on 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 Magnet 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 Magnet.

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

Caution: To avoid false welds and ensure adequate membrane attachment to the plates, induction tool calibration and test welds (along with the proper positioning of the induction welder over the plate and placement of the magnet) must be performed prior to the start of work each day. All test welds must be completed using the exact components of the assembly to be installed.

1. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond or Isowled Plates per 4' x 8' board in the designated field and eight HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area.

   Note: Avoiding fastener overdrive to prevent plate from deforming.

2. Place Sure-Weld membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.

3. Place RhinoBond Induction Tool over the RhinoBond TPO Welding Plate, under the roofing membrane OR Place the Isowled Induction Tool over the Isoweld TPO Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

4. Activate induction welding tool and leave in place until heating cycle is complete.

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

6. 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 "Part III" of the Sure-Weld TPO Mechanically Fastened Roofing System Specification.

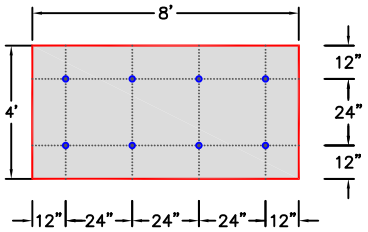
2. Base wall securement and securement around roof penetrations as well as flashings of walls and penetrations must comply with Carlisle requirements for the Sure-Weld TPO Mechanically Fastened Roofing System.

G. Associated Installation Details

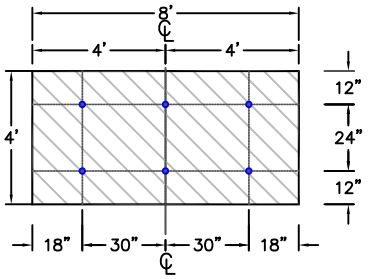
End of Section

NOTES:

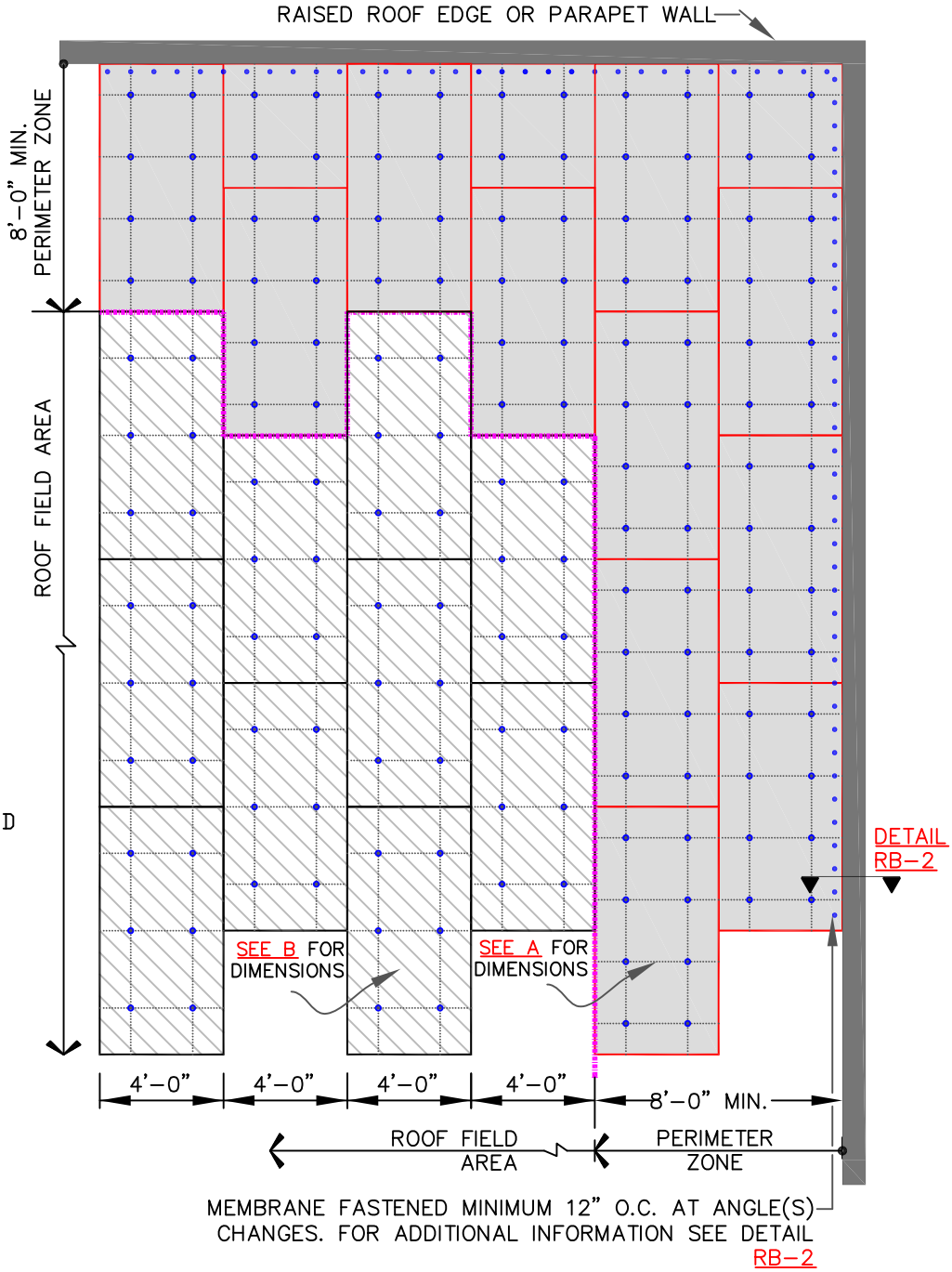
1. RhinoBond METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL RB-2

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & RhinoBond FASTENER PLATE

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

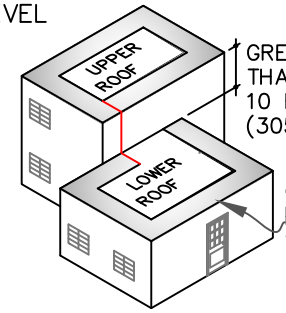
RhinoBond ATTACHMENT METHOD - NUMBER OF FASTENERS AND LOCATIONS

For additional information, refer to Specifications

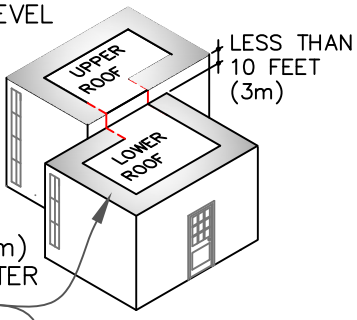
DETAIL NO.
RB-1
RhinoBond

ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

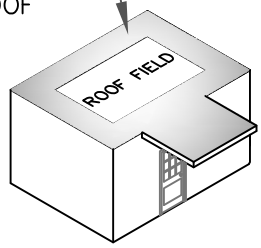
SPLIT LEVEL ROOFS



SPLIT LEVEL ROOFS

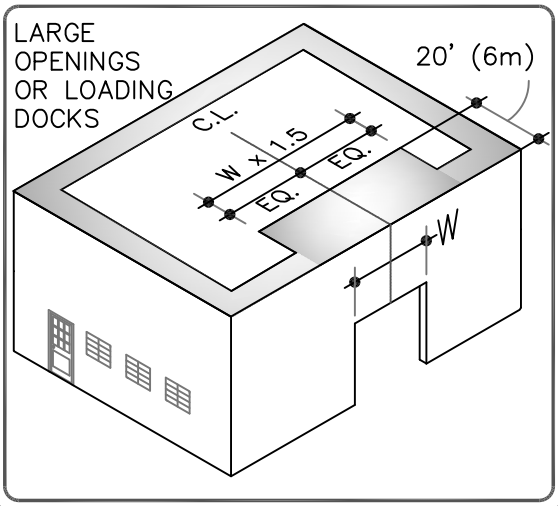


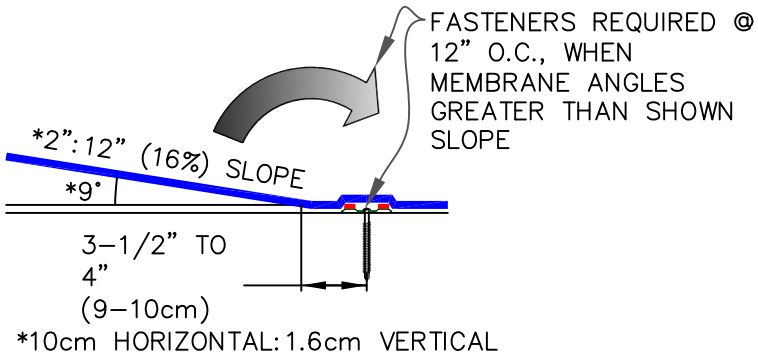
CANOPY ROOF



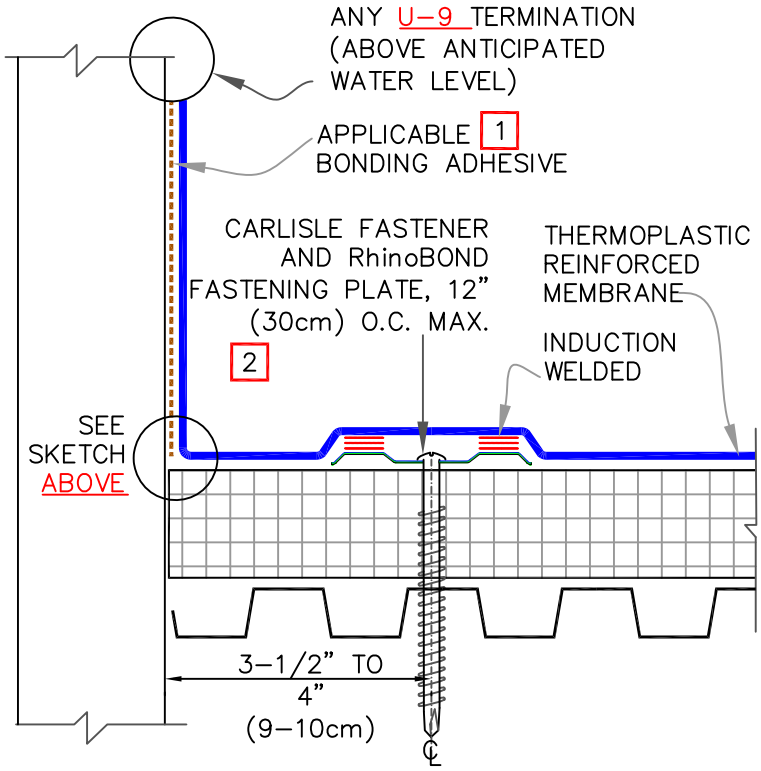
MAIN ROOF EXTENDING ON THE SAME LEVEL

LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



ANGLE CHANGE SECUREMENT

NOTES:

1. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.

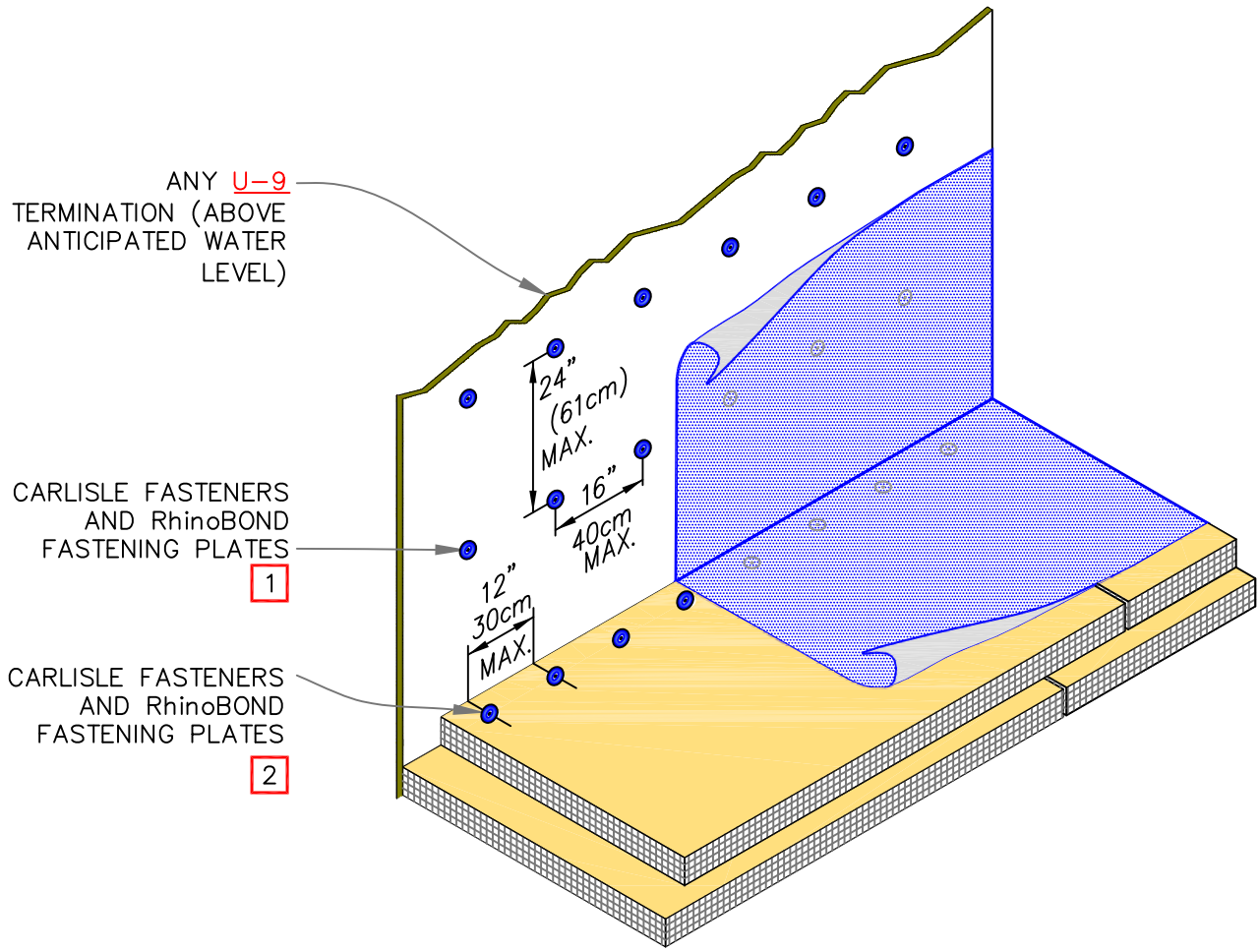
2. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ANGLE CHANGE SECUREMENT METHOD WITH RhinoBond PLATES

For additional information, refer to Specifications

DETAIL NO.
RB-2
RhinoBond



NOTES:

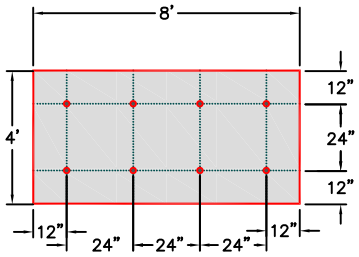
1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

2. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.

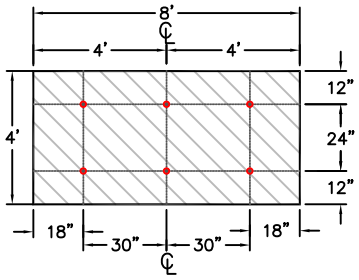
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	RhinoBond WALL ATTACHMENT For additional information, refer to Specifications	DETAIL NO. RB-3 RhinoBond

NOTES:

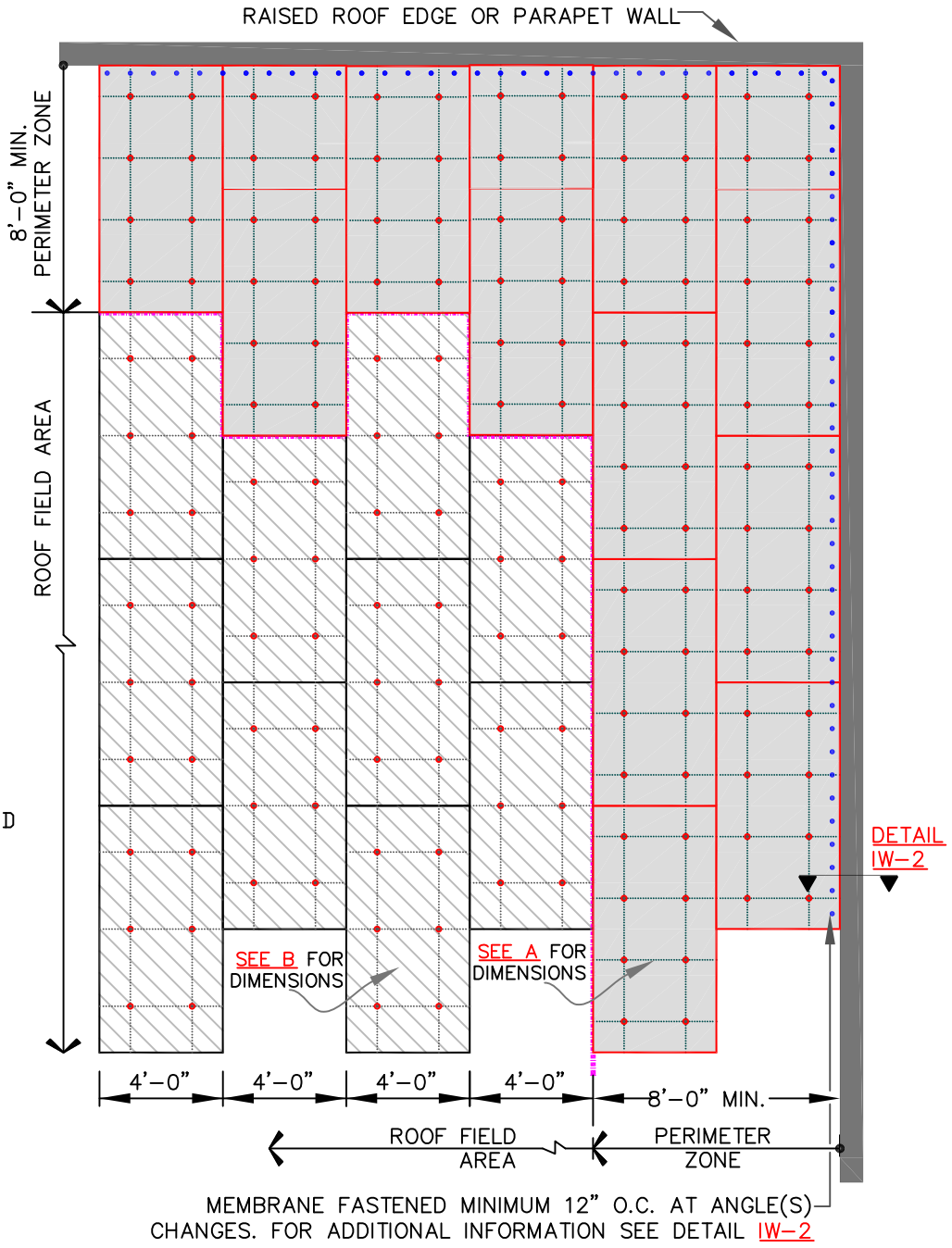
1. Isoweld METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL IW-2

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & INDUCTION WELD FASTENER PLATE

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 — SEE NOTE(S)

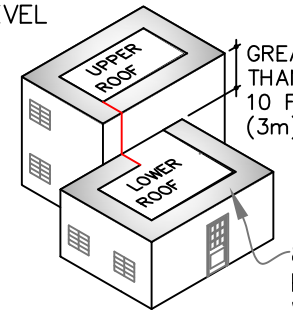
ISOWLED ATTACHMENT METHOD – NUMBER OF FASTENERS AND LOCATIONS

For additional information, refer to Specifications

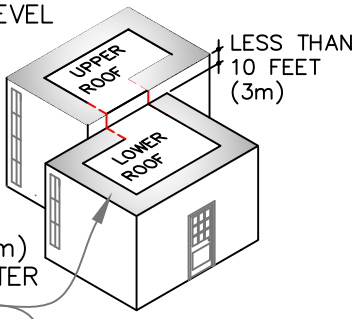
DETAIL NO.
IW-1
Isoweld Attachment

ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

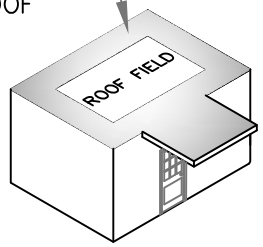
SPLIT LEVEL ROOFS



SPLIT LEVEL ROOFS

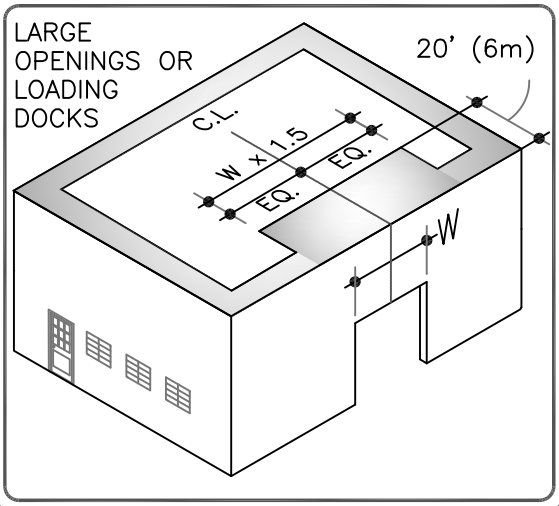


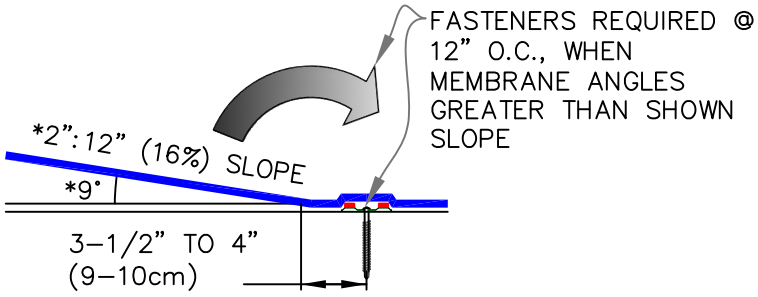
CANOPY ROOF



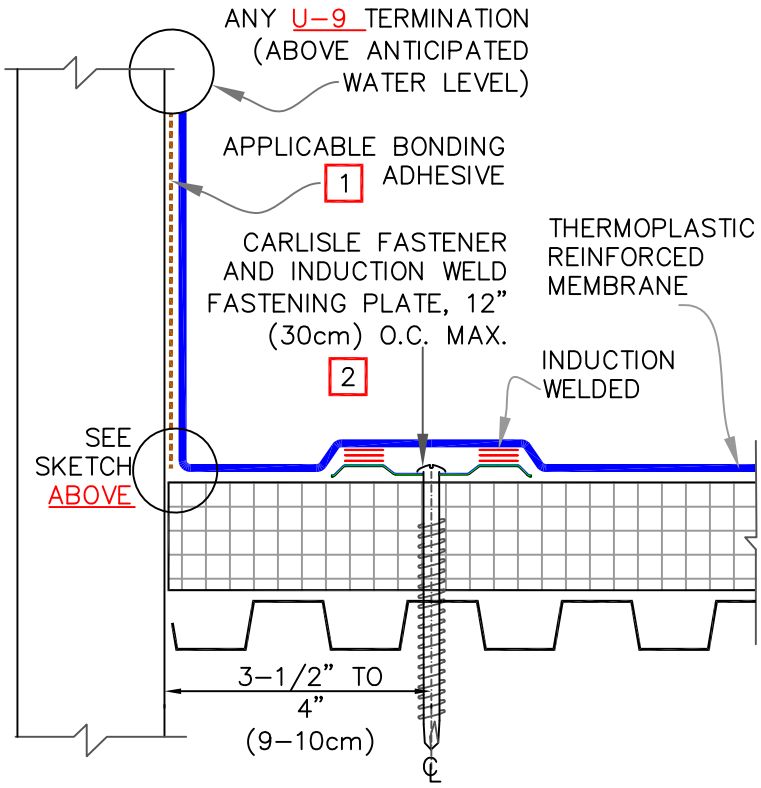
MAIN ROOF EXTENDING ON THE SAME LEVEL

LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



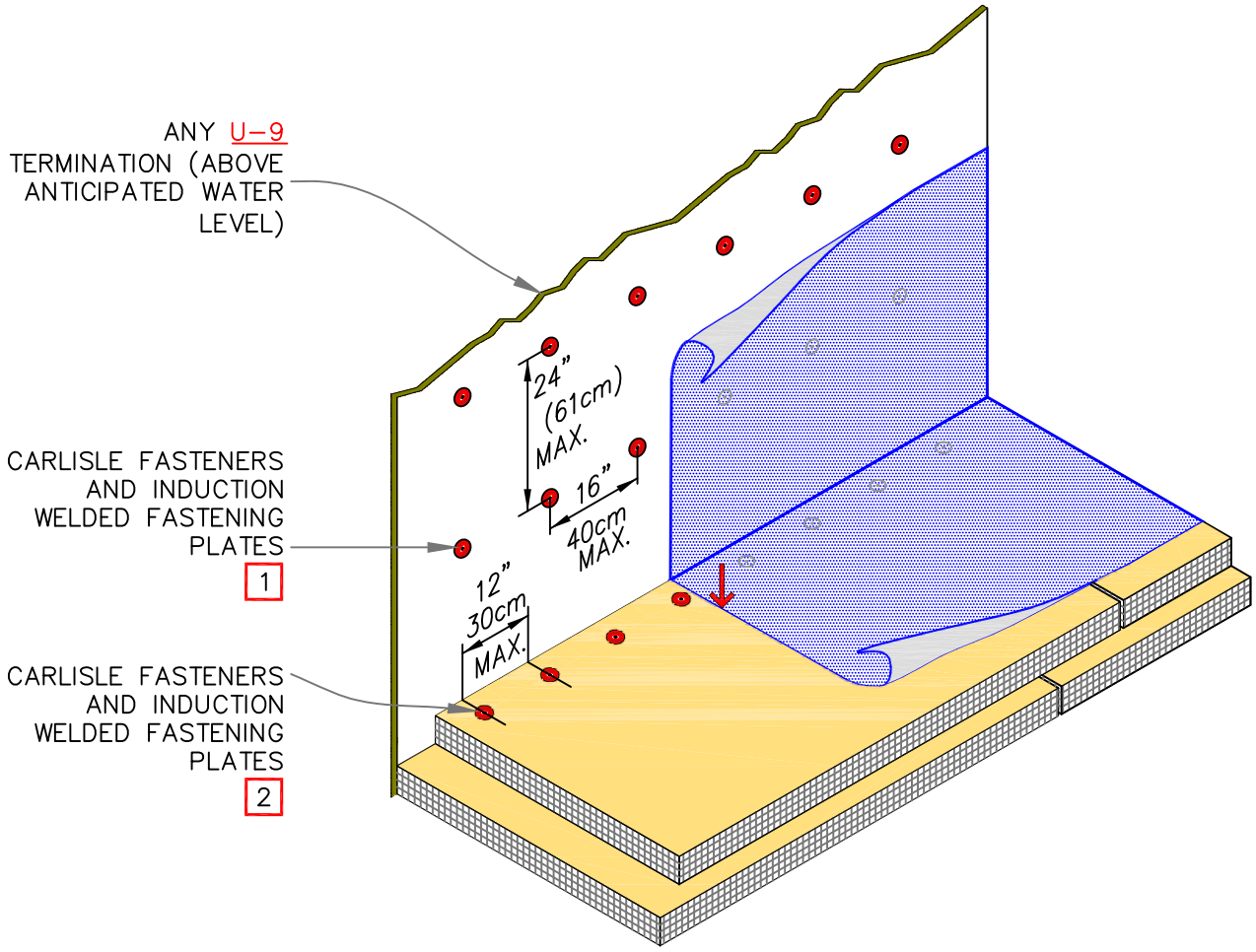
ANGLE CHANGE SECUREMENT

NOTES:

1. SURE–WELD MEMBRANE REQUIRES SURE–WELD BONDING ADHESIVE AND SURE–FLEX MEMBRANE REQUIRES SURE–FLEX BONDING ADHESIVE.

2. HP–X FASTENERS AND INDUCTION WELD PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	ANGLE CHANGE SECUREMENT METHOD WITH ISOWELD PLATES For additional information, refer to Specifications	DETAIL NO. IW–2 Isoweld Attachment

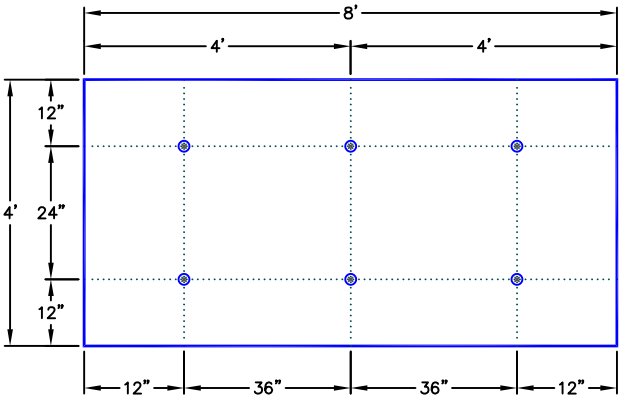


NOTES:

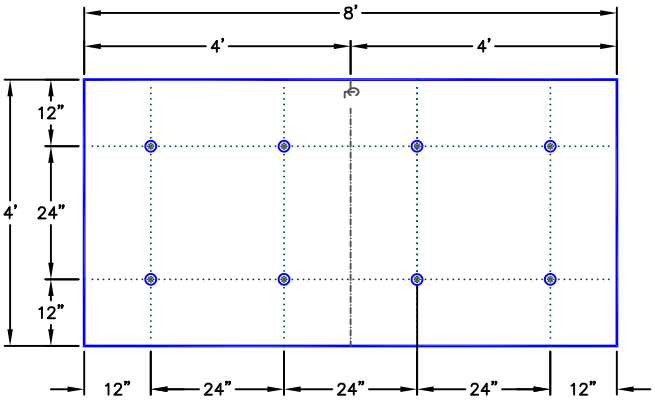
1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

2. HP-X FASTENERS ARE REQUIRED OVER STEEL AND WOOD DECKS.

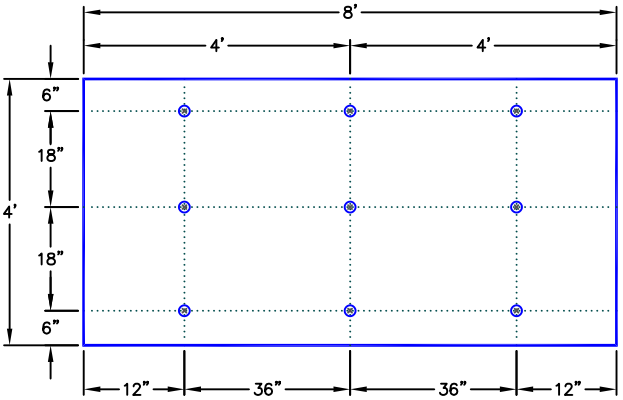
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	ISOWELD WALL ATTACHMENT For additional information, refer to Specifications		DETAIL NO. IW-3 Isoweld Attachment



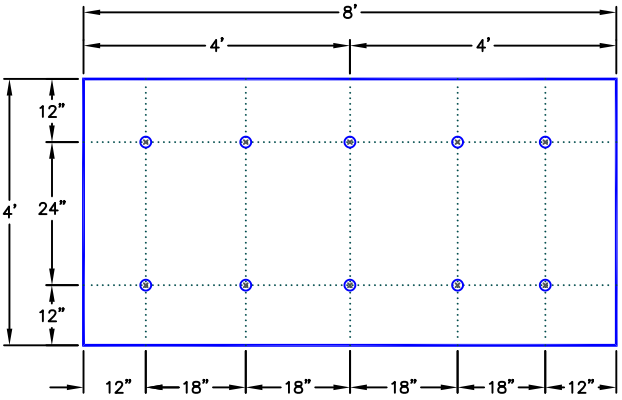
6 FASTENERS PER 4'X8' BOARD



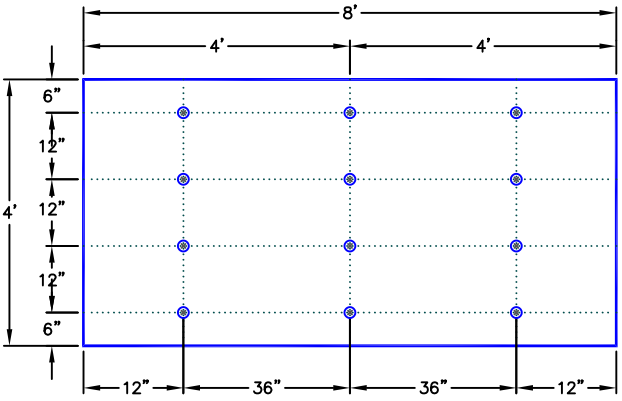
8 FASTENERS PER 4'X8' BOARD



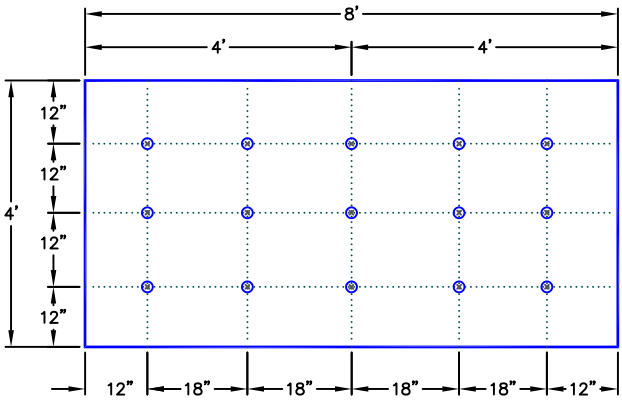
9 FASTENERS PER 4'X8' BOARD



10 FASTENERS PER 4'X8' BOARD



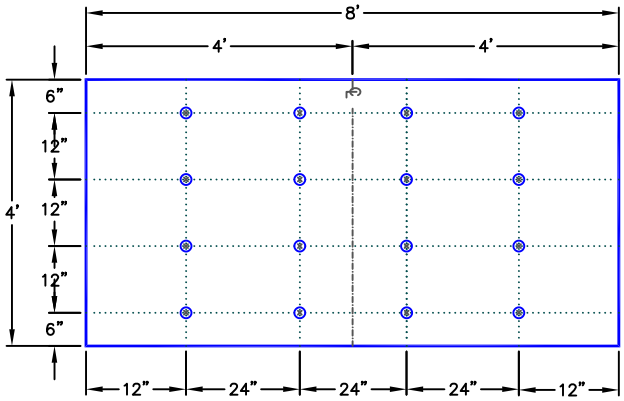
12 FASTENERS PER 4'X8' BOARD



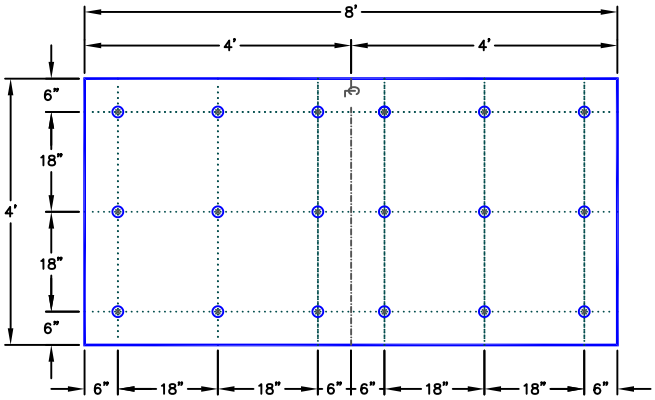
15 FASTENERS PER 4'X8' BOARD

NOTE: FOR FM INSURED PROJECTS, CONSULT FM GLOBAL PRIOR TO INSTALLATION.

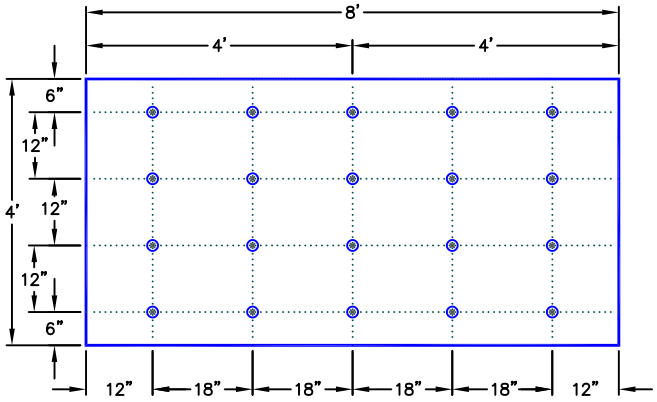
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–1 Induction Welding



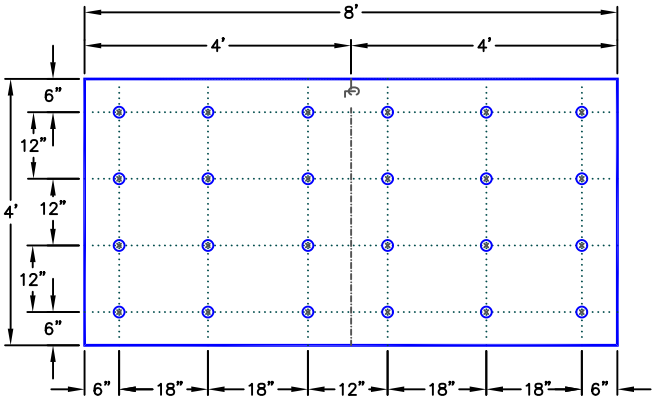
16 FASTENERS PER 4'X8' BOARD



18 FASTENERS PER 4'X8' BOARD



20 FASTENERS PER 4'X8' BOARD



24 FASTENERS PER 4'X8' BOARD

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–2 Induction Welding

SPECIFICATION ATTACHMENT
TPO/PVC ROOFING SYSTEMS

Sure-Weld TPO Flashing Procedures utilizing Sure-White EPDM Flashing Products

"Attachment II"
July 2024

This is an alternate method for flashing **Carlisle's Sure-Weld TPO membrane ONLY** and is intended to be used in conjunction with the Carlisle Sure-Weld TPO Specification and Details.

A. Description

TPO flashing procedures utilizing Carlisle Sure-White EPDM flashing products incorporates Pressure-Sensitive Elastoform Flashing, Pressure-Sensitive Inside/Outside Corners, Pressure Sensitive 'T'-Joint Covers, Pressure-Sensitive Pipe Seals, and Pressure-Sensitive Pourable Sealer Pockets. These Pressure-Sensitive products are used as an option and in lieu of welding TPO Flashing products for a **maximum warranty duration of 20 years**.

Carlisle's Sure-White EPDM Pressure-Sensitive products are comprised of uncured or cured White EPDM membrane laminated to fully cured Pressure-Sensitive adhesive.

B. Products

Products listed below can be used as part of this alternate flashing method in conjunction with **TPO Primer**.

1. **Sure-White Pressure-Sensitive Elastoform® Flashing:** A 6" X 100' and 9" or 12" wide by 50' long, 60-mil thick Sure-White **uncured** EPDM Flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with TPO Primer.

   Sure-White Uncured Pressure-Sensitive Elastoform Flashing is used to flash inside and outside corners, pipes, scuppers and field fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

2. **Sure-Seal Gray Pressure-Sensitive Elastoform Flashing: A** 12" wide by 50' long, 60-mil thick EPDM flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with TPO Primer.

   Sure-Seal Gray Pressure-Sensitive Elastoform Flashing is used to flash inside and outside corners, pipes, scuppers and field fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

3. **Sure-White Pressure-Sensitive Corner/T-Joint Cover:** A 7" x 9" precut 60-mil thick (white) Elastoform Flashing with a 30-mil Pressure-Sensitive TAPE; used for inside and outside corners, to overlay field splice intersections, and to cover field splices at angle changes.

4. **Sure-White Pressure-Sensitive Cured Cover Strip:** A 6" or 9" wide and 100' long and 12" wide by 50' long Sure-White 60-mil cured EPDM membrane laminated to a nominal 30-mil cured Pressure-Sensitive TAPE. The Cured Cover Strip is for flashing Carlisle Seam Fastening Plates.

5. **Sure-White Pressure-Sensitive Pipe Seals** with Pressure-Sensitive TAPE on the deck flange. Pipe Seals are available in one size: 1" to 6".

6. **Sure-White 20" Pressure-Sensitive Cured Flashing** - A 20" wide by 50' long Sure-White cured 60-mil thick EPDM membrane, with Pressure-Sensitive TAPE the full width already applied, used to flash curbs/skylights, etc.
7. **Sure-White Pourable Sealer Pocket**: A pre-fabricated Pourable Sealer Pocket which consists of a 2" wide plastic support strip with Pressure-Sensitive, adhesive backed uncured Elastoform Flashing; available in 6" diameter.

8. **Sure-White SecurTAPE:** A 3" or 6" wide by 100' long splice tape used to bond Sure-White EPDM or Sure-Weld TPO membrane to Sure-Weld TPO membrane when flashing a curb or a wall with a separate section of membrane.

9. **Low-VOC EPDM and TPO Primer -** A Low-VOC (volatile organic compound) primer (less than 250 grams/liter) for priming of EPDM or TPO surfaces prior to application of FAT, Cover strip, SecurTAPE and all other pressure-sensitive products. Available in 1 gallon pails.

C. Sure-White EPDM Flashing Installation Criteria

General

1. When using Sure-White Pressure-Sensitive EPDM products on TPO membrane, TPO primer should be used to prepare the TPO membrane surface.

2. Sure-White Pressure-Sensitive Seam Tape is not to be used for field membrane seaming.

3. **Pressure-Sensitive Uncured Elastoform Flashing** must be limited to the overlayment of vertical seams (as required at angle changes), or to flash inside/outside corners, vent pipes, scuppers and other unusually shaped penetrations where the use of Pre-molded Pipe Seals is not practical.

   Note: Even when working in warmer temperatures, in most cases a heat gun will be required to elevate the temperature of Pressure-Sensitive Uncured Flashing between 105°F and 110°F (40°C and 43°C) to permit proper forming of the uncured flashing.

4. **Inside/Outside Corners and 'T'-Joint Covers**

   a. Pressure-Sensitive Inside/Outside Corners and 'T'-Joint Covers are installed on both inside and outside corners in conjunction with TPO Primer.
   b. T-Joint Covers are installed at field splice intersections or at horizontal to vertical transitions of field splices in conjunction with TPO Primer.

5. **Other Penetrations**

   a. Flash pipes and round supports with Pressure-Sensitive Pipe Seals, when feasible, in accordance with the applicable detail.

   b. Form Field Fabricated Pipe Seals using Pressure-Sensitive Uncured Elastoform Flashing around pipes, round supports and structural steel tubing with corner radius greater than 1/4".

   c. When flashing seamless metal posts, maximum 4" by 4", with a corner radius less than 1/4", apply a field fabricated pipe flashing with a double vertical wrapping.

   d. For pipe clusters or unusually shaped penetrations, a pourable sealer pocket must be utilized.

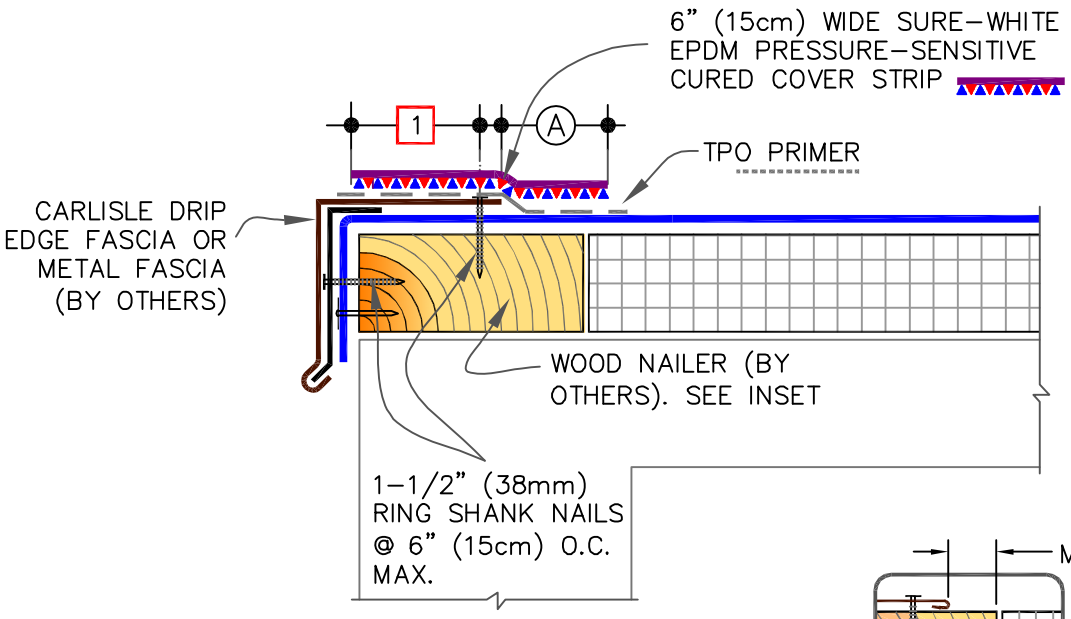
D. Associated Installation Details

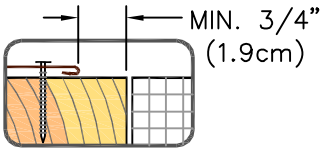
End of Section

CAUTIONS

- THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM THE GUTTER /EDGE. REFER TO DETAILS U-1B OR U-1C.
- FOR 30-YEAR WARRANTY PROJECTS, SEE DETAILS U-1.B, U-1C, U-1D, U-1E OR U-1F.

TPO WITH EPDM FLASHING

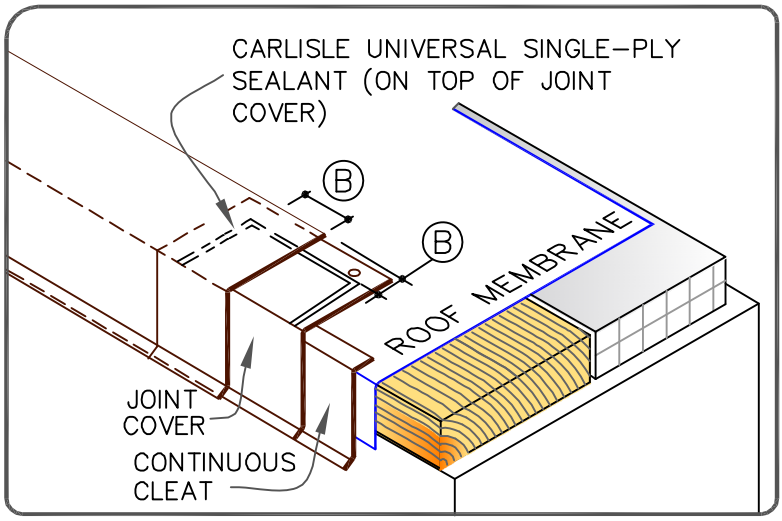




NOTES:

1. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY SURE-WHITE PRESSURE-SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING TPO PRIMER.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
4. T-JOINT COVERS ARE REQUIRED AT INTERSECTIONS WITH 60-MIL (1.52mm) OR 80-MIL (2.03mm) MEMBRANES.
5. THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM THE GUTTER/EDGE. REFER TO DETAILS U-1B OR U-1C.

DIMENSIONS		cm	
A	2"	5	MIN.
B	1/2" - 1"	1.5-2.5	



CARLISLE SYNTEC SYSTEMS

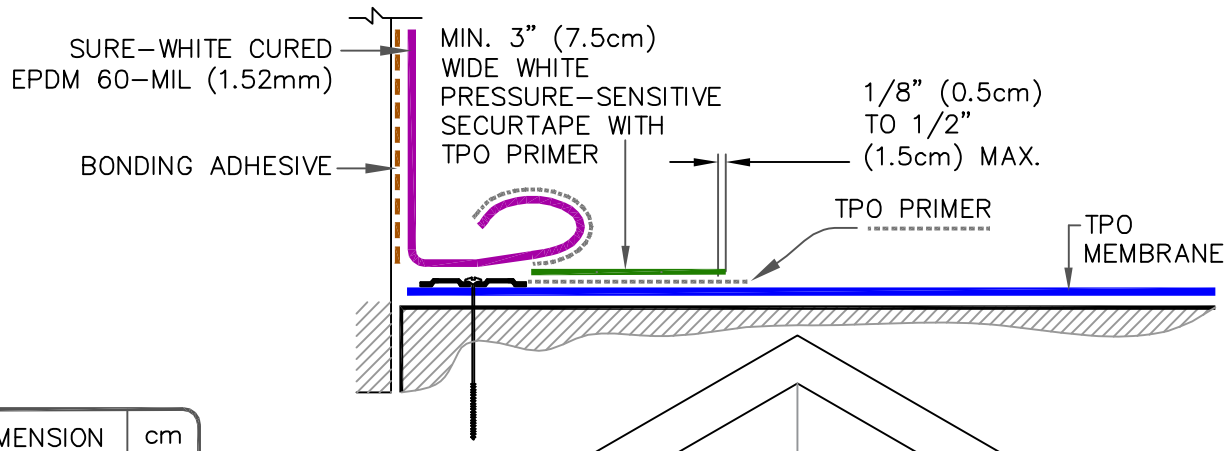
DRIP EDGE FASCIA WITH EPDM FLASHING

MAXIMUM WARRANTY: 20 YEARS

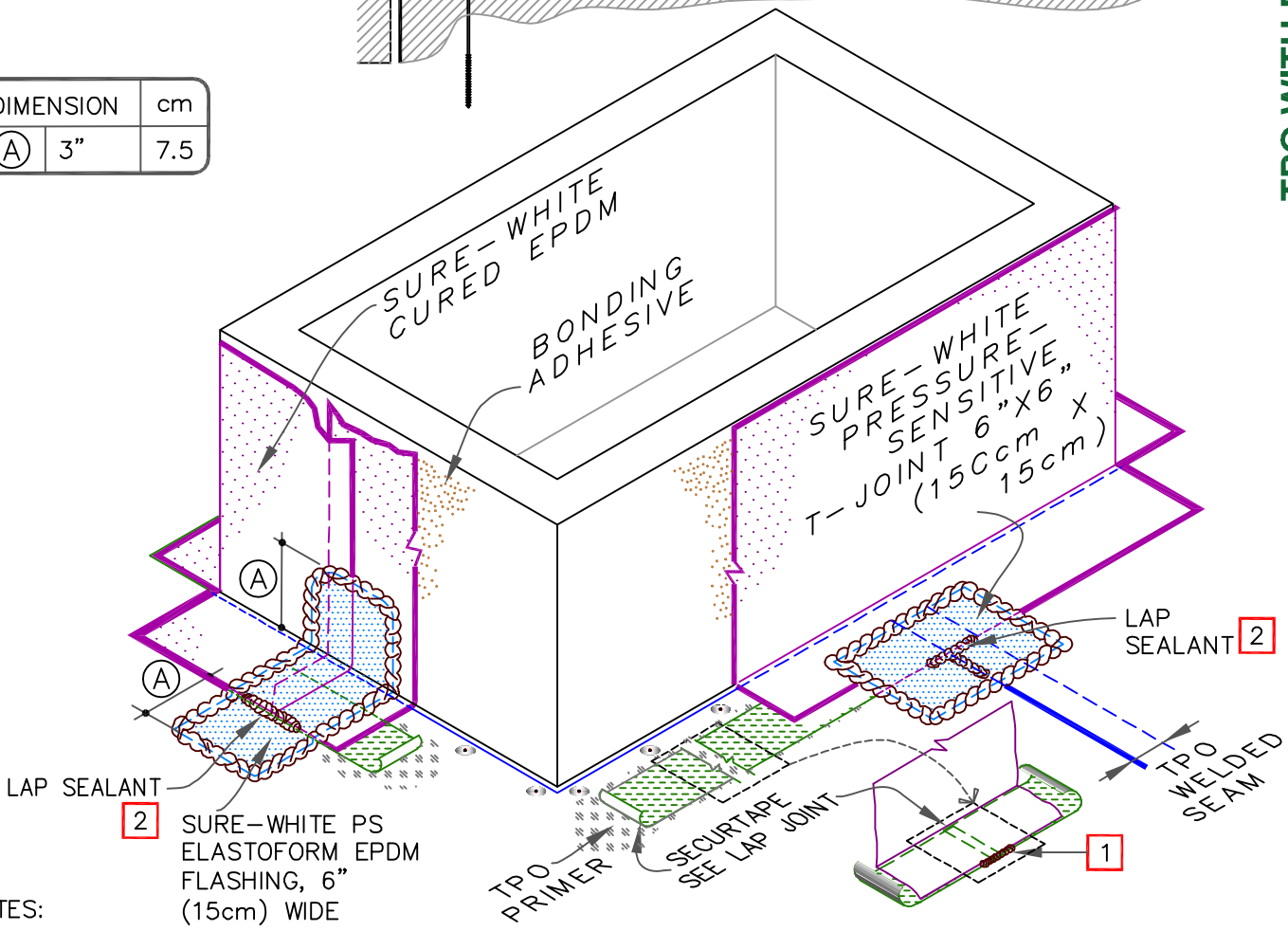
DETAIL NO. U-1AT

WARRANTY REQUIREMENTS		
20 YEAR WARRANTY	USE MIN 3" (7.5cm) WIDE FACTORY-APPLIED TAPE OR	MIN 3" (7.5cm) WIDE FIELD-APPLIED SURE-WHITE SECURTAPE
25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL TPO DETAIL U-2A.	

TPO WITH EPDM FLASHING



DIMENSION	cm
Ⓐ 3"	7.5



NOTES:

1. FIELD APPLIED SURE-WHITE PRESSURE-SENSITIVE SEAM TAPE IS TO BE OVERLAPPED A MINIMUM OF 1" (2.5cm) AT THE ENDS OF EACH CUT PIECE. APPLY LAP SEALANT AT TAPE OVERLAPS 2" (5cm) IN BOTH DIRECTIONS.
2. APPLY CARLISLE WHITE LAP SEALANT ALONG THE LEADING EDGE OF THE MEMBRANE SPLICE UNDER THE T-JOINT COVER, COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN ALL DIRECTIONS FROM THE SPLICE INTERSECTION.
3. INSTALL OUTSIDE CORNERS PER DETAIL U-15ET OR U-15GT.

CARLISLE SYNTEC SYSTEMS

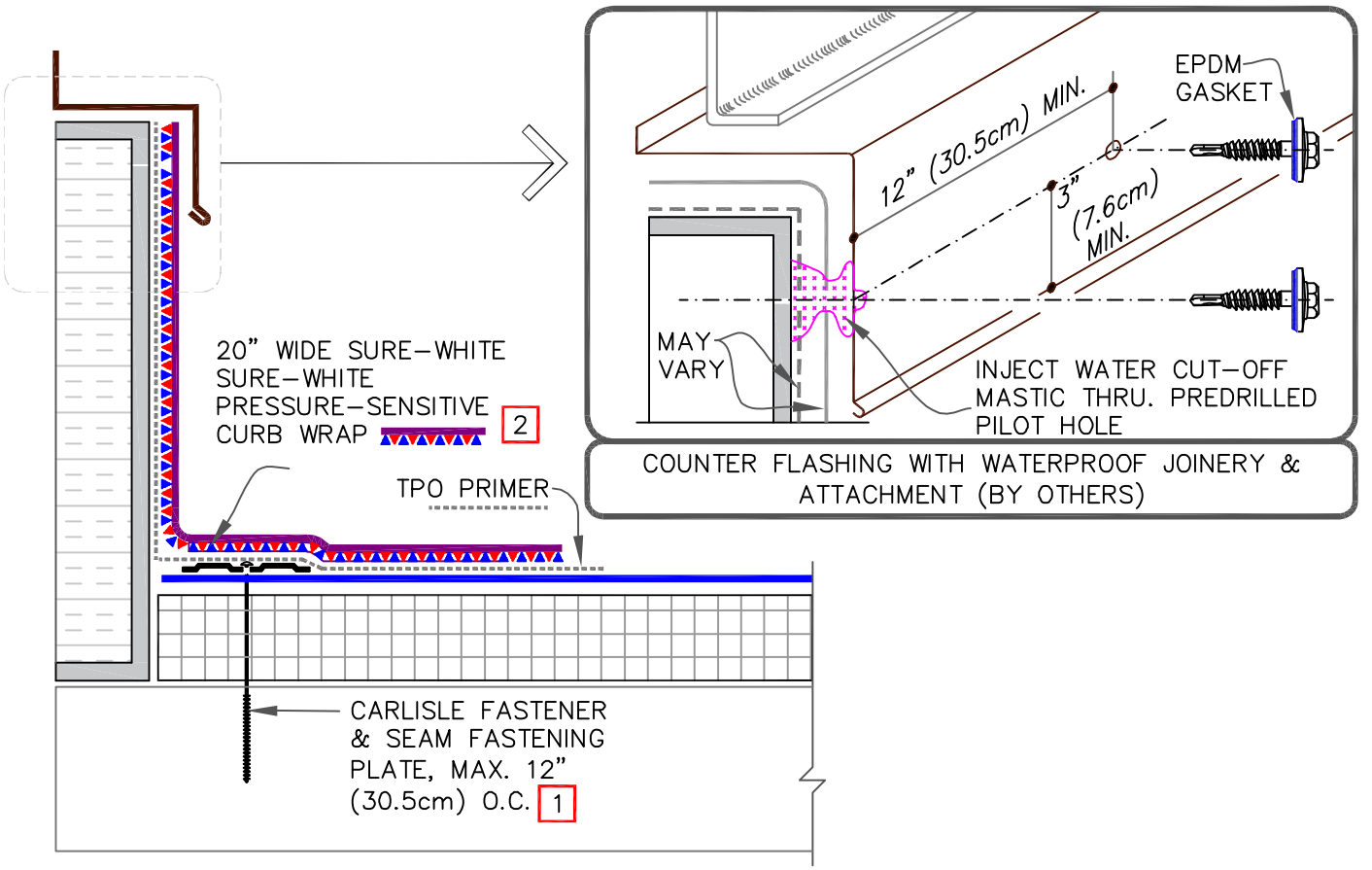
CURB/WALL WITH SURE-WHITE EPDM & SURE-WHITE SecurTAPE

MAXIMUM WARRANTY: SEE WARRANTY REQUIREMENT ON TOP

TP

DETAIL NO. U-5AT

WARRANTY REQUIREMENTS	
20 YEAR WARRANTY	SEE DETAIL BELOW
25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL APPLICABLE TPO DETAIL(S) U-5A, U-5B & U-5C FOR REQUIRED CURB DETAIL

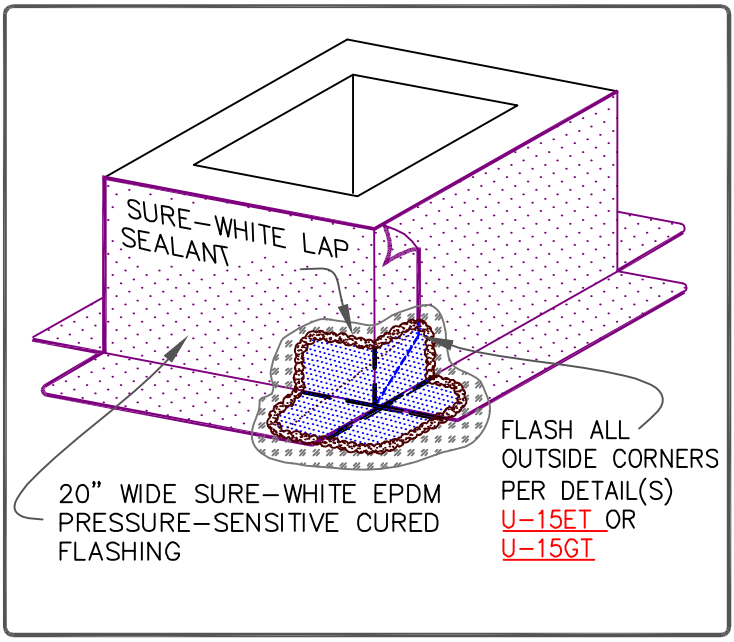


NOTES:

1. SEAM FASTENING PLATES/FASTENERS MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
2. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, A 6" (15cm) WIDE PRESSURE-SENSITIVE UNCURED OR A T-JOINT FLASHING, IN CONJUNCTION WITH TPO PRIMER MUST BE CENTERED OVER FIELD SPLICE AT ANGLE CHANGE.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA



CARLISLE SYNTEC SYSTEMS

CURB WITH PRESSURE-SENSITIVE EPDM CURB WRAP FLASHING

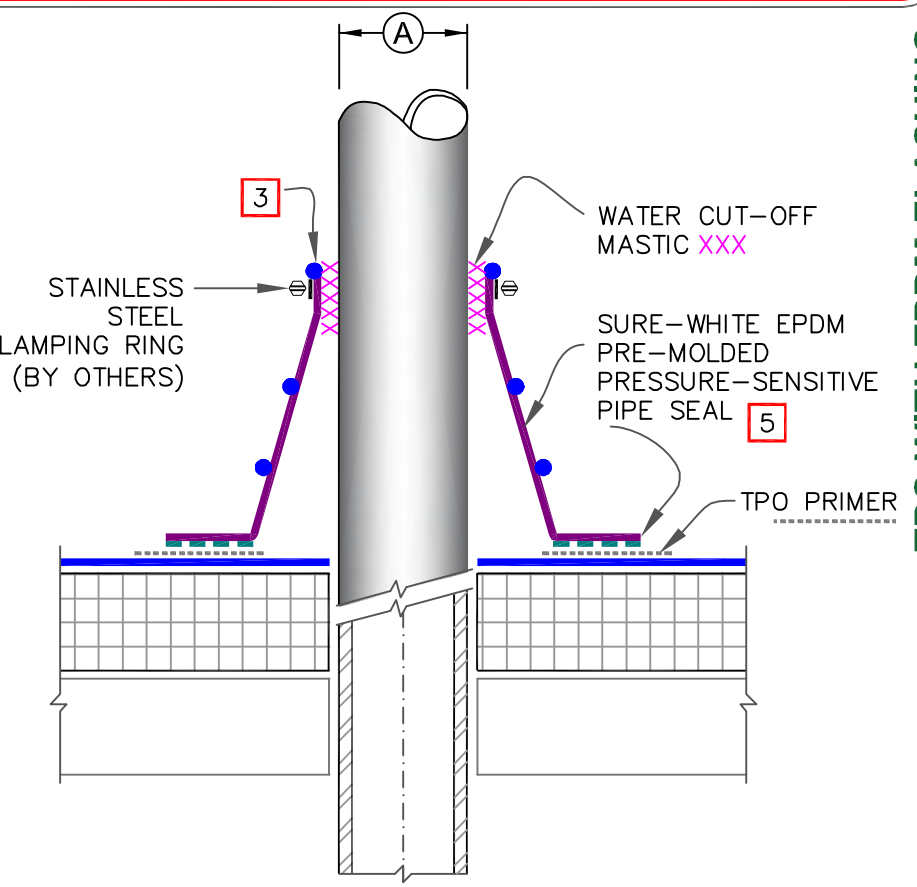
FOR WARRANTY, SEE TABLE ON TOP OF PAGE.

TP

DETAIL NO. U-5BT

WARRANTY REQUIREMENTS		
	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL TPO DETAIL U-8A. NO FIELD-FABRICATION ALLOWED FOR 25/30 YEAR ROOF.

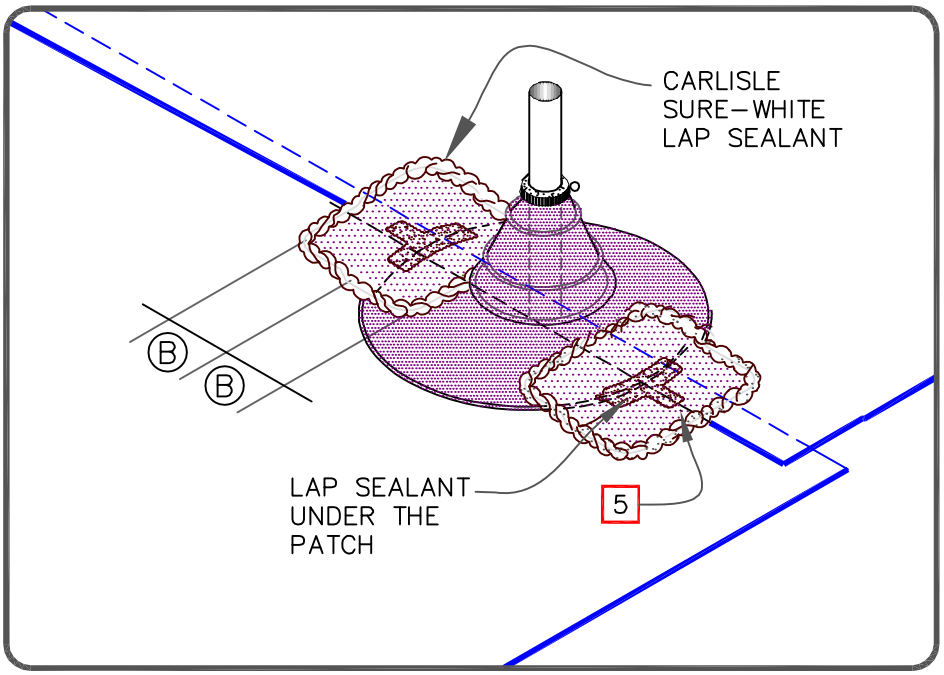
DIMENSIONS		cm	
(A)	1/2"	1.5	TO
	6"	15	
(B)	3"	7.5	



TPO WITH EPDM FLASHING

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE-SENSITIVE PIPE SEAL.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. PRE-MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE PRESSURE-SENSITIVE PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
5. WHEN A FIELD SPLICE INTERSECTS A PIPE SEAL, APPLY SURE-WHITE LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION & OVERLAY WITH A 7"X9" (18cm X 23cm) T-JOINT COVER.
6. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED. REFER TO DETAIL U-8A



CARLISLE SYNTEC SYSTEMS

PIPE: PRE-MOLDED PRESSURE-SENSITIVE EPDM PIPE SEAL

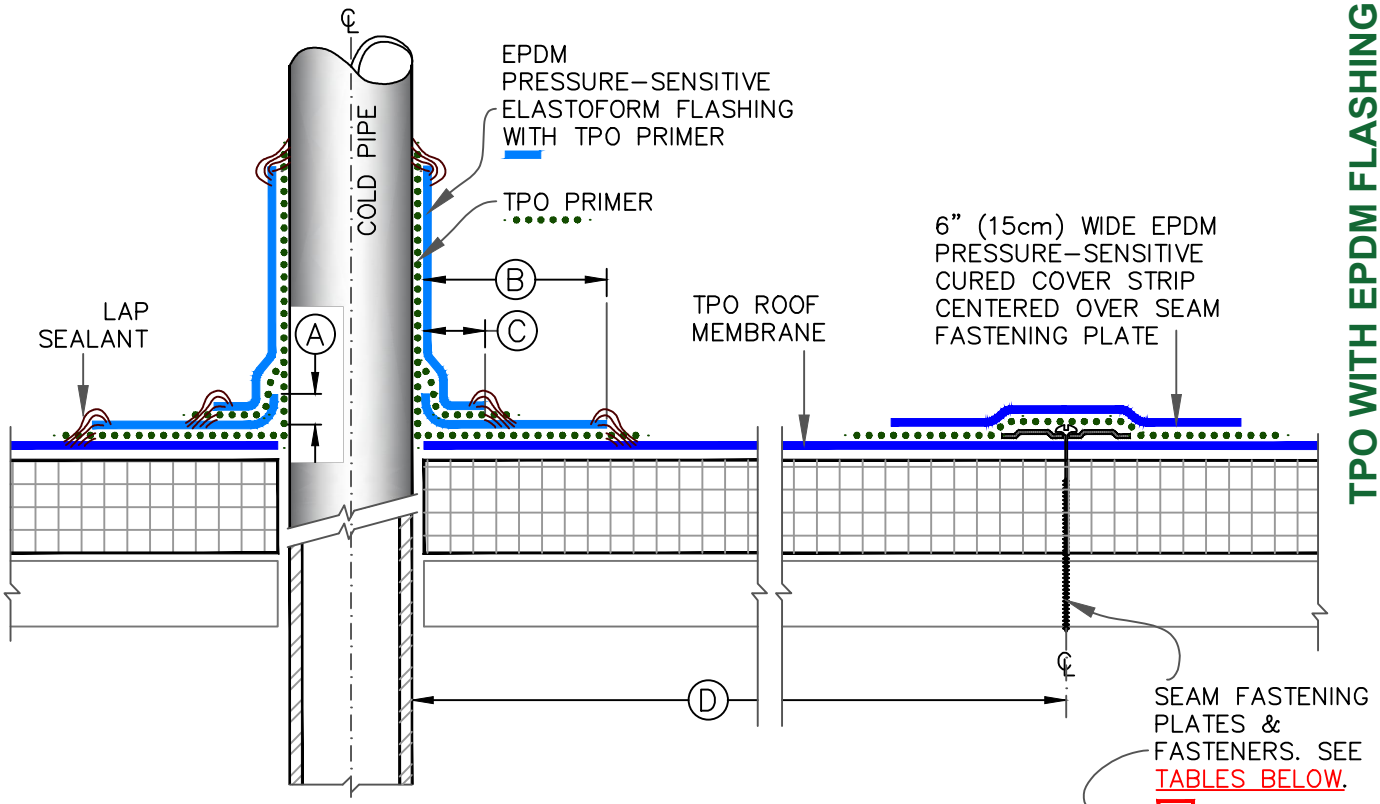
SEE WARRANTY REQUIREMENT TABLE ON TOP OF PAGE.

TP

DETAIL NO. U-8AT

WARRANTY REQUIREMENTS	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	USE ONLY TPO PREFABRICATED ACCESSORIES

TPO WITH EPDM FLASHING



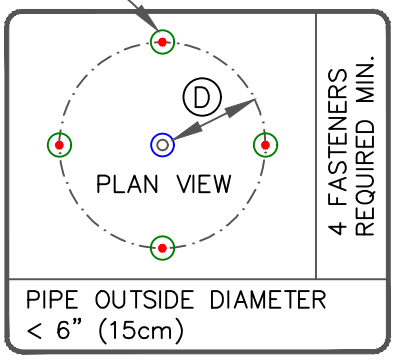
NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE–SENSITIVE ELASTOFORM FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).
4. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.

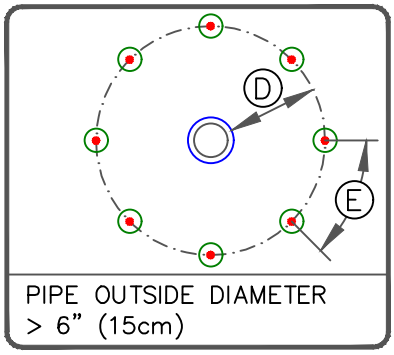
DIMENSIONS	cm	
A 1/2"	1.5	
B 3"	7.5	
C 1"	2.5	
D 6"	15	TO
12"	30	
E 12"	30	MAX.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



PIPE OUTSIDE DIAMETER < 6" (15cm)



PIPE OUTSIDE DIAMETER > 6" (15cm)

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PIPE SEAL

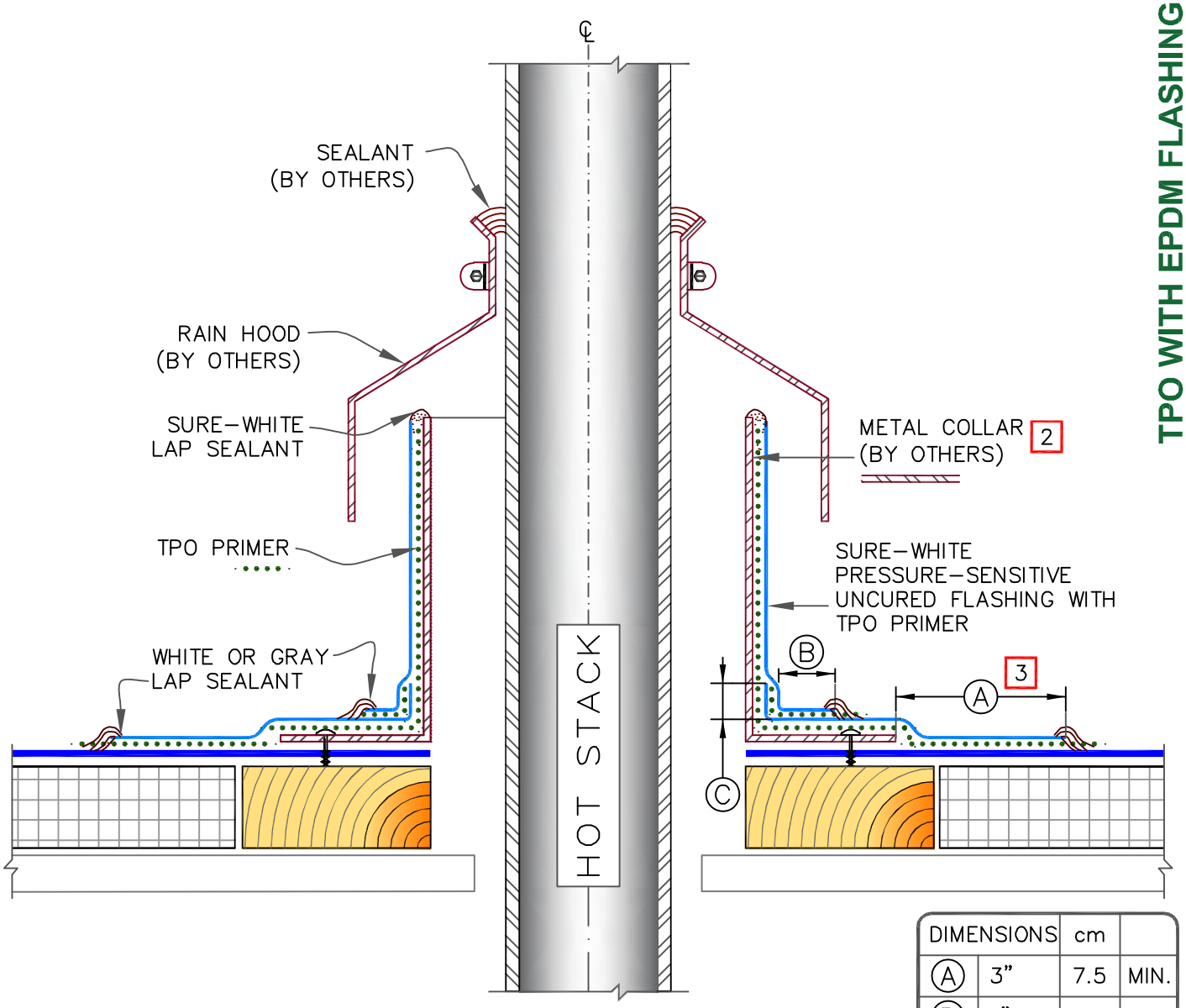
SEE WARRANTY REQUIREMENTS.

DETAIL NO. U–8BT

THERMOPLASTIC TPO

WARRANTY REQUIREMENTS	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TPO DETAIL U 8.6.

TPO WITH EPDM FLASHING



DIMENSIONS	cm	
A 3"	7.5	MIN.
B 1"	2.5	MIN.
C 1/2"	1.5	MIN.

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF METAL COLLAR MUST NOT EXCEED 180°F (82°C).
3. TPO PRIMER MUST BE APPLIED TO THE MATING SURFACES PRIOR TO APPLYING SURE–WHITE PRESSURE–SENSITIVE UNCURED FLASHING.
4. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE UNCURED FLASHING.

CARLISLE SYNTEC SYSTEMS

HOT STACK: FIELD FABRICATED FLASHING WITH SURE–WHITE UNCURED EPDM

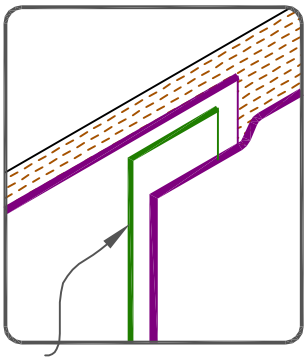
WARRANTY: SEE TABLE ON TOP OF PAGE

TP

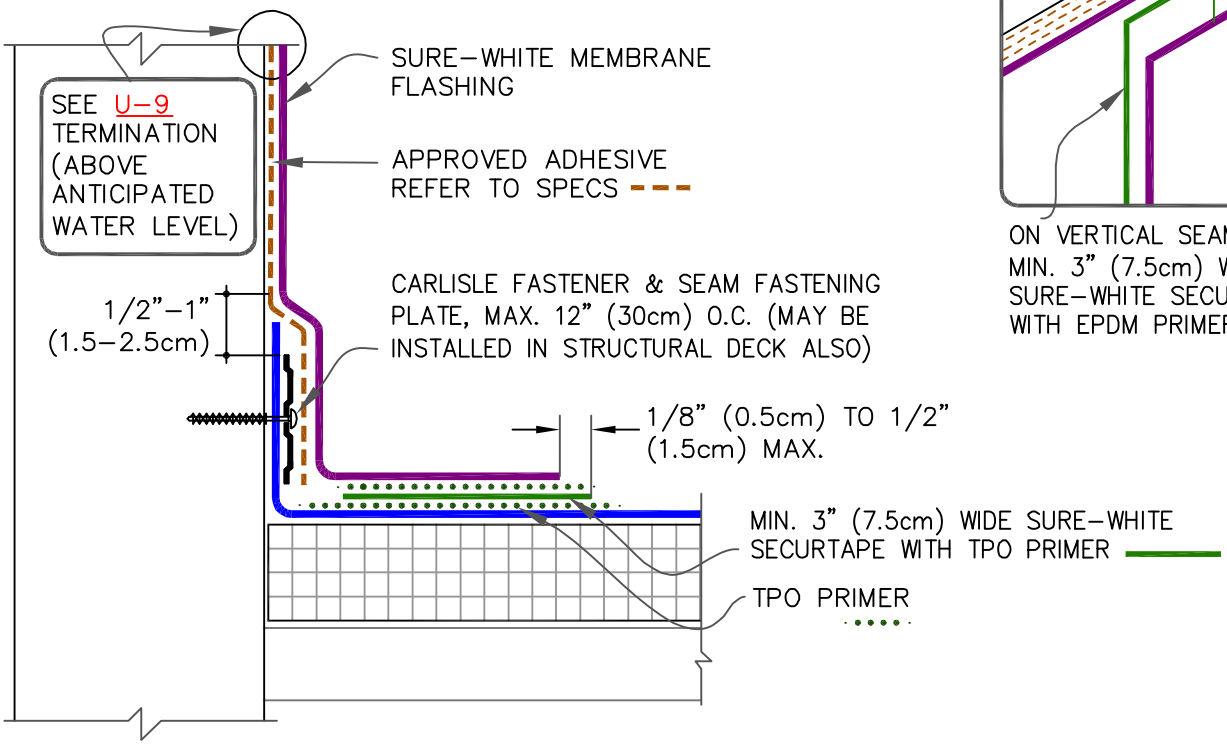
DETAIL NO. U–8DT

WARRANTY REQUIREMENTS	DETAIL IS LIMITED TO 20-YEAR WARRANTY.
	FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ADHERED SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS.

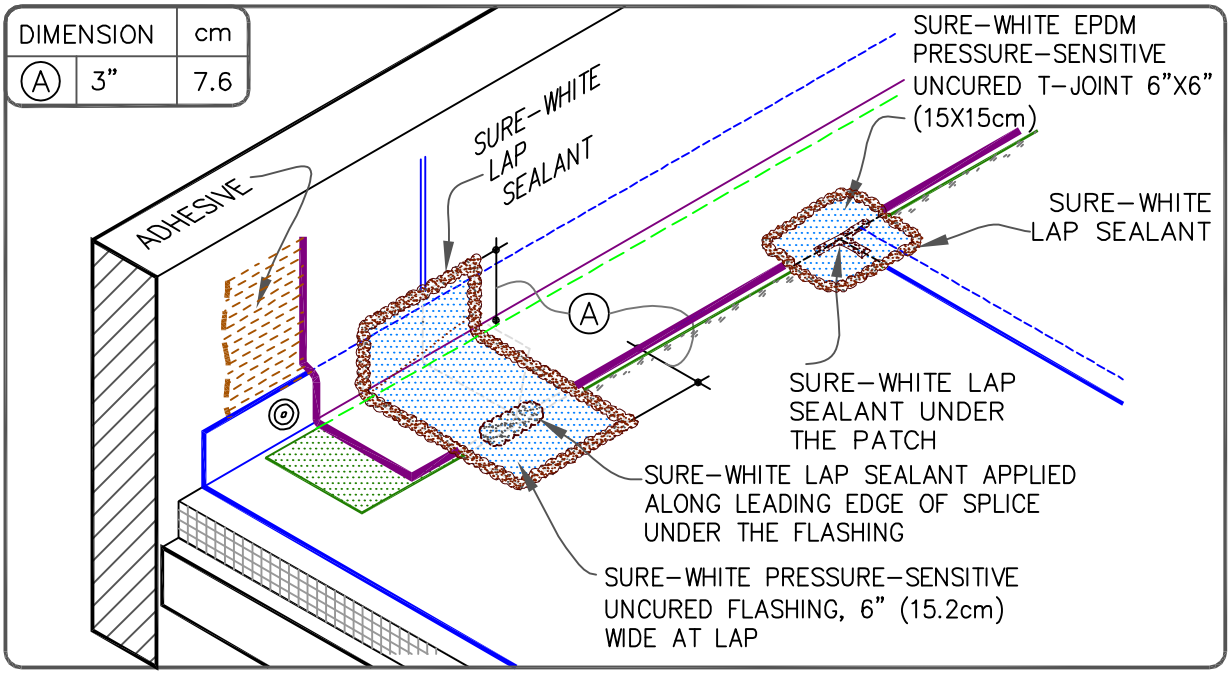
TPO WITH EPDM FLASHING



ON VERTICAL SEAMS, MIN. 3" (7.5cm) WIDE SURE-WHITE SECURTAPE WITH EPDM PRIMER



DIMENSION	cm
Ⓐ 3"	7.6



CARLISLE SYNTEC SYSTEMS

PARAPET/CURB WITH SURE-WHITE EPDM & SURE-WHITE SecurTAPE

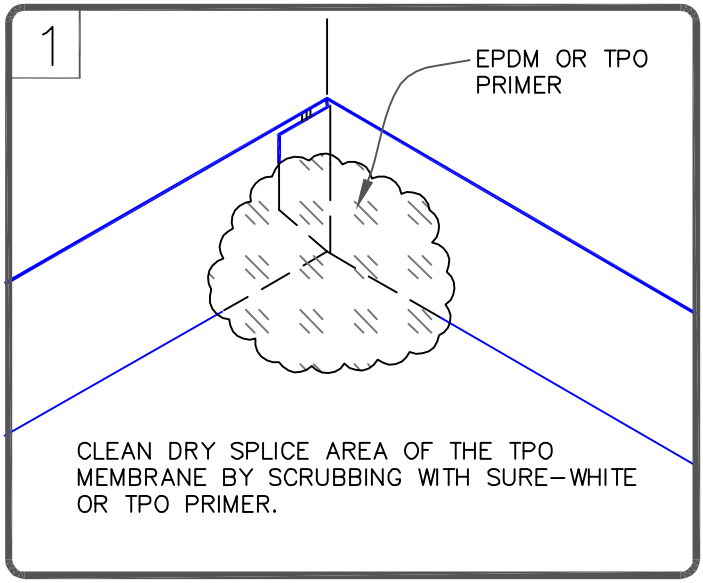
WARRANTY: SEE WARRANTY REQUIREMENTS ON TOP OF PAGE.

TP

DETAIL NO. U-12AT

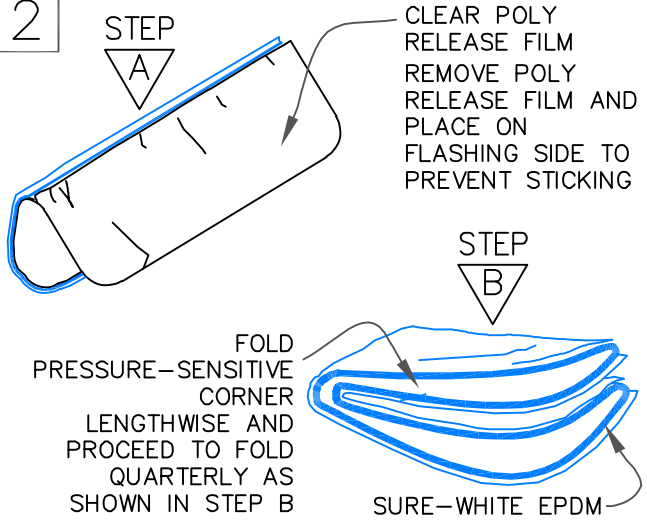
TPO WITH EPDM FLASHING

1

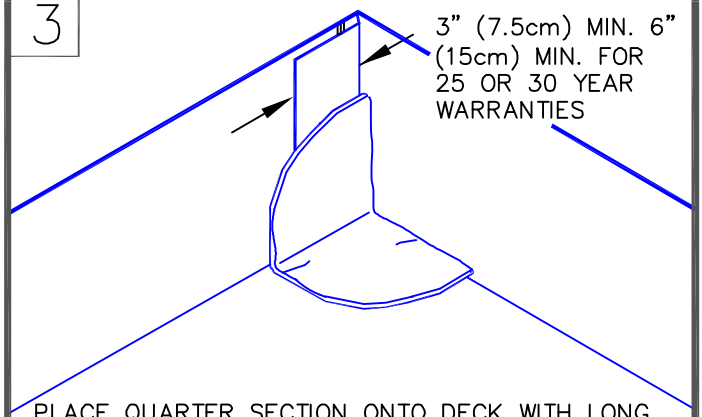


CLEAN DRY SPLICE AREA OF THE TPO MEMBRANE BY SCRUBBING WITH SURE-WHITE OR TPO PRIMER.

2

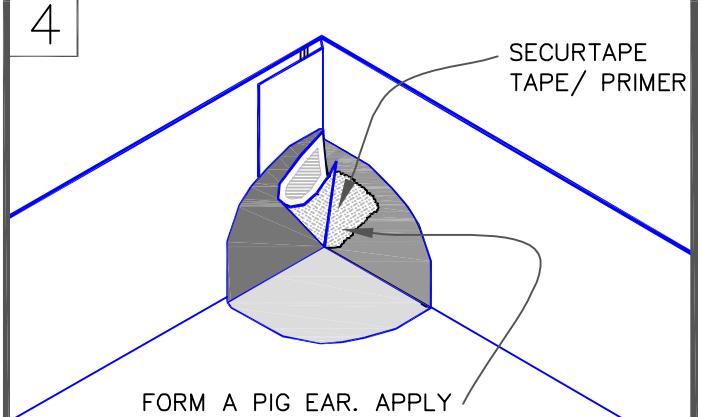


3



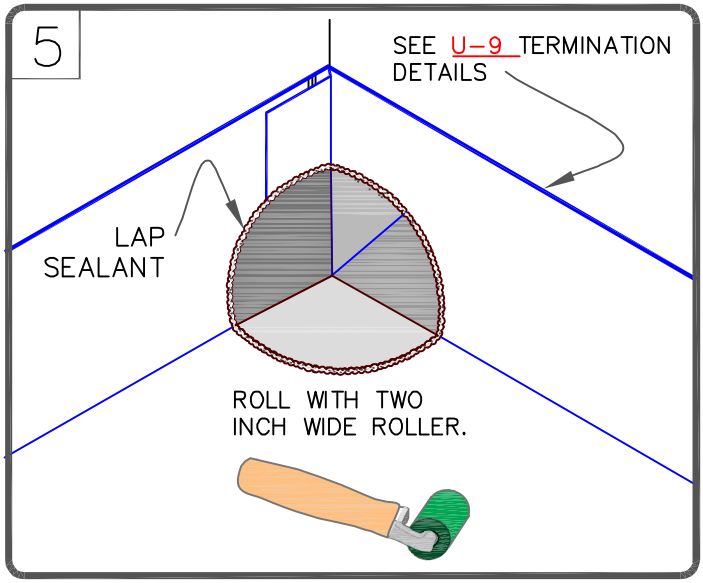
PLACE QUARTER SECTION ONTO DECK WITH LONG FOLDED SIDE FACING THE WALL. REMOVE REMAINING RELEASE PAPER. PRESS FIRMLY AND PROCEED WITH SECOND QUARTER GOING UP THE VERTICAL WALL BY PRESSING FIRMLY INTO CORNER.

4



FORM A PIG EAR. APPLY PRIMER/SECURTAPE TAPE TO THE PIG EAR AND ADHERE TO THE WALL.

5



NOTE:

1. TPO PRIMER MUST BE APPLIED TO ALL SPLICE AREAS AND FOR EACH LAYER OF PRESSURE-SENSITIVE FLASHING.

CARLISLE SYNTEC SYSTEMS

EPDM PRESSURE-SENSITIVE INSIDE CORNER WITH CONTINUOUS TPO WALL FLASHING

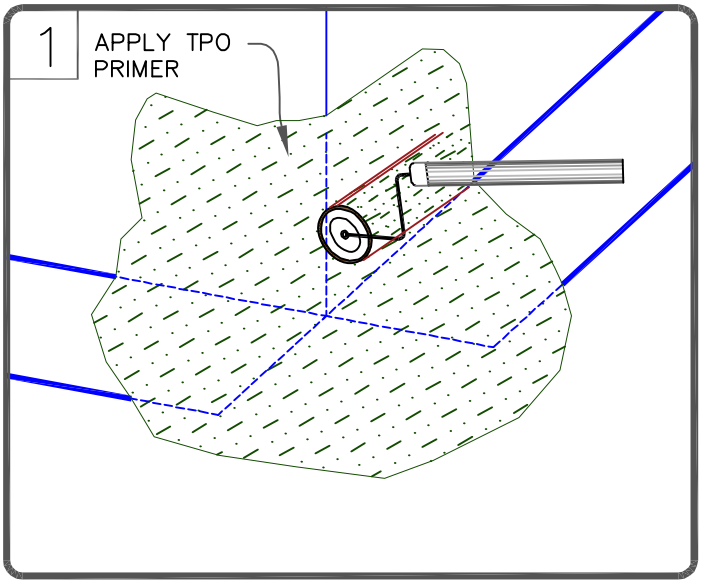
MAXIMUM WARRANTY: 20 YEARS

TP

DETAIL NO. U-15CT

TPO WITH EPDM FLASHING

1



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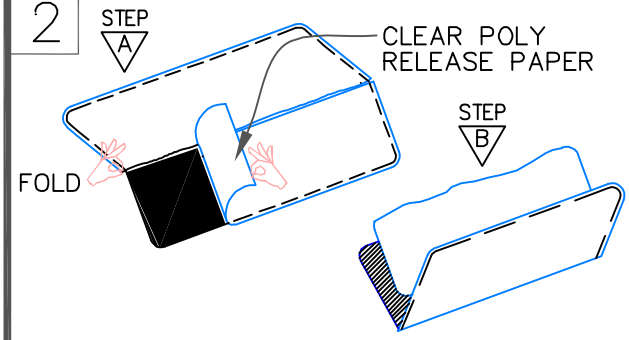
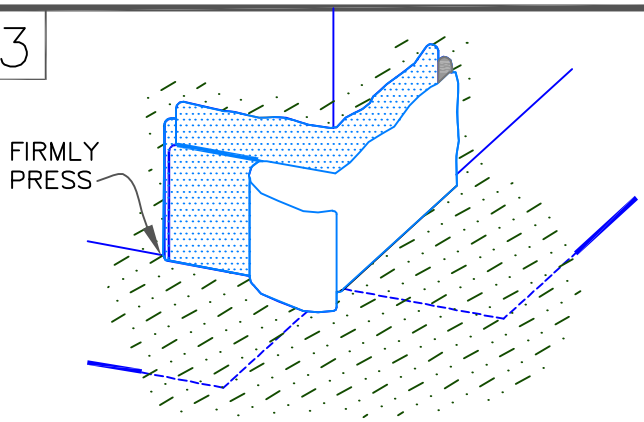


PRIOR TO PLACEMENT OF SURE-WHITE PRESSURE-SENSITIVE SURE-WHITE CORNER, PEEL OFF THE POLY RELEASE FILM FROM THE FLASHING SIDE AND HEAT WITH A HEAT GUN. RE-APPLY THE POLY LOOSELY. FOLD THE FLASHING IN HALF.

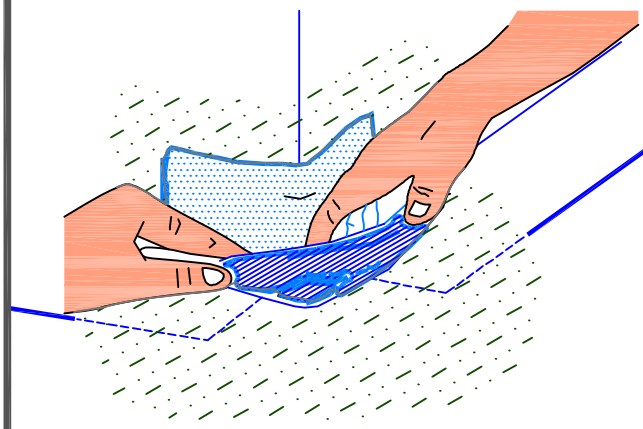
3



PLACE SURE-WHITE INSIDE/OUTSIDE CORNER AS SHOWN AND REMOVE RELEASE PAPER.

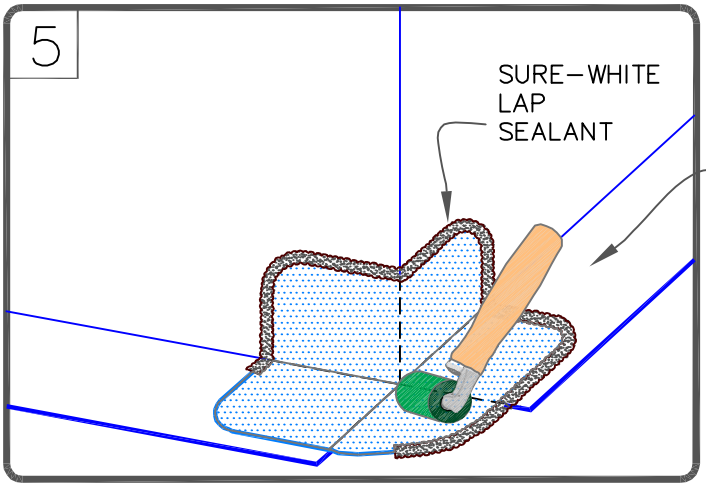
PRESS FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING AGAINST THE VERTICAL SURFACE.

4



PLACE FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING ONTO THE DECK FLANGE BY PRESSING THE FLASHING AGAINST THE HORIZONTAL SURFACE.

5



AFTER ADHERING, ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES.

IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE UNCURED FLASHING.

WARRANTY REQUIREMENTS	DETAIL NOT FOR USE ON 25-30 YEAR WARRANTY ROOFS.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH PRE-CUT PRESSURE-SENSITIVE EPDM FLASHING (OPTION 1)

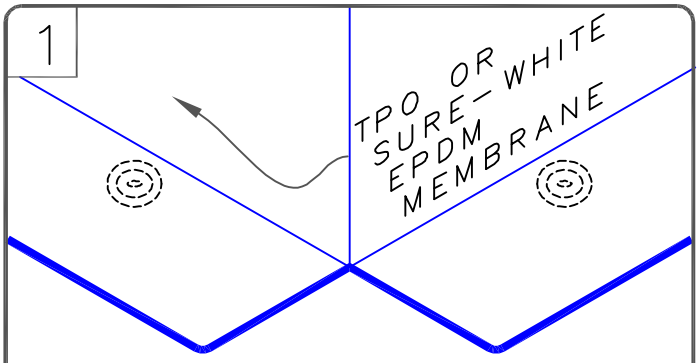
MAXIMUM WARRANTY: 20 YEARS

TP

DETAIL NO. U-15ET

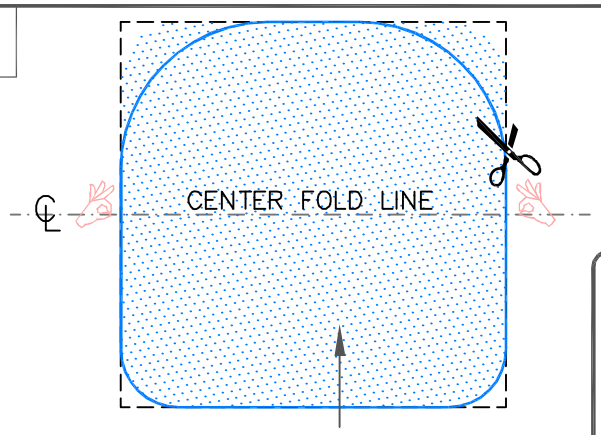
TPO WITH EPDM FLASHING

1



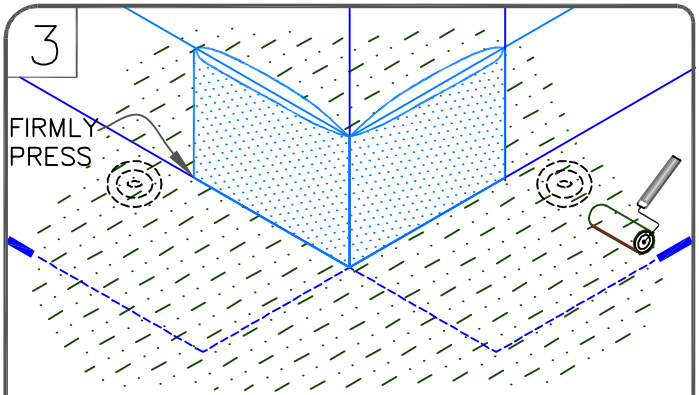
FASTEN MEMBRANE AND FLASH CURB OR WALL WITH MEMBRANE FOLLOWING STANDARD PROCEDURES USING BONDING ADHESIVE AND SURE-WHITE PRESSURE-SENSITIVE TAPE OR HOT AIR WELDING.

2



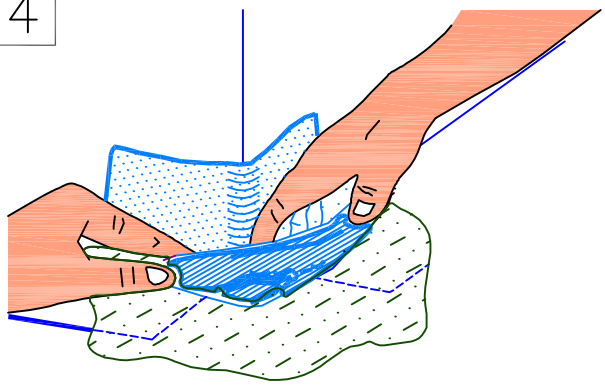
CUT A 9"x9" (23cm x 23cm) SECTION OF SURE-WHITE (WHITE OR GRAY) PRESSURE-SENSITIVE UNCURED FLASHING AND MAKE ROUNDED CORNERS AS SHOWN.

3



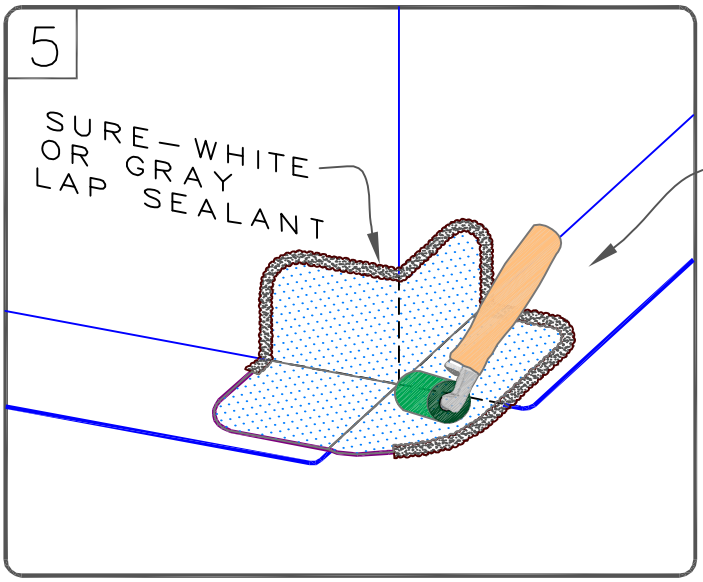
AFTER APPLYING TPO PRIMER, REMOVE AND REPLACE POLY BACKING. ON FLASHING SIDE, FOLD 9"x9" (23cm x 23cm) FLASHING IN HALF WITH ROUNDED PORTION TURNED UP. CENTER FLASHING ON CORNER AND FIRMLY PRESS AGAINST VERTICAL SURFACE.

4



ROLL AND CREASE FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY ROLL FLASHING ONTO THE DECK MEMBRANE.

5



AFTER ADHERING, ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES.

IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE UNCURED FLASHING.

WARRANTY REQUIREMENTS	DETAIL NOT FOR USE ON 25-30 YEAR WARRANTY ROOFS.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH EPDM PRESSURE-SENSITIVE ELASTOFORM FLASHING (OPTION 2)

MAXIMUM WARRANTY: 20 YEARS

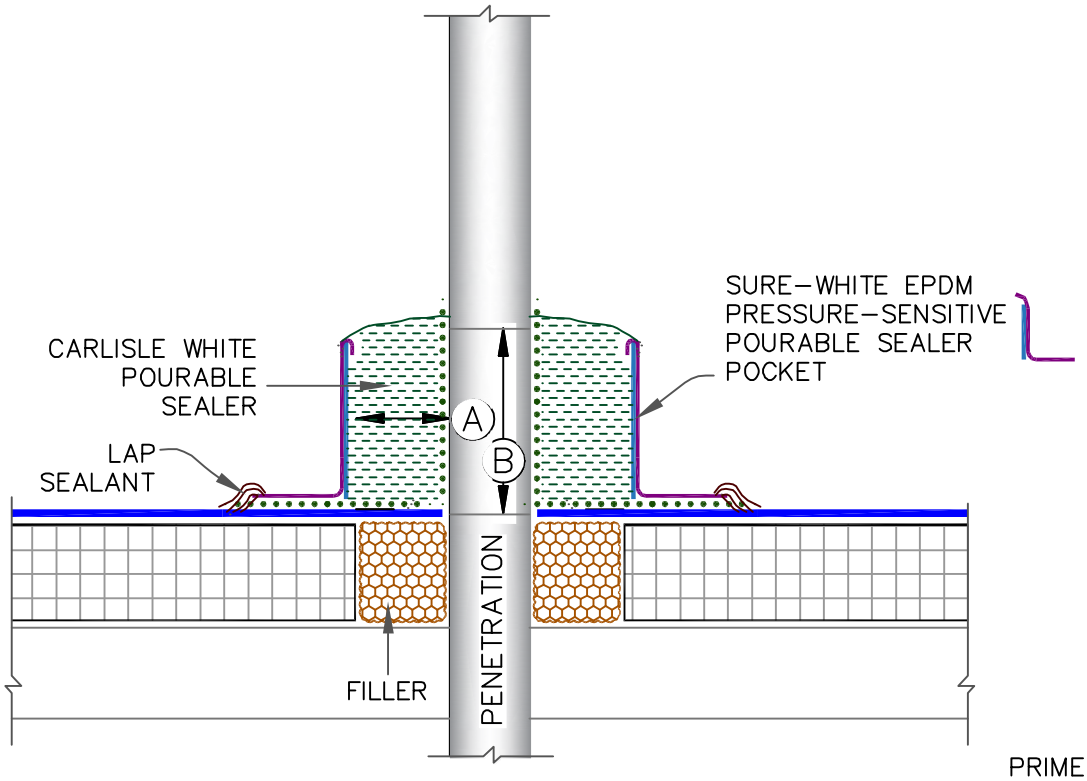
TP

DETAIL NO. U-15GT

CAUTION

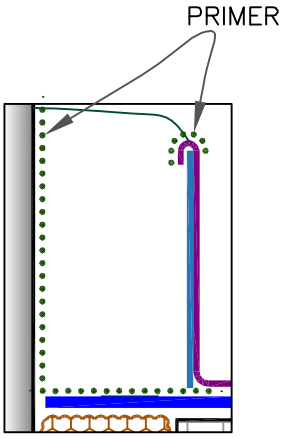
FOR 25–30 YEAR WARRANTY ROOFS, USE DETAIL 16–A WITH MANDATORY REQUIREMENT OF SHEET METAL RAIN HOOD.

TPO WITH EPDM FLASHING



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180°F (82°C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. PENETRATIONS, MEMBRANE, FLASHING AND METAL (INSIDE POCKET) MUST BE PRIMED WITH TPO PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE–SENSITIVE UNCURED FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY–FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO U–8A) REGARDLESS OF SIZE OR DIAMETER.
8. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.



MANDATORY TPO PRIMER AT ALL INTERFACES OF POURABLE SEALER EXCEPT BLUE PLASTIC SUPPORT STRIP

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

CARLISLE SYNTEC SYSTEMS

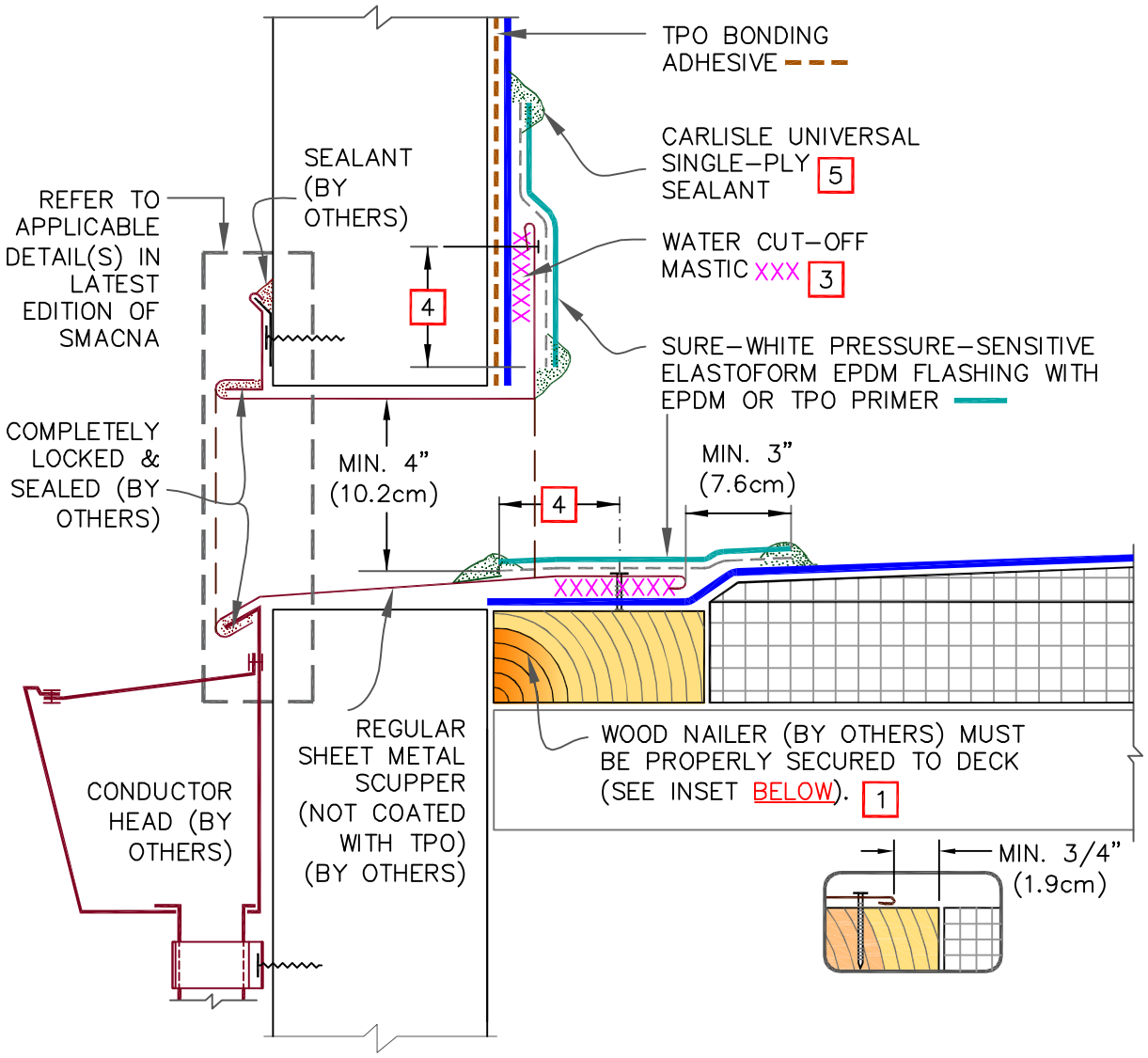
PRESSURE–SENSITIVE POURABLE SEALER POCKET

MAXIMUM WARRANTY: 20 YEARS, SEE CAUTION ON TOP OF PAGE

TP

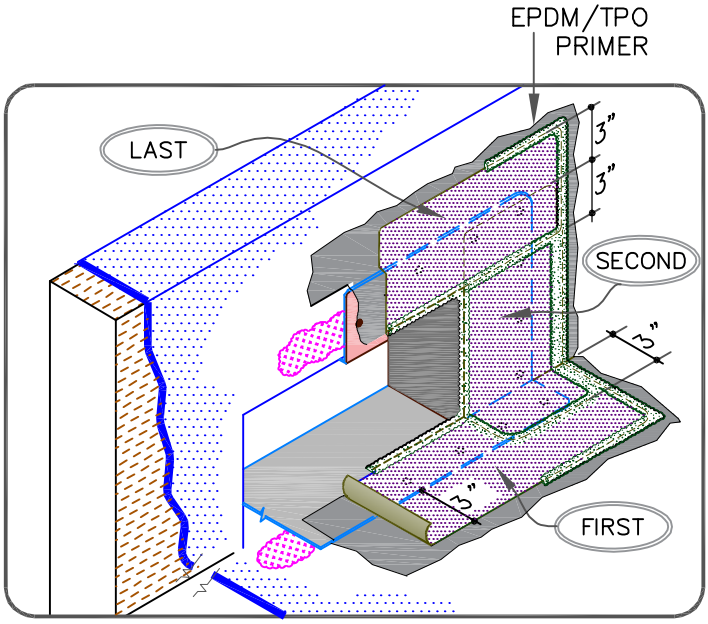
DETAIL NO. U–16BT

TPO WITH EPDM FLASHING



NOTES:

1. WOOD NAILERS ARE INSTALLED AT SCUPPERS TO SECURE METAL SLEEVE. SEE INSET.
2. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
3. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. SCUPPER FLANGES MUST BE TOTALLY COVERED BY PRESSURE-SENSITIVE UNCURED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.
5. UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.



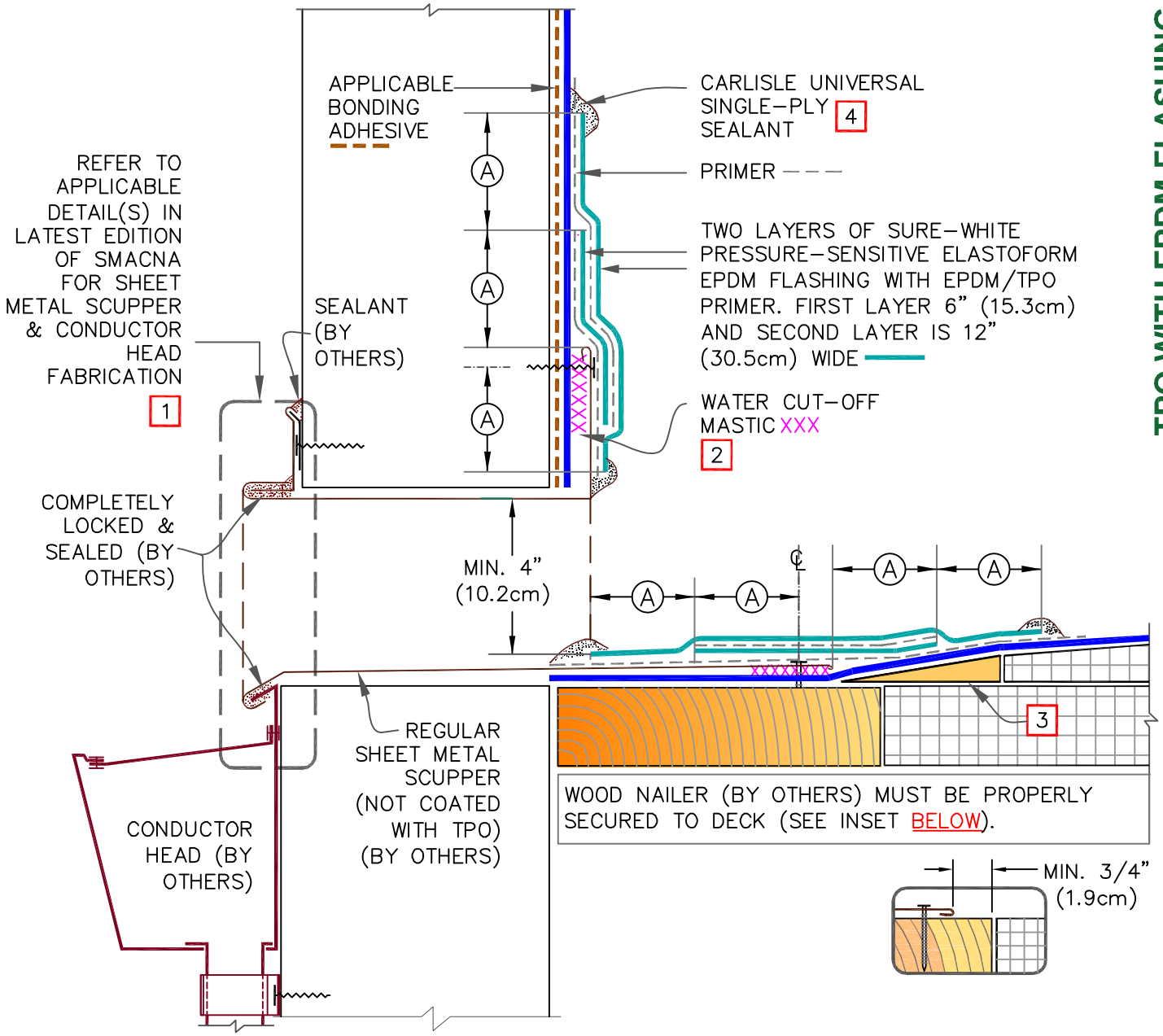
CARLISLE SYNTEC SYSTEMS

SCUPPER WITH EPDM FLASHING

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. U-18BT

TPO WITH EPDM FLASHING



NOTES:

1. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS AIR & WATER-TIGHT.
2. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
3. TAPERED EDGE STRIP BY HUNTER OR CANT STRIP, AS REQUIRED & SET IN ADHESIVE OR SHAVE THE EDGES OF TAPERED INSULATION.
4. UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.

DIMENSIONS		cm	
A	2"	5	MIN.
B	3"	7.6	MIN.

CARLISLE SYNTEC SYSTEMS

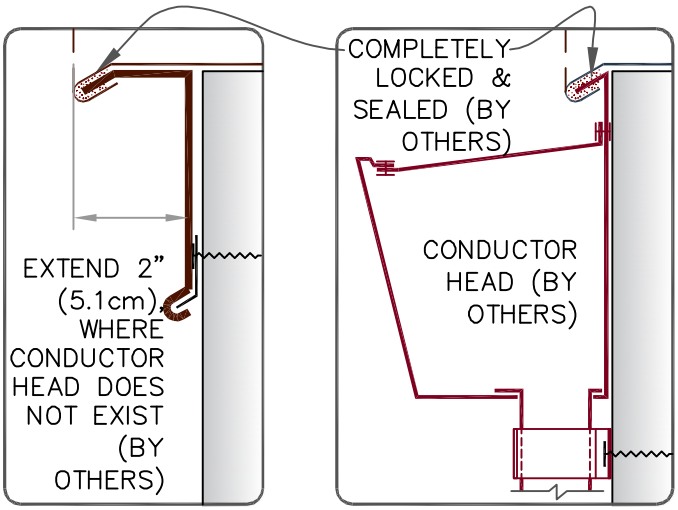
SCUPPER WITH EPDM FLASHING, PAGE 1 OF 2

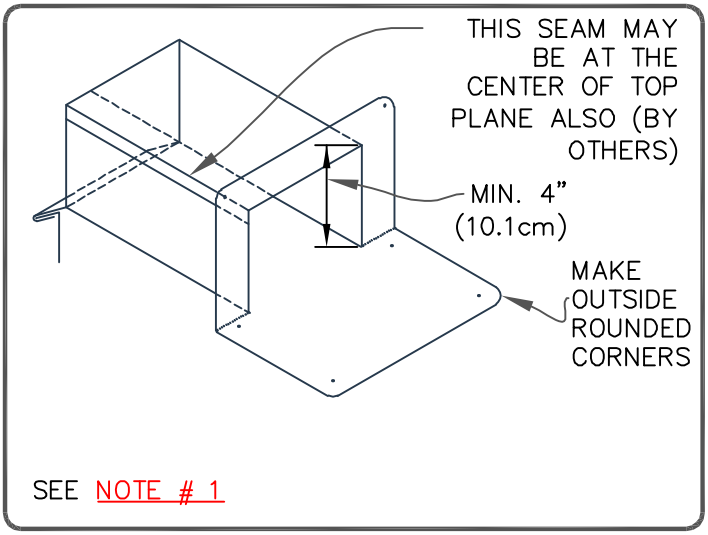
MAXIMUM WARRANTY: 30 YEARS

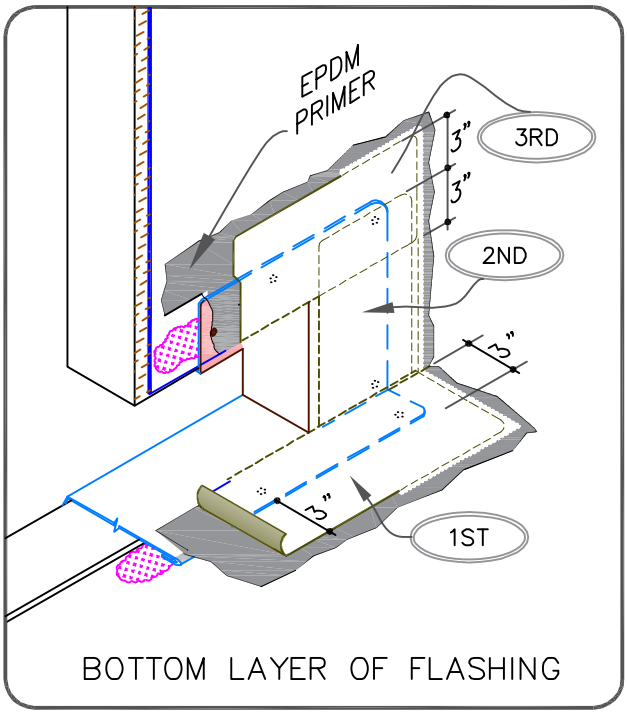
TP

DETAIL NO. U-18CT

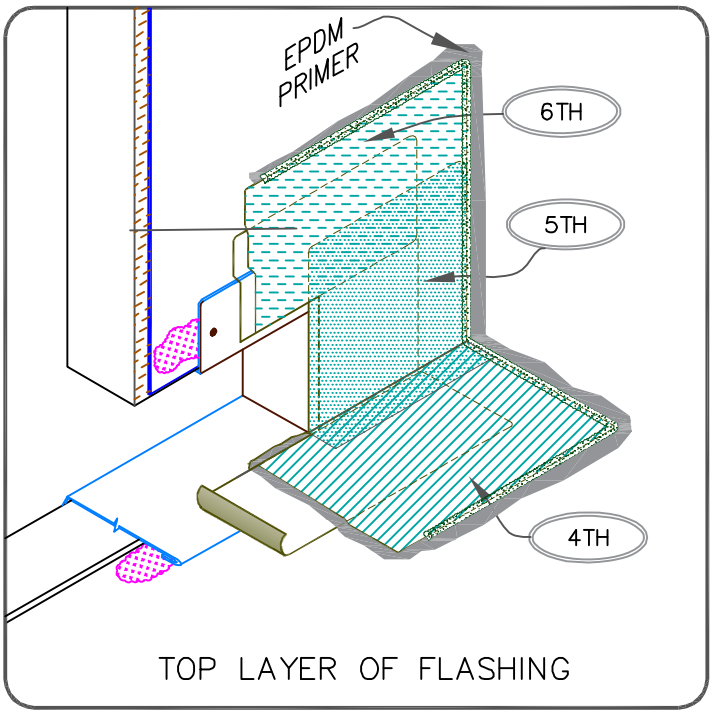
TPO WITH EPDM FLASHING







BOTTOM LAYER OF FLASHING



TOP LAYER OF FLASHING

CARLISLE SYNTEC SYSTEMS	SCUPPER WITH EPDM FLASHING, PAGE 2 OF 2	TP	DETAIL NO. U-18CT
	MAXIMUM WARRANTY: 30 YEARS		

Sure-Weld® TPO Roofing Systems

Sure-Weld®

Mechanically Fastened and Adhered Roofing Systems

Installation Details

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July 2024

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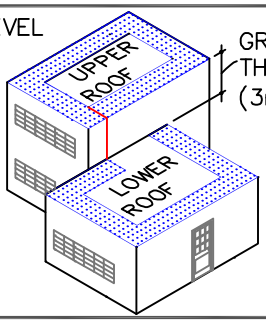
PERIMETER ZONES

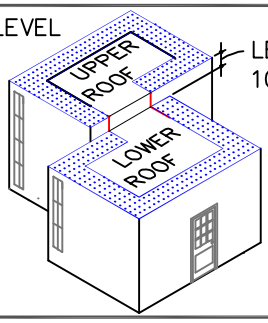
SAME LEVEL ROOF



GREATER THAN 10 FT (3m)

1

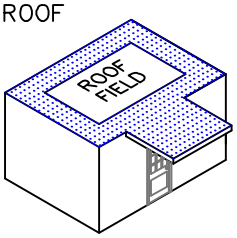
SPLIT LEVEL ROOFS



LESS THAN 10 FT (3m)

2

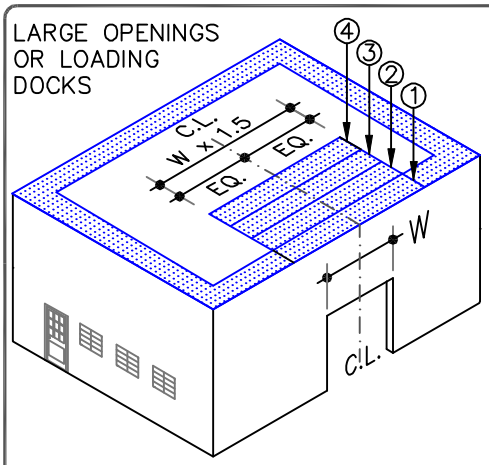
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG (PROJECTION ROOF) AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN

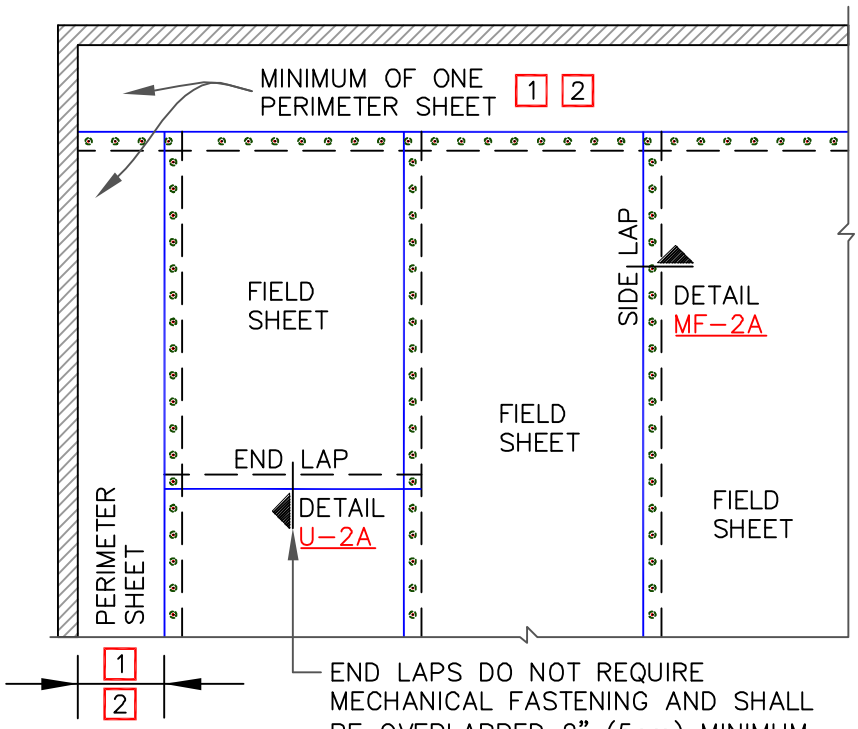
3

LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

4



NOTES:

1. PERIMETER SHEETS:

   1.1. WHEN USING 10' (3m) OR 12' (3.7m) WIDE FIELD SHEETS, 6' (1.8m) WIDE PERIMETER SHEETS ARE UTILIZED.

   1.2. WHEN USING 8' (2.4m) WIDE FIELD SHEETS, 4' (1.2m) WIDE PERIMETER SHEETS ARE UTILIZED.

2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.

MECHANICALLY FASTENED ASSEMBLY

CARLISLE SYNTEC SYSTEMS

MEMBRANE SECUREMENT

MAXIMUM WARRANTY: 30 YEARS

TP

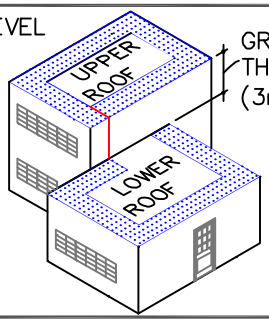
DETAIL NO.

MF-2

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

PERIMETER ZONES

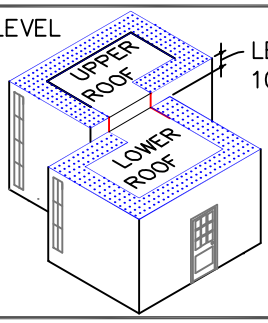
SAME LEVEL ROOF



GREATER THAN 10 FT (3m)

1

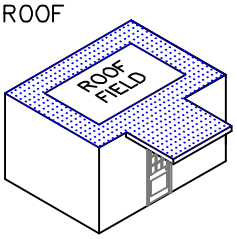
SPLIT LEVEL ROOFS



LESS THAN 10 FT (3m)

2

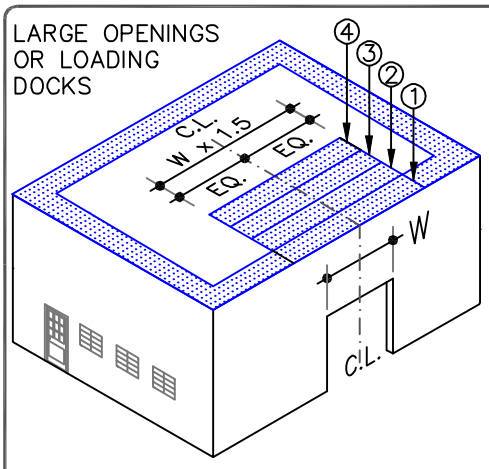
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG (PROJECTION ROOF) AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

3

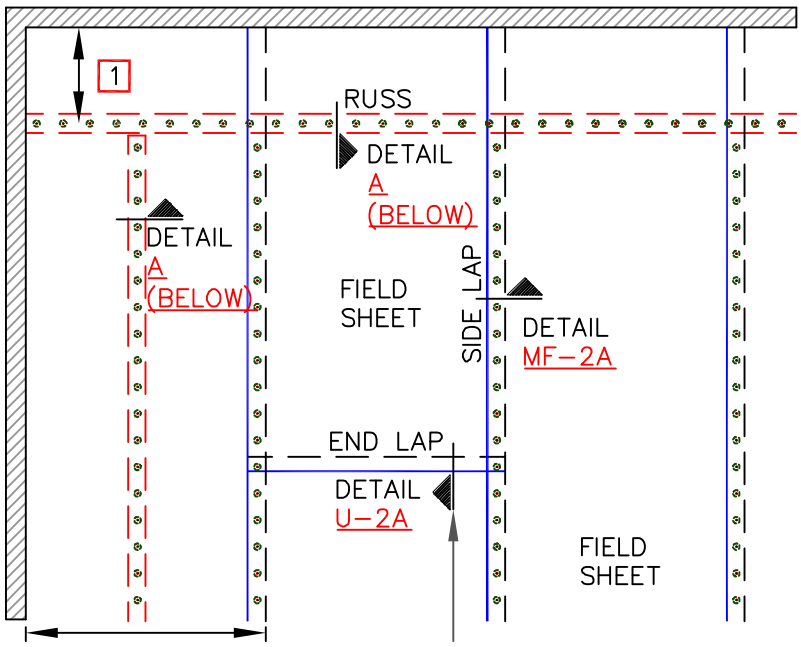
LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

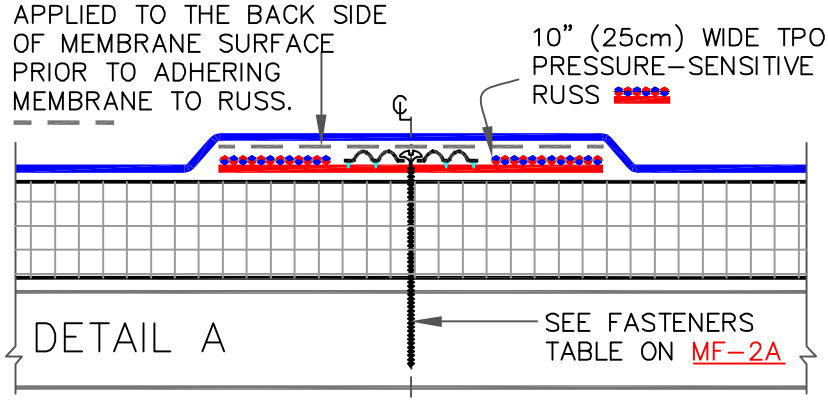
4

RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)



END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (5cm) MINIMUM. SEE DETAIL U-2A

TPO PRIMER MUST BE APPLIED TO THE BACK SIDE OF MEMBRANE SURFACE PRIOR TO ADHERING MEMBRANE TO RUSS.



NOTES:

1. RUSS SHALL BE POSITIONED 5' (1.5m) TO 6' (1.8m) FROM THE PERIMETER EDGE WHEN USING 10' (3m) OR 12' (3.7m) WIDE FIELD SHEETS. WHEN USING 8' (2.4m) WIDE FIELD SHEETS, RUSS SHALL BE POSITIONED 4' (1.2m) FROM THE PERIMETER EDGE.

2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.

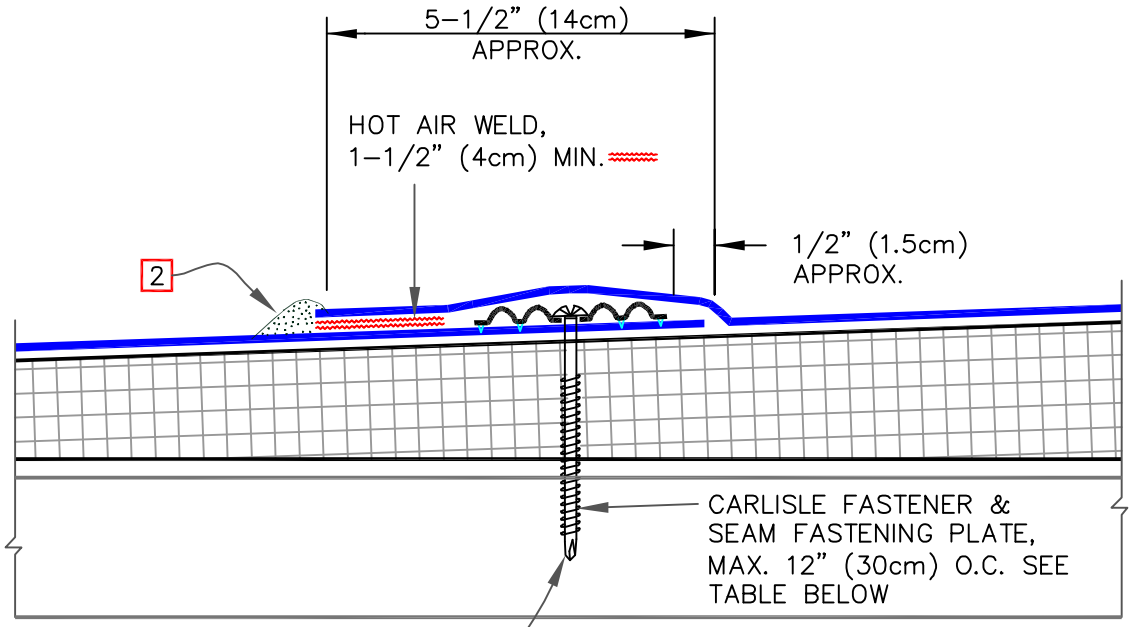
MECHANICALLY FASTENED ASSEMBLY

CARLISLE SYNTEC SYSTEMS

MEMBRANE SECUREMENT WITH RUSS

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-2.1



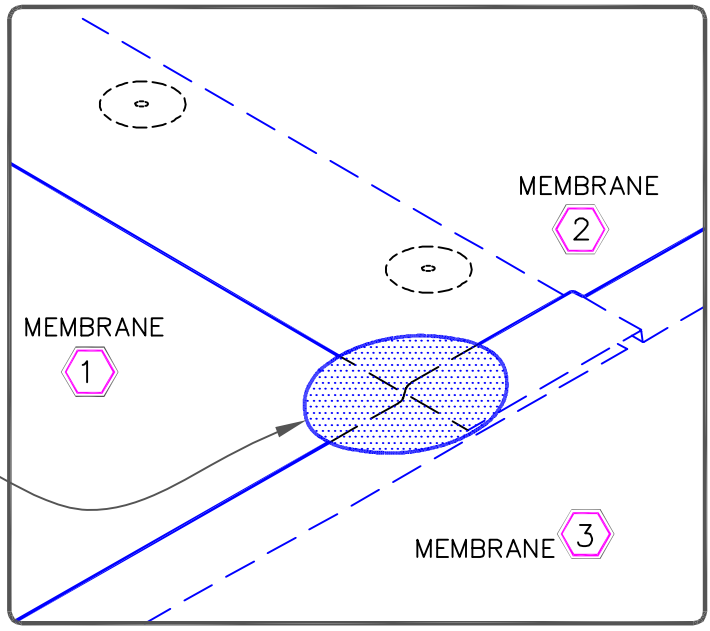
FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

NOTES:

1. POSITION SEAM FASTENING PLATES BEYOND NON–REINFORCED ENCAPSULATED EDGE.
2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

WHEN USING 60 OR 80-MIL (1.52/2.03mm) THICK MEMBRANE
APPLY A 4–1/2" (11.8cm) DIAMETER "T–JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.



MECHANICALLY FASTENED ASSEMBLY

CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM,
PAGE 1 OF 2

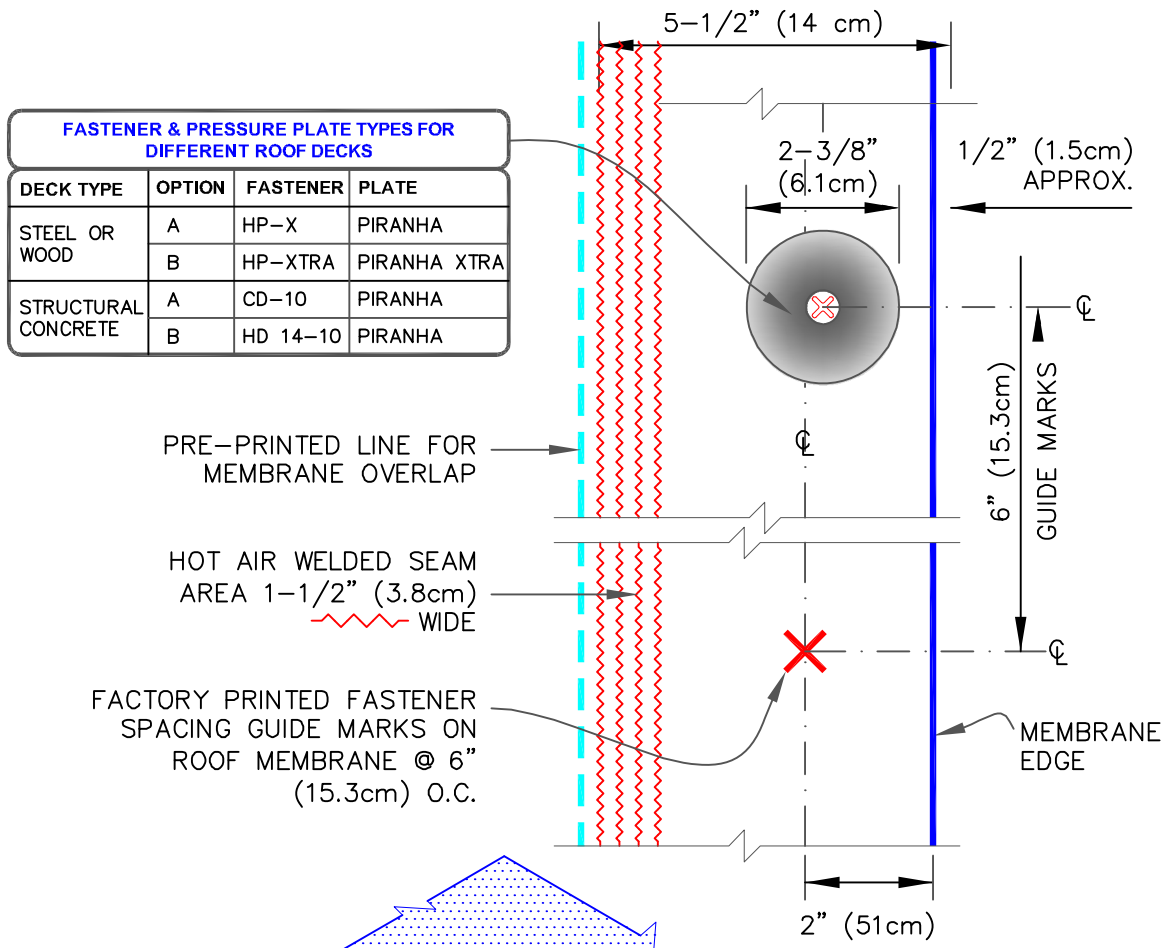
MAXIMUM WARRANTY: 30 YEARS

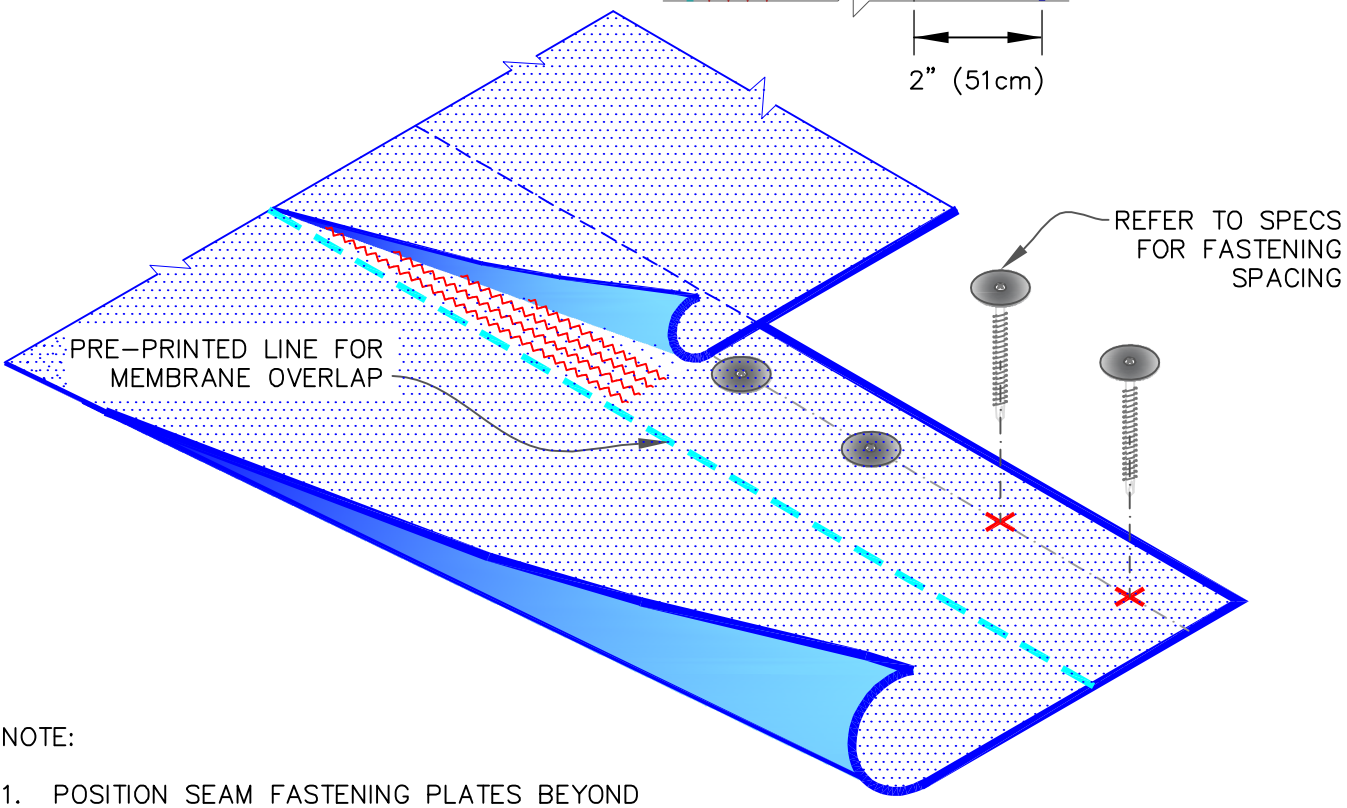
TP

DETAIL NO.
MF–2A

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA





NOTE:

1. POSITION SEAM FASTENING PLATES BEYOND NON-REINFORCED ENCAPSULATED EDGE.

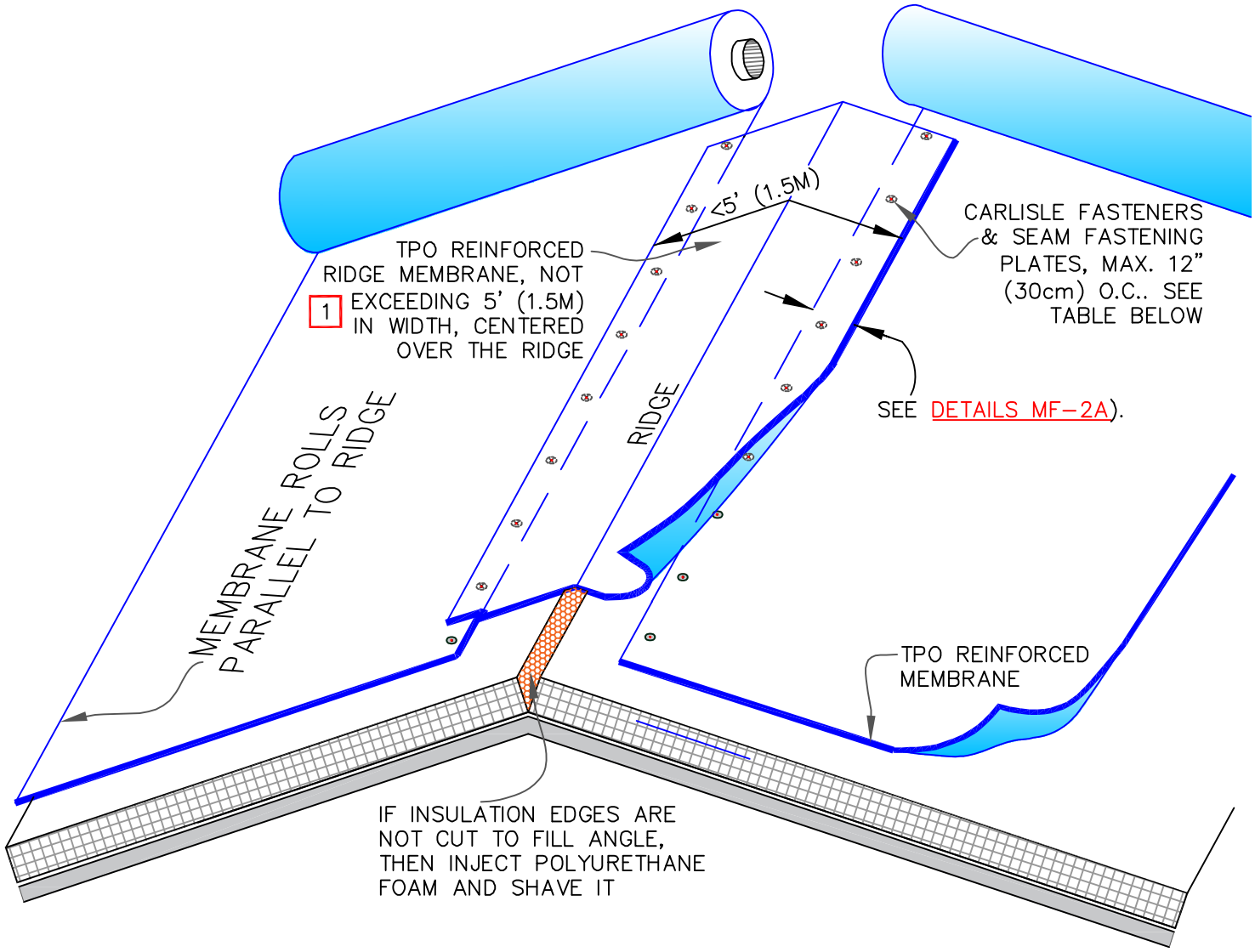
MECHANICALLY FASTENED ASSEMBLY

CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM, PAGE 2 OF 2

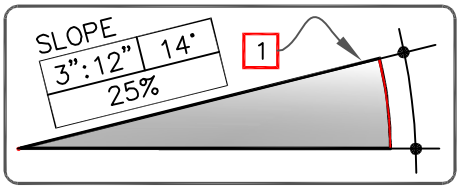
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-2A



NOTES

1. RIDGE MEMBRANE ATTACHMENT IS ONLY REQUIRED WHEN ROOF SLOPE EXCEEDS 3" TO 12" (7.5cm TO 30.5cm) HORIZONTAL.
2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.
3. AS AN OPTION TO USING PERIMETER SHEETS, 10" (25cm) WIDE PRESSURE-SENSITIVE RUSS MAY BE USED BENEATH THE TPO FIELD SHEETS ONLY FOR PERIMETER SECUREMENT. SEE DETAIL MF-2.1, DETAIL A.
4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

MECHANICALLY FASTENED ASSEMBLY

CARLISLE SYNTEC SYSTEMS

RIDGE MEMBRANE ATTACHMENT

MAXIMUM WARRANTY: 30 YEARS

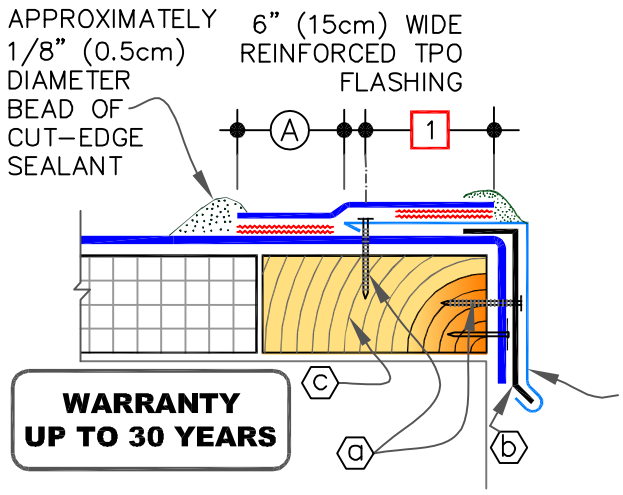
TP

DETAIL NO. MF-22

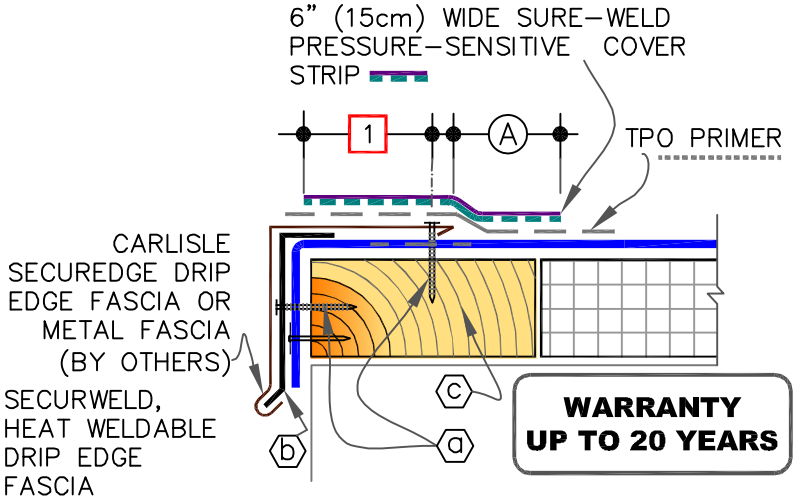
MF (MECHANICALLY FASTENED)

CAUTIONS

- DETAIL B IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM THE GUTTER /EDGE. REFER TO DETAILS U-1B OR U-1C.
- FOR 30-YEAR WARRANTY PROJECTS, SEE ALSO DETAILS U-1B, U-1C, U-1D OR U-1F



A SECURWELD DRIP EDGE FASCIA



B SecurSeal DRIP EDGE FASCIA

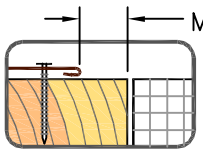
ⓐ M1-1/2" (3.8cm) RING SHANK NAILS 6" (15cm) O.C. MAX.

ⓑ MINIMUM 22-GAUGE CONTINUOUS CLEAT.

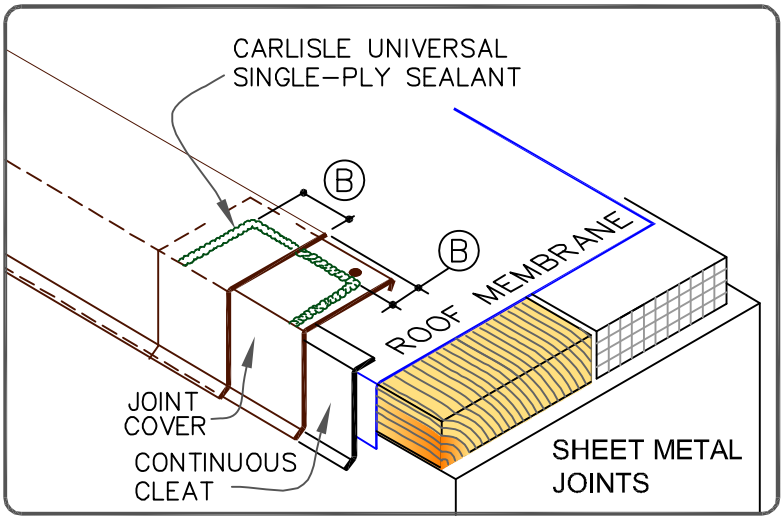
ⓒ WOOD NAILER (BY OTHERS)

NOTES:

1. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY TPO PRESSURE-SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING TPO PRIMER.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
4. TO ENSURE TPO PRESSURE-SENSITIVE COVER STRIP CONFORMS TO STEP-OFFS, HEAT COVER STRIP AT SPLICE INTERSECTIONS PRIOR TO ROLLING.



DIMENSIONS		cm	
A	2"	5	MIN.
B	1/2"	1.5	TO
	1"	2.5	



CARLISLE SYNTEC SYSTEMS

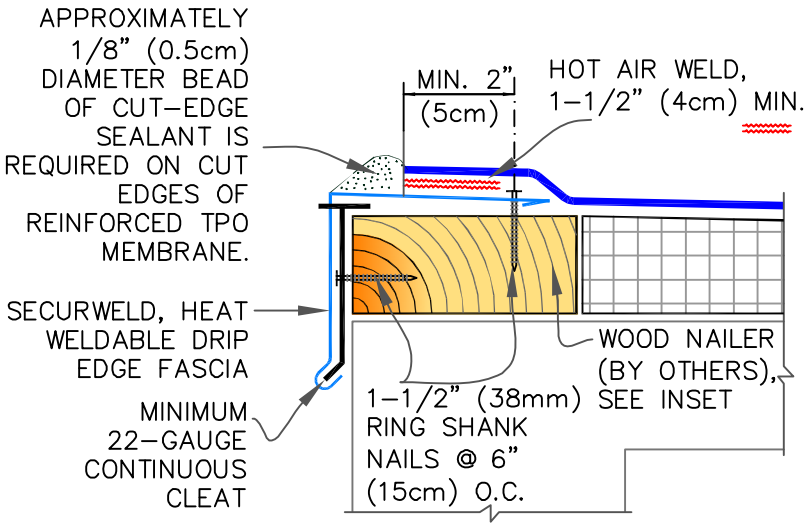
DRIP EDGE FASCIA WITH TPO FLASHING

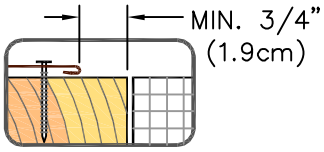
MAXIMUM WARRANTY: SEE EACH DETAIL (SEE CAUTION ON TOP OF PAGE)

DETAIL NO. U-1A

U (UNIVERSAL DETAILS)

THERMOPLASTIC ROOF MEMBRANE — TPO

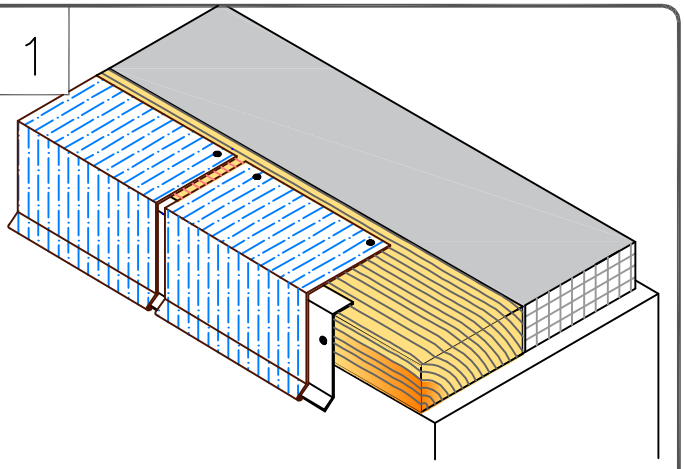




SEQUENCE:

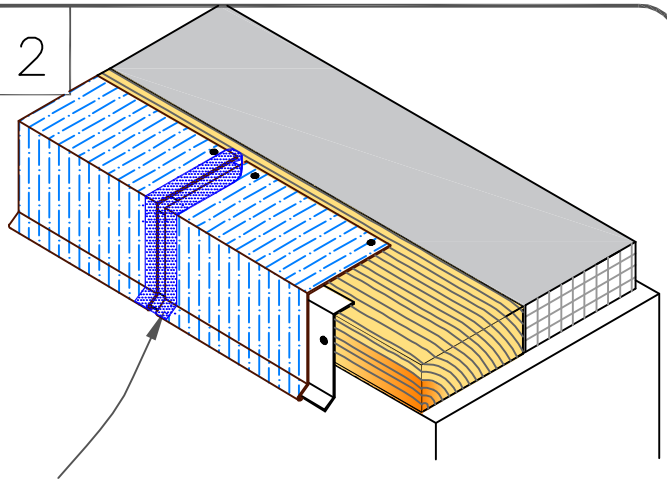
1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON-REINFORCED MEMBRANE STRIPPING.

1



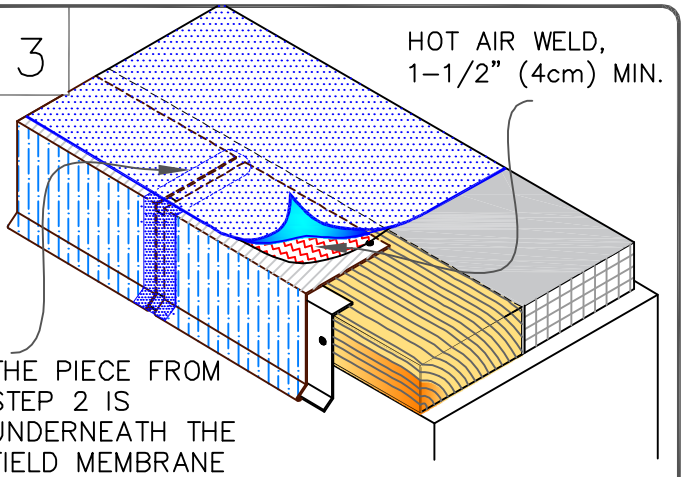
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"-1/4" (0.5-1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



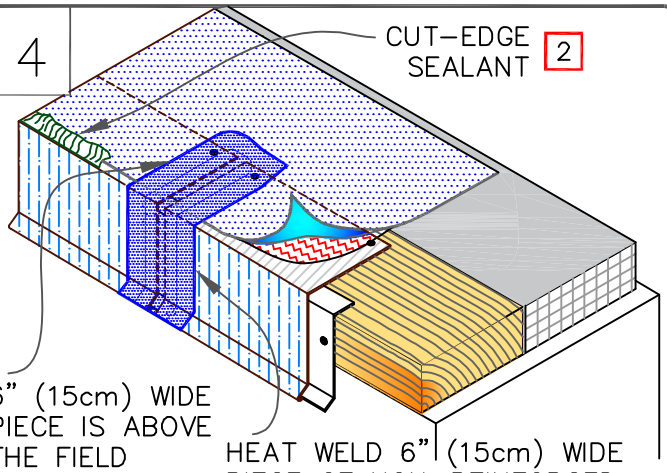
HEAT WELD 3" (7.5cm) WIDE PIECE OF REINFORCED TPO MEMBRANE OVER JOINT

3



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

4



HEAT WELD 6" (15cm) WIDE PIECE OF NON-REINFORCED MEMBRANE OVER JOINT, CENTERED ABOVE STEP 2 PIECE

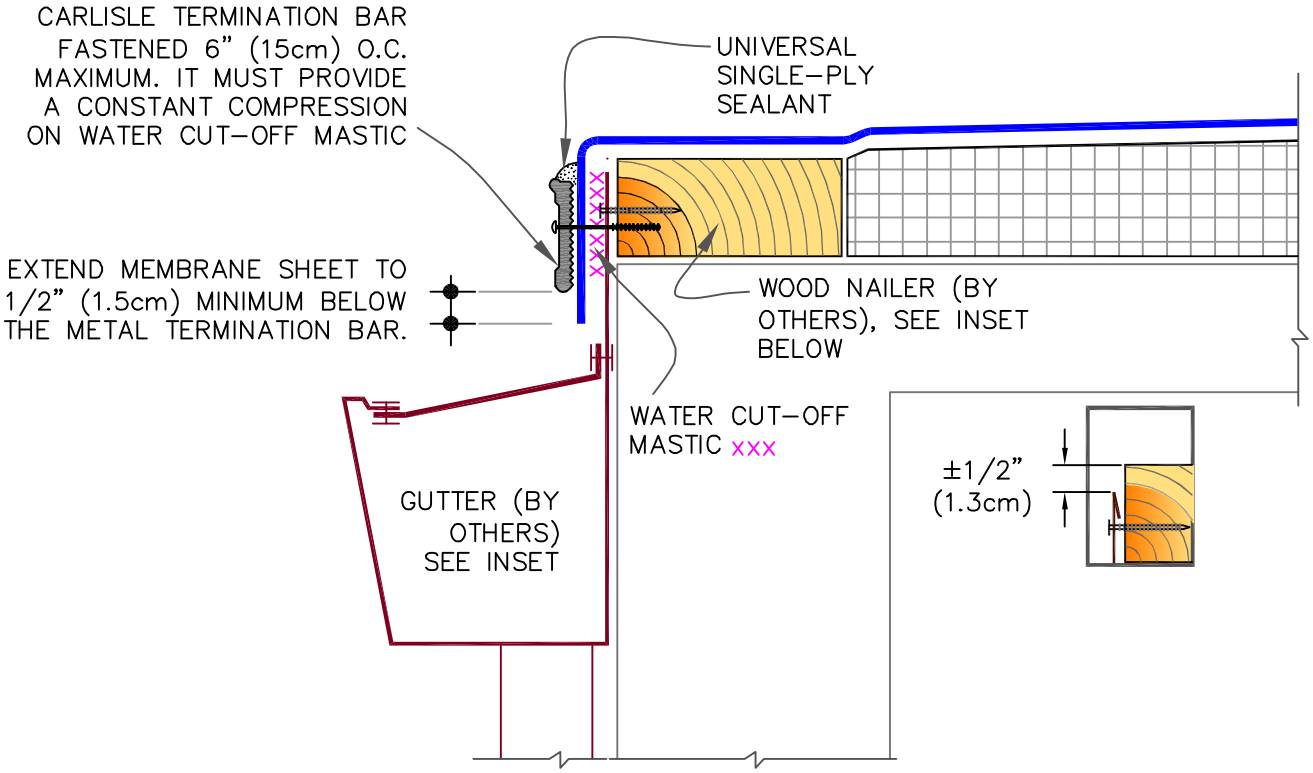
CARLISLE SYNTEC SYSTEMS

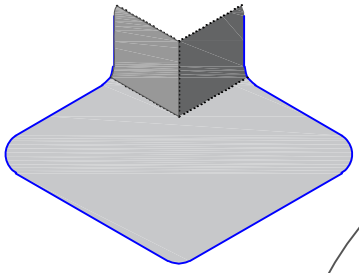
SecurWELD COATED DRIP EDGE FASCIA

MAXIMUM WARRANTY: 30 YEARS

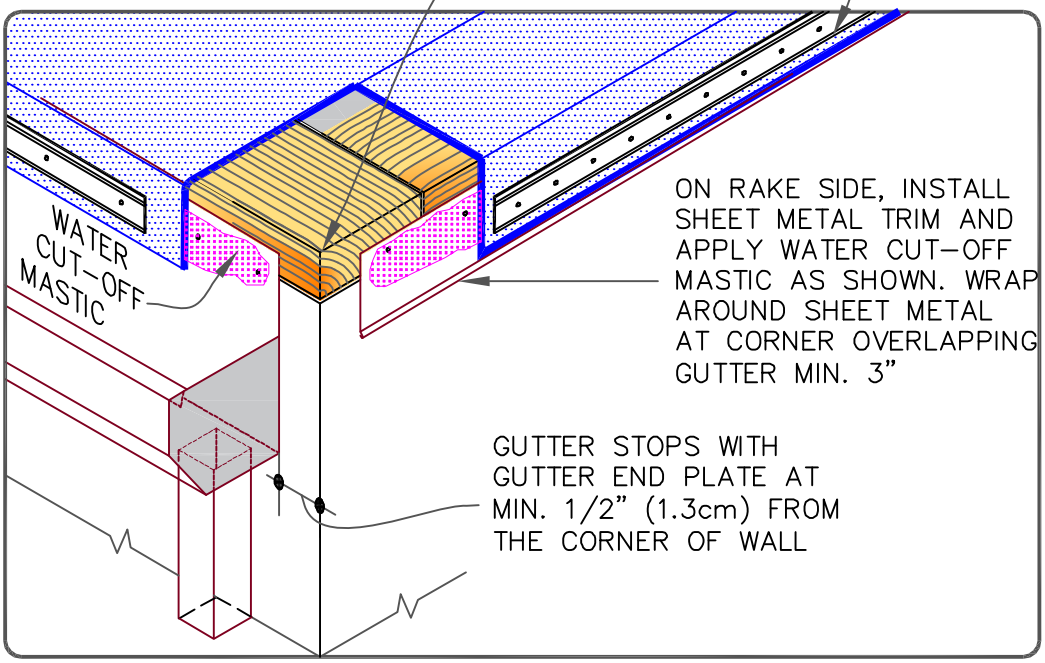
TP

DETAIL NO. U-1B





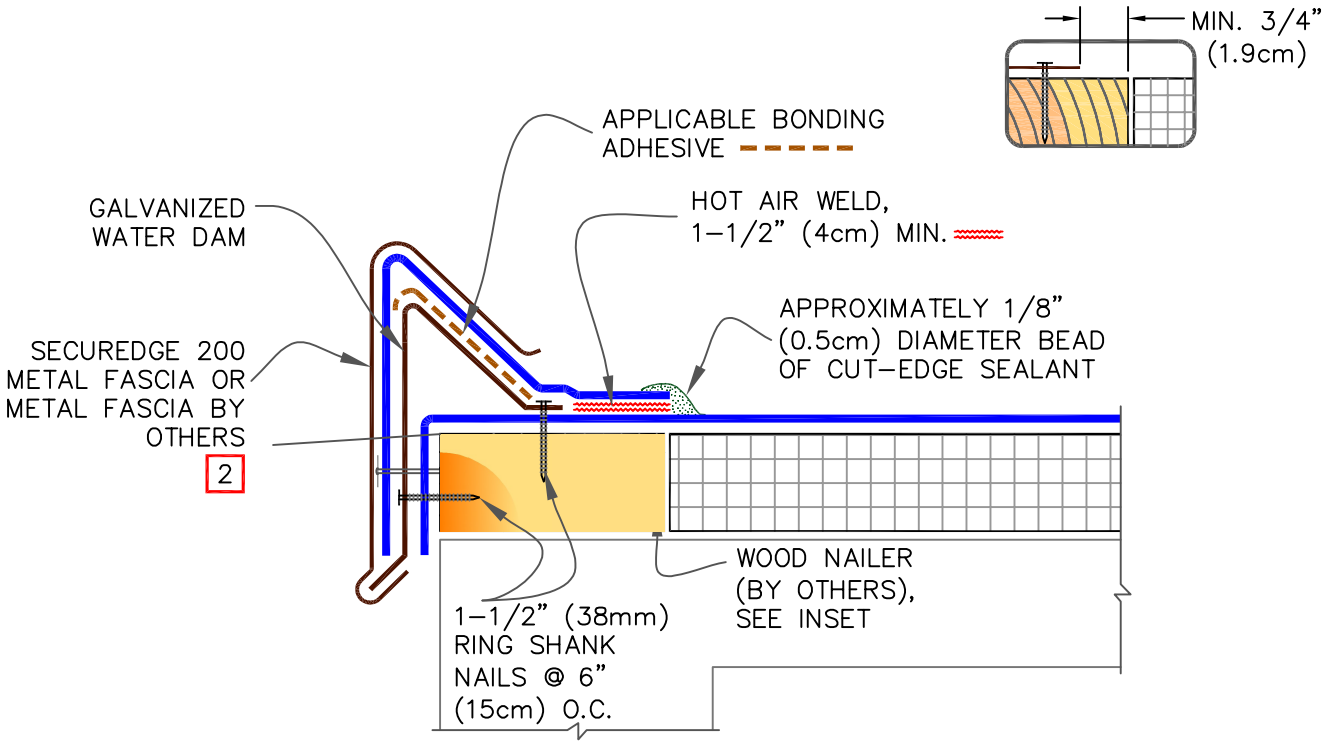
60-MIL (1.52mm) THICK TPO, UNIVERSAL CORNER CAN BE USED FOR AT TOP CORNER. CUT AS SHOWN IN DETAIL U-15G



DESIGNER MAY USE CARLISLE SECUREDGE TERMINATION BAR WITH FASCIA COVER ALSO

COLORED COVER

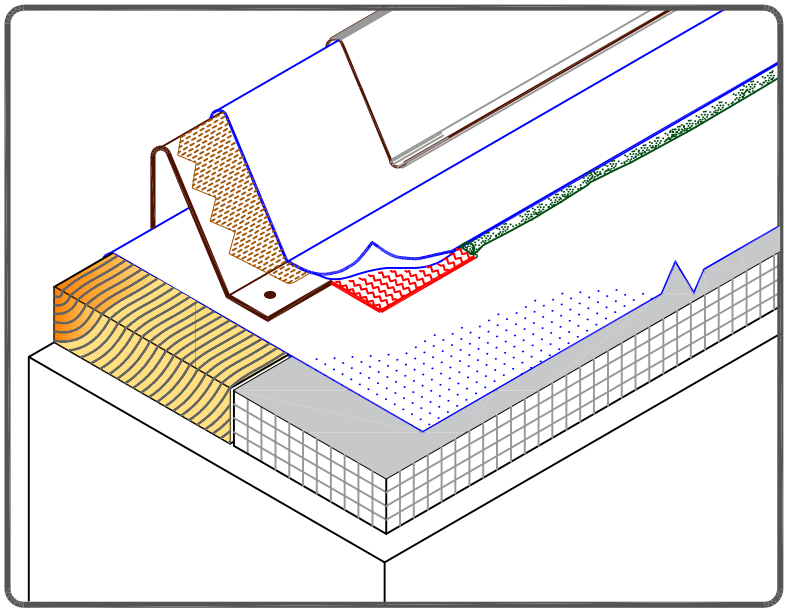
CARLISLE SYNTEC SYSTEMS	METAL BAR EDGE TERMINATION MAXIMUM WARRANTY: 30 YEARS	TP DETAIL NO. U-1C



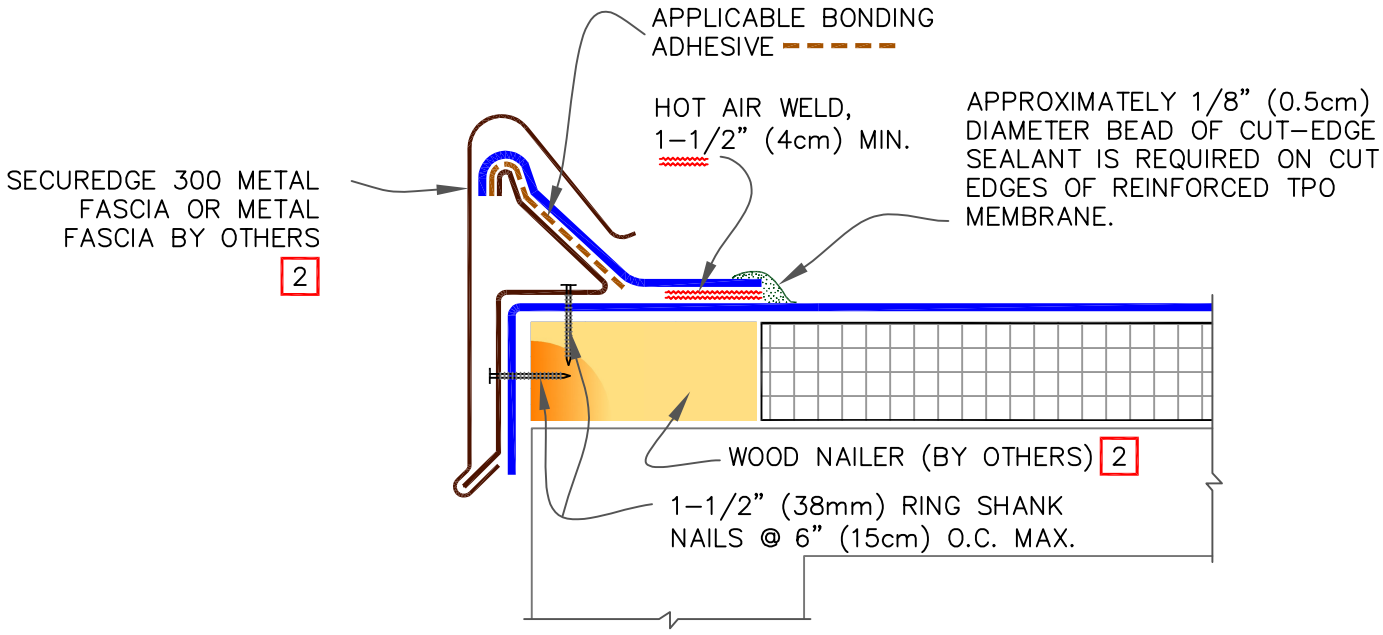
NOTES:

1. REFER TO SecurEdge 200 INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.

2. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



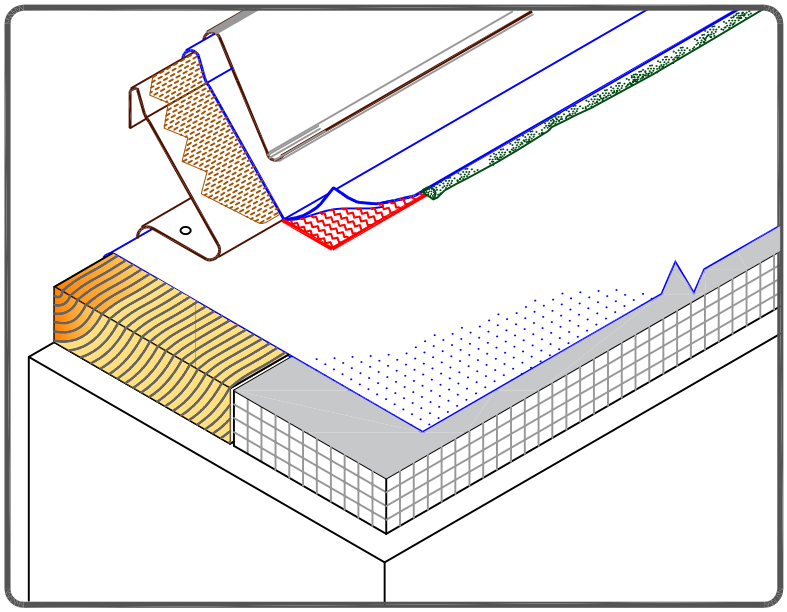
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 200	TP	DETAIL NO. U–1D
	MAXIMUM WARRANTY: 30 YEARS		



NOTES:

1. REFER TO SECUREDGE 300 INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.

2. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



CARLISLE SYNTEC SYSTEMS

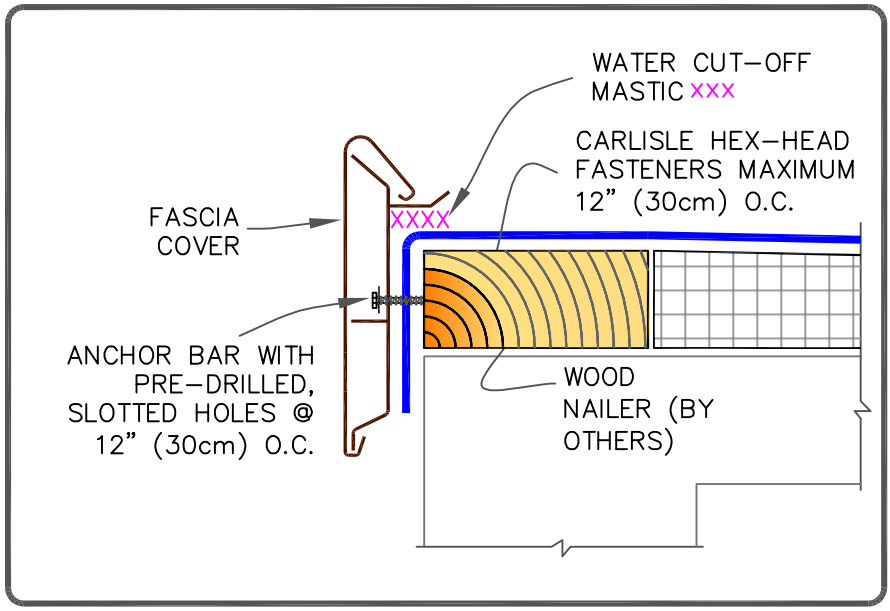
CARLISLE SecurEdge 300

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO.

U–1E

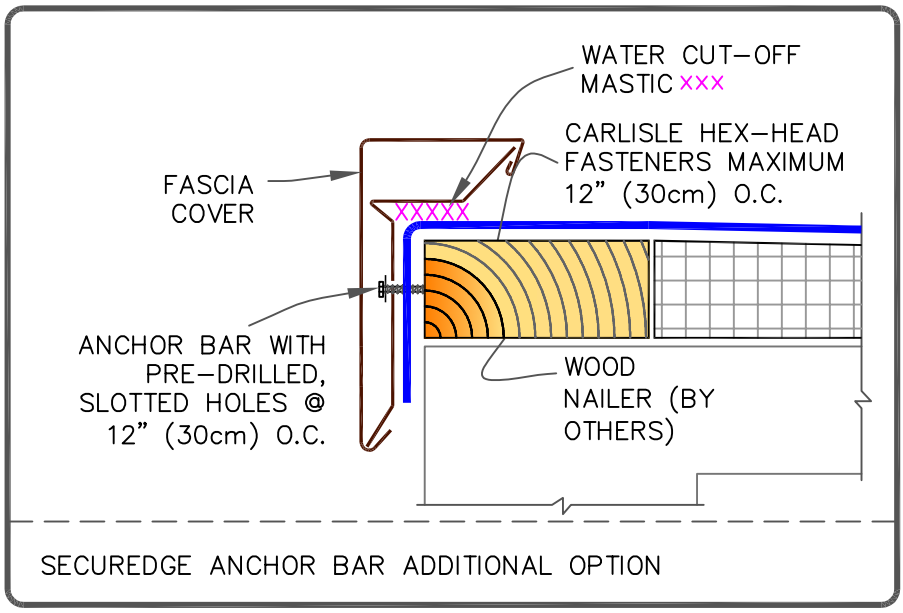


NOTES:

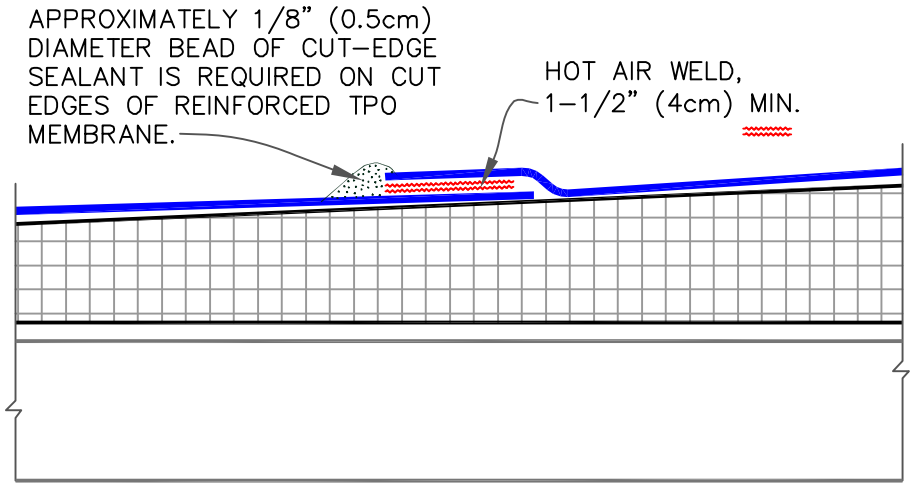
1. REFER TO SECUREDGE INSTALLATION INSTRUCTION MANUAL FOR THE STEP BY STEP INSTALLATION PROCEDURES AND FOR THE VARIOUS PRODUCT FEATURES AVAILABLE.

2. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SECUREDGE MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.

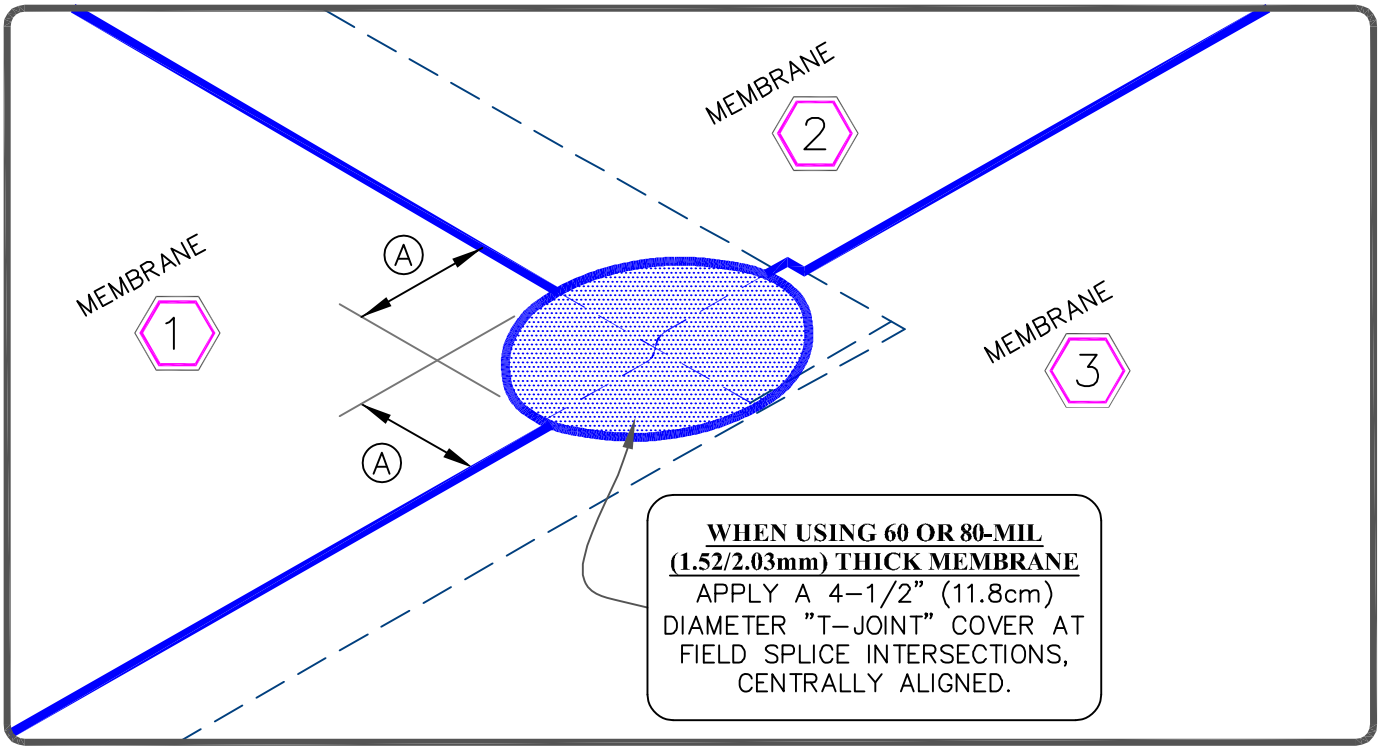
3. ENSURE ROOF SLOPES AWAY FROM SECUREDGE .



CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 2000 & 3000 MAXIMUM WARRANTY: 30 YEARS	TP	DETAIL NO. U–1F



DIMENSIONS		cm	
Ⓐ	2-1/4"	6	MIN.



NOTE:

1. WHEN USING 60-MIL (1.52mm) THICK TPO MEMBRANE, THEN MAXIMUM WARRANTY IS 20 YEARS.

CARLISLE SYNTEC SYSTEMS

MEMBRANE SPLICE

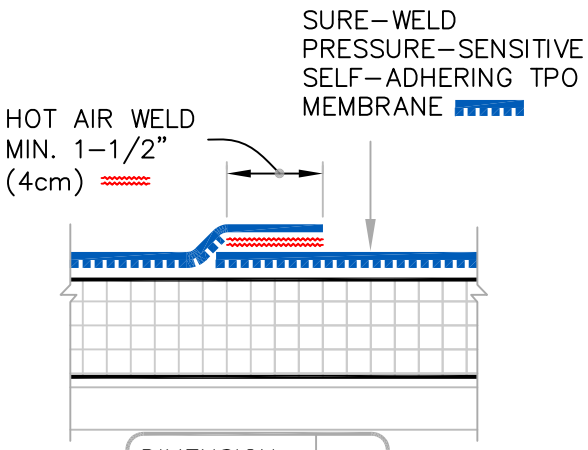
MAXIMUM WARRANTY: 30 YEARS (SEE NOTE 1)

TP

DETAIL NO. U-2A

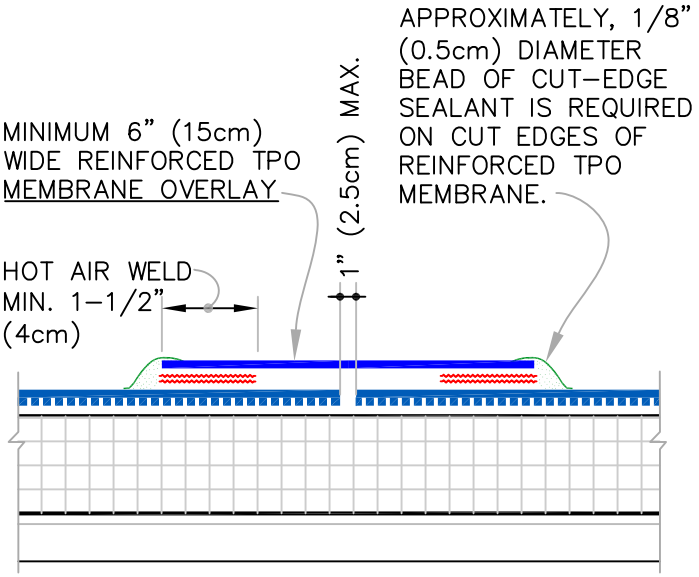
SELF-ADHERING TPO

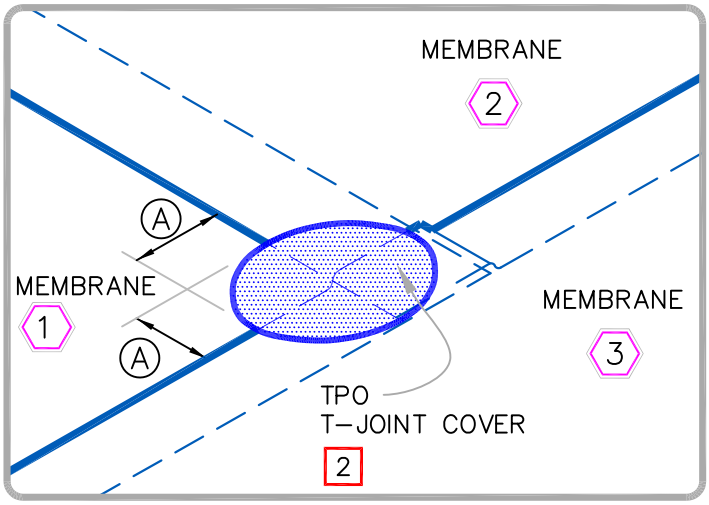
SIDE LAP SPLICE

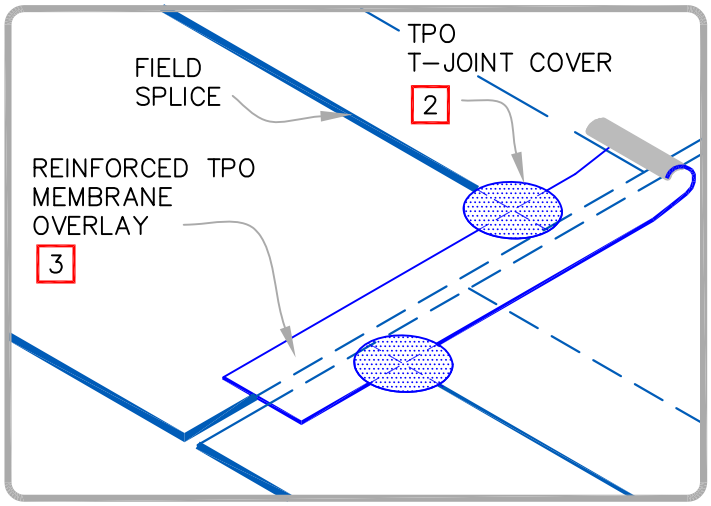


DIMENSION	cm
(A) 2–1/4"	6

END LAP SPLICE





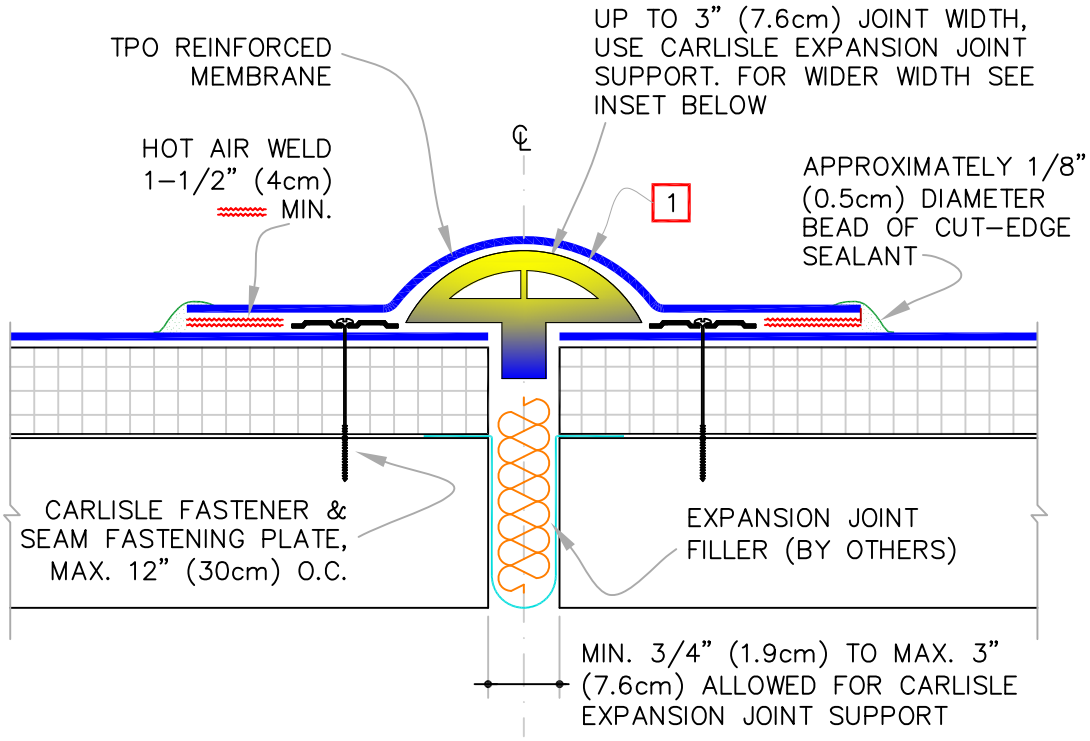


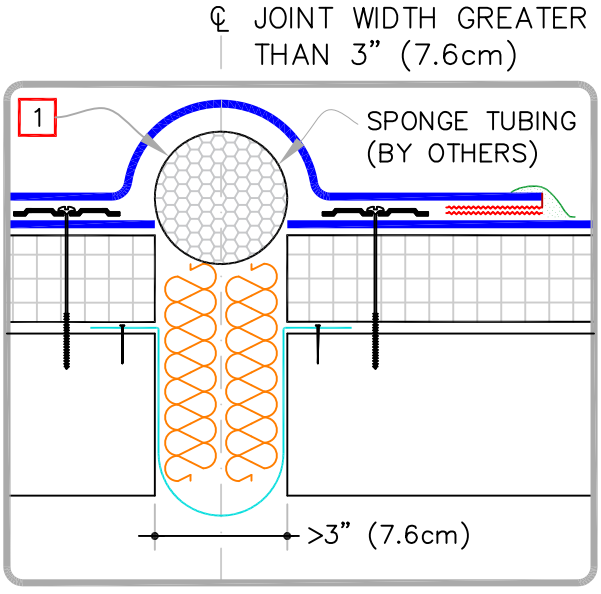
NOTES:

1. WHEN USING 60–MIL (1.52mm) THICK TPO, MAXIMUM WARRANTY IS 20 YEARS.
2. WHEN USING SAT TPO MEMBRANE, 60/80–MIL (1.52/2.03mm) THICK, APPLY A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS. .
3. WHEN USING 60/80 MIL (1.52/2.03mm) THICK TPO REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER.

SAT TPO

CARLISLE SYNTEC SYSTEMS	SELF–ADHERING TPO MEMBRANE SPLICE MAXIMUM WARRANTY: 30 YEARS (SEE NOTE 1)	TP DETAIL NO. U–2B





NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.
2. WHEN THE EXPANSION JOINT INTERSECTS WITH A COATED METAL DRIP EDGE, THEN COATED METAL SHOULD BE GAPPED AND THE U-1b DETAIL BE FOLLOWED. DRIP EDGE BY OTHERS SHOULD ALSO BE GAPPED.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

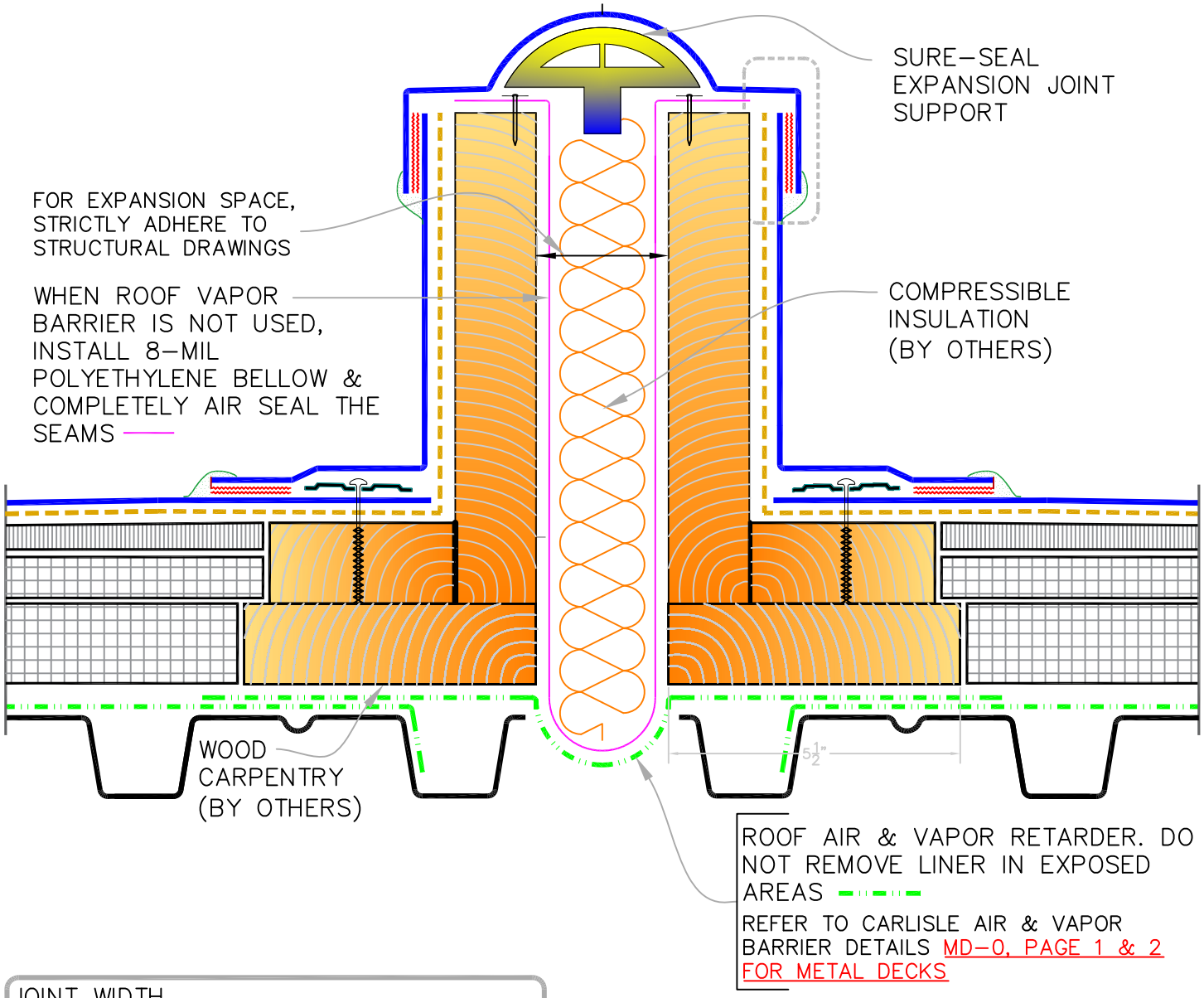
DECK-TO-DECK EXPANSION JOINT

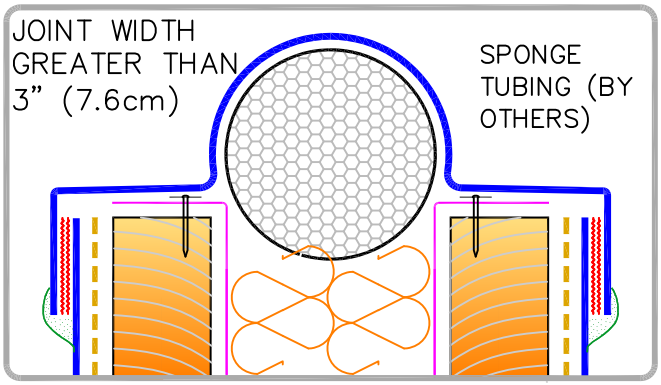
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-3A

- CARLISLE NEW ROOF OR
- EXISTING ROOF ANY TYPE OR
- NEW ROOF ASSEMBLY BY
- 2 OTHER MANUFACTURER

CARLISLE NEW ROOF





NOTES:

1. ENSURE SEAMS ARE PROPERLY MADE OUTSIDE THE EXPANSION JOINT, SEALED AND TAPED AND THEN VAPOR RETARDER IS LAID IN PLACE.
2. IN CASE THE ROOF TYPE IS DIFFERENT, DESIGNER TO PROVIDE ROOF TYPE AND ITS CONDITION TO CARLISLE TO DEVELOP TIE-IN DETAIL ON THIS SIDE ACCORDINGLY.

CARLISLE SYNTEC SYSTEMS

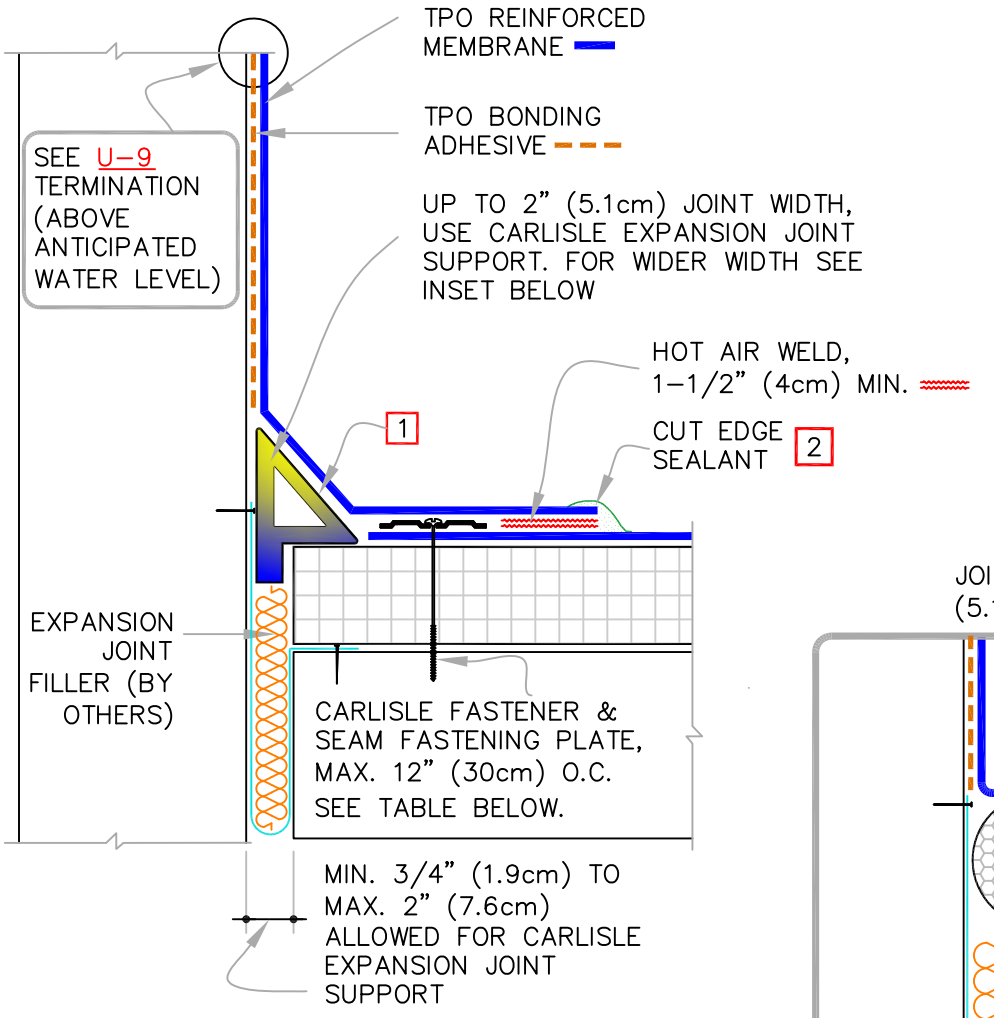
DECK-TO-DECK CURBED EXPANSION JOINT

MAXIMUM WARRANTY: 30 YEARS

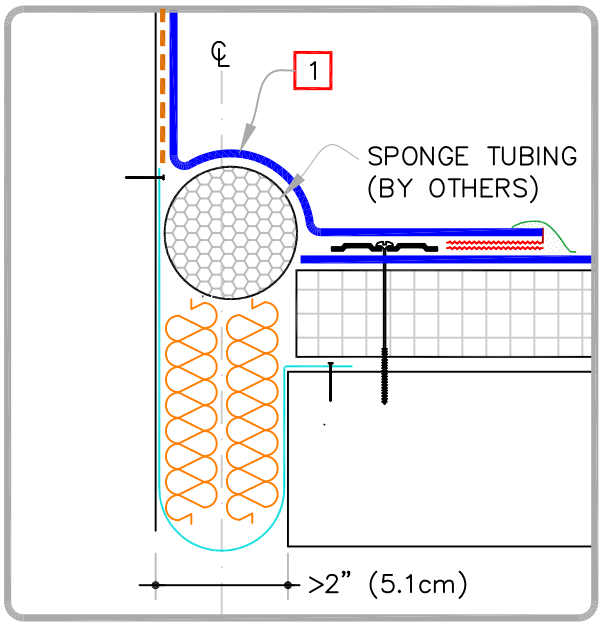
TP

DETAIL NO.
U-3A.1

WHEN A WARRANTY WIND SPEED GREATER THAN 90MPH IS SPECIFIED, CARLISLE FASTENERS AND SEAM FASTENING PLATES SHALL NOT EXCEED 6" (15cm) ON CENTER FOR ADHERED MEMBRANE ASSEMBLIES.



JOINT WIDTH GREATER THAN 2" (5.1cm)



NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE. PLATES.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

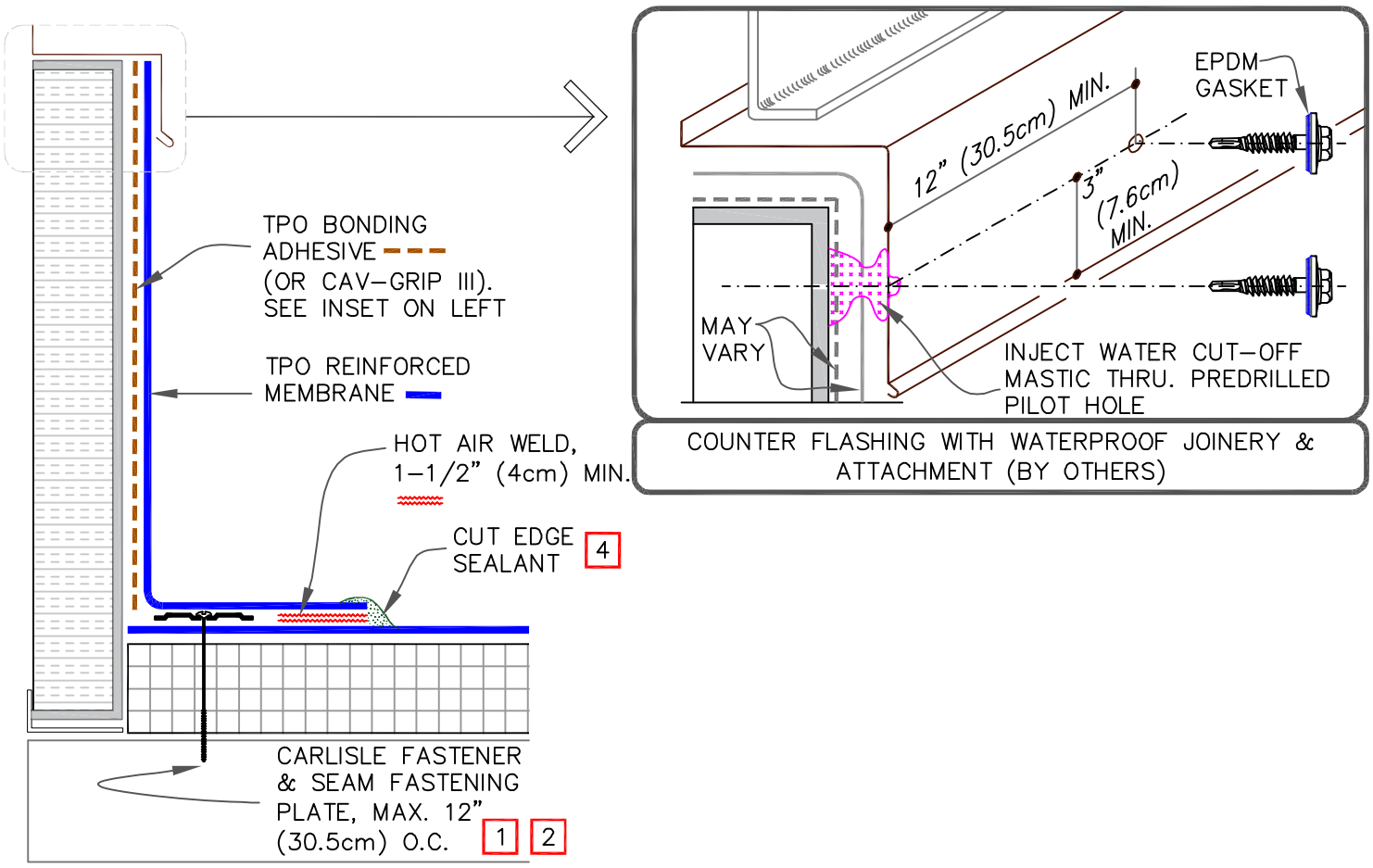
CARLISLE SYNTEC SYSTEMS

DECK–TO–WALL EXPANSION JOINT

MAXIMUM WARRANTY: 30 YEARS

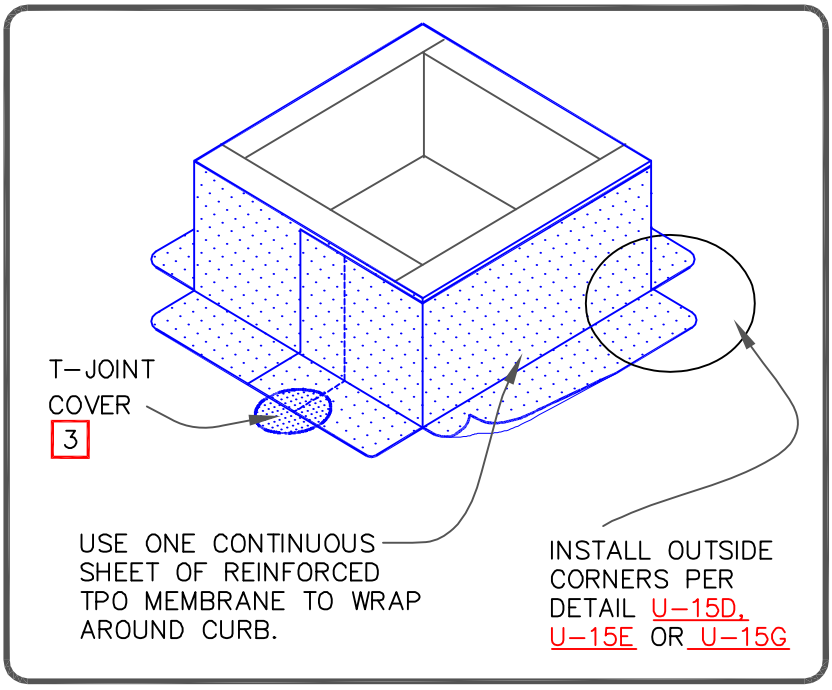
TP

DETAIL NO. U–3B



NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
2. MECHANICAL SECUREMENT MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
3. WHEN USING 80 MIL (2.03mm) THICK CURB FLASHING, THE INTERSECTIONS BETWEEN SPLICES MUST OVERLAID WITH A TPO "T-JOINT" COVER.
4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



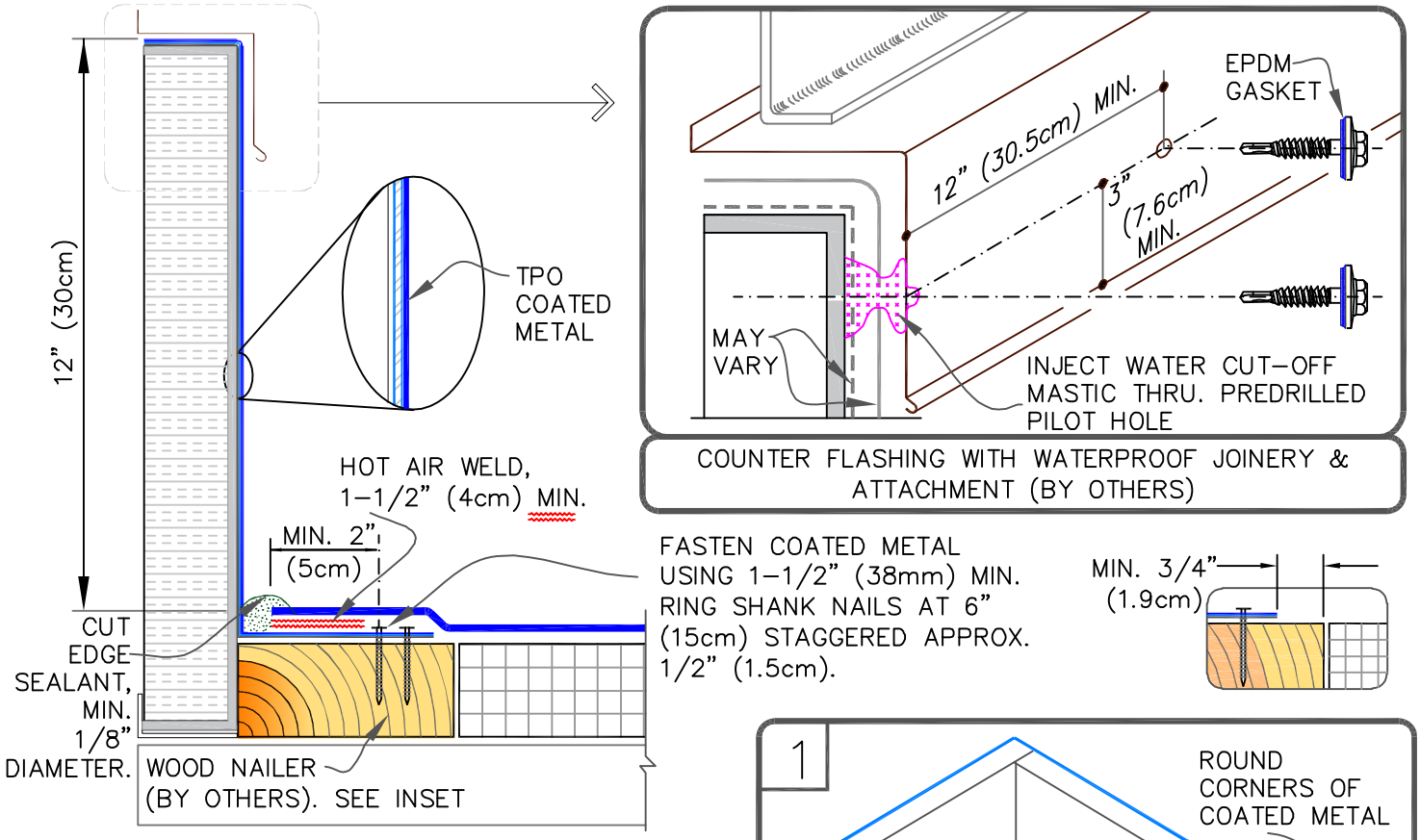
CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH TPO MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

TP

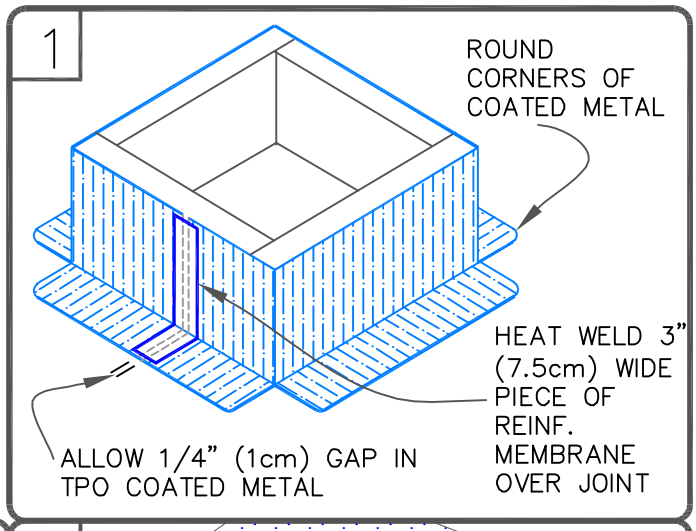
DETAIL NO. U-5A

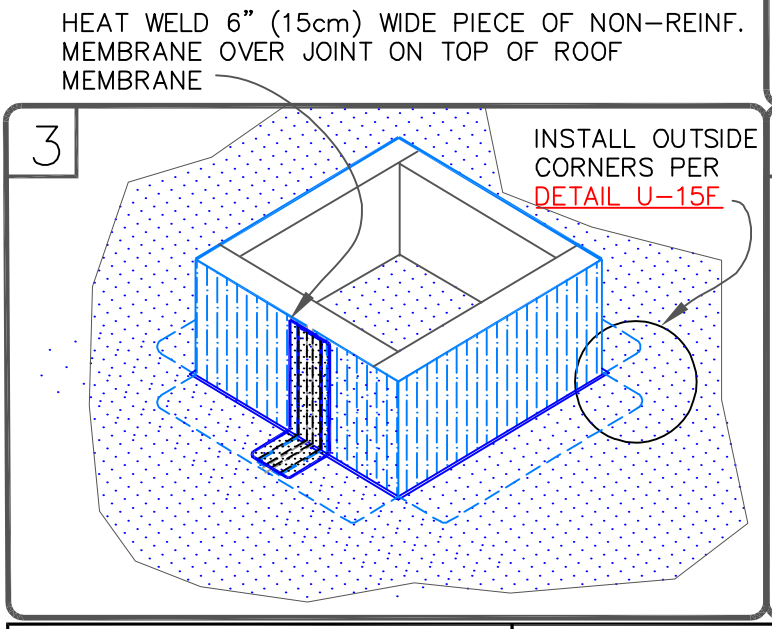


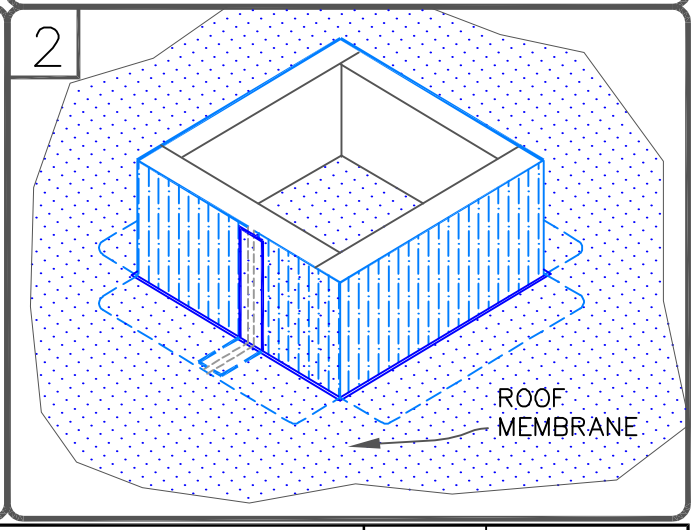
COUNTER FLASHING WITH WATERPROOF JOINERY & ATTACHMENT (BY OTHERS)

SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.







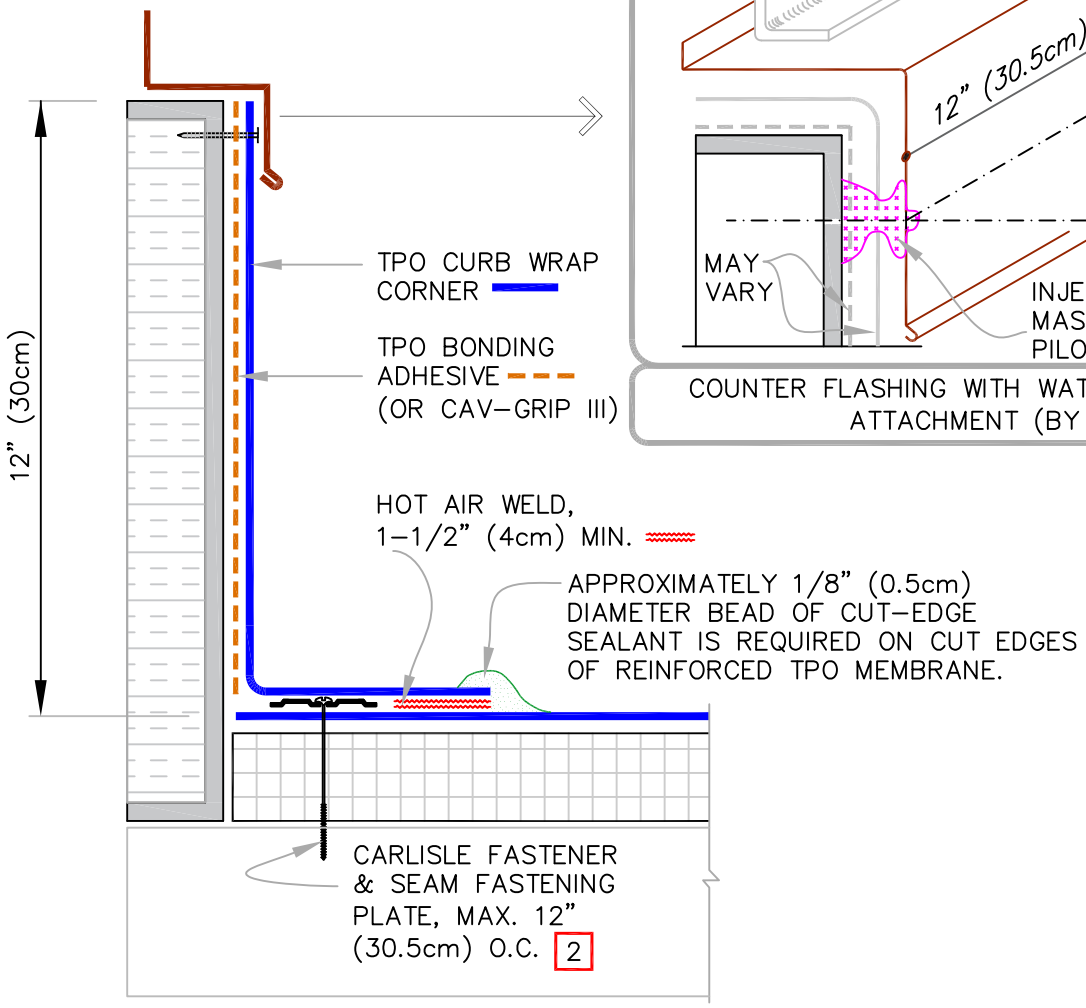
CARLISLE SYNTEC SYSTEMS

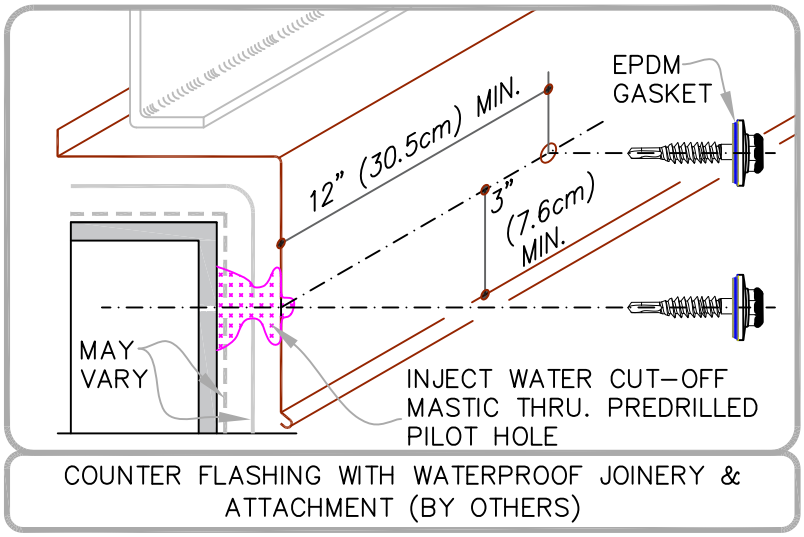
MAXIMUM WARRANTY: 30 YEARS

CURB FLASHING WITH TPO COATED METAL

TP

DETAIL NO. U–5B





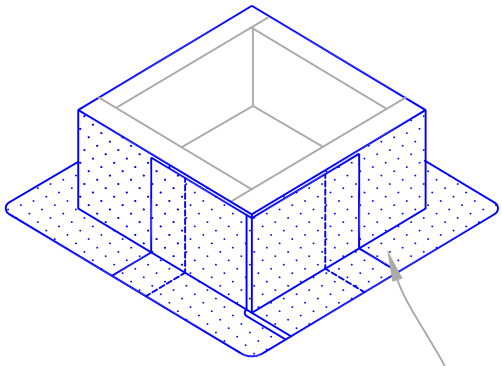
COUNTER FLASHING WITH WATERPROOF JOINERY & ATTACHMENT (BY OTHERS)

NOTES:

1. FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (91cmX 91cm). FOR LARGER CURBS USE THE TPO CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF SURE-WELD TPO MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).



USE ONE TPO CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

CFA (CERTIFIED FABRICATED ACCESSORIES)

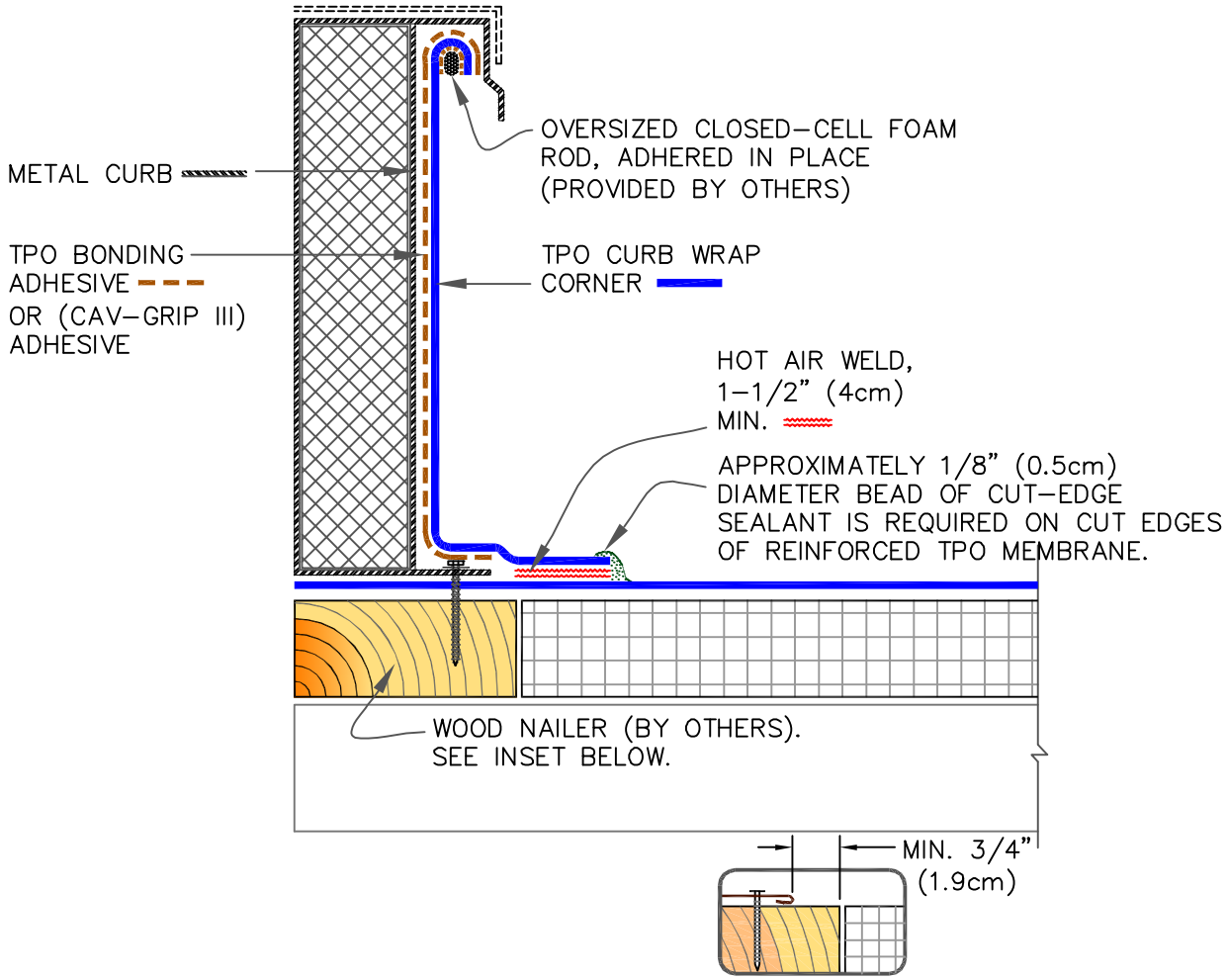
CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH CFA TPO CURB WRAP CORNERS

MAXIMUM WARRANTY: 30 YEARS

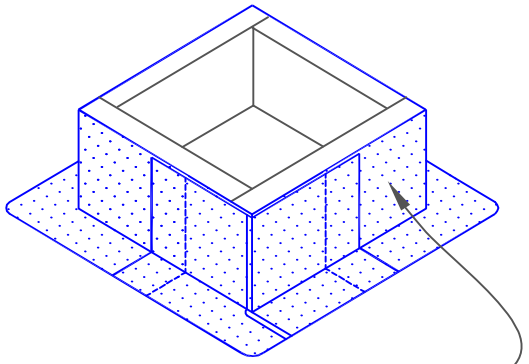
TP

DETAIL NO. U-5C



NOTES:

1. FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (90cmX 90cm). FOR LARGER CURBS USE THE TPO CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF SURE-WELD TPO.
2. IF CURB WRAP CORNER IS NOT USED, THEN USE DETAIL U-15G FOR OUTSIDE CORNERS.
3. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
4. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).



USE ONE TPO CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

CFA (CERTIFIED FABRICATED ACCESSORIES)

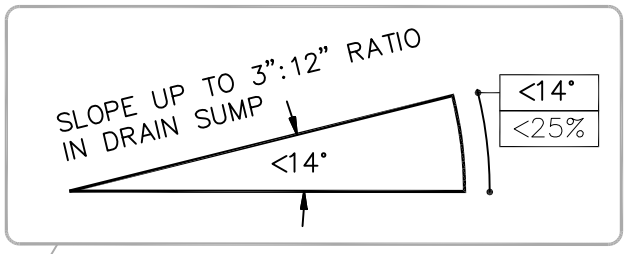
CARLISLE SYNTEC SYSTEMS

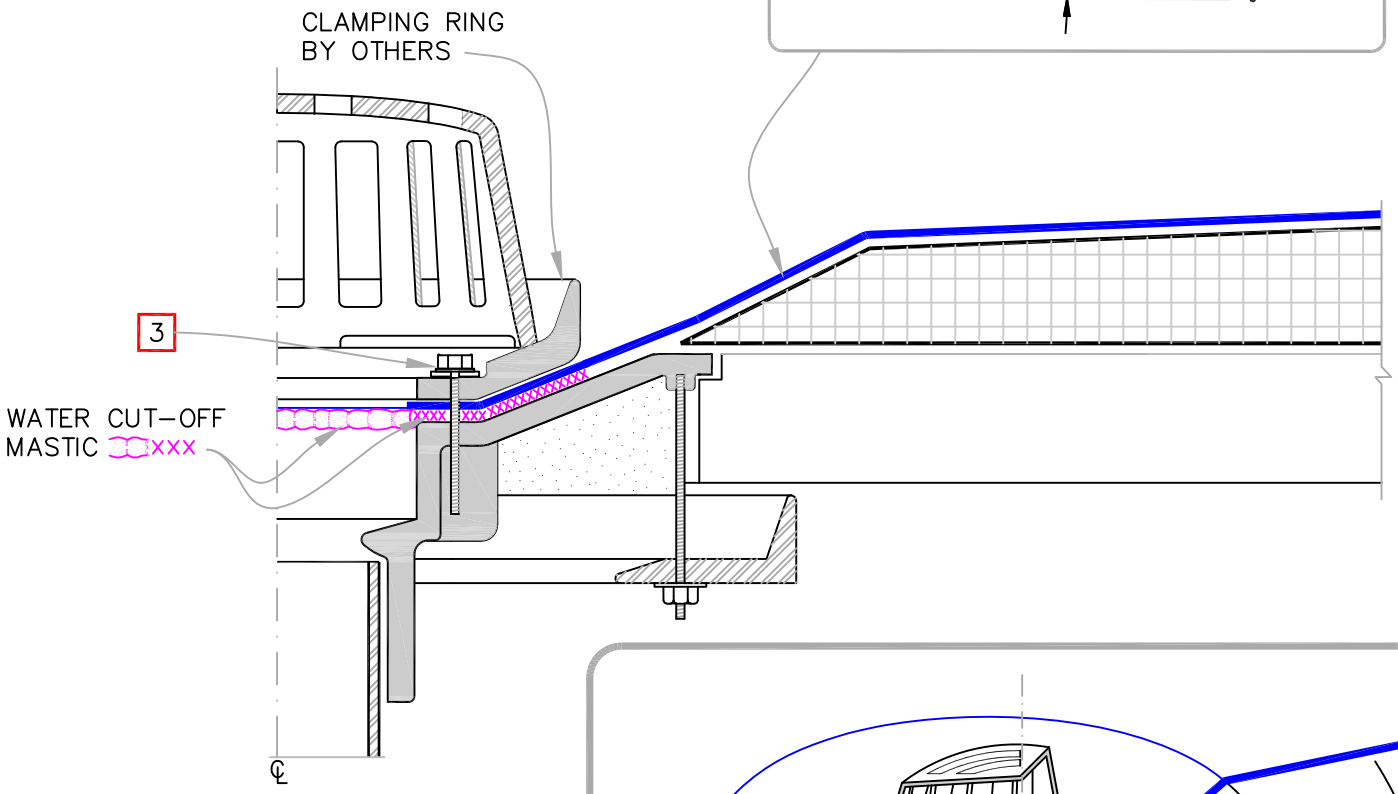
SELF-FLASHING CURB WITH CFA TPO CURB WRAP CORNERS

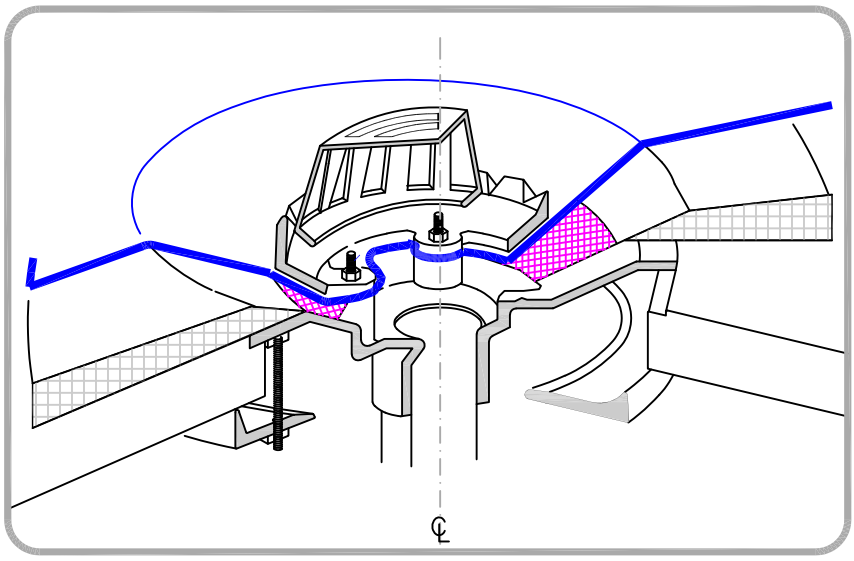
MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-5D

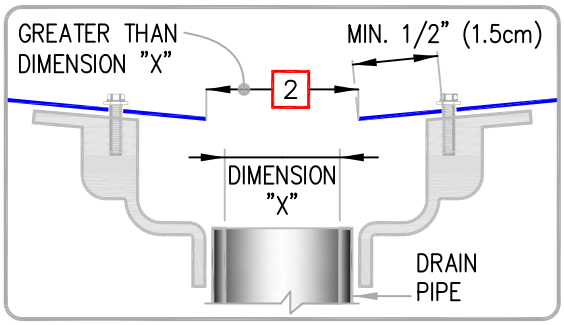






NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.



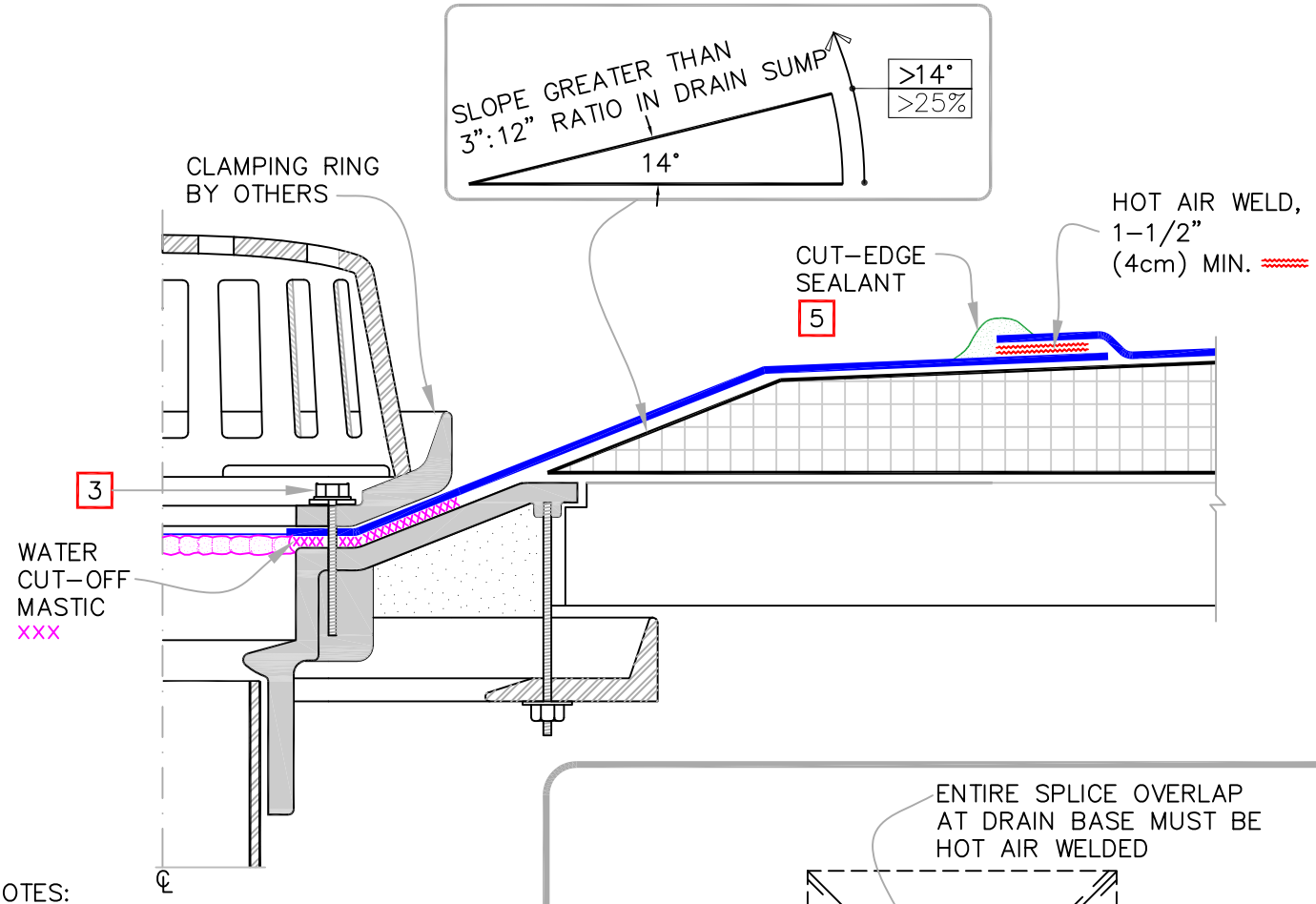
CARLISLE SYNTEC SYSTEMS

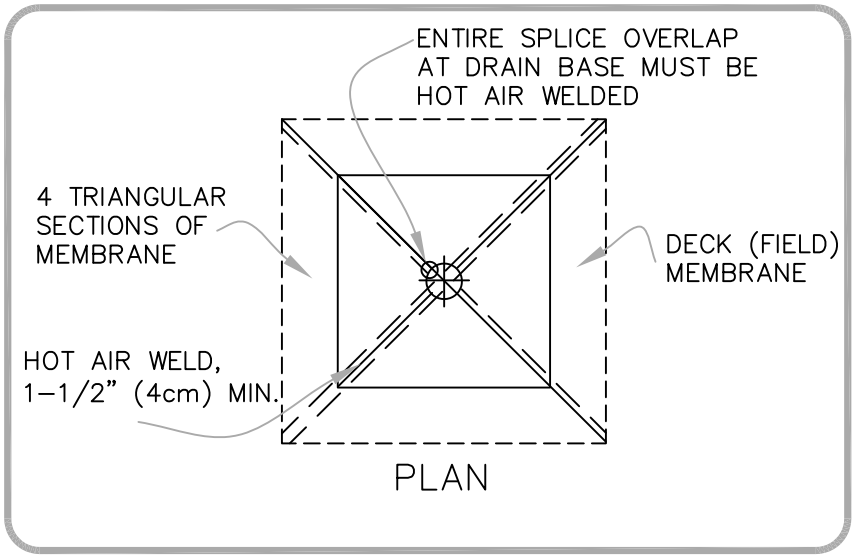
ROOF DRAIN: SUMP SLOPE LESS THAN 3" TO ONE HORIZONTAL FOOT

MAXIMUM WARRANTY: 30 YEARS

TP

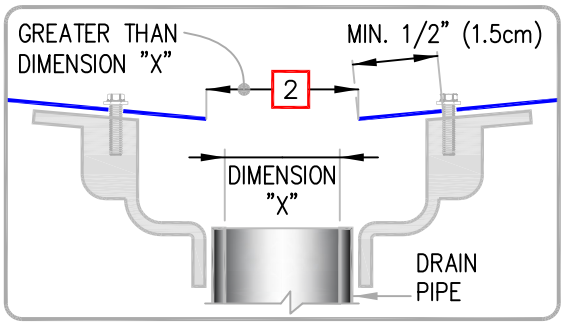
DETAIL NO. U-6A





NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



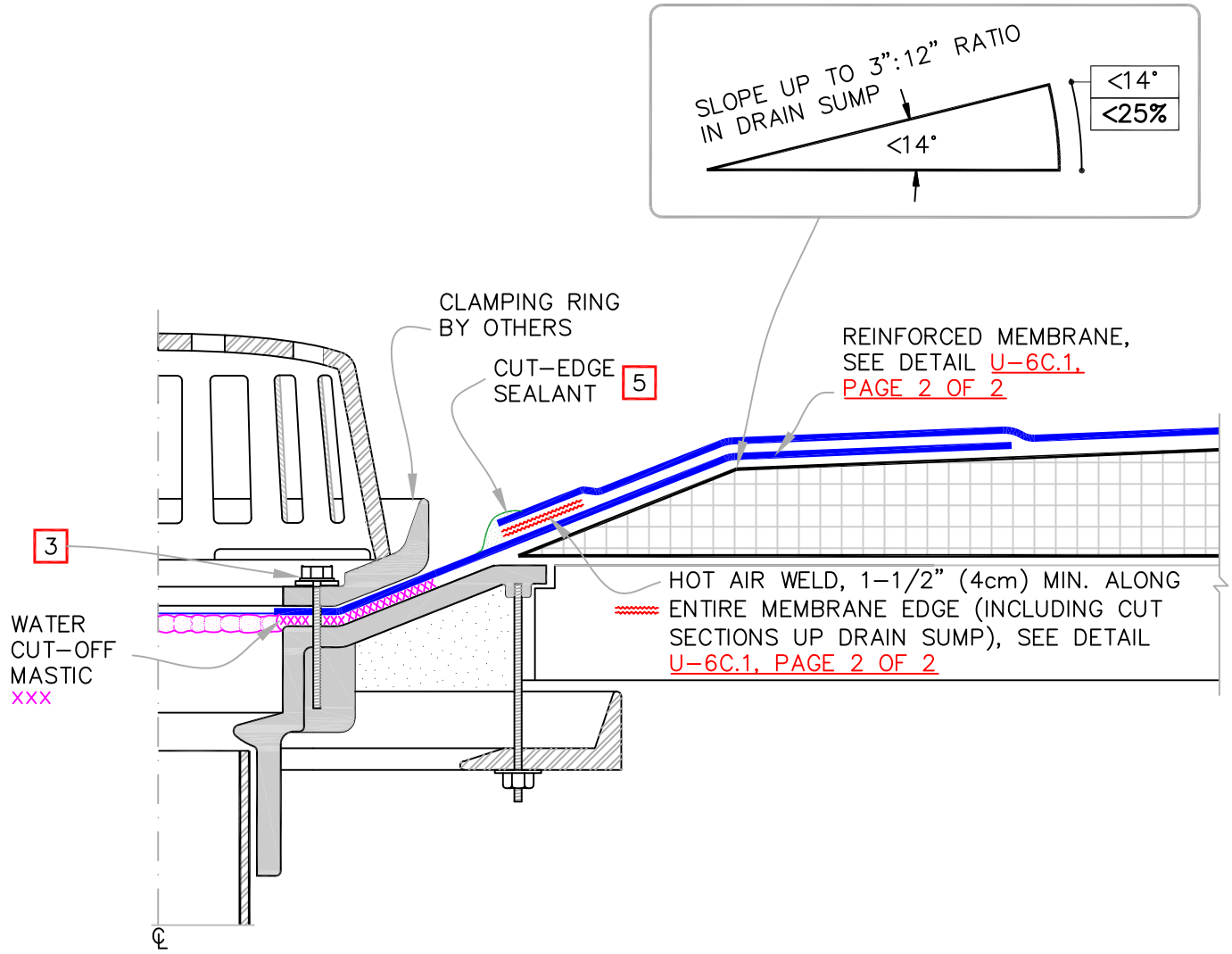
CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 1)

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–6B



NOTES:

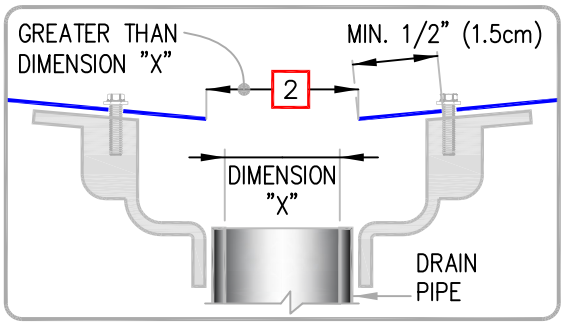
1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.

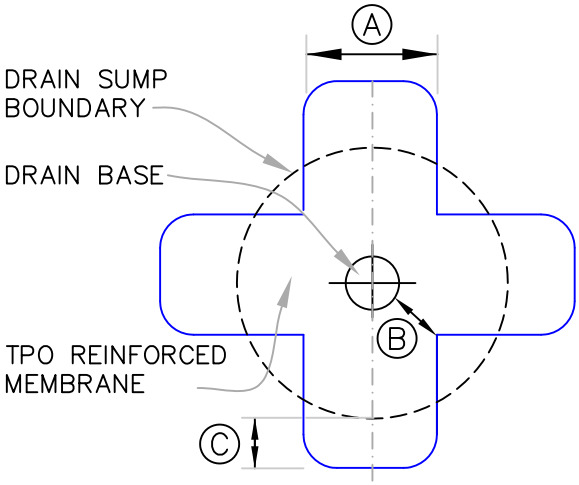
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.

4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.

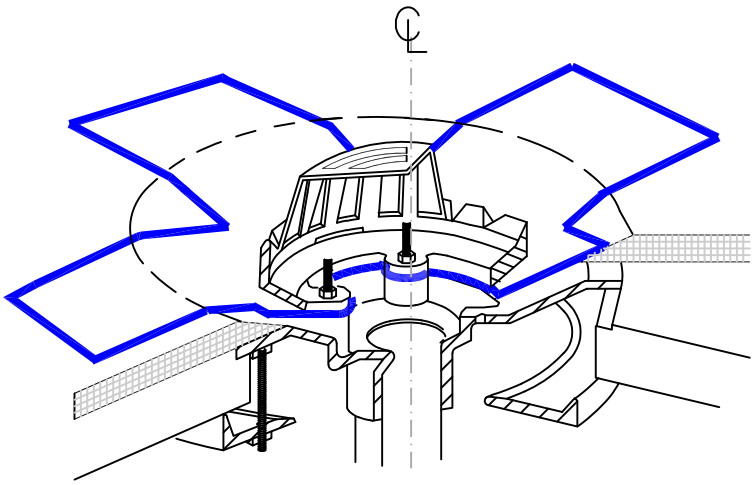
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS	ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 2), PAGE 1 OF 2 MAXIMUM WARRANTY: 30 YEARS	TP	DETAIL NO. U–6C

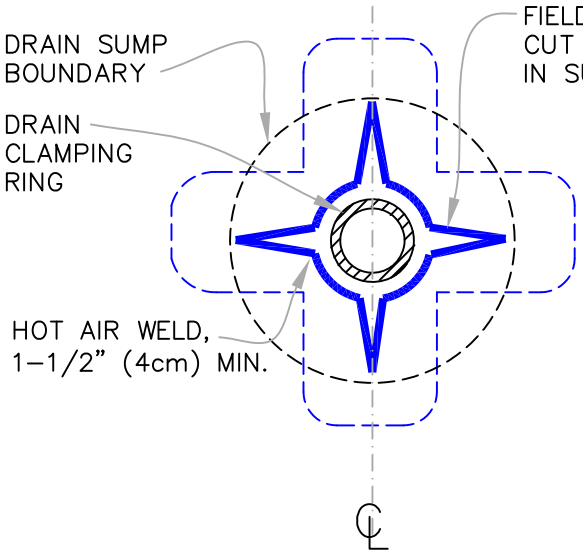


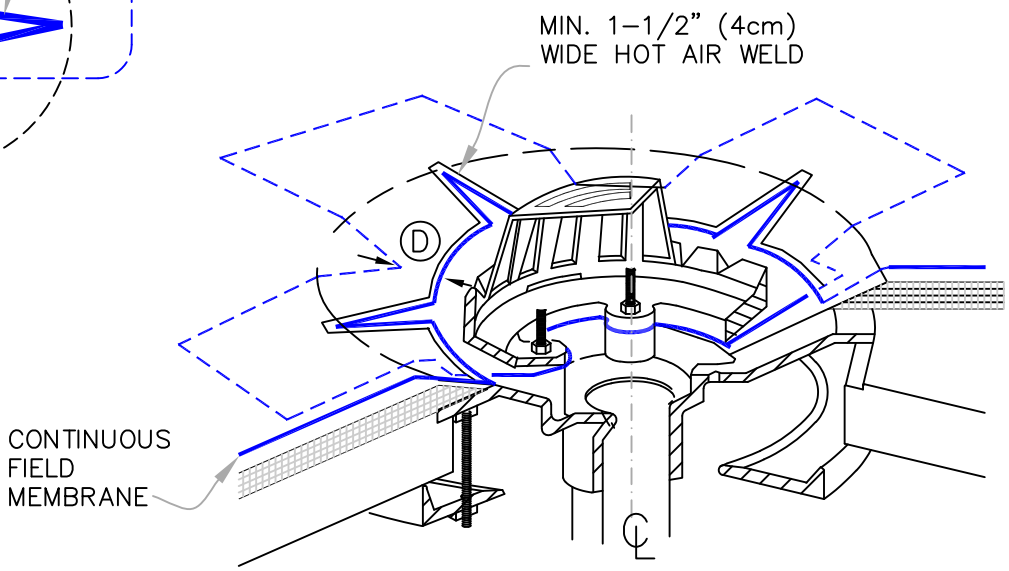
CUT SECTION OF TPO REINFORCED MEMBRANE AS SHOWN AND POSITION INTO DRAIN SUMP. EXTEND MEMBRANE OUT OF DRAIN SUMP APPROXIMATELY 6" (15cm) (ROUND CORNERS).



EXTEND TPO MEMBRANE ONTO MEMBRANE SECTION POSITIONED AT DRAIN SUMP AND CUT AS SHOWN TO LAY FLAT IN SUMP. HOT AIR WELD A MINIMUM OF 1–1/2" (4cm) COMPLETELY SURROUNDING AREA.

DIMENSIONS		cm	
A	12"	30	MIN.
B	6"	15	MIN.
C	6"	15	APPROX.
D	3"	7.5	MIN.





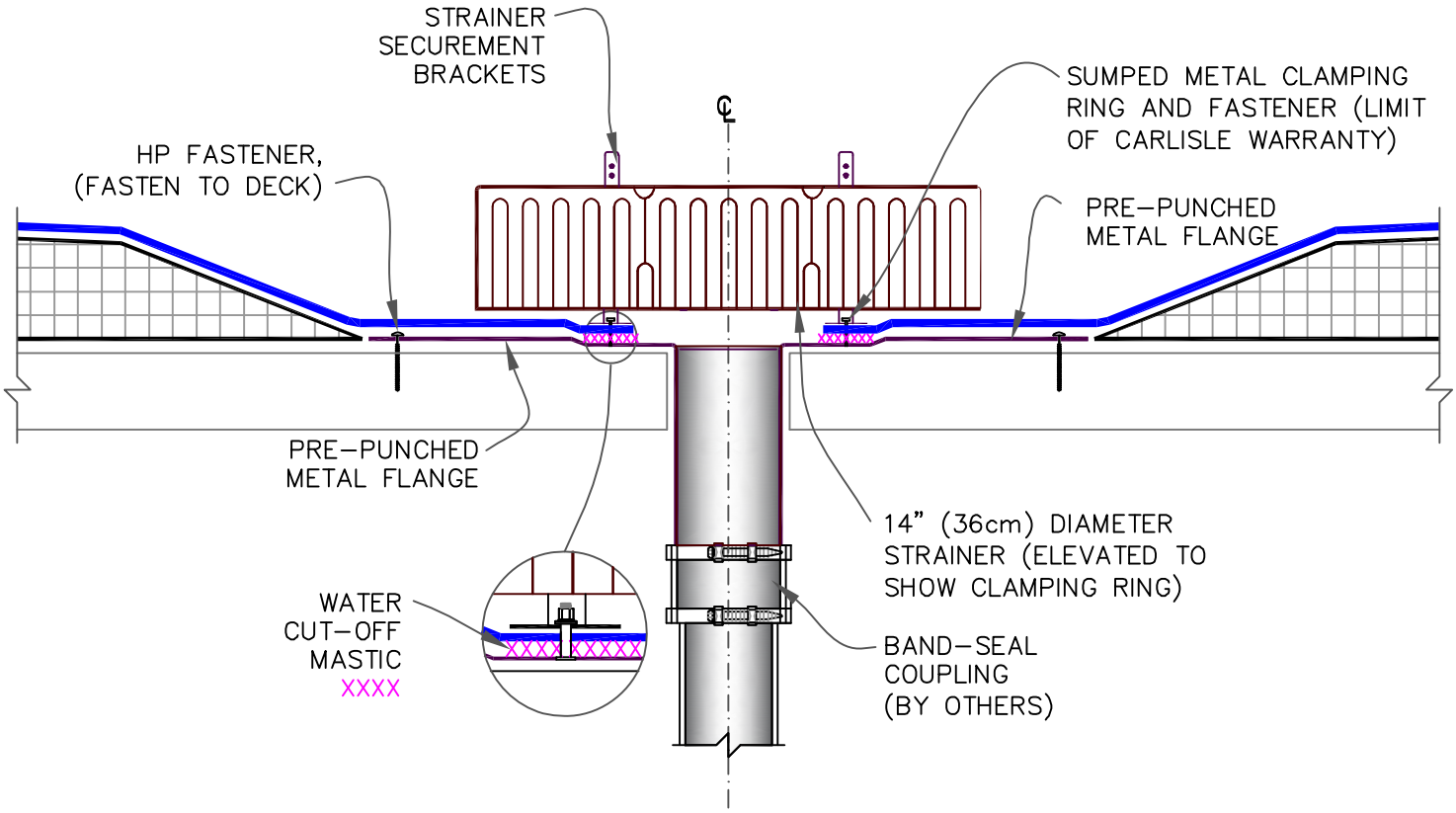
CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO 1" HORIZONTAL FOOT (OPTION 2), PAGE 2 OF 2

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–6C



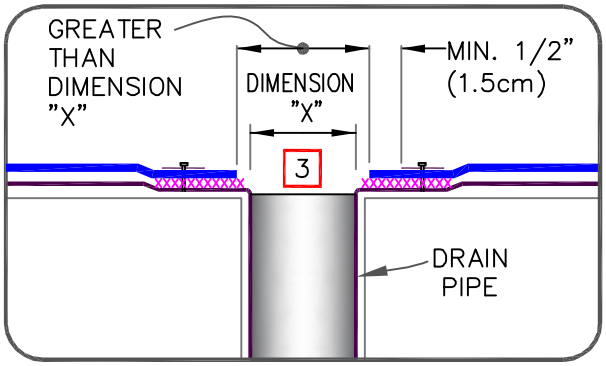
NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

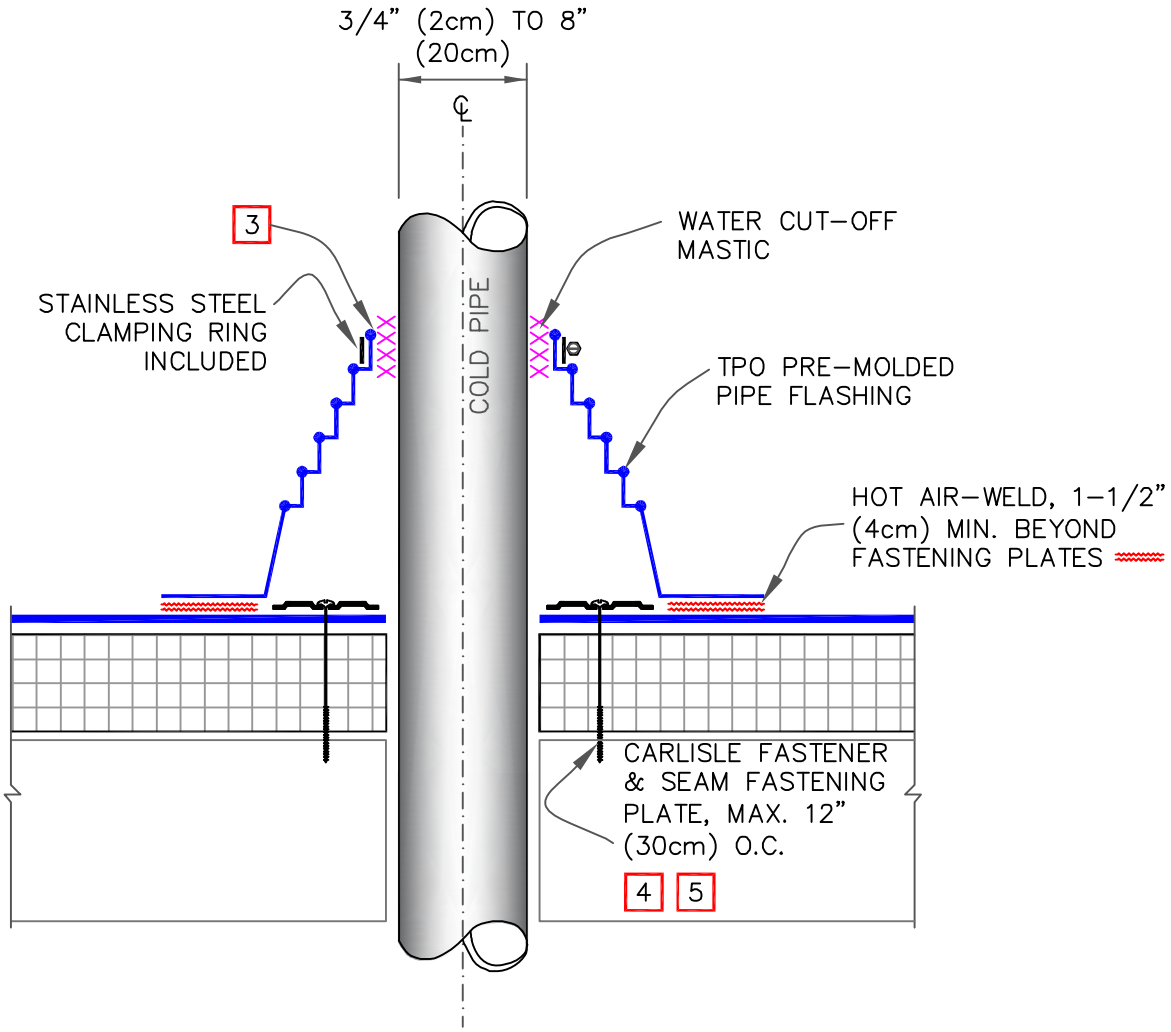
2. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.

3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.

4. INSULATION TAPER SHALL NOT BE GREATER THAN 6" (15cm) IN 12" (30cm) HORIZONTAL.



CARLISLE SYNTEC SYSTEMS	ADD-ON DRAIN MAXIMUM WARRANTY: 30 YEARS	TP DETAIL NO. U-6D



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE-MOLDED PIPE FLASHING.

2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).

3. PRE-MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.

4. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH TPO REINFORCED MEMBRANE / TPO CUT-EDGE SEALANT. REFER TO DETAIL U8B.

5. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

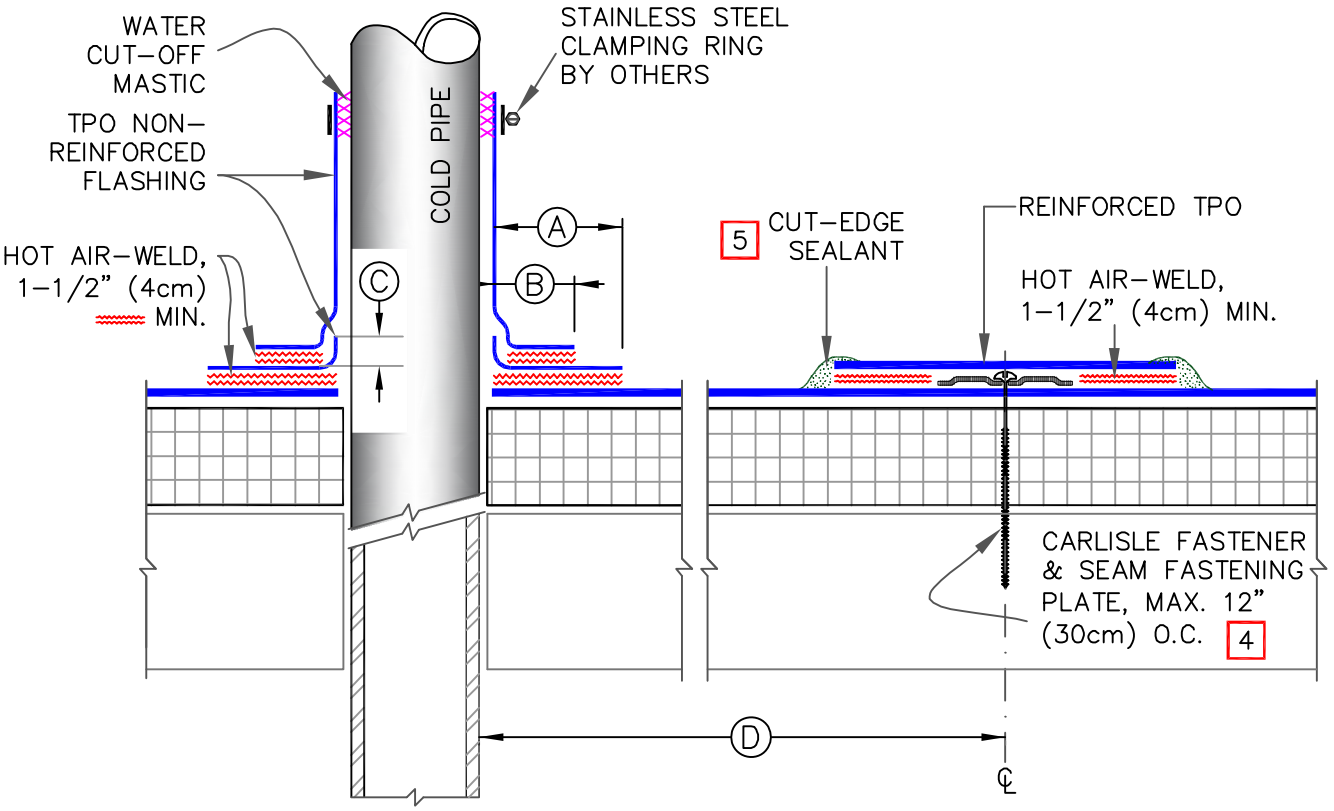
PRE-MOLDED PIPE FLASHING

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-8A

CAUTION

DETAIL NOT FOR USE ON 25 OR 30-YEAR WARRANTY PROJECT. PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE PIPE FLASHINGS SHALL CONFORM WITH TPO UNIVERSAL DETAILS U-8A, U-8C OR U-8D.



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING FIELD FABRICATED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).
3. TPO NON-REINFORCED FLASHING WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2" (4cm) VERTICAL HOT AIR WELD. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR PIPES WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (15cm) IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
4. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

DIMENSIONS		cm	
A	1-1/2"	4	TO
	2"	5	
B	1"	2.5	MIN.
C	1/2"	1.5	MIN.
D	12"	30	APPROX.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

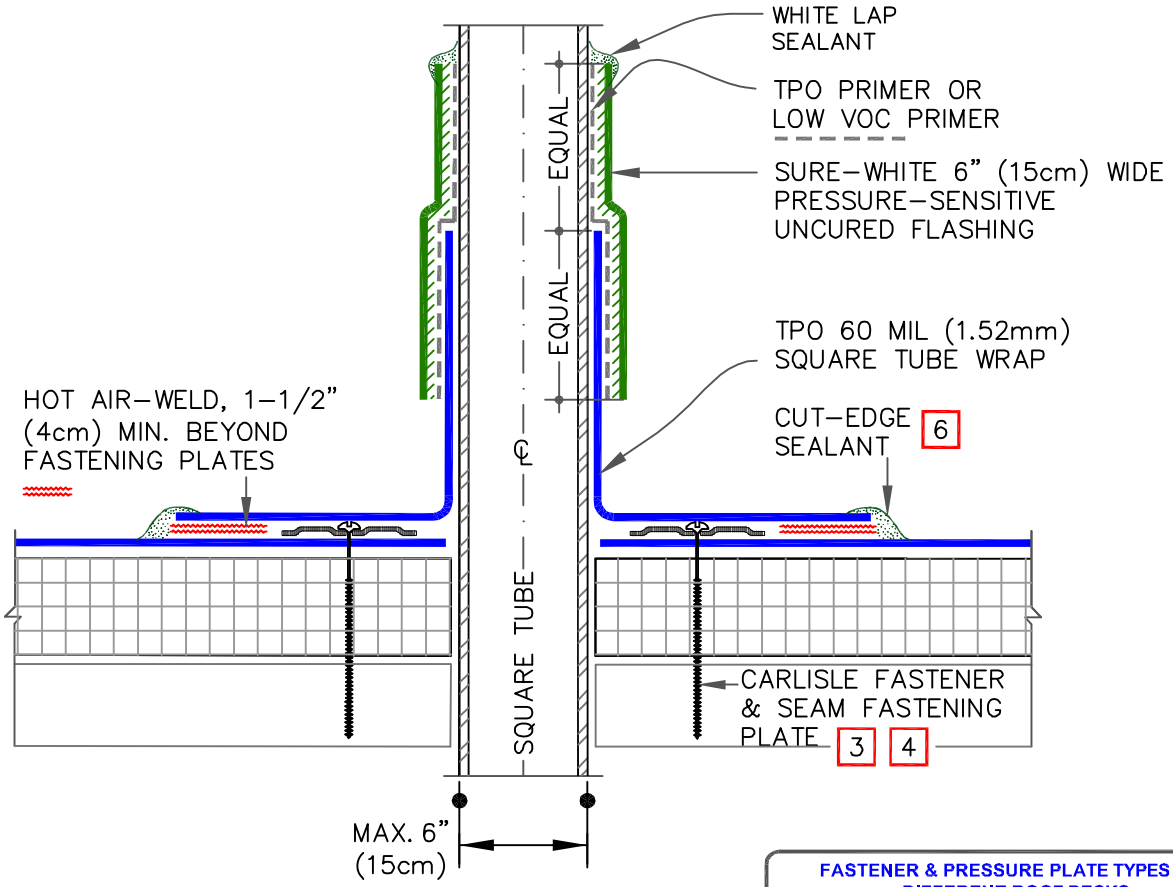
CARLISLE SYNTEC SYSTEMS

FIELD-FABRICATED PIPE FLASHING

MAXIMUM WARRANTY: 20 YEARS

TP

DETAIL NO. U-8B

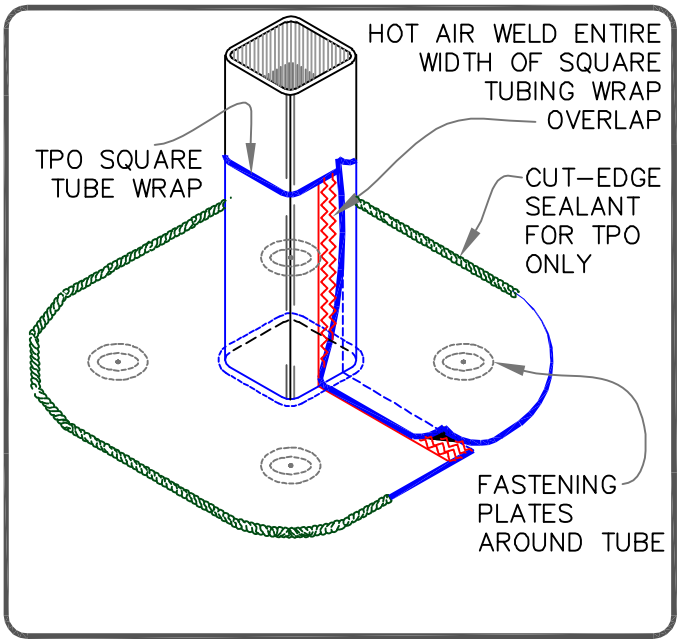


FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE-FABRICATED SQUARE TUBE WRAP.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).
3. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR TUBE SIDE DIMENSIONS UP TO 6" (15cm).
4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEM. SEE TABLE FOR MF SYSTEM.
5. T-JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY, FOR ADDITIONAL COLORS IT IS REQUIRED TO COVER T-JOINTS.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS

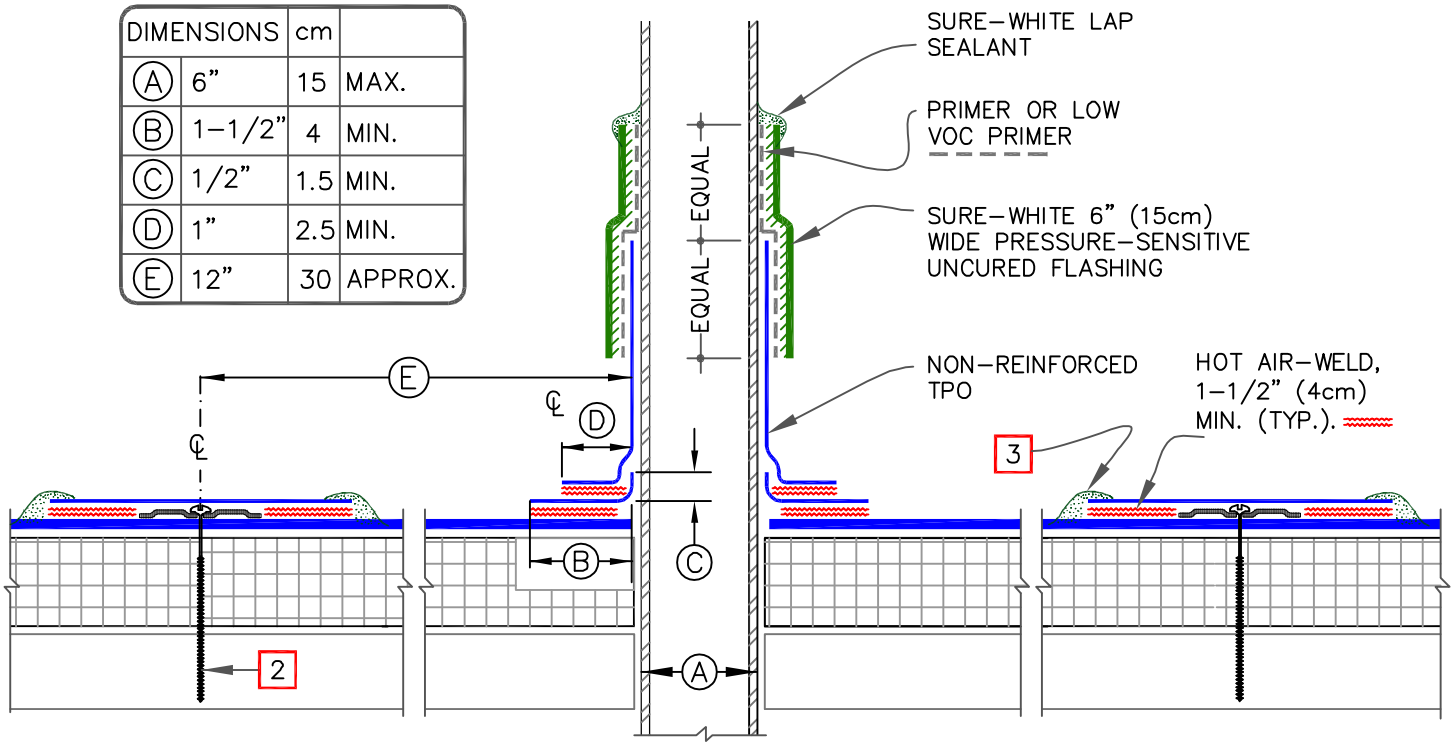
CFA CERTIFIED PRE-FABRICATED SQUARE TUBE WRAP

MAXIMUM WARRANTY: 30 YEARS

TP

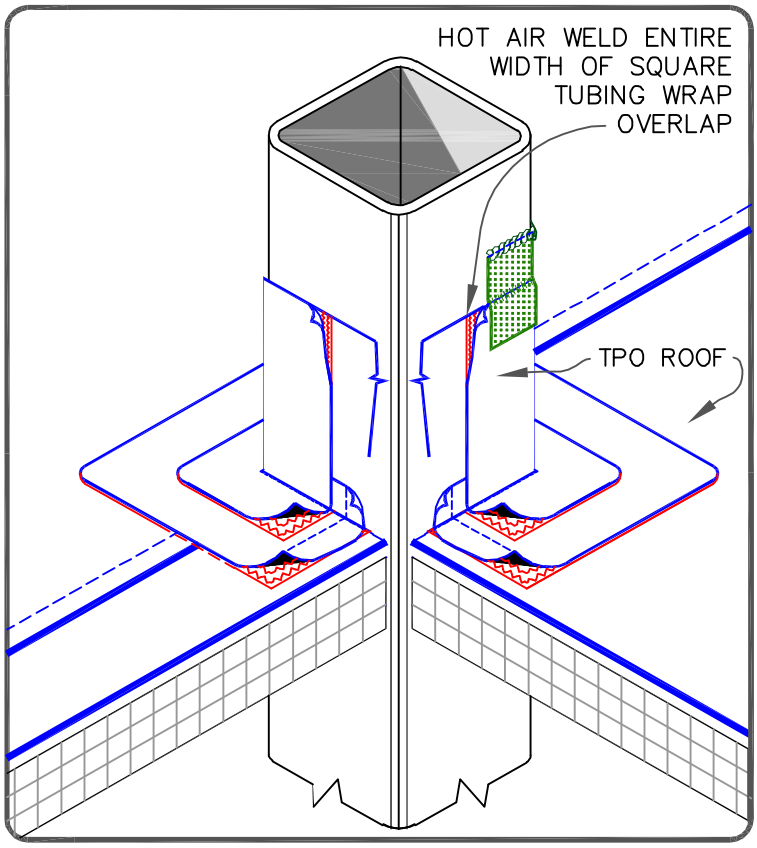
DETAIL NO. U-8C

DIMENSIONS		cm	
Ⓐ	6"	15	MAX.
Ⓑ	1–1/2"	4	MIN.
Ⓒ	1/2"	1.5	MIN.
Ⓓ	1"	2.5	MIN.
Ⓔ	12"	30	APPROX.



FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE–FABRICATED SQUARE TUBE WRAP.
2. CARLISLE FASTENERS & SEAM FASTENING PLATES FOR MECHANICALLY FASTENED SYSTEM (NOT REQUIRED ON ADHERED SYSTEM). SEE TABLE ABOVE.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

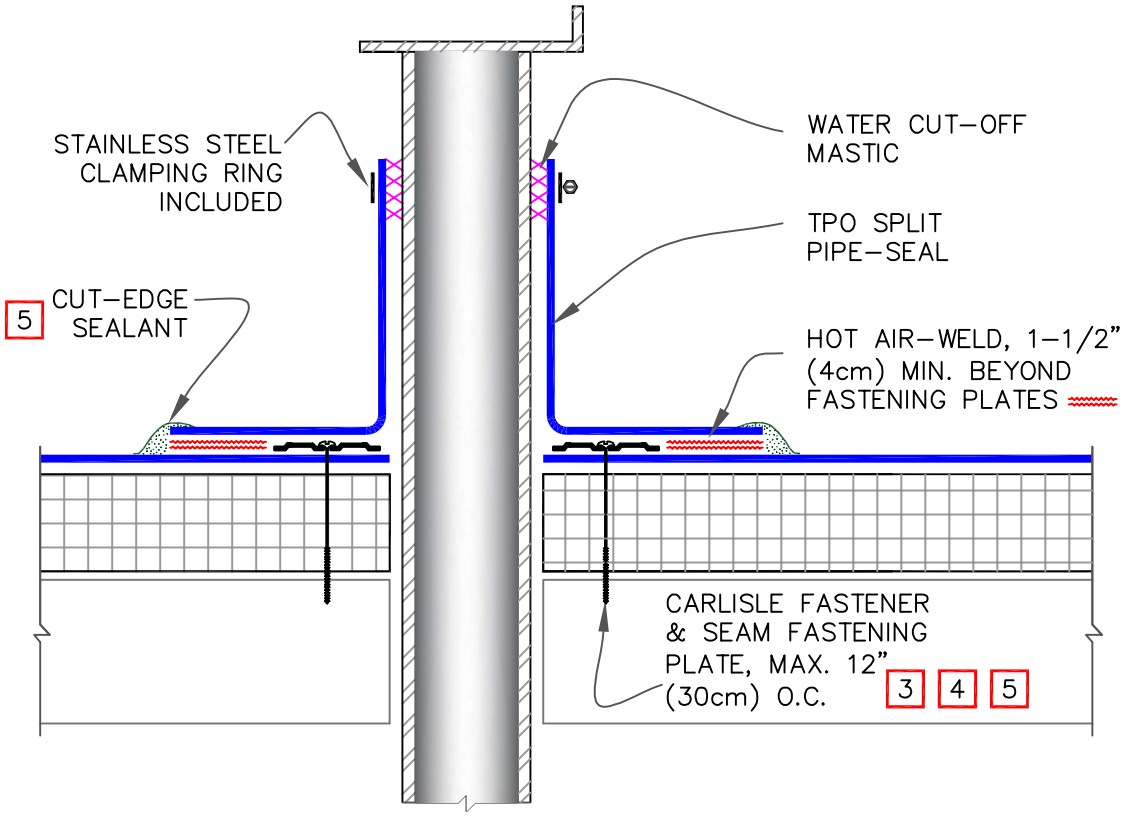
CARLISLE SYNTEC SYSTEMS

FIELD–FABRICATED SQUARE TUBE FLASHING

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–8D



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING SPLIT PIPE FLASHING.

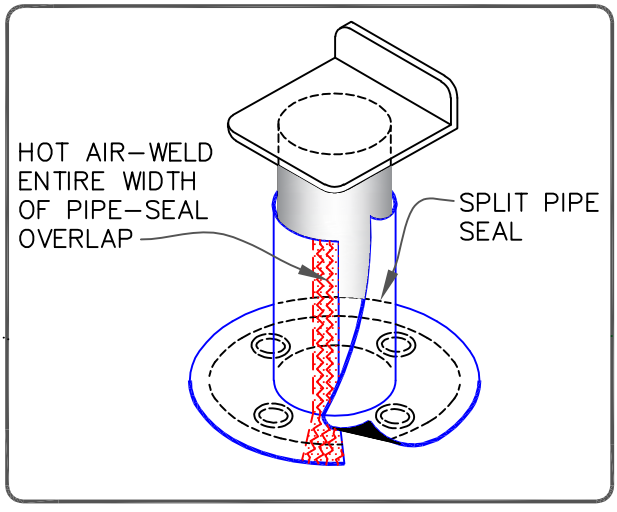
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).

3. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH TPO REINFORCED MEMBRANE/CUT–EDGE SEALANT. REFER TO DETAIL U–8B.

4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).

5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE ONLY.

6. T–JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY PREFABRICATED ACCESSORIES. FOR ALL ADDITIONAL COLORS IT IS REQUIRED TO COVER T–JOINTS.



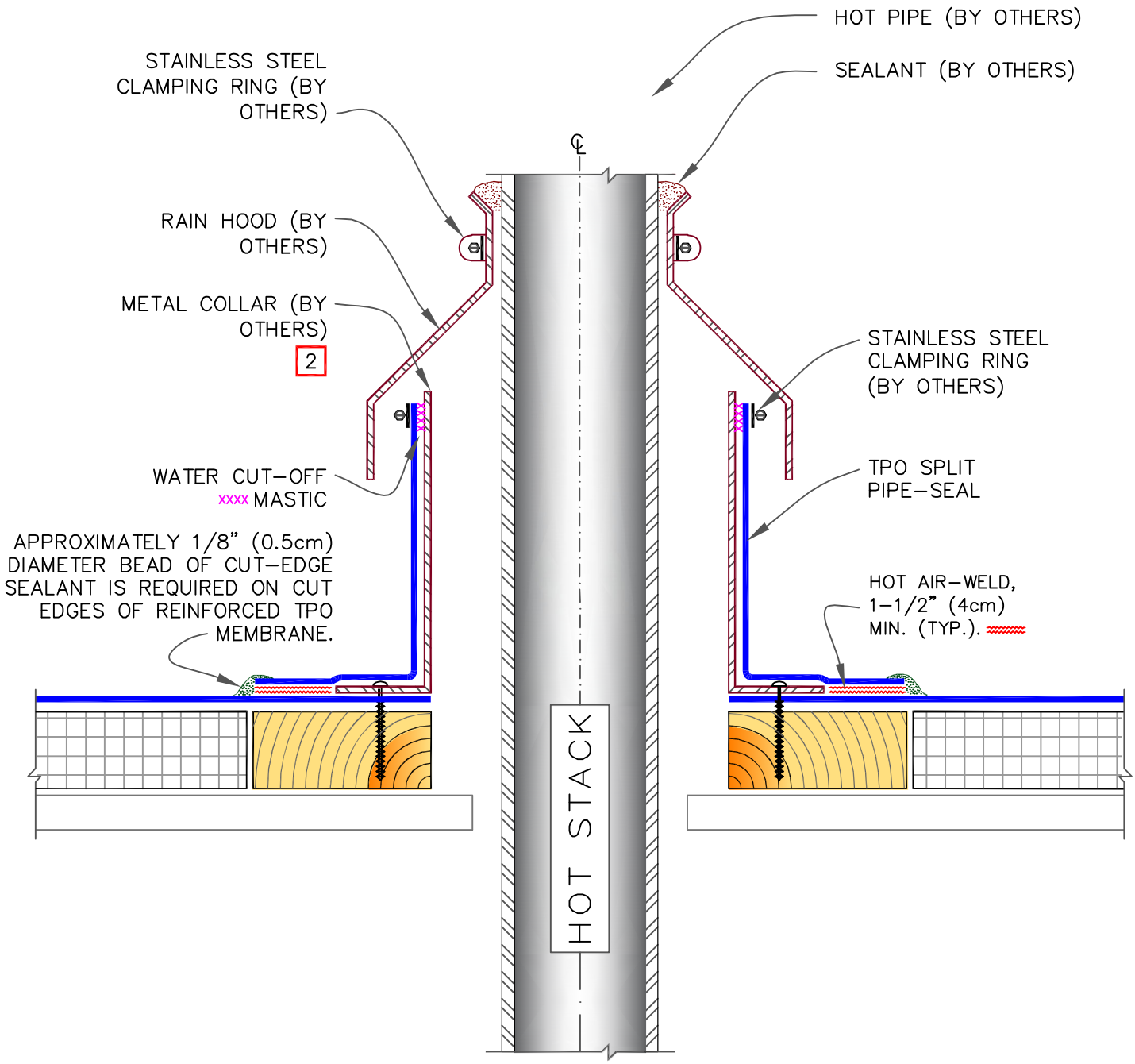
CARLISLE SYNTEC SYSTEMS

CFA CERTIFIED PRE–FABRICATED SPLIT PIPE SEAL

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–8E



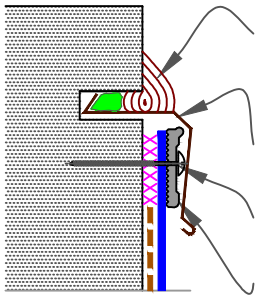
NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PIPE FLASHING.
2. TEMPERATURE OF THE METAL COLLAR MUST NOT EXCEED 160°F (71°C).
3. T-JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY, FOR ADDITIONAL COLORS IT IS REQUIRED TO COVER T-JOINTS.

CFA (CERTIFIED FABRICATED ACCESSORIES)

CARLISLE SYNTEC SYSTEMS	CFA CERTIFIED HOT PIPE FLASHING	TP	DETAIL NO. U-8F
	MAXIMUM WARRANTY: 30 YEARS		

9A MECHANICAL TERMINATION WITH COUNTER FLASHING



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

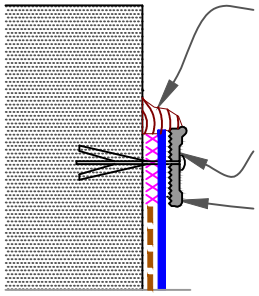
METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

THREADED FASTENERS OR CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 30 YEARS | **SEE INSET A**

9B MECHANICAL TERMINATION



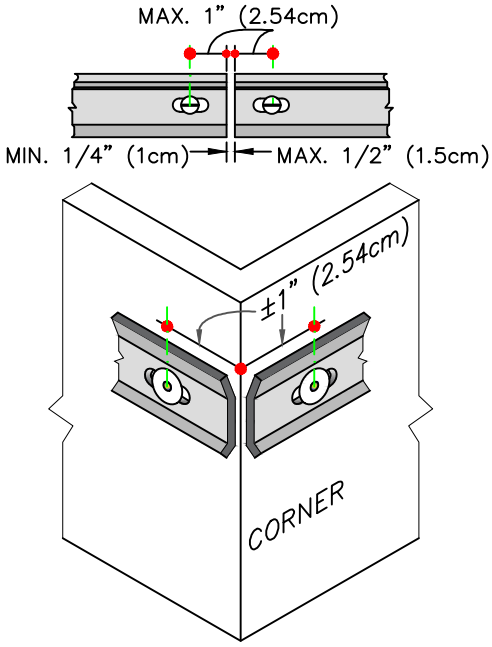
CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 20 YEARS | **SEE INSET A**

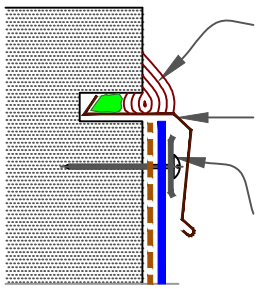
INSET A



NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. DETAIL 9D MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

9C COUNTER FLASHING TERMINATION



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

FASTEN MEMBRANE @ 12" (30cm) O.C. MAX. USE GALVANIZED WASHERS, MIN. 1", (2.54cm) DIAMETER

NOTE:

1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER–FLASHING, USE EPDM WASHERS, APPLY WATER CUT–OFF MASTIC UNDER THE COUNTER–FLASHING OR CAULK THE FASTENER HEADS.

WARRANTY UP TO 10 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT–OFF MASTIC– MUST BE HELD UNDER CONSTANT COMPRESSION.

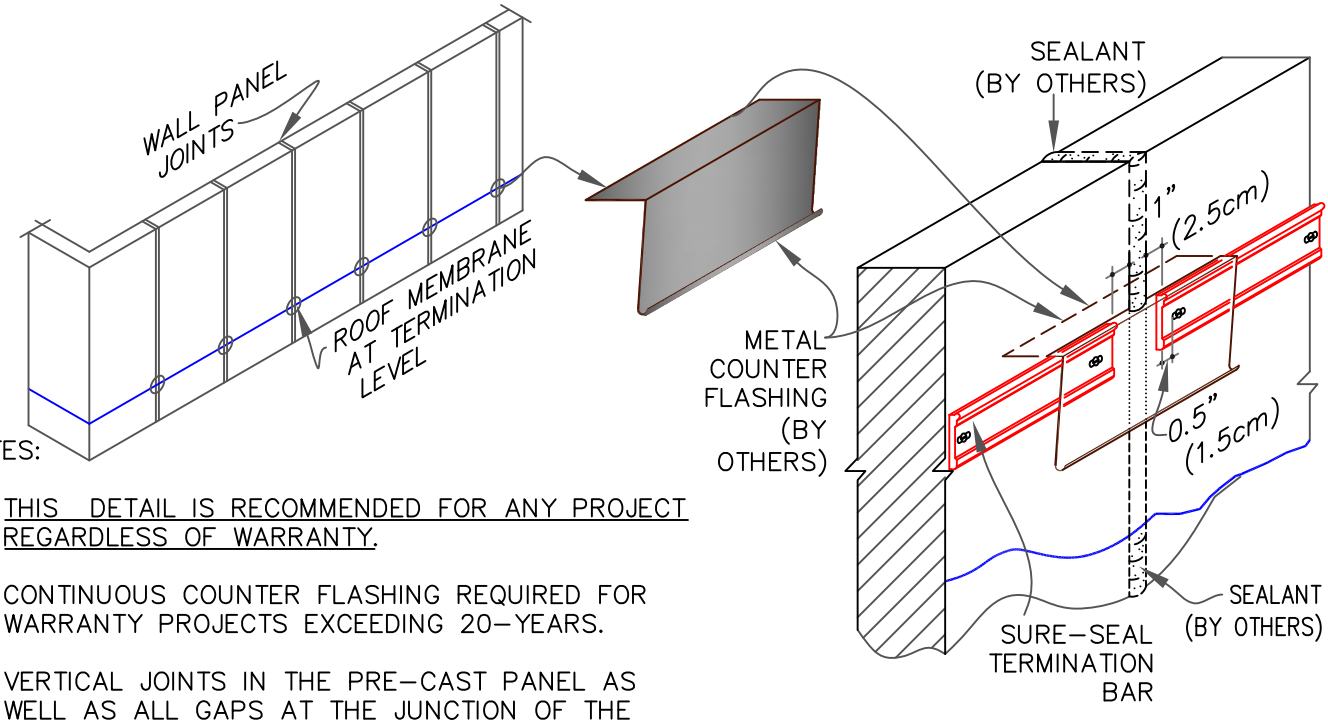
CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 1 OF 3)

WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. U–9

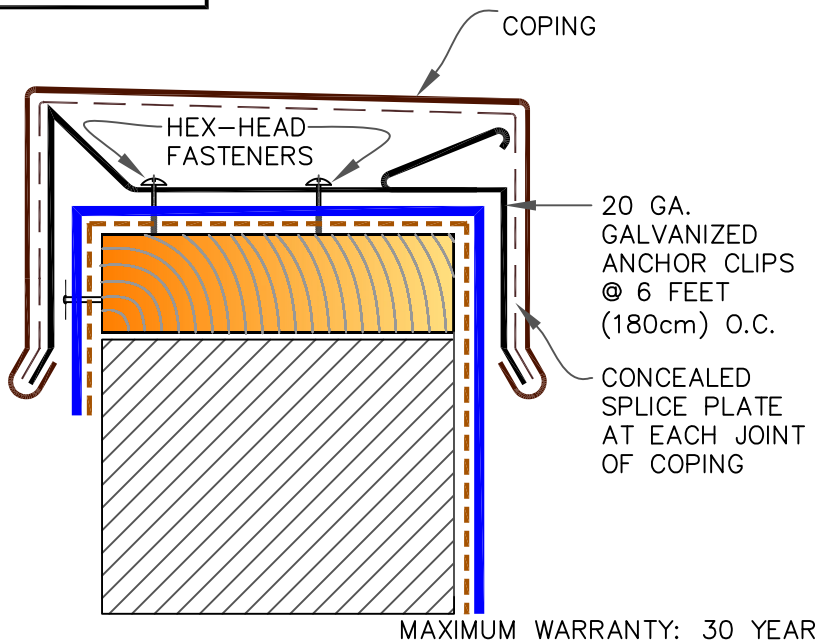
9D MECHANICAL TERMINATION AT VERTICAL JOINTS



NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.

9E SecurEdge 200 & 300 COPINGS



NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. REFER TO 3D DETAIL ON DETAIL U-9F.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.

MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

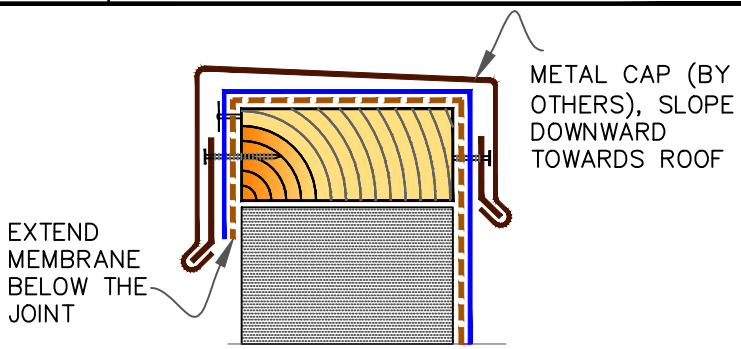
MEMBRANE TERMINATIONS (PAGE 2 OF 3)

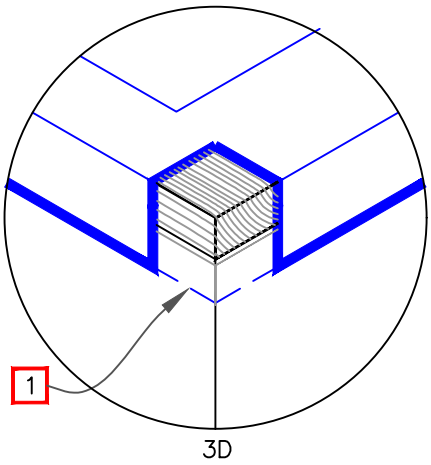
WARRANTY AS NOTES FOR EACH DETAIL

TP

DETAIL NO. U-9

9F SHEET METAL COPING (BY OTHERS)

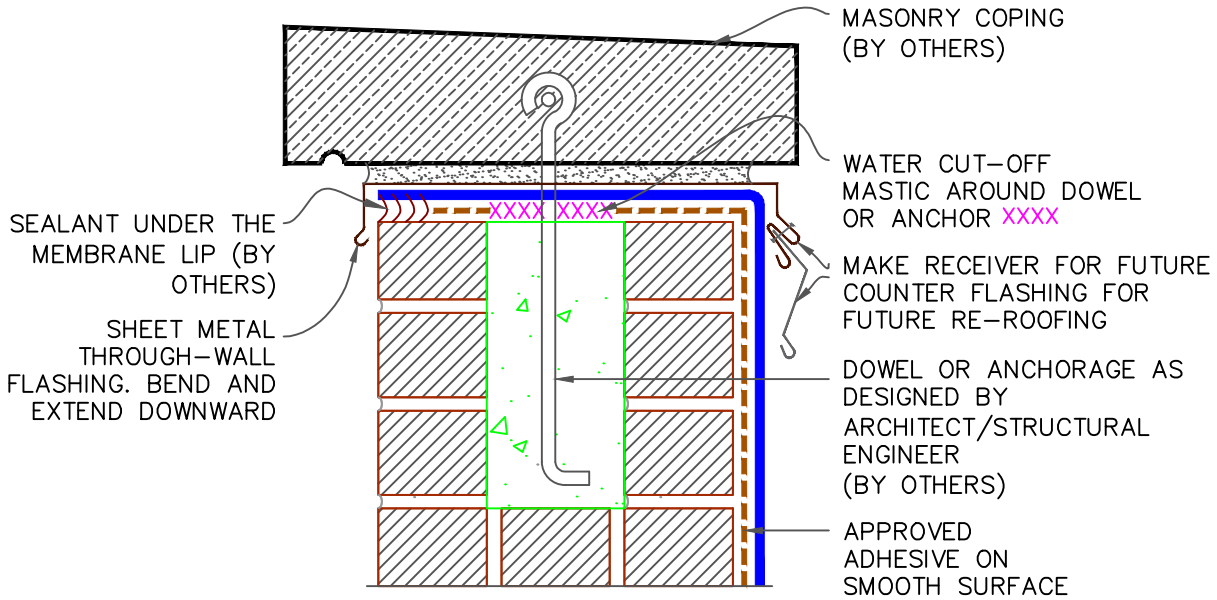




NOTES:

1. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE.
2. WARRANTY AS PROVIDED (BY OTHERS).

9G MASONRY COPINGS (BY OTHERS)



MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

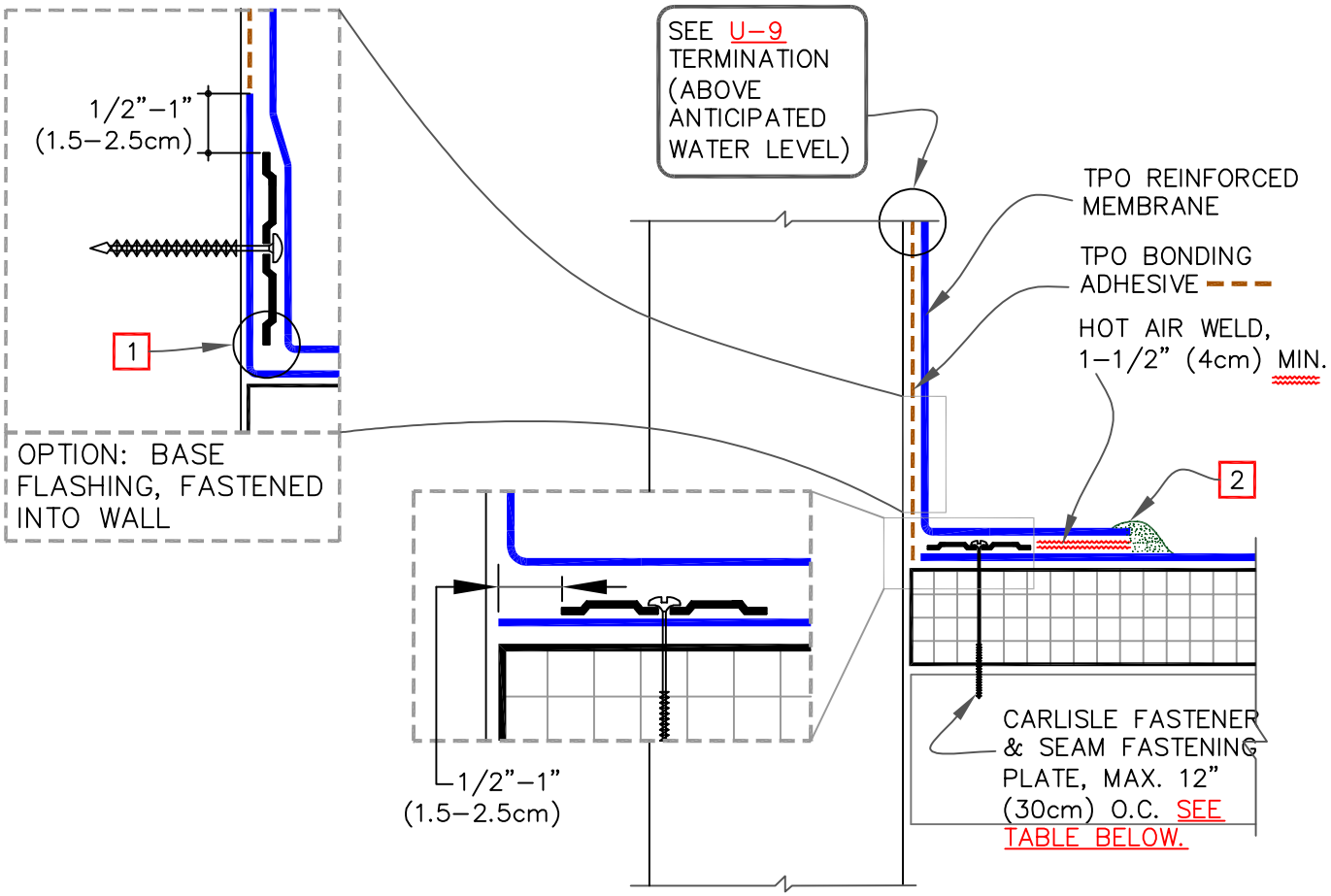
MEMBRANE TERMINATIONS (PAGE 3 OF 3)

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-9

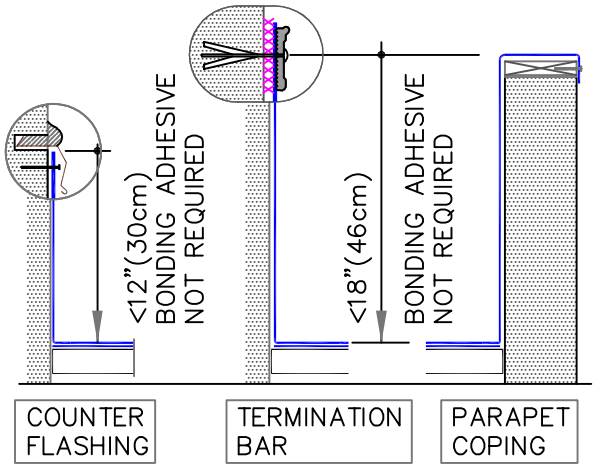
CAUTION

FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ALL SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS.



FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



NOTES:

1. CARE MUST BE TAKEN TO PRESS THE MEMBRANE TIGHTLY INTO THE ANGLE CHANGE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE MEMBRANE IN THE PROPER POSITION.

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

PARAPET BASE FLASHING: FASTENED INTO DECK OR WALL

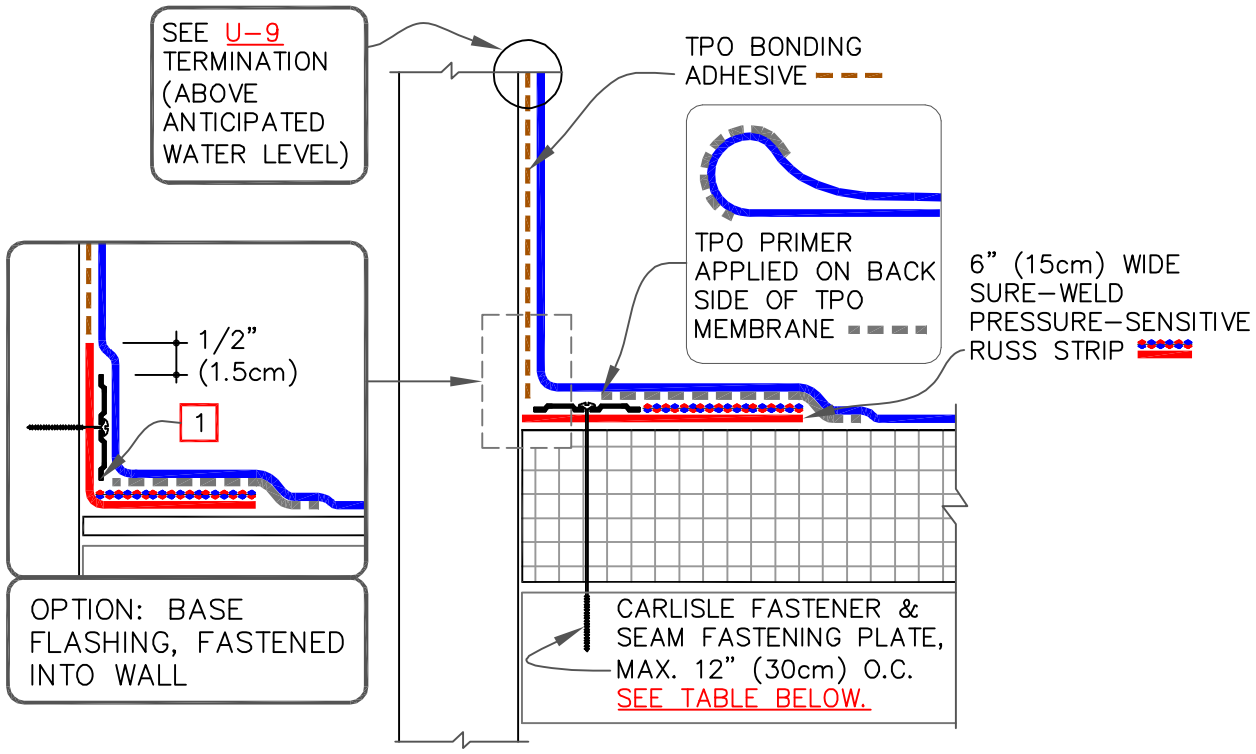
MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–12A

CAUTION

FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ADHERED SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS.



NOTE:

1. IN A CASE WHERE FASTENERS MUST BE FASTENED INTO THE VERTICAL SURFACE, CARE MUST BE TAKEN TO PRESS THE PRESSURE-SENSITIVE RUSS, AS WELL AS THE MEMBRANE, TIGHTLY INTO THE ANGLE CHANGE TO MAXIMIZE CONTACT BETWEEN THE TAPE AND MEMBRANE. MEMBRANE MUST BE ADHERED TO THE FULL WIDTH OF THE TAPE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE PRESSURE-SENSITIVE RUSS IN THE PROPER POSITION.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HPVX	HPVX
	B	HPV-XL	HPV-XL
STRUCTURAL CONCRETE	A	CD-10	HPVX
	B	MP 14-10	HPVX

RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

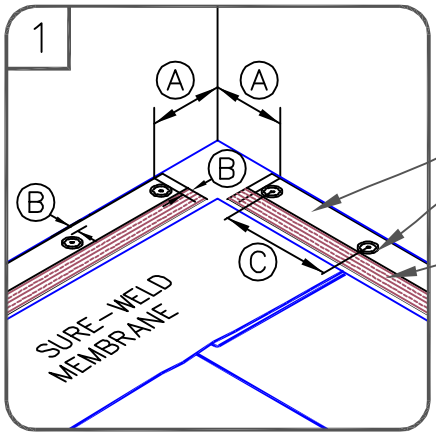
CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING WITH PRESSURE SENSITIVE RUSS, PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-12B



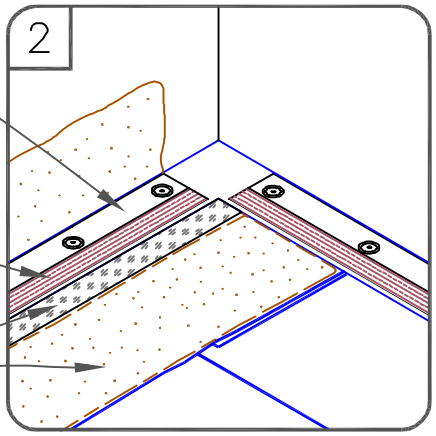
6" (15cm) WIDE PS RUSS

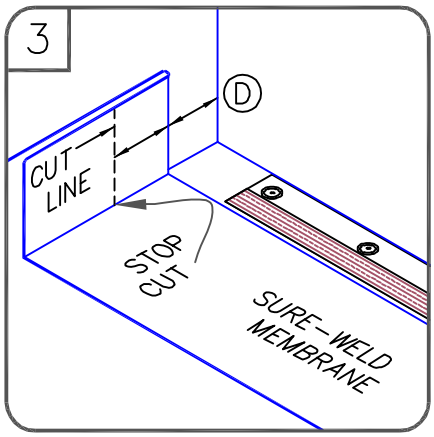
CARLISLE FASTENER & SEAM FASTENING PLATE, MAX. 12" (30cm) O.C.

PRE-APPLIED PS TAPE

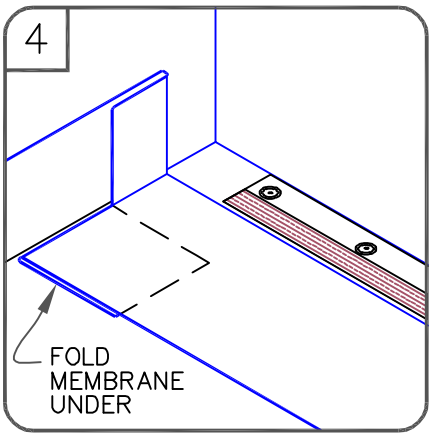
TPO PRIMER

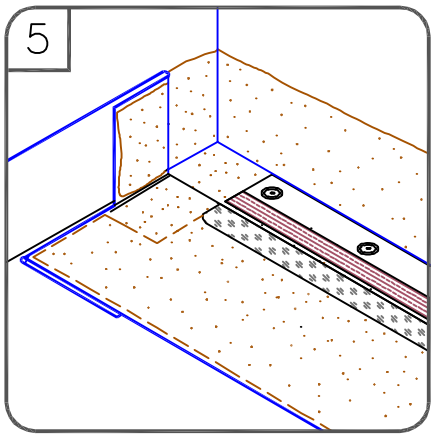
SURE-WELD BONDING ADHESIVE





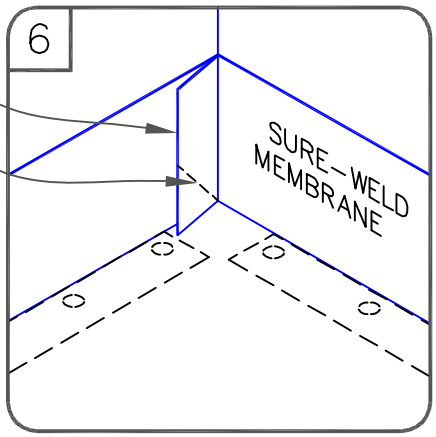
DIMENSIONS		cm	
A	6"	15	TO
	9"	23	
B	1/8"	0.5	MIN.
	1"	2.5	MAX.
C	12"	30	MIN.
D	6"	15	MIN.
E	1-1/2"	4	MIN.





HOT AIR WELD FLAP IN STEP 7

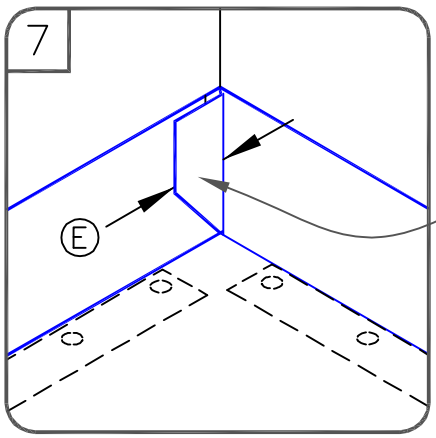
CUT AT 45°



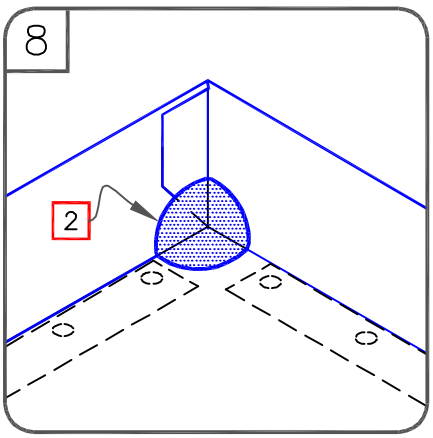
NOTES:

1. THE CUT SECTION OF VERTICAL MEMBRANE WILL BE FOLDED UNDER THE FIELD MEMBRANE AS SHOWN IN STEP 4.

2. APPLY INSIDE CORNER IN ACCORDANCE WITH CARLISLE DETAILS U-15A OR U-15B.



HOT AIR WELD



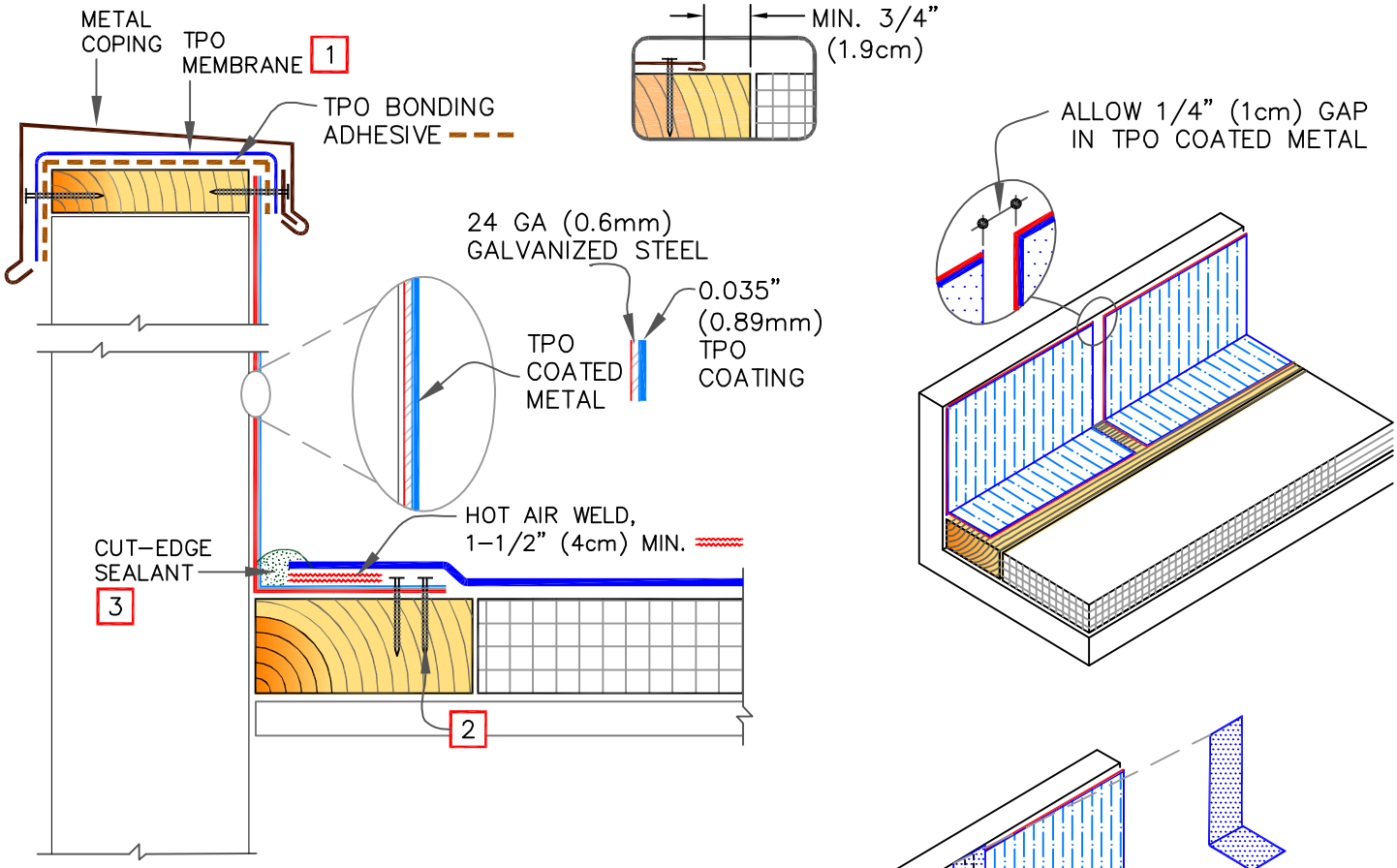
CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING WITH PRESSURE SENSITIVE RUSS, PAGE 2 OF 2

MAXIMUM WARRANTY: 30 YEARS

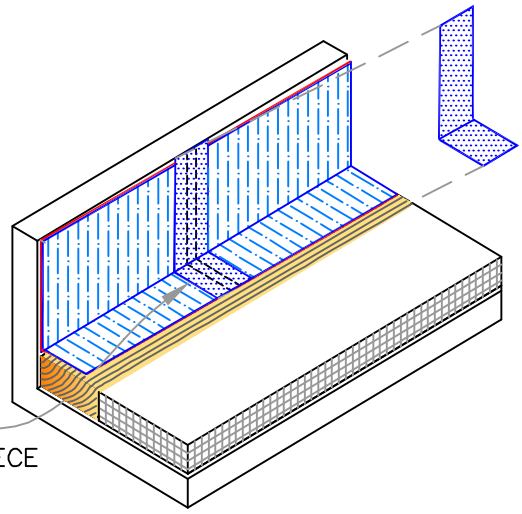
TP

DETAIL NO.
U-12B.1



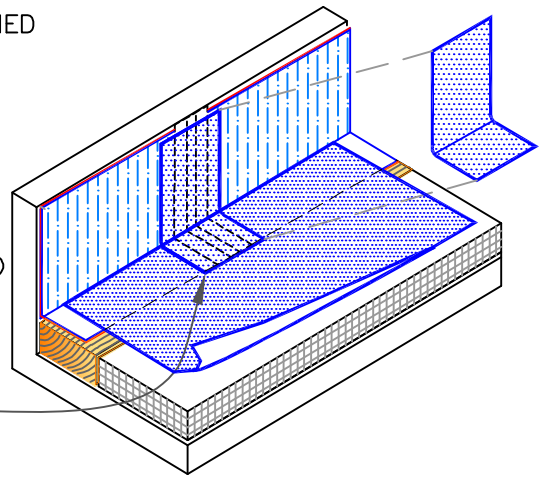
SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON-REINFORCED MEMBRANE STRIPPING.



2

HEAT WELD 3" (7.5cm) WIDE PIECE OF REINFORCED MEMBRANE CENTRALLY ALIGNED OVER JOINT



3

HEAT WELD 6" (15cm) WIDE PIECE OF NON-REINFORCED MEMBRANE CENTRALLY ALIGNED OVER JOINT, COVERING TOP OF FIELD MEMBRANE. SEE SEQUENCE IN TABLE.

NOTES:

1. PLACE A LAYER OF TPO MEMBRANE UNDER THE METAL CAP TO PROTECT AGAINST MOISTURE INFILTRATION AT JOINTS.
2. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
4. SEE U-15C FOR ADDITIONAL INFORMATION.

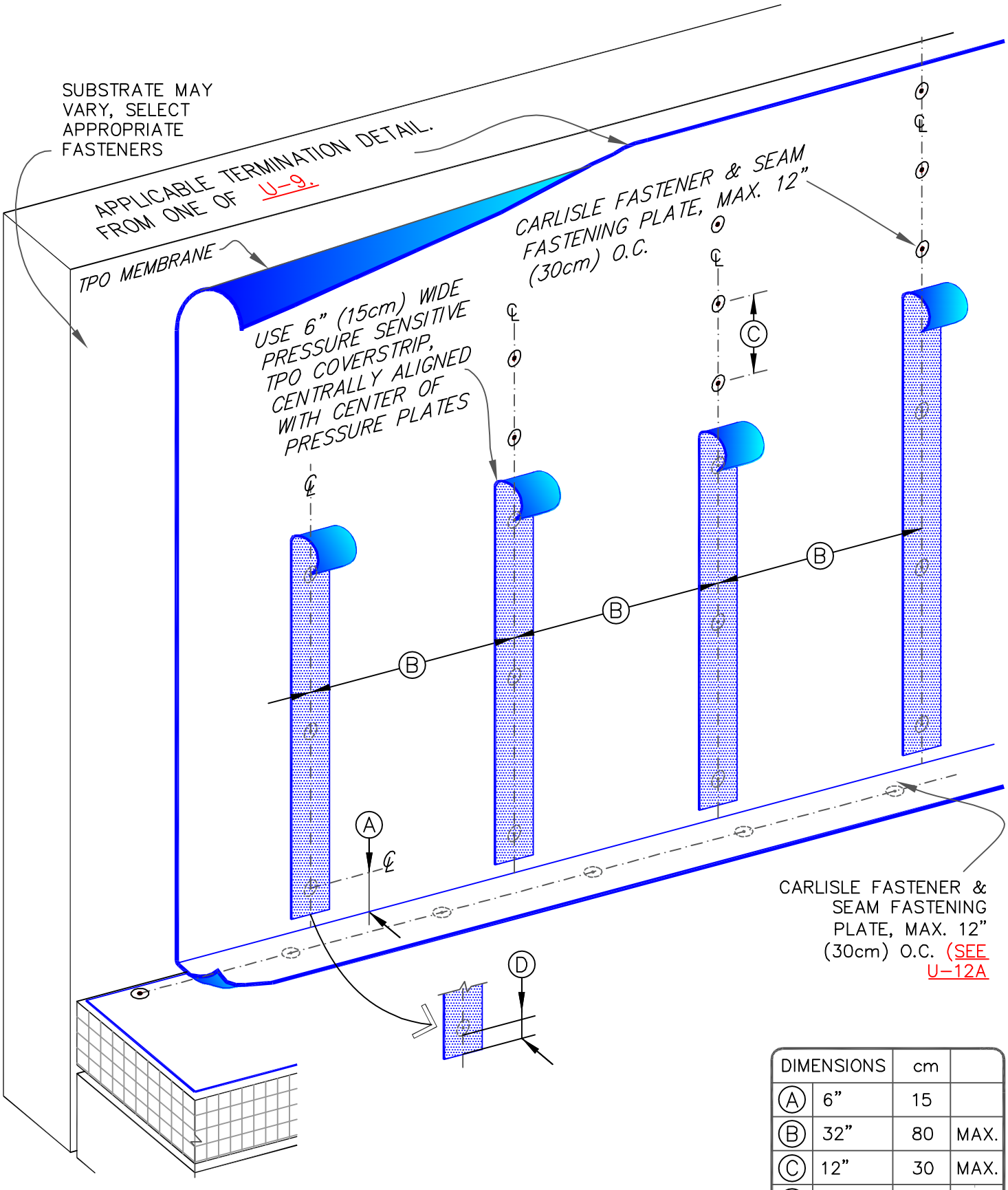
CARLISLE SYNTEC SYSTEMS

TPO COATED METAL WALL FLASHING

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-12C



DIMENSIONS		cm	
A	6"	15	
B	32"	80	MAX.
C	12"	30	MAX.
D	3"	7.6	MIN.

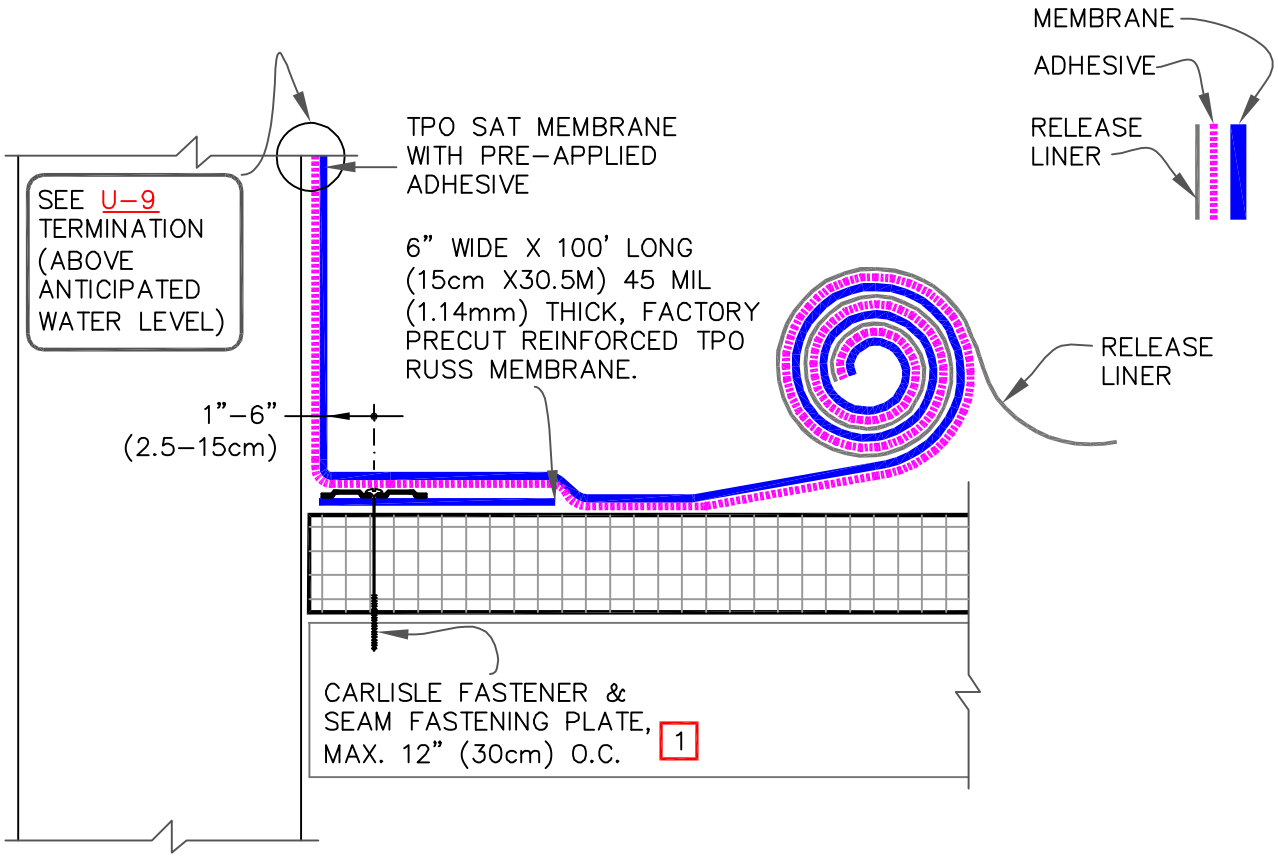
CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING / NO ADHESION – ANY HEIGHT OPTION

MAXIMUM WARRANTY: 30 YEARS

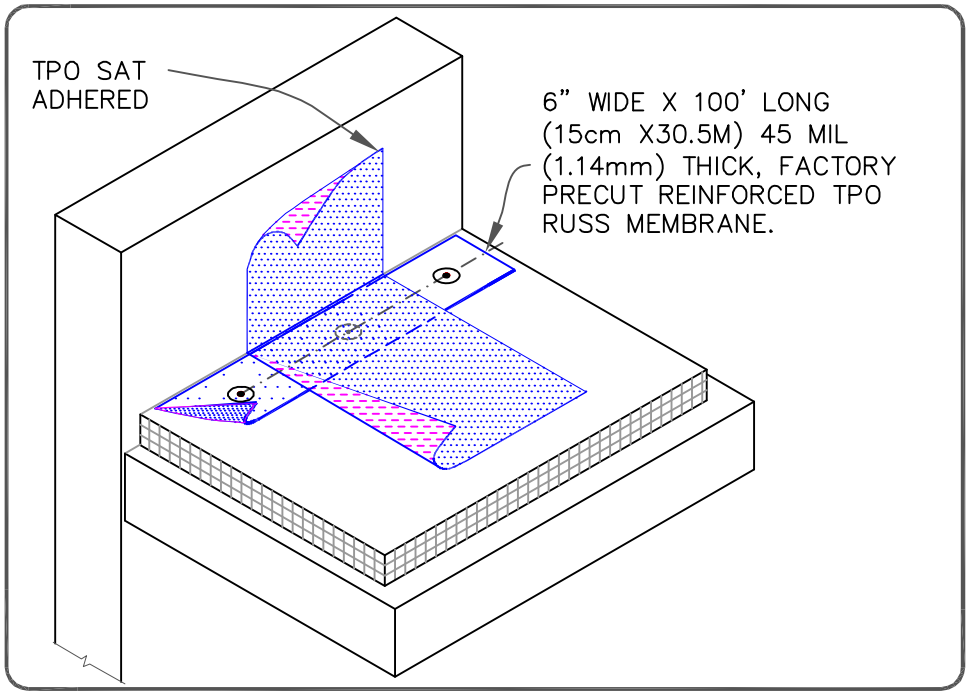
DETAIL NO. U-12F

TPO WITH SAT (SELF ADHERING TECHNOLOGY)



NOTE:

1. WIND SPEED GREATER THAN 90 MPH (145 KILOMETERS /HOURS)(40.3 METER PER SECOND) OR PROJECTS WITH 25 OR 30-YEAR WARRANTIES REQUIRE FASTENING @ 6"(15.2cm) O.C.



RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

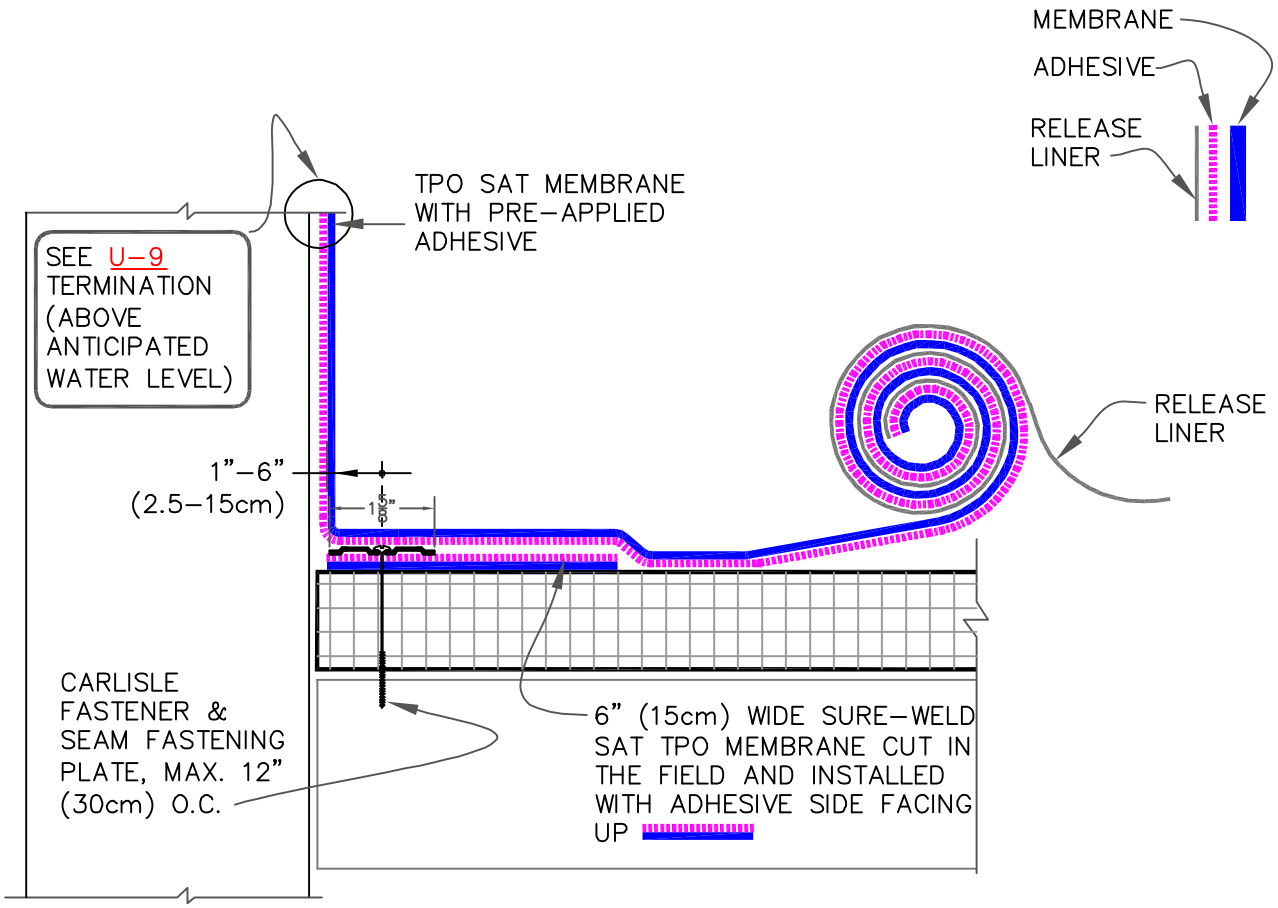
TPO SAT PARAPET FLASHING WITH TPO RUSS

MAXIMUM WARRANTY: 30 YEARS

TP

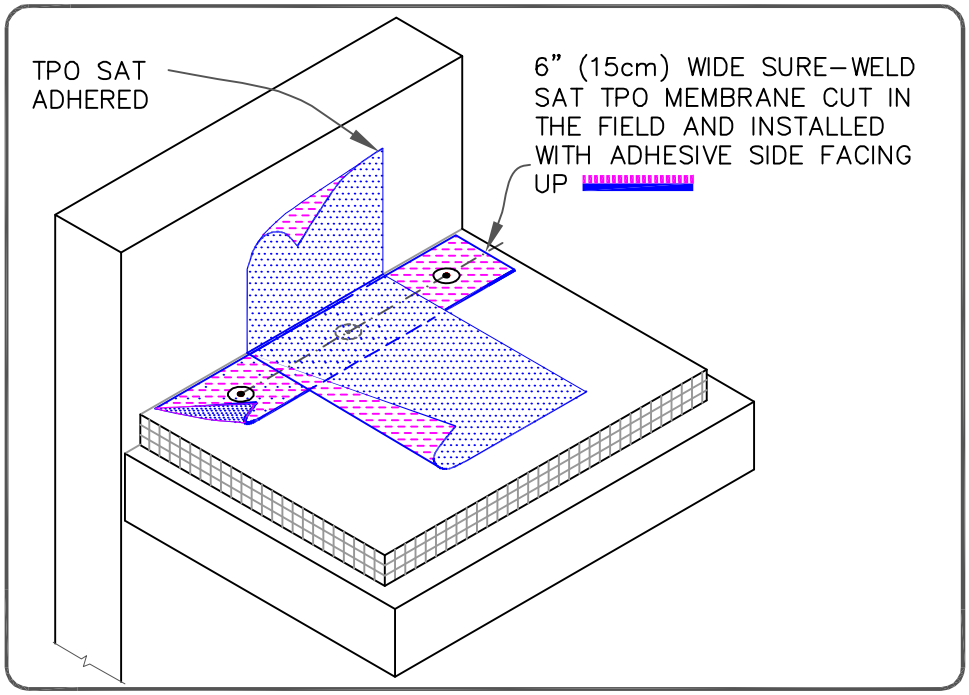
DETAIL NO. U-12G

TPO WITH SAT (SELF ADHERING TECHNOLOGY)



NOTE:

1. WIND SPEED GREATER THAN 90 MPH (145 KILOMETERS /HOURS)(40.3 METER PER SECOND) OR PROJECTS WITH 25 OR 30-YEAR WARRANTIES REQUIRE FASTENING @ 6"(15.2cm) O.C.



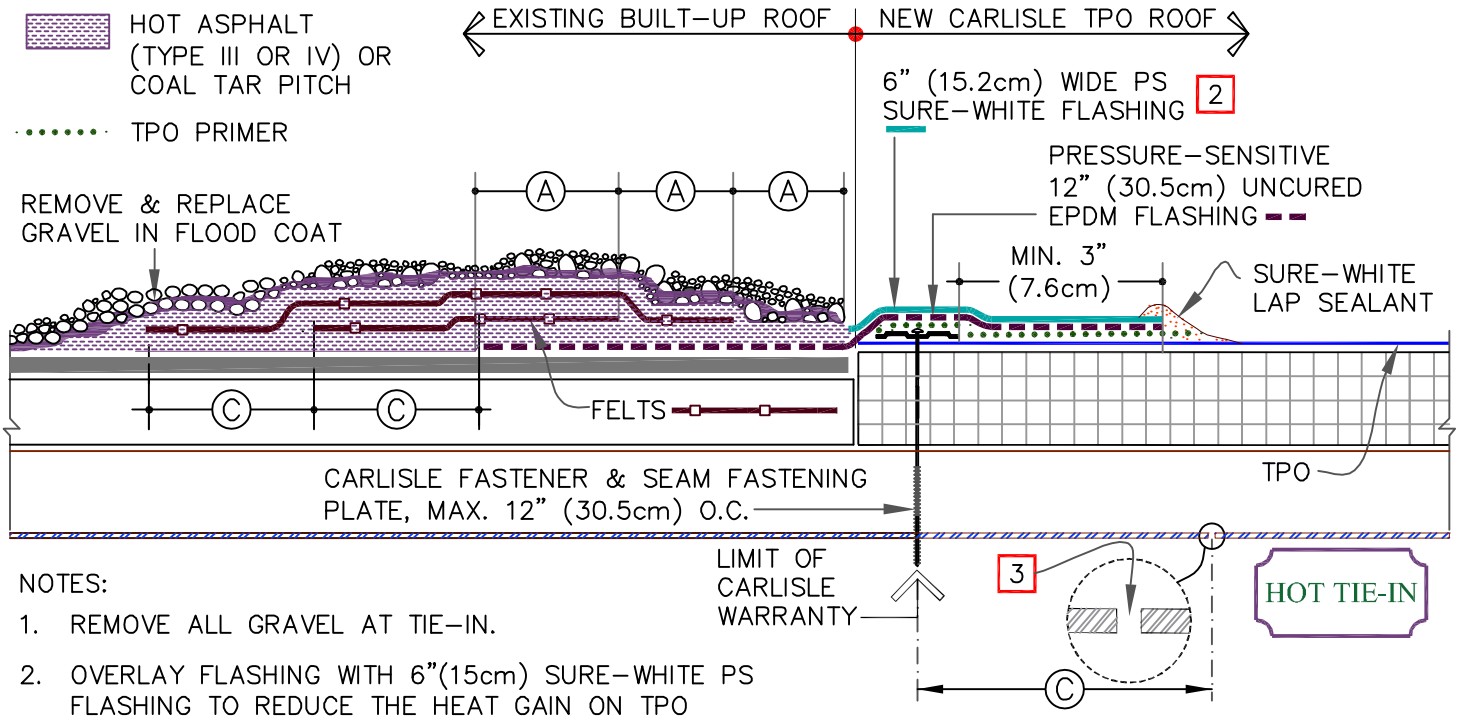
RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

TPO SAT PARAPET FLASHING WITH SELF-ADHERING TPO RUSS

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-12H

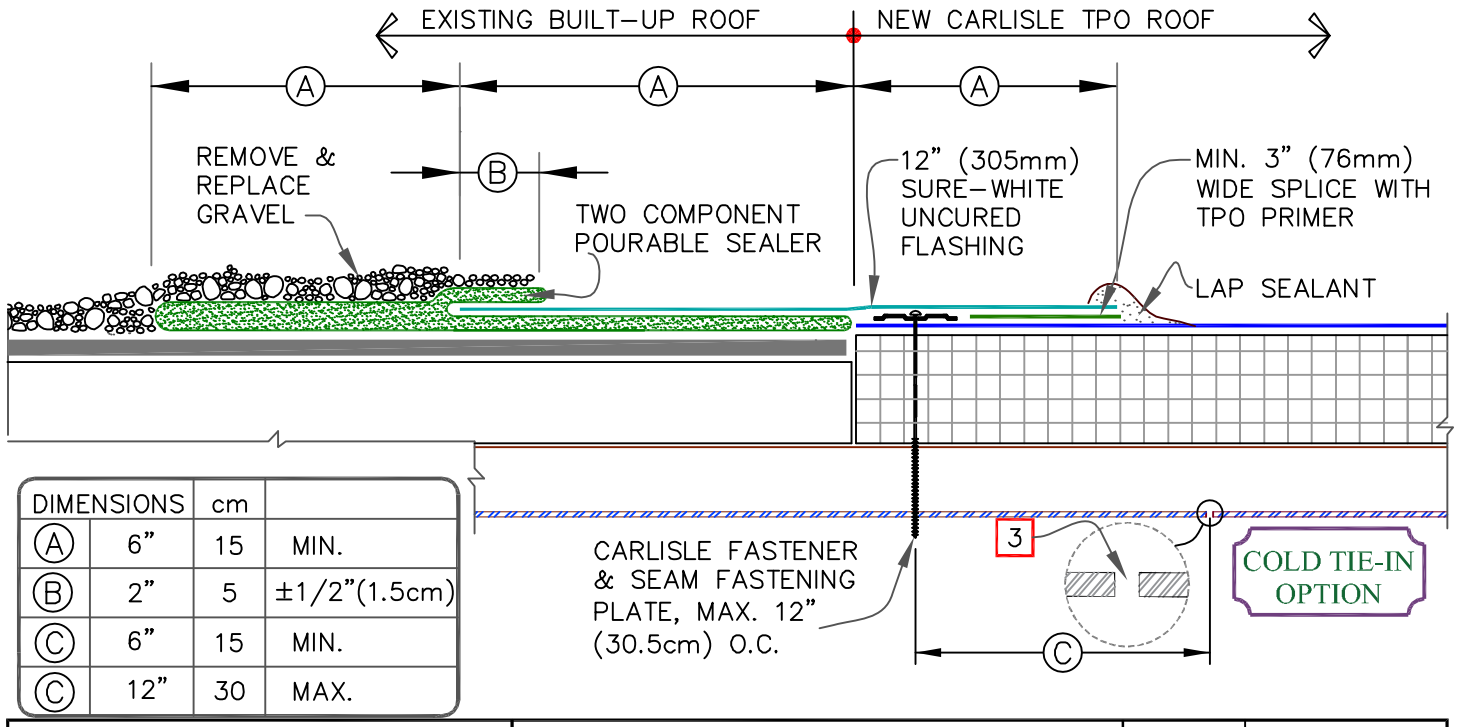


NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. OVERLAY FLASHING WITH 6"(15cm) SURE-WHITE PS FLASHING TO REDUCE THE HEAT GAIN ON TPO MEMBRANE.
3. IF FLUTES ARE PERPENDICULAR TO THE TIE-IN DRILL A 3/8" (1cm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (15cm) MINIMUM TO 12" (30cm) MAXIMUM FROM THE SEAM FASTENING PLATE. HOLES MAY NOT BE REQUIRED IF DECK SLOPES DOWN TOWARDS EXISTING ROOF.
4. IF WATER PONDS OR FLOWS OVER TIE-IN FROM BUR SURFACE, USE DETAIL U-13B

FASTENER AND PLATE TYPES (STEEL DECK)

OPTIONS	FASTENER	PLATE
A	HP-X	PIRANHA
B	HP-XTRA	PIRANHA XTRA



DIMENSIONS		cm	
A	6"	15	MIN.
B	2"	5	±1/2"(1.5cm)
C	6"	15	MIN.
C	12"	30	MAX.

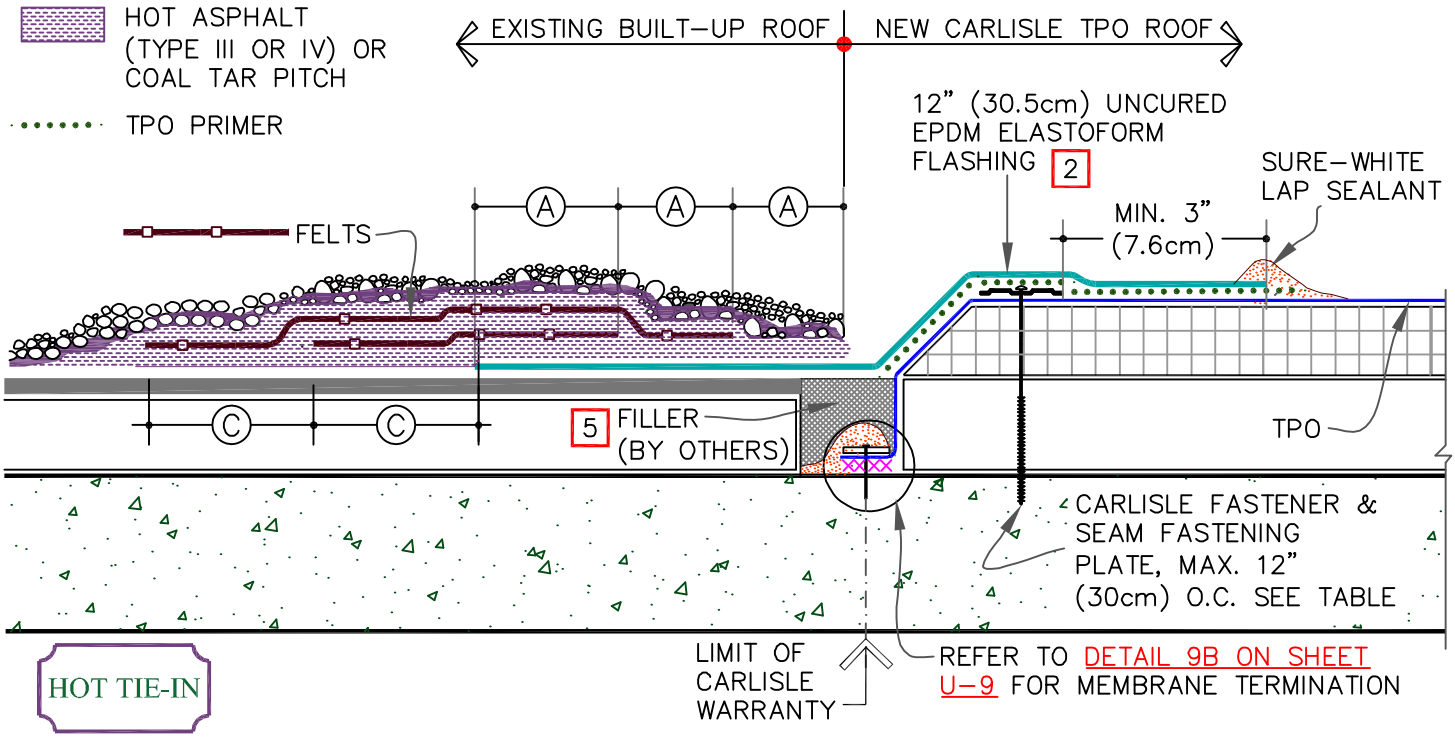
CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO BUILT-UP ROOFING OVER STEEL ROOF DECK

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-13A



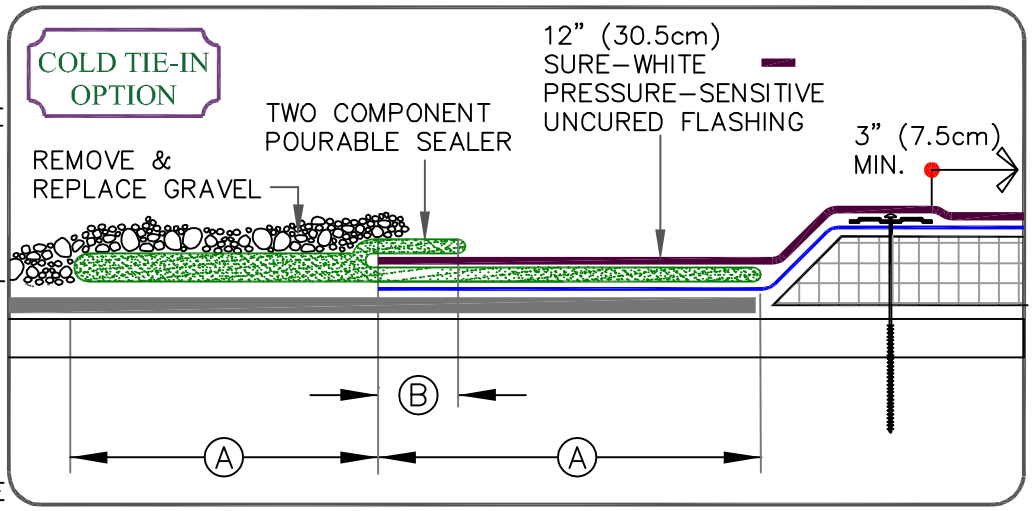
NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. SPLICE TWO PIECES OF WHITE PRESSURE-SENSITIVE UNCURED FLASHING TOGETHER TO ACHIEVE DESIRED WIDTH.
3. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION.
4. CARLISLE IS NOT RESPONSIBLE FOR DAMAGE TO THE BUILT-UP ROOF OR STRUCTURAL DECK RESULTING FROM PONDED WATER; THIS DETAIL APPLIES TO RE-ROOFING WHEN A TEAR-OFF IS NOT SPECIFIED AND WAS DESIGNED TO PREVENT MIGRATION OF WATER WITHIN THE NEW ROOFING SYSTEM.
5. ACHIEVE SMOOTH SURFACE ON TOP.

FASTENER AND PLATE TYPE (STRUCTURAL CONCRETE DECK)

OPTION	FASTENER	PLATE
A	CD-10	PIRANHA
B	HD 14-10	PIRANHA

DIMENSIONS	cm	
Ⓐ 6"	15	MIN.
Ⓑ 2"	5	±1/2"(1.5cm)
Ⓒ 6"	15	MIN.
Ⓒ 12"	30	MAX.



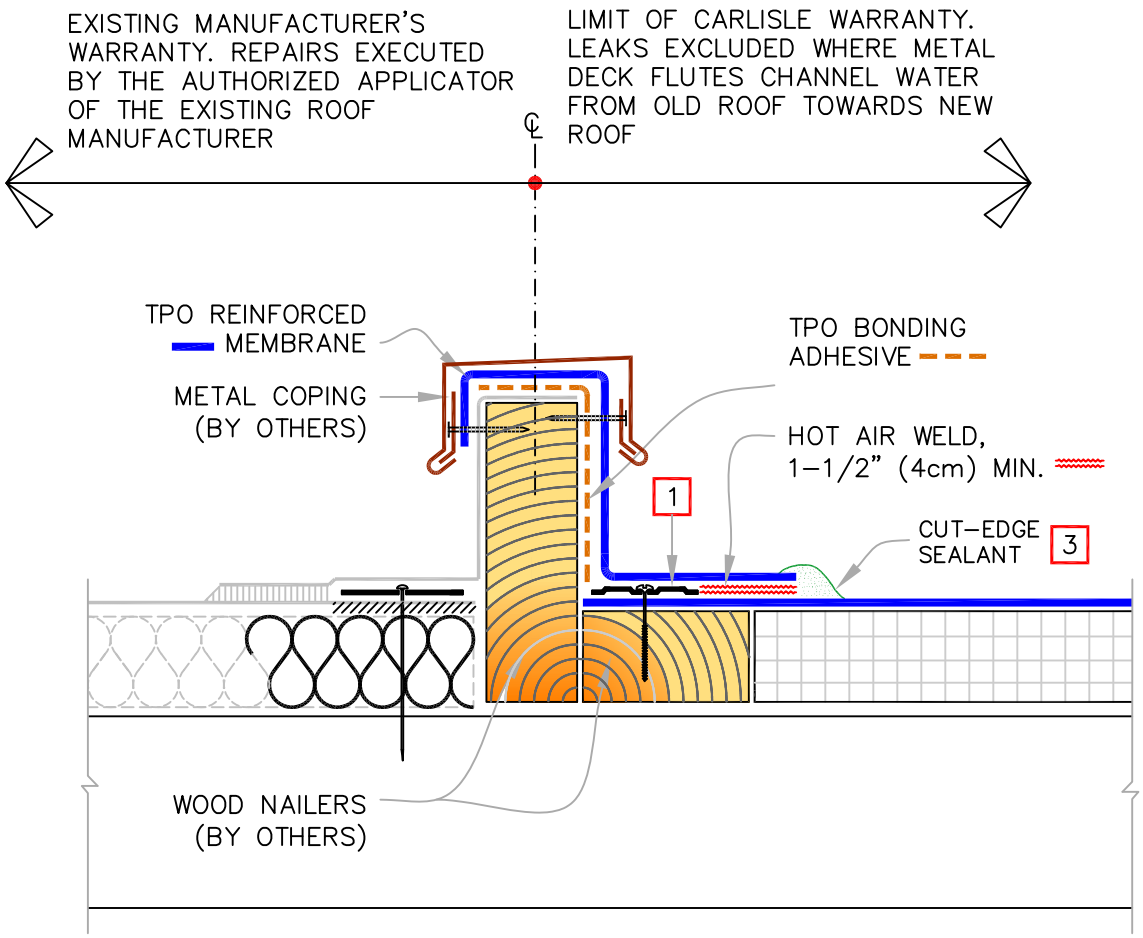
CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO BUILT-UP ROOFING OVER CONCRETE ROOF DECK

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-13B



NOTES:

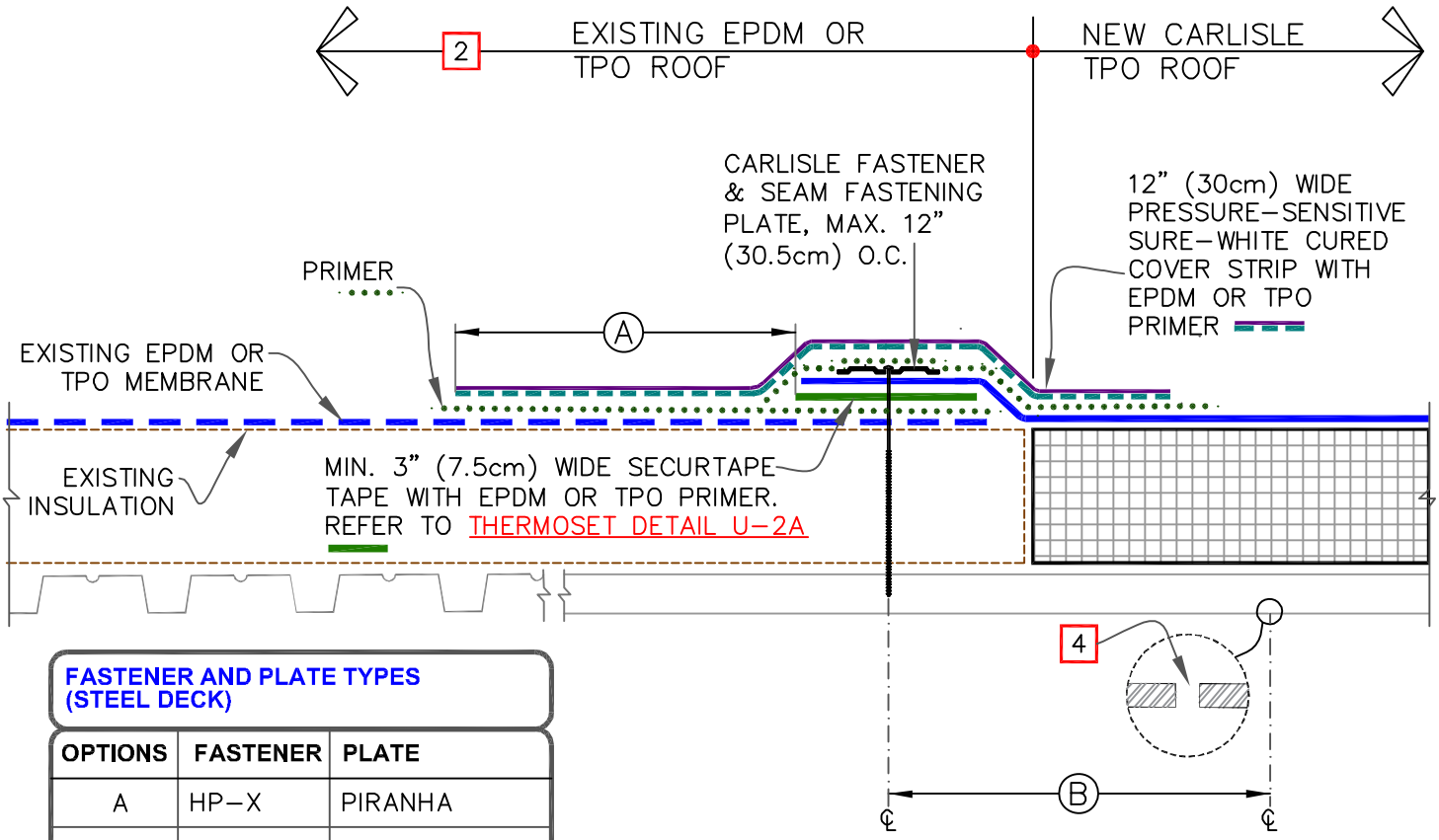
1. POSITION MEMBRANE FASTENING PLATES 1/2" (1.5cm) TO 1" (2.5cm) FROM EDGE OF DECK MEMBRANE.

2. ENSURE THE LOCATION OF CURB WILL NOT IMPEDE THE FLOW OF WATER AT EXISTING ADJACENT ROOF.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS	TPO TIE–IN TO EXISTING SINGLE PLY ROOF WITH CURB MAXIMUM WARRANTY: 30 YEARS	TP	DETAIL NO. U–13C

EPDM / TPO PRIMER



FASTENER AND PLATE TYPES (STEEL DECK)

OPTIONS	FASTENER	PLATE
A	HP-X	PIRANHA
B	HP-XTRA	PIRANHA XTRA

NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM OR TPO BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.
2. CONTACT MANUFACTURER OF EXISTING WARRANTED MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN.
3. FOR EXISTING BALLASTED SYSTEMS BY OTHERS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.
4. IF FLUTES ARE PERPENDICULAR (AS DEPICTED), DRILL A 3/8" (1cm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (15cm) MINIMUM TO 12" (30cm) MAXIMUM FROM THE SEAM FASTENING PLATE. HOLES MAY NOT BE REQUIRED IF DECK SLOPES DOWN TOWARDS EXISTING ROOF.

DIMENSIONS		cm	
A	6"	15	
B	6"	15	MIN.
B	12"	30	MAX.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

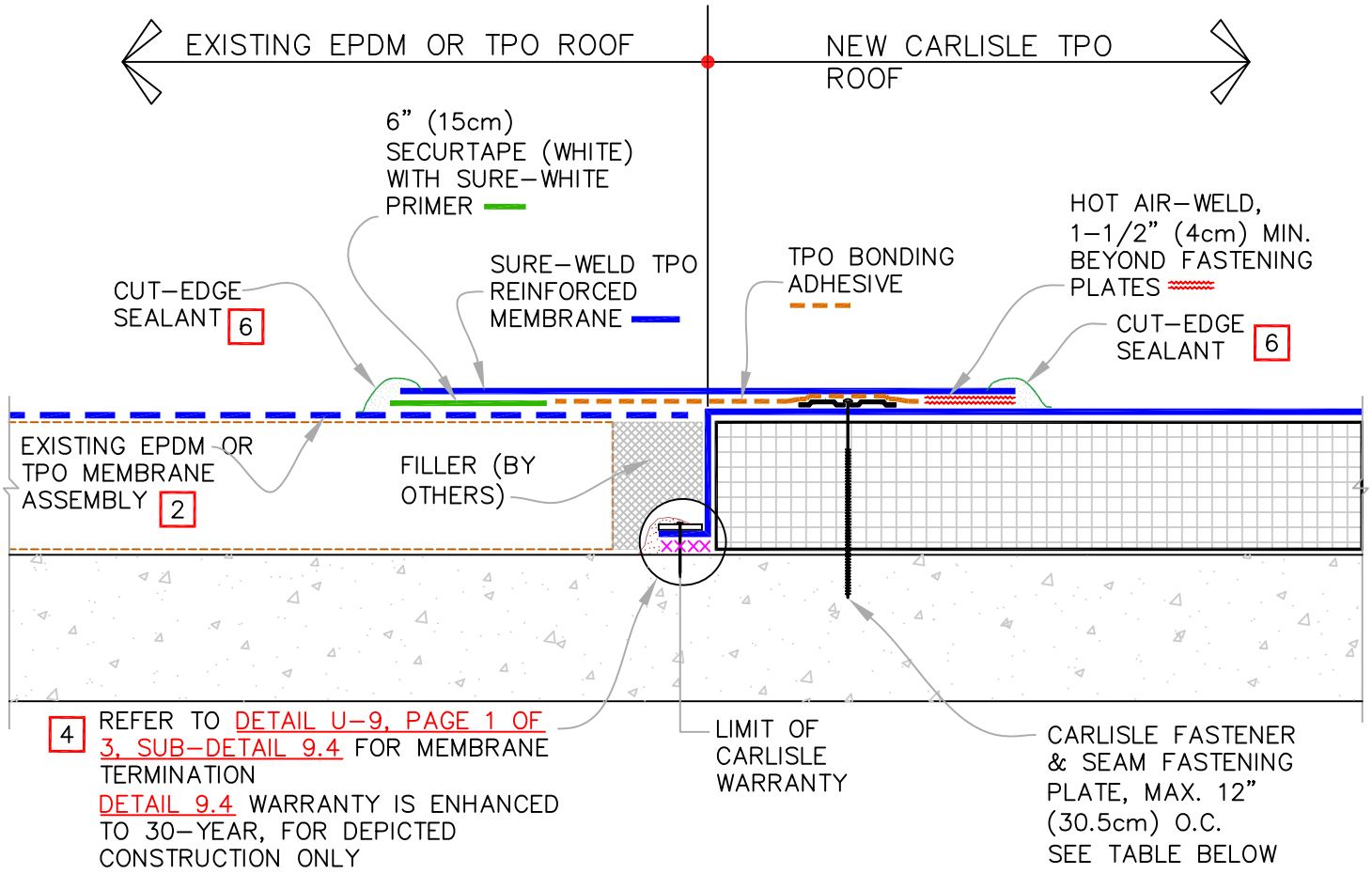
CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO EXISTING EPDM / TPO MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-13D



NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM OR TPO MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.
2. CONTACT MANUFACTURER OF EXISTING WARRANTED MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN.
3. ON EXISTING BALLASTED SYSTEMS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.
4. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION.
5. WHEN RE-ROOFING OVER PRE-CAST CONCRETE, APPLY LIBERAL BEAD OF WATER CUT-OFF MASTIC IN THE JOINTS TO PREVENT MOISTURE MIGRATION.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

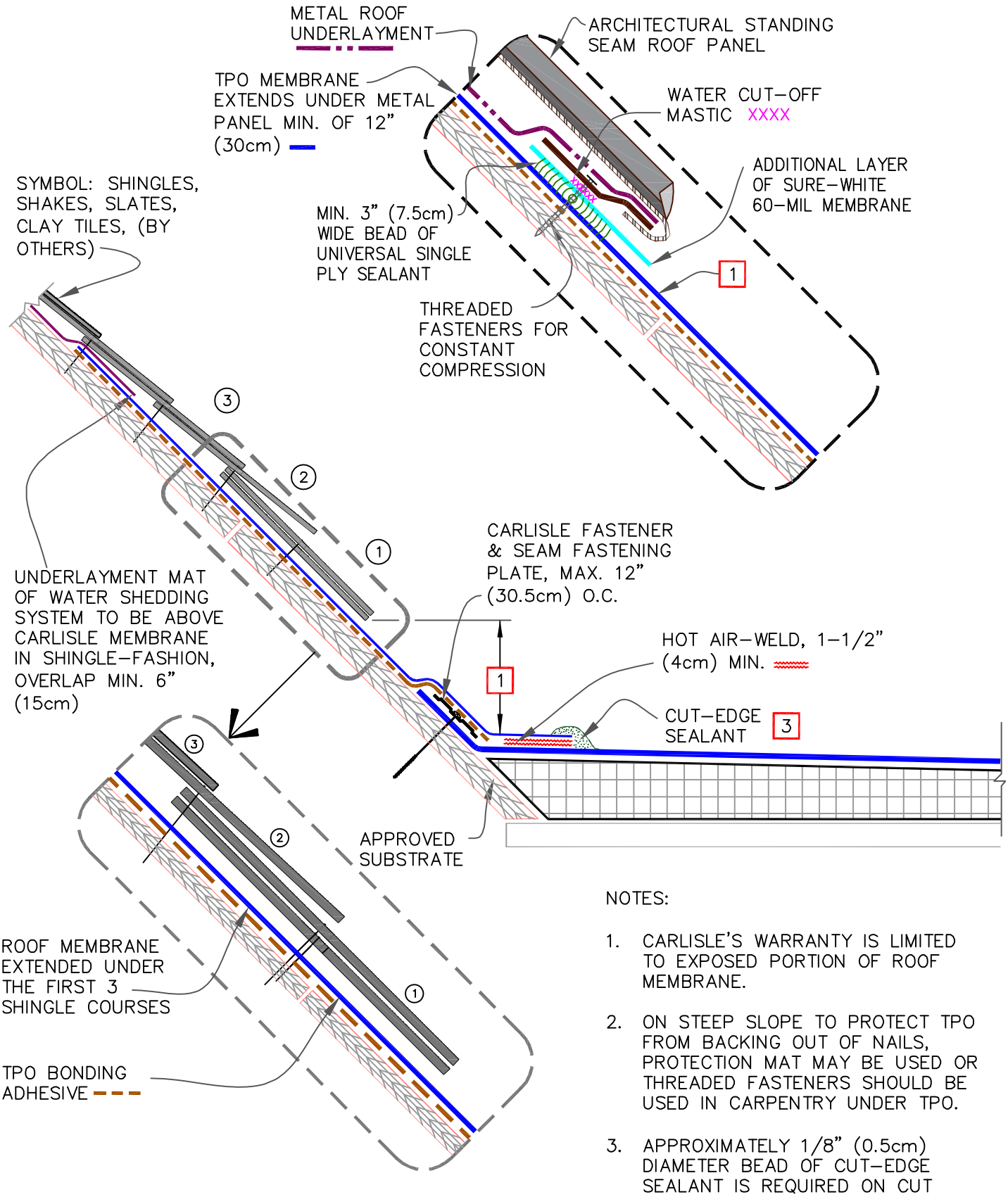
DECK TYPE	OPTION	FASTENER	PLATE
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

EPDM/TPO TIE-IN ON CONCRETE DECK

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-13E



NOTES:

1. CARLISLE'S WARRANTY IS LIMITED TO EXPOSED PORTION OF ROOF MEMBRANE.
2. ON STEEP SLOPE TO PROTECT TPO FROM BACKING OUT OF NAILS, PROTECTION MAT MAY BE USED OR THREADED FASTENERS SHOULD BE USED IN CARPENTRY UNDER TPO.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

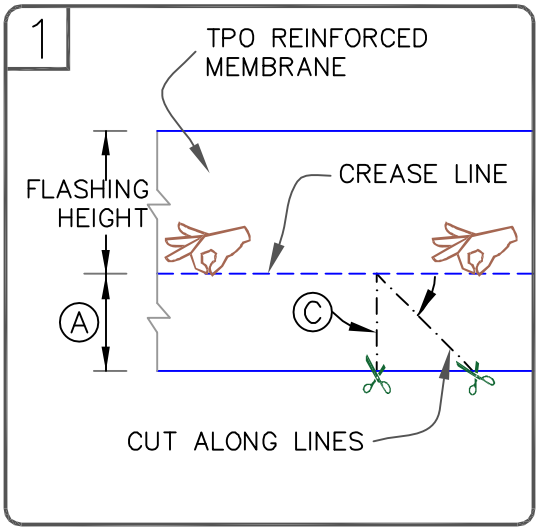
CARLISLE SYNTEC SYSTEMS

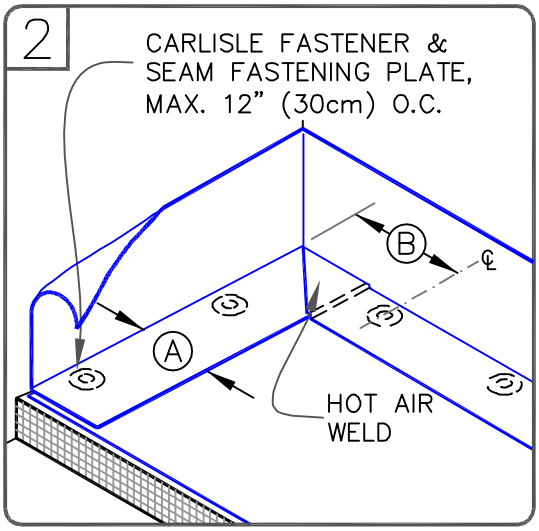
TPO TIE-IN TO SHINGLED OR METAL PANEL ROOF

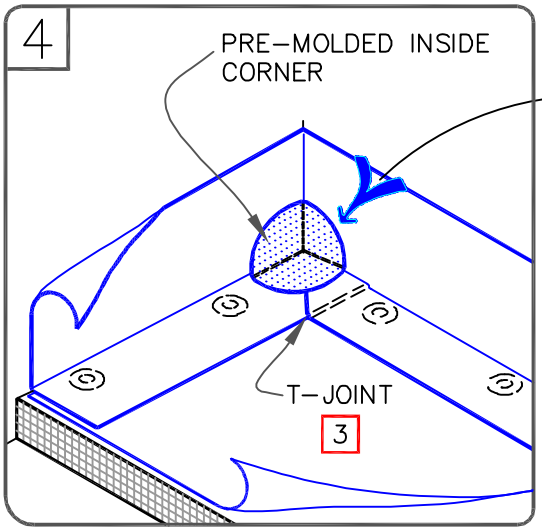
MAXIMUM WARRANTY: 30 YEARS

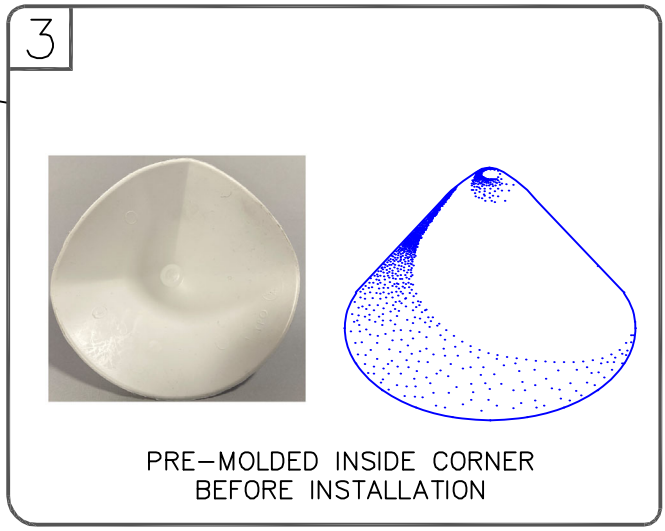
TP

DETAIL NO. U-13F









NOTES:

1. POSITION FASTENING PLATES 6" TO 9" (15 TO 23cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. WHEN USING 60-MIL TPO OR 80-MIL, APPLY A 4-1/2" (11.5cm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"-9"	15-23	
C	45-DEGREES APPROX.		

CARLISLE SYNTEC SYSTEMS

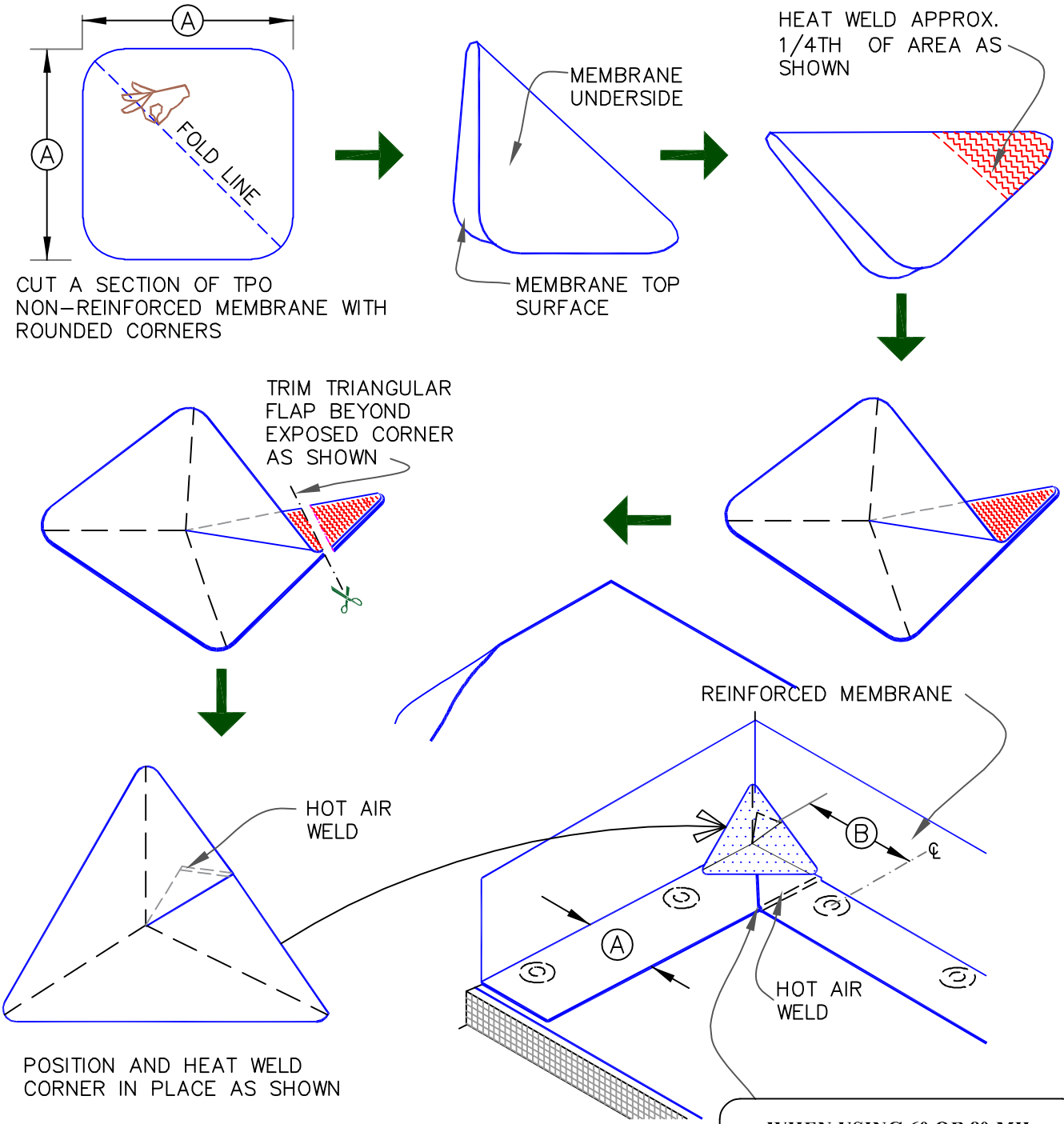
PRE-MOLDED INSIDE CORNER FLASHING

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-15A

CAUTION

FOR 30-YEAR WARRANTY PROJECTS, PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH TPO UNIVERSAL DETAIL U-15A OR U-15G.



DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"-9"	15-23	

WHEN USING 60 OR 80-MIL (1.52/2.03mm) THICK MEMBRANE

APPLY A 4-1/2" (11.8cm) DIAMETER "T-JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.

CARLISLE SYNTEC SYSTEMS

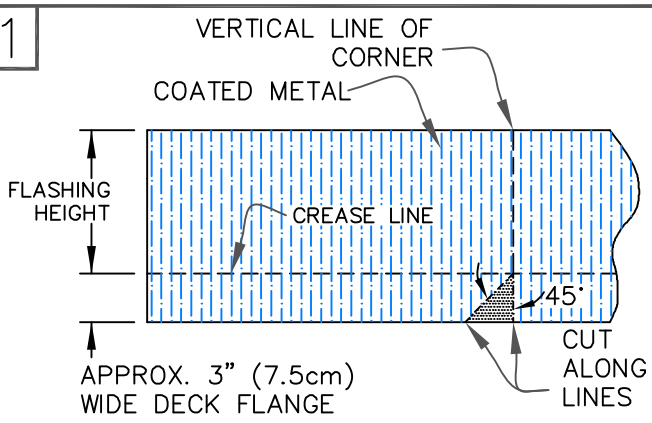
FIELD FABRICATED INSIDE CORNER FLASHING

MAXIMUM WARRANTY: 20 YEARS. SEE CAUTION ON TOP OF PAGE

TP

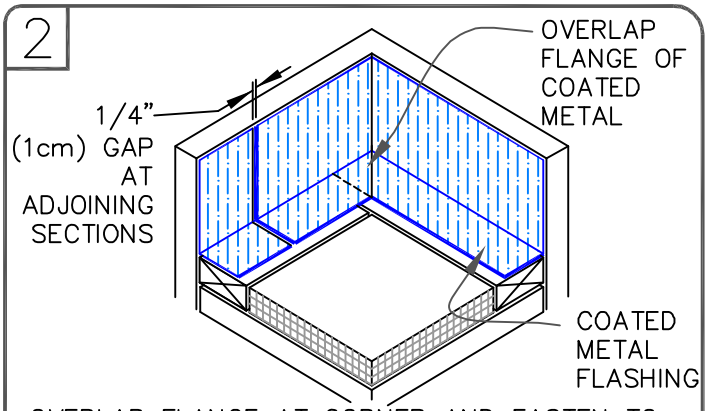
DETAIL NO. U-15B

1



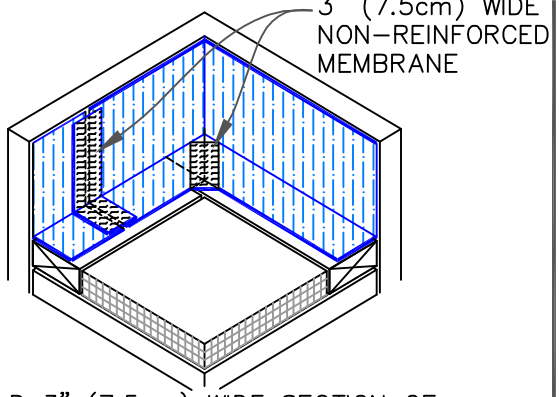
CREASE COATED METAL FLASHING ALONG DASHED LINES AFTER CUTTING AND REMOVING SHADED TRIANGLE.

2



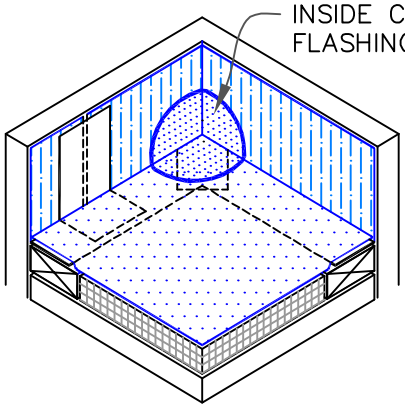
OVERLAP FLANGE AT CORNER AND FASTEN TO WOOD NAILERS USING 1–1/2" (4cm) RING SHANK NAILS SPACED 6" (15cm) O.C., STAGGERED 1/2" (1.5cm).

3



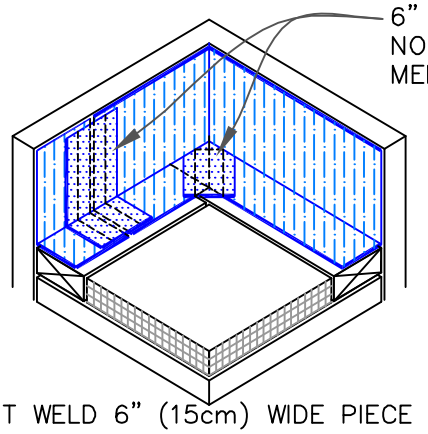
HEAT WELD 3" (7.5cm) WIDE SECTION OF REINFORCED MEMBRANE OVER VERTICAL JOINT IN COATED METAL AND OVER CUT EDGE AT CORNER AS SHOWN.

4



INSTALL FIELD MEMBRANE AND HEAT WELD TO FLANGE OF COATED METAL. ALSO INSTALL INSIDE CORNER FLASHING PER DETAILS: U–15A OR U–15B OR U–15G

5



HEAT WELD 6" (15cm) WIDE PIECE OF NON–REINFORCED MEMBRANE OVER 3" WIDE REINFORCED MEMBRANE, AFTER ROOF MEMBRANE INSTALLATION

SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.

NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1–1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. COORDINATE THIS DETAIL WITH U–12C FOR ADDITIONAL INFORMATION.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

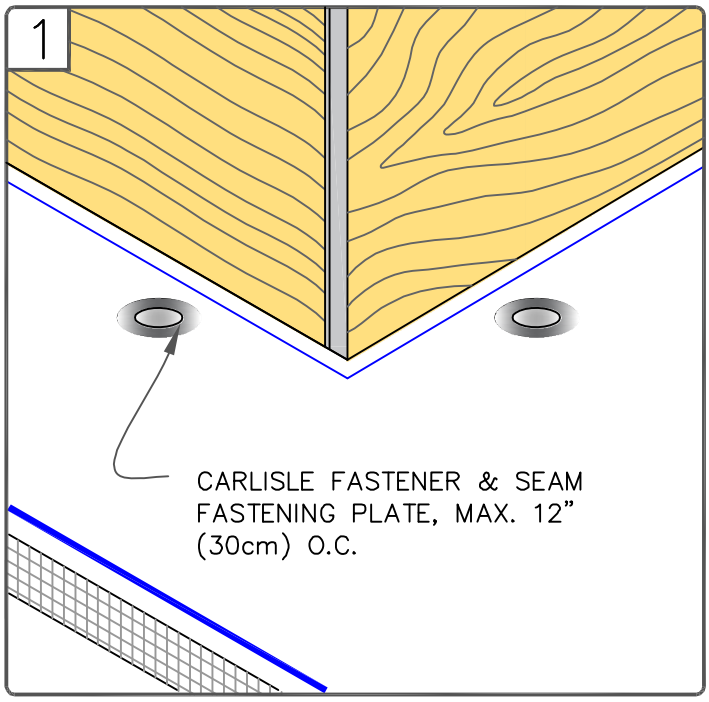
CARLISLE SYNTEC SYSTEMS

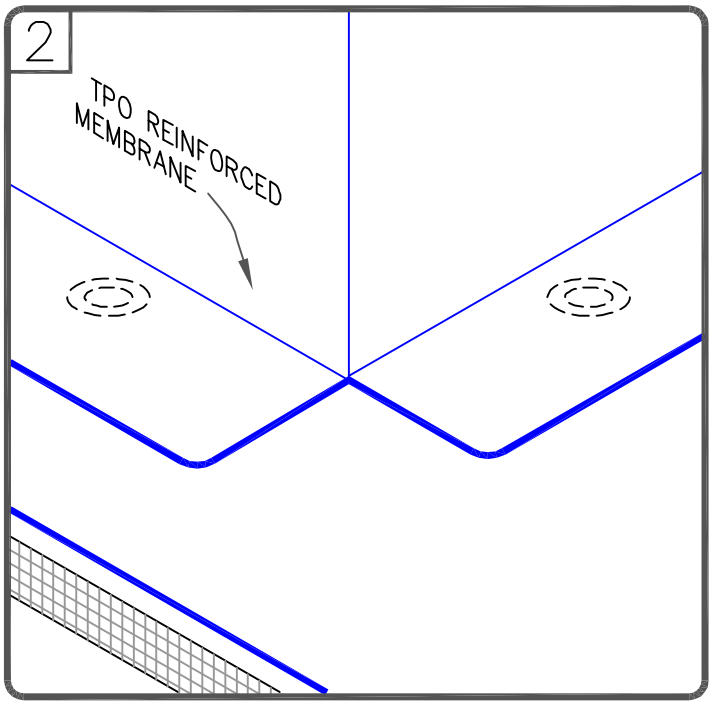
INSIDE CORNER WITH TPO COATED METAL WALL FLASHING

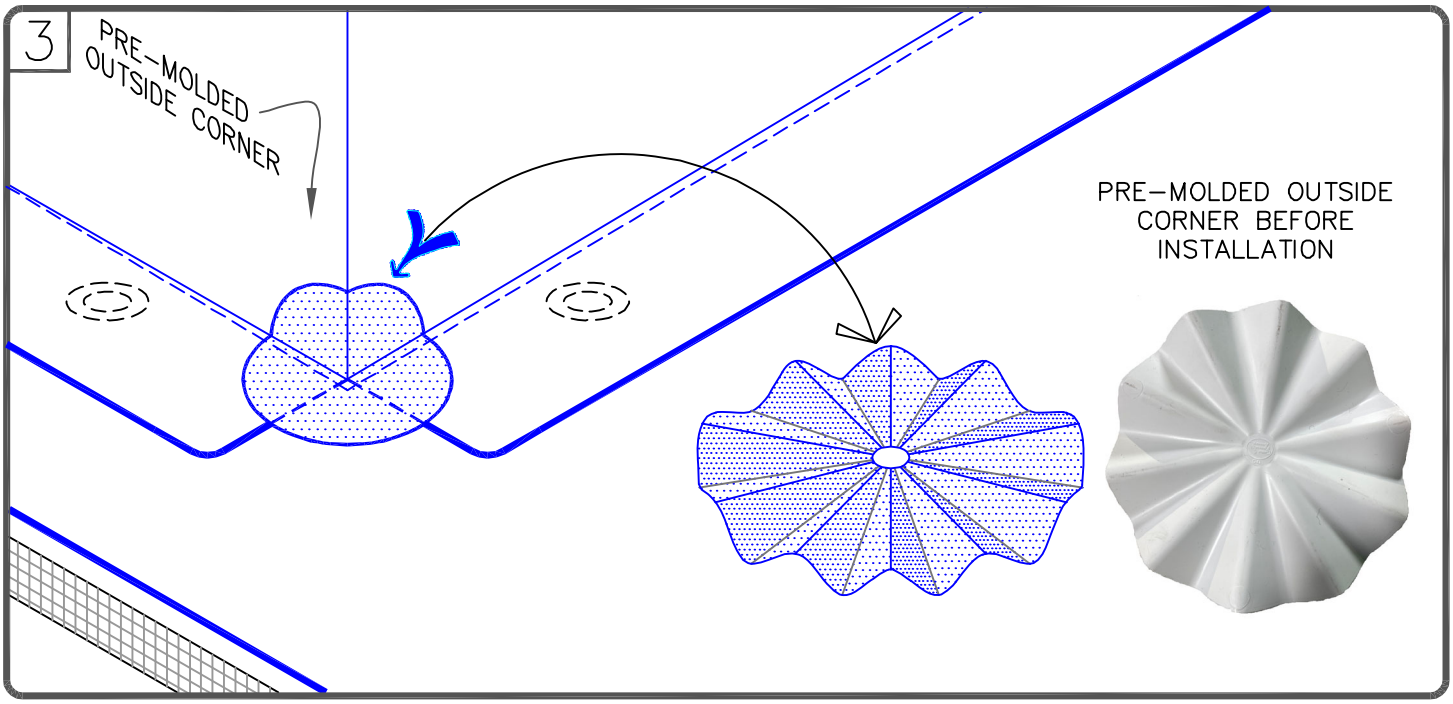
MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–15C







NOTES:

1. POSITION FASTENING PLATES 6" (15cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

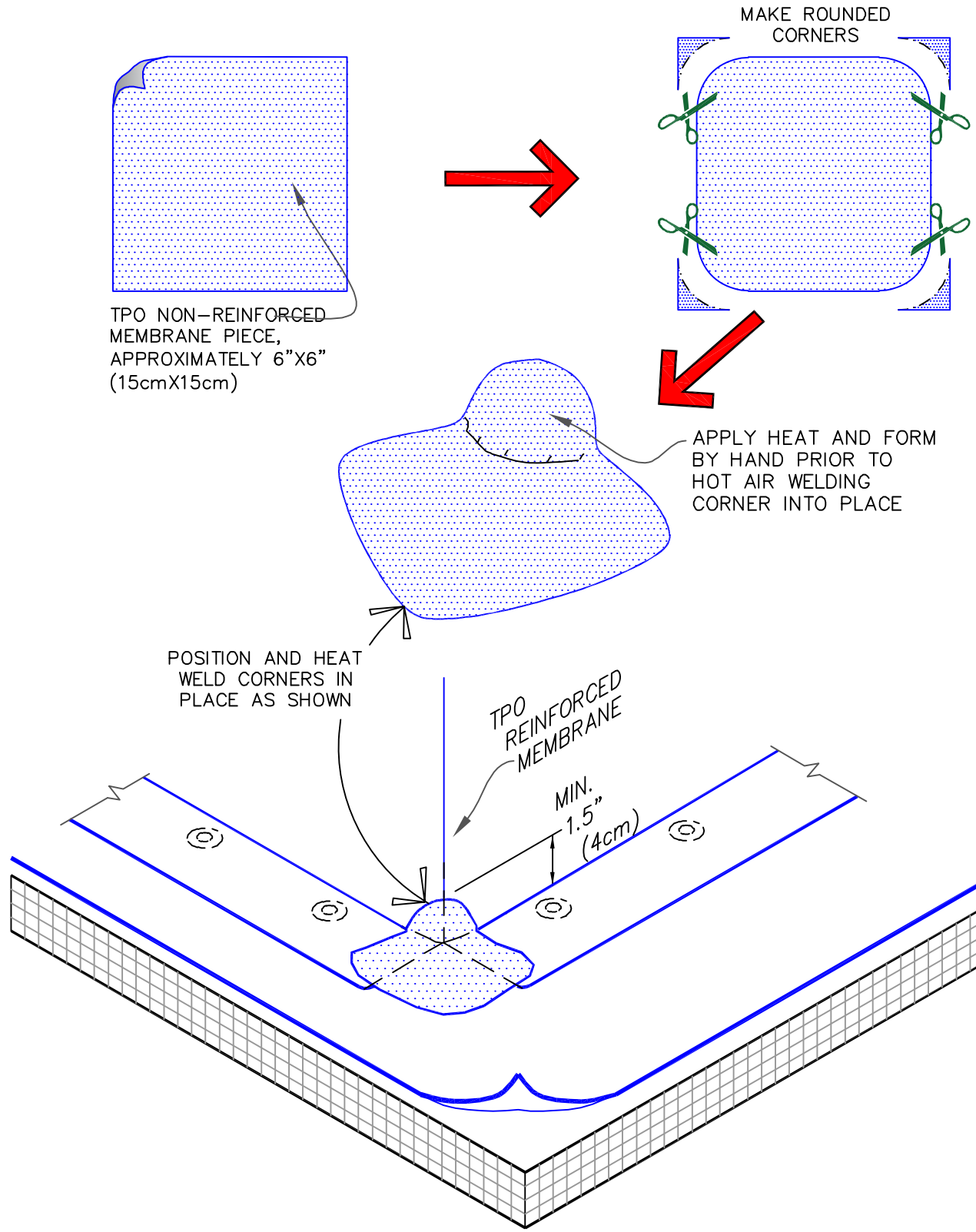
2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS	PRE-MOLDED OUTSIDE CORNER FLASHING MAXIMUM WARRANTY: 30 YEARS	TP DETAIL NO. U-15D

CAUTION

FOR 30-YEAR WARRANTY PROJECTS, PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH TPO UNIVERSAL DETAIL U-15D OR U-15G.

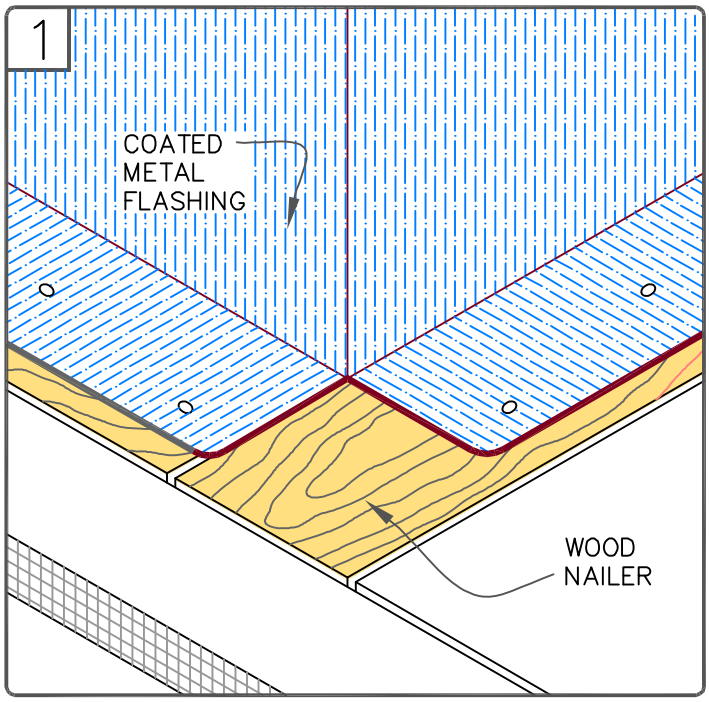


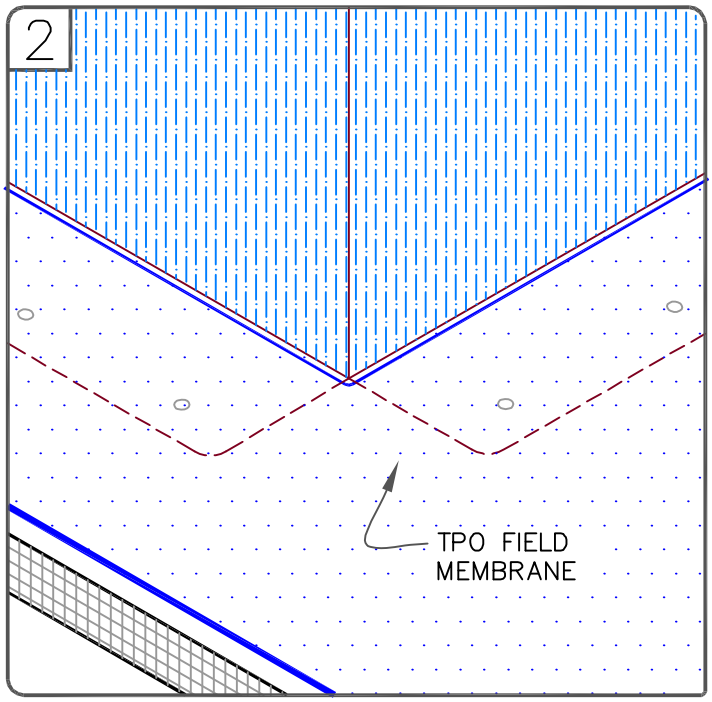
CARLISLE SYNTEC SYSTEMS

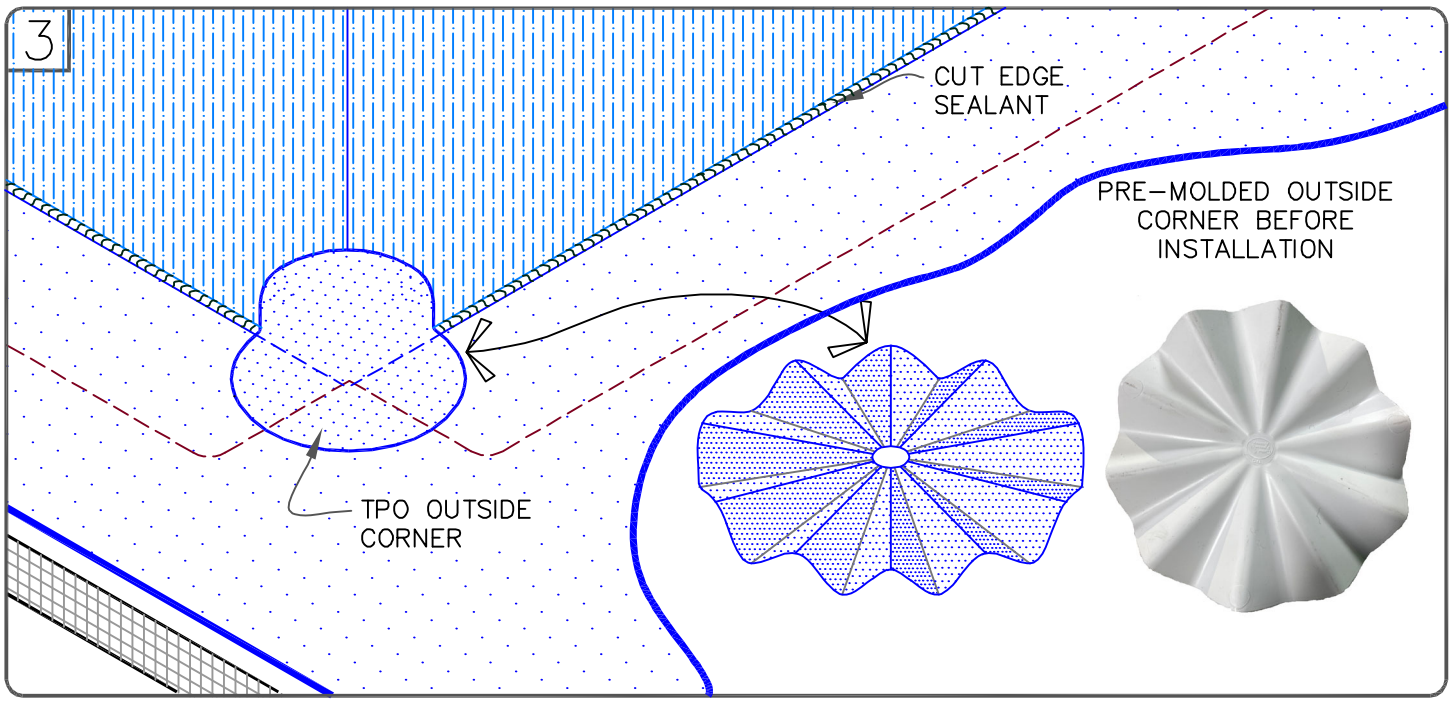
FIELD FABRICATED OUTSIDE CORNER FLASHING

MAXIMUM WARRANTY: 20 YEARS. SEE CAUTION ON TOP OF PAGE

DETAIL NO. U-15E







NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. REFER TO TPO DETAIL U-5B FOR FLASHING VERTICAL JOINTS IN COATED METAL.

CARLISLE SYNTEC SYSTEMS

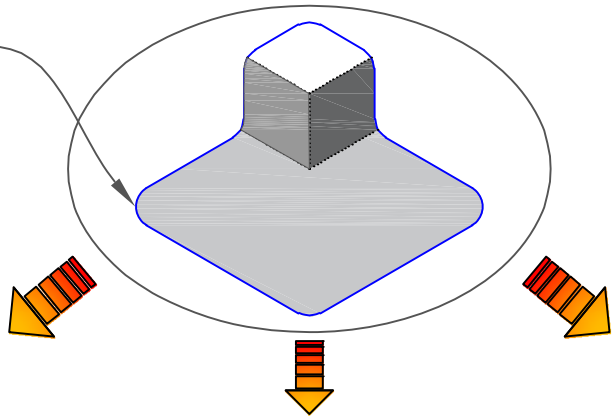
OUTSIDE CORNER WITH TPO COATED METAL WALL FLASHING

MAXIMUM WARRANTY: 30 YEARS

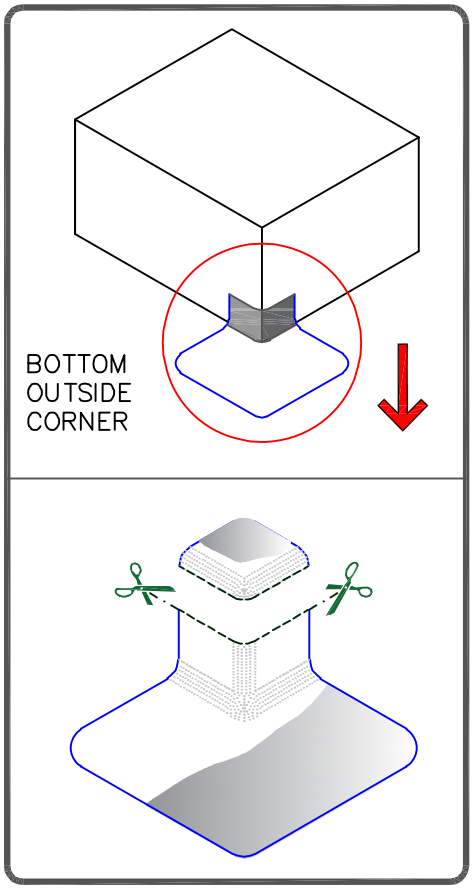
TP

DETAIL NO.
U-15F

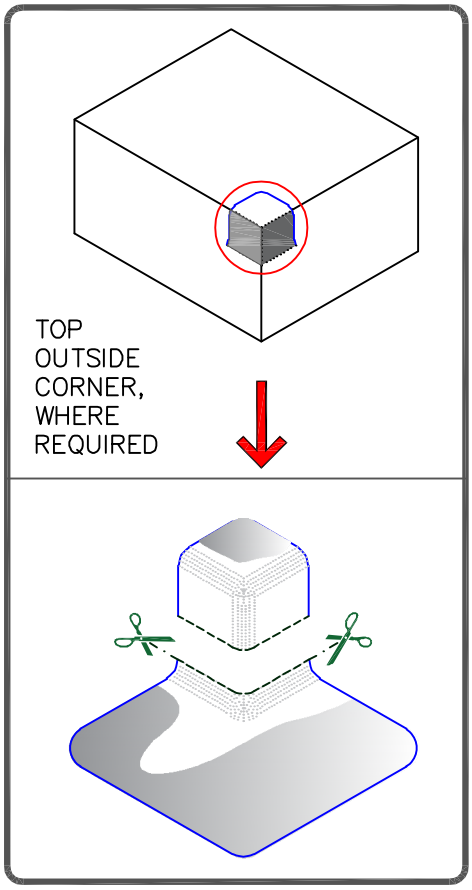
60–MIL (1.52mm) THICK TPO, UNIVERSAL CORNERS CAN BE USED FOR 3 DIFFERENT CORNER CONDITIONS AS SHOWN BELOW



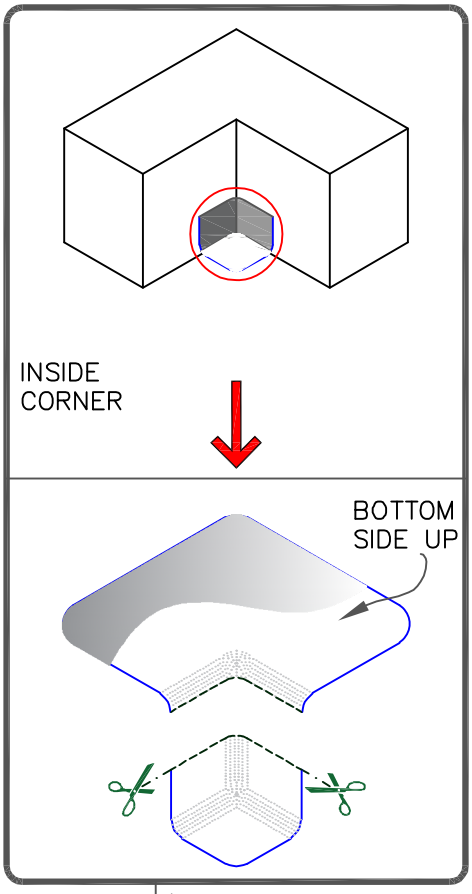
OPTION A



OPTION B

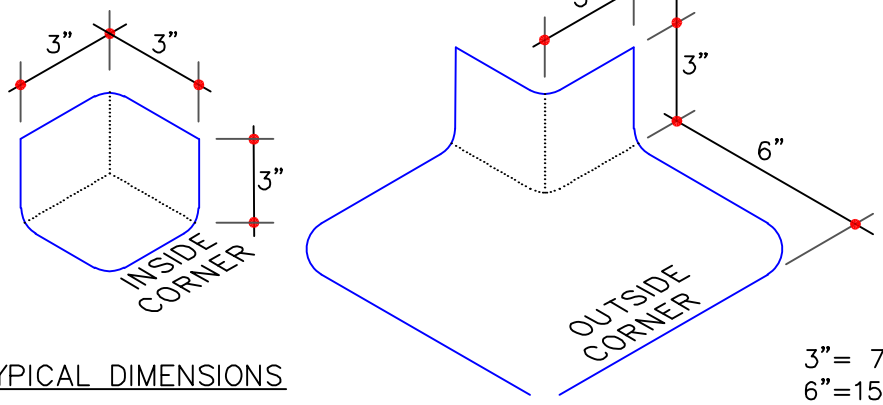


OPTION C



NOTES:

1. ROOF SYSTEMS MUST NOT HAVE FIELD FABRICATED OR BUILT–IN CANT STRIP.
2. REFER TO TECHNICAL DATA BULLETINS FOR COLOR AVAILABILITY.



TYPICAL DIMENSIONS

3"= 7.5cm
6"=15cm

CARLISLE SYNTEC SYSTEMS

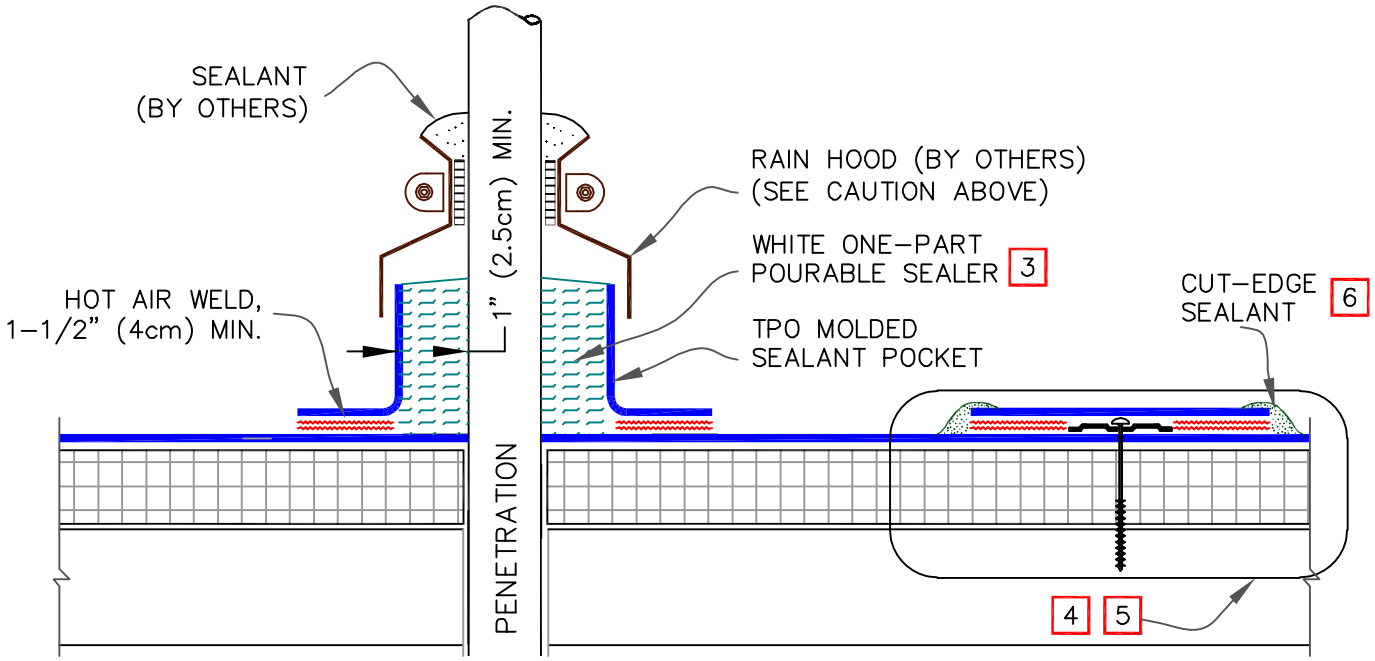
TPO UNIVERSAL CORNERS–COMBINATION INSIDE & OUTSIDE CORNERS

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–15G

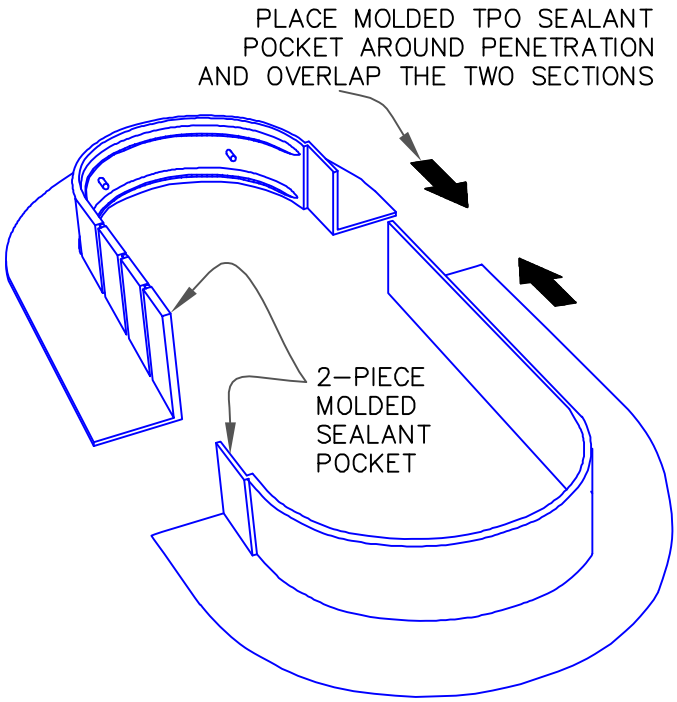
CAUTION

MOLDED SEALANT POCKETS MUST BE USED WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30–YEAR WARRANTIES.



NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 160˚ F (71˚ C).
2. WHEN USING TPO MOLDED SEALANT POCKET, TPO PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT.
3. FILL POCKET COMPLETELY WITH WHITE ONE–PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY–FASTENED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER FASTENERS AND PLATES.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



REFER TO PRODUCT DATA SHEET FOR STEP–BY–STEP INSTALLATION PROCEDURES

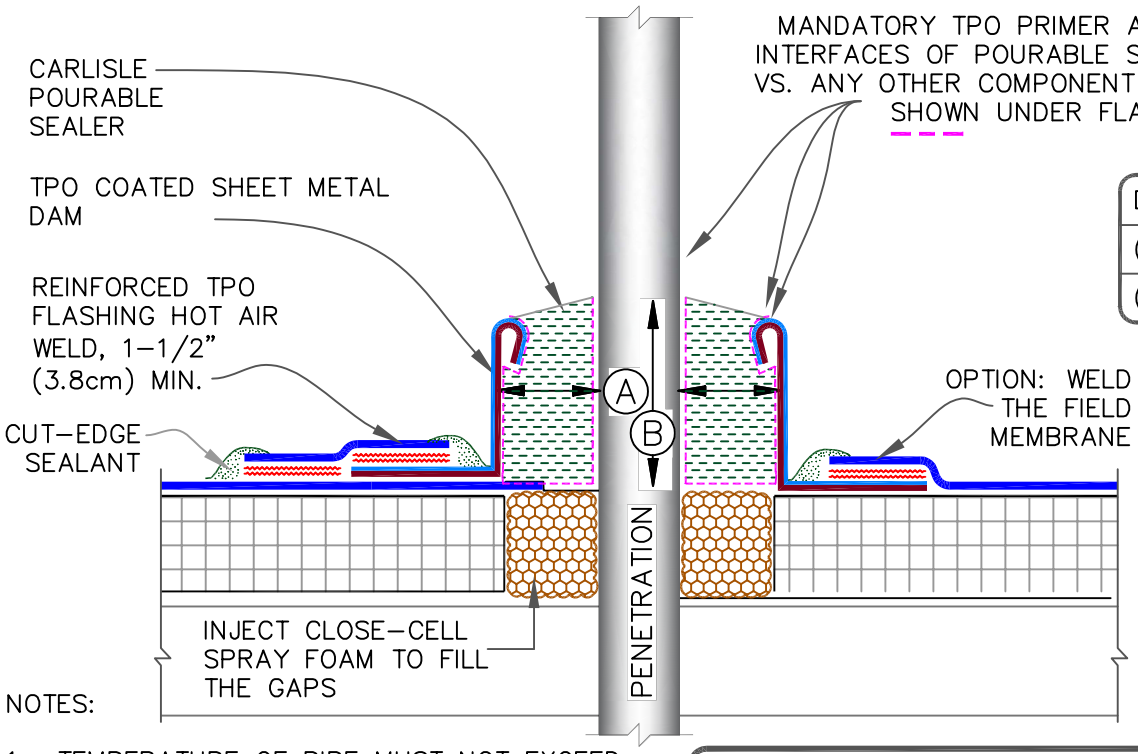
CARLISLE SYNTEC SYSTEMS

MOLDED SEALANT POCKET

MAXIMUM WARRANTY: 20–YEAR. SEE CAUTION AT THE TOP OF PAGE.

TP

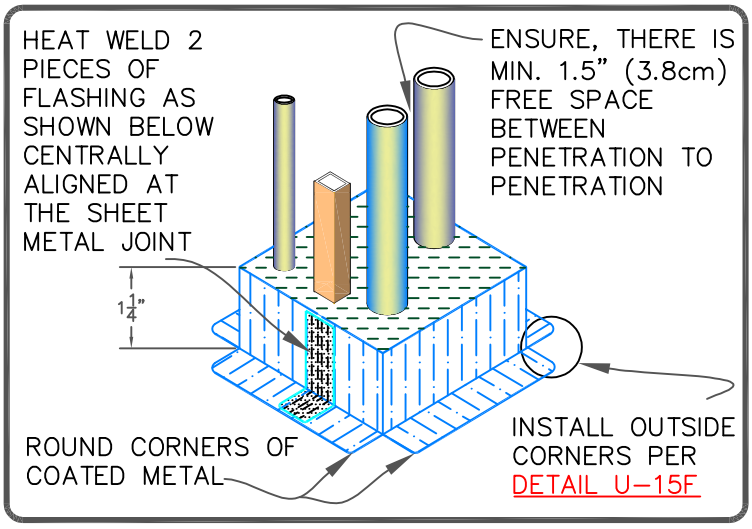
DETAIL NO.
U–16A

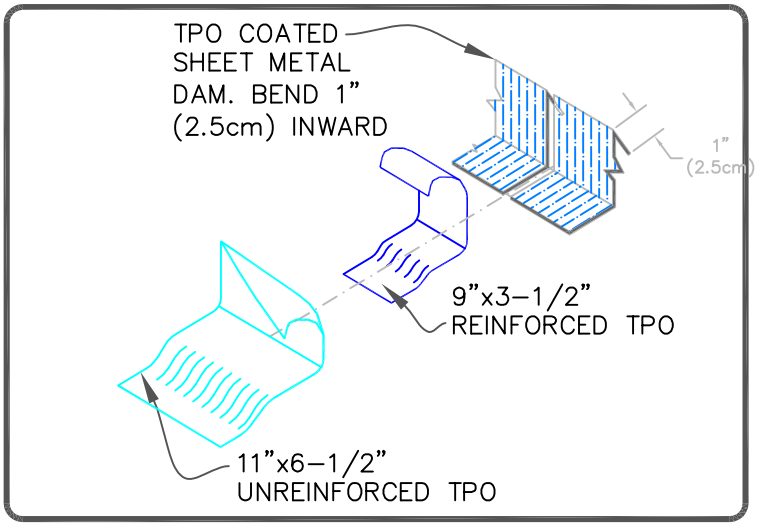


DIMENSIONS	cm	
Ⓐ 1"	2.5	MIN.
Ⓑ 2.5"	5	MIN.

NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 160° F (71° C).
2. TPO PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT..
3. FILL POCKET COMPLETELY WITH WHITE ONE–PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY–ATTACHED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (152mm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (305mm) ON CENTER MAXIMUM. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS SEALANT POCKET DIAMETER EXCEEDS 18" (305mm).
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER TYPES OF FASTENERS AND PLATES.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46 CM) IN DIAMETER. REFER TO SPECIFICATIONS.
7. WHEN ANY ONE SIDE OF THE FIELD FABRICATED POURABLE SEALER POCKET EXCEEDS 12" (30 CM). USE WOOD BLOCKING TO ANCHOR SHEET METAL.





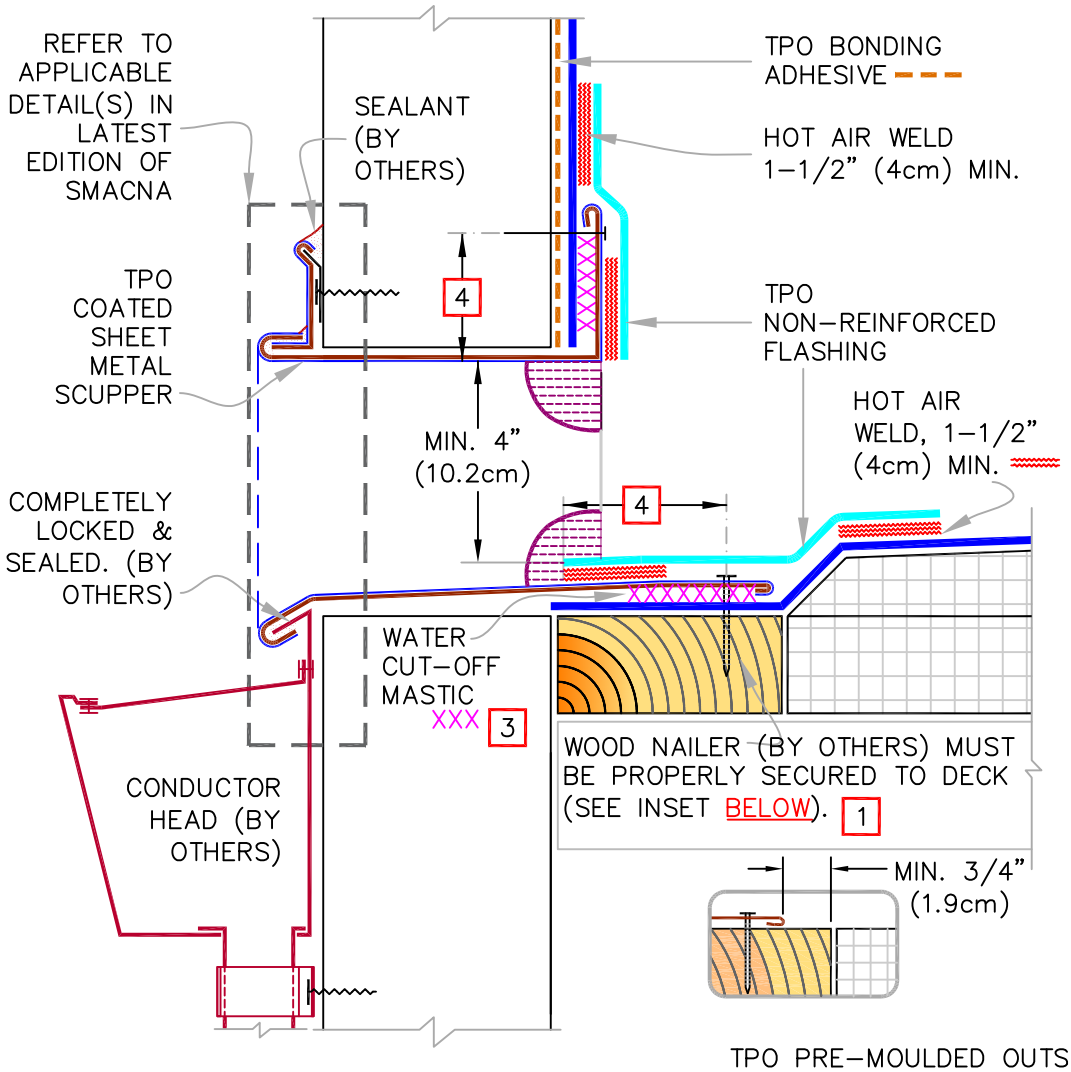
CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED TPO COATED METAL POCKET

MAXIMUM WARRANTY: 20 YEARS

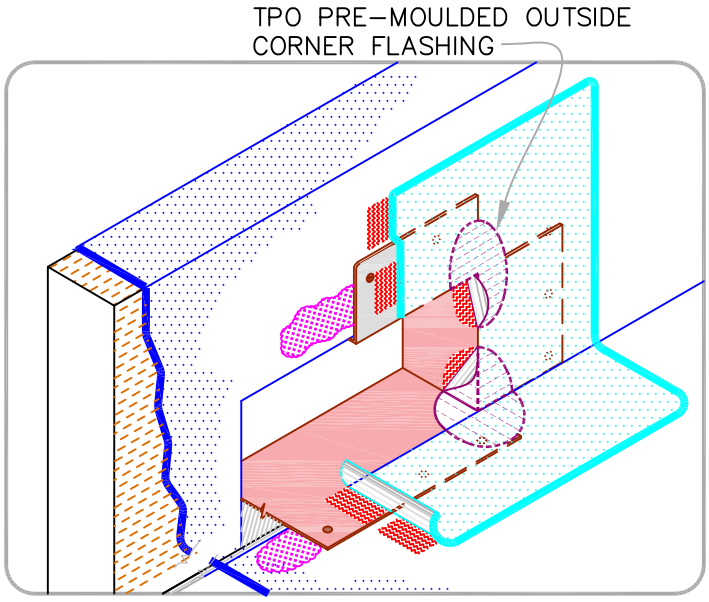
DETAIL NO. U–16C

TPO UNIVERSAL



NOTES:

1. WOOD NAILERS ARE INSTALLED AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. METAL SCUPPER BOX MUST HAVE FOLDED FLANGE CORNERS FULLY COVERED BY OUTSIDE CORNER FLASHING.
3. WATER CUT–OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. SCUPPER FLANGES MUST BE TOTALLY COVERED BY NON–REINFORCED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.



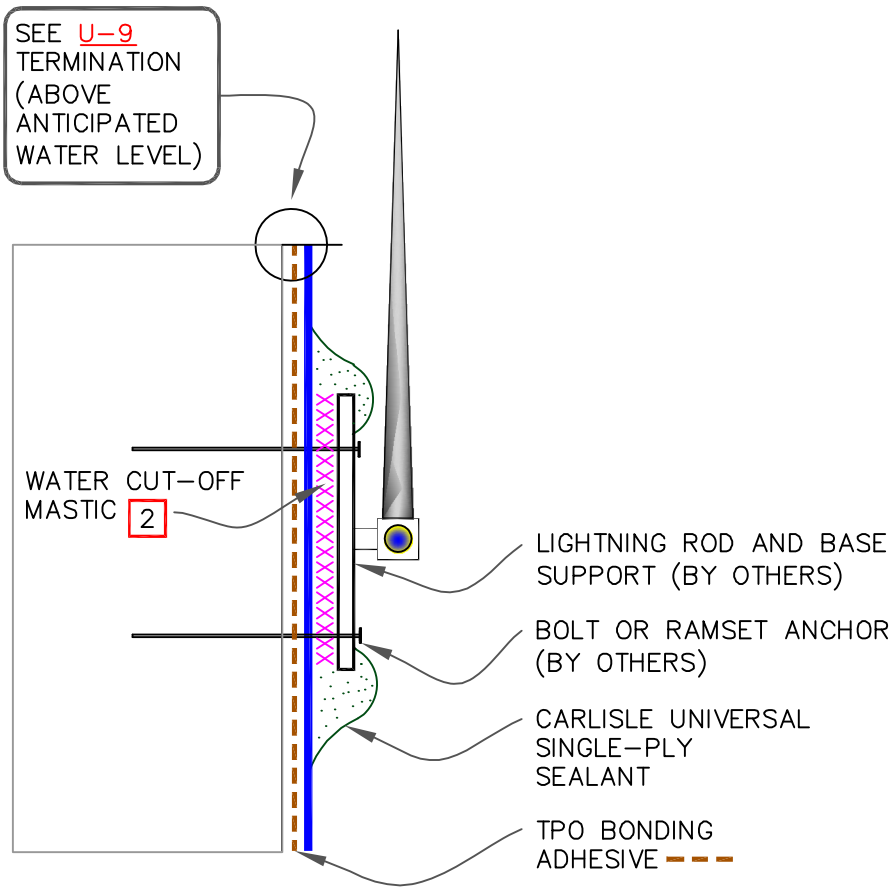
CARLISLE SYNTEC SYSTEMS

PREFABRICATED SCUPPER WITH TPO COATED METAL

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–18A



NOTES:

1. DETAIL MAY BE USED FOR ANY FASTENER PENETRATION (E.G., ACCESS LADDER, ANCHOR SUPPORT TO PARAPET).
2. WATER CUT-OFF MASTIC MUST BE UNDER CONSTANT COMPRESSION.
3. DETAIL UNACCEPTABLE FOR HORIZONTAL APPLICATION ON ROOF DECK.
4. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

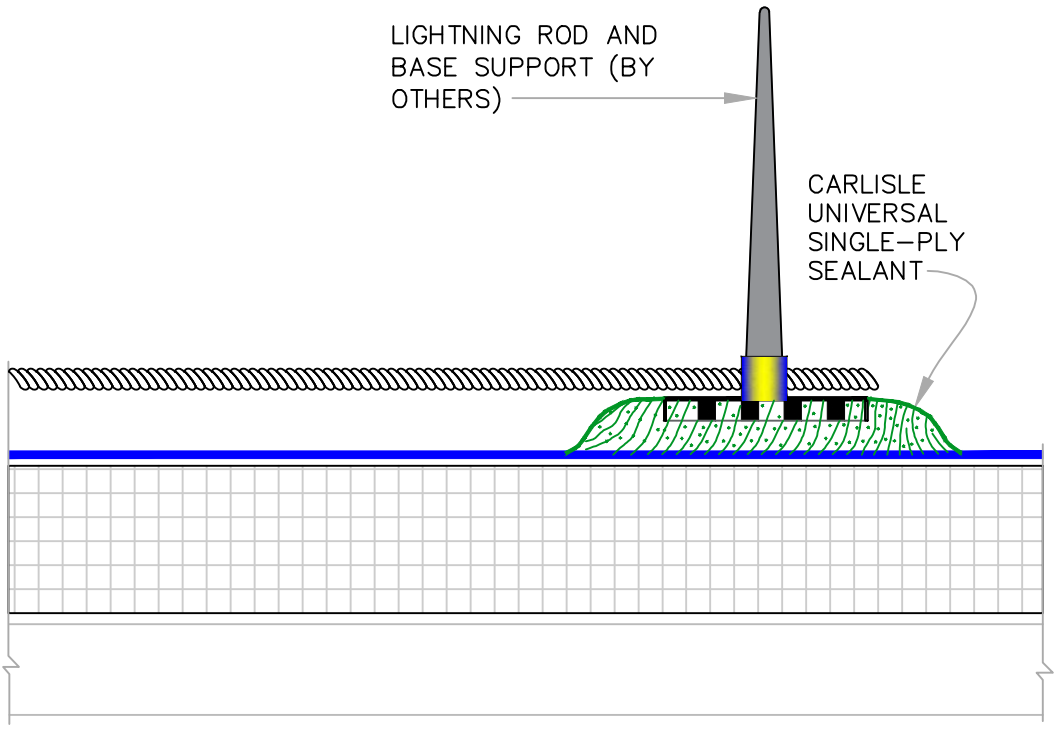
CARLISLE SYNTEC SYSTEMS

LIGHTNING ROD AT PARAPET (VERTICAL ATTACHMENT)

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-20A



NOTES:

1. CLEAN EXPOSED MEMBRANE SURFACE WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.

2. WHEN USING TPO MEMBRANE, APPLY TPO PRIMER TO THE MEMBRANE SURFACE PRIOR TO THE APPLICATION OF UNIVERSAL SINGLE–PLY SEALANT.

3. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

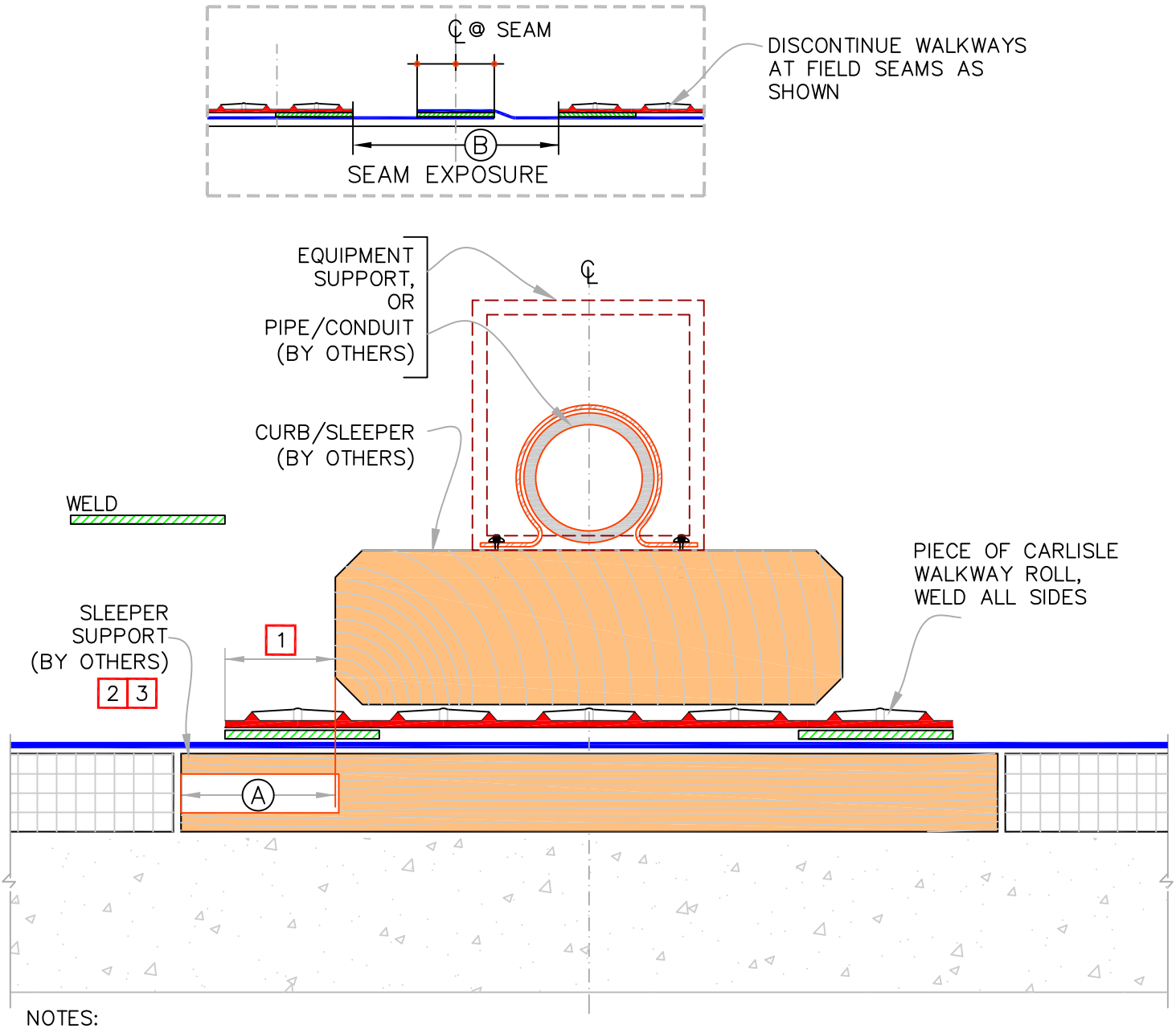
CARLISLE SYNTEC SYSTEMS

LIGHTNING ROD AT DECK LEVEL

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO.
U–20B



NOTES:

1. SLEEPER MUST BE LARGE ENOUGH TO SUPPORT WEIGHT OF EQUIPMENT WITHOUT INDENTING INSULATION. EXTEND SLEEPER OUT AS REQUIRED BY STRUCTURAL ENGINEER TO DISTRIBUTE SUBJECT LOAD OR AT LEAST EXTEND OUT MIN. 3" (7.5cm).
2. ENSURE SCREW/ANCHOR HEADS IN TOP SURFACE OF WOOD BLOCKING ARE RECESSED TO PROTECT MEMBRANE.
3. SLEEPER SUPPORT NOT REQUIRED UNDER CONDUIT OR PIPE SUPPORTS.
4. CONSULT STRUCTURAL ENGINEER AND/OR SPECIFIER TO AVOID WATER PONDING DUE TO DECK DEFLECTION.
5. RAISE CONDUITS AND PIPES ABOVE THE REGIONAL SNOW LINE WHEN SLOPE OF THE ROOF CAN LEAD TO SLIDING SNOW.

DIMENSIONS		cm	
A	3"	7.5	MIN. ALL SIDES
B	8"	20	

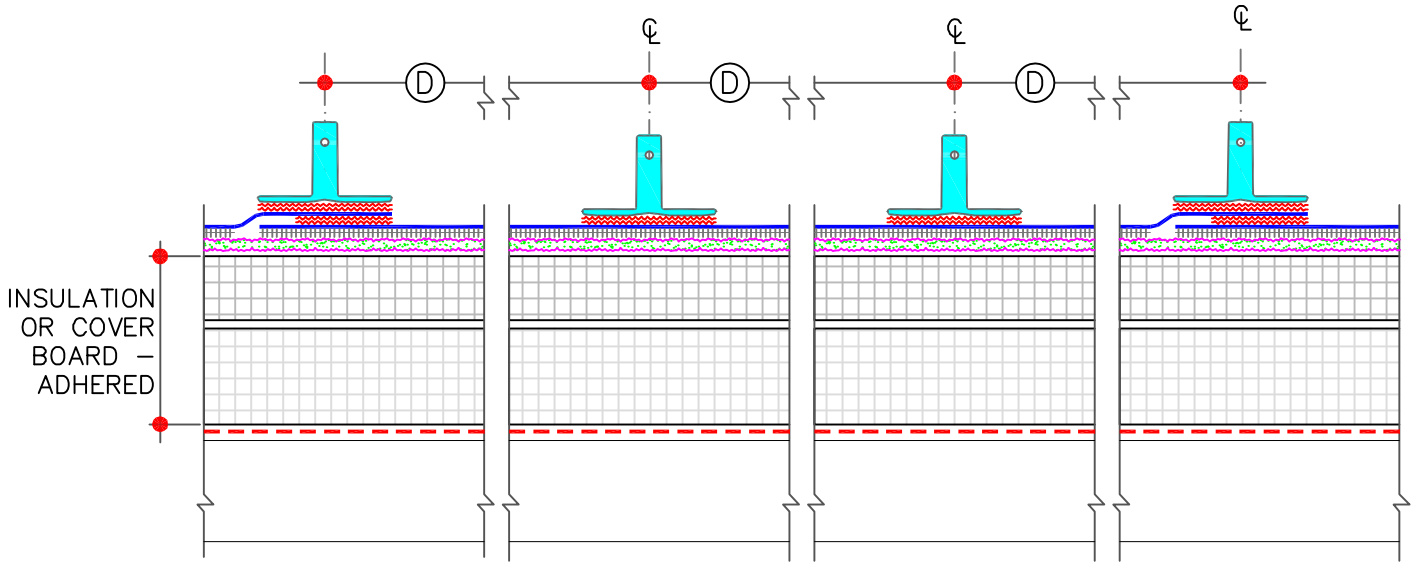
CARLISLE SYNTEC SYSTEMS

SLEEPER

MAXIMUM WARRANTY: 30 YEARS

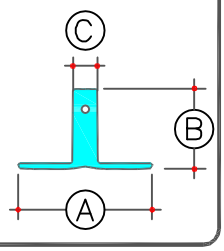
TP

DETAIL NO. U-24



SECTION AA: CONTOUR RIB PROFILE

CONTOUR RIB		
DIMENSIONS		cm
Ⓐ	1–3/4"	4.5
Ⓑ	1–1/4"	3
Ⓒ	1/2"	1
Ⓓ	VARIES	



TPO REINFORCED MEMBRANE

APPROVED ADHESIVE

HOT AIR WELD (REFER TO SPECS)

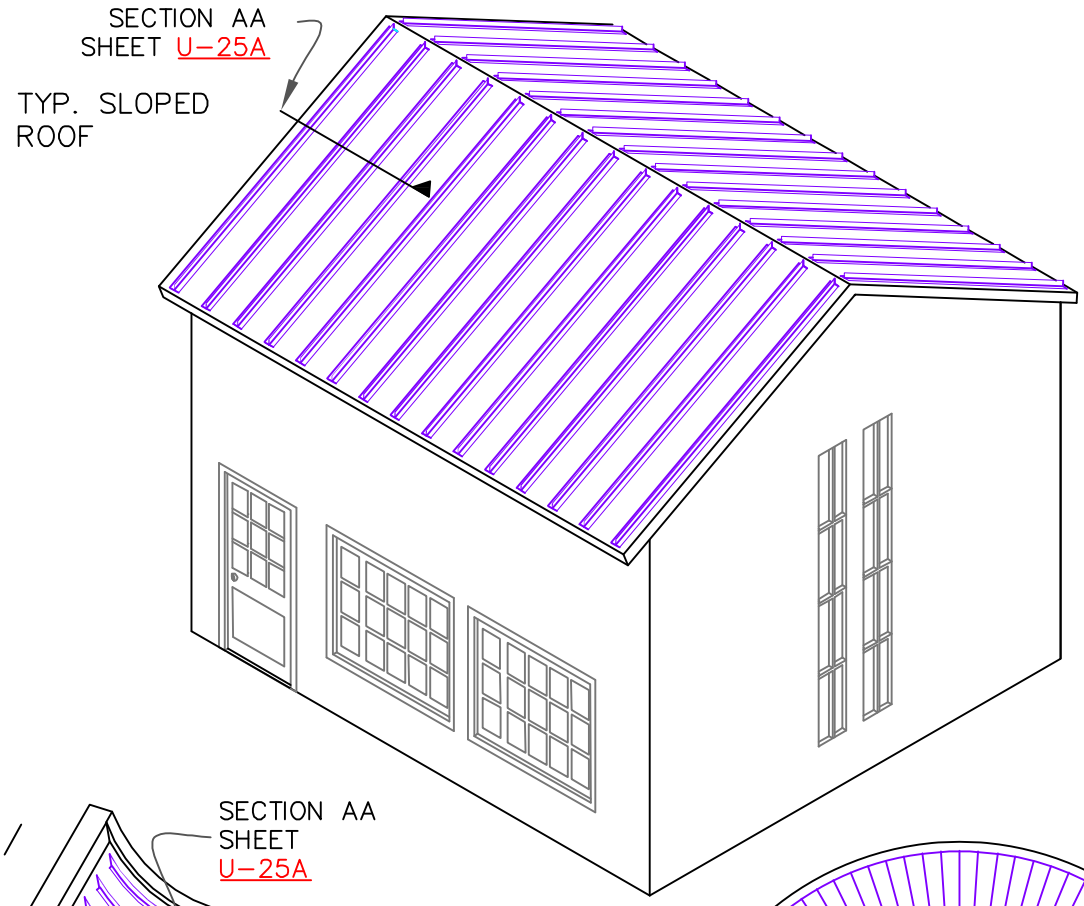
AIR/VAPOR BARRIER (WHERE REQUIRED)

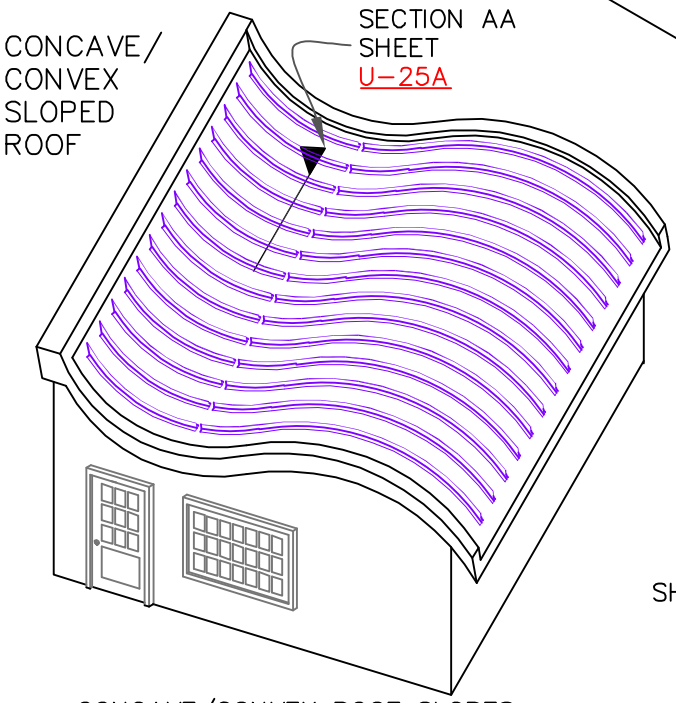
CARLISLE SYNTEC SYSTEMS

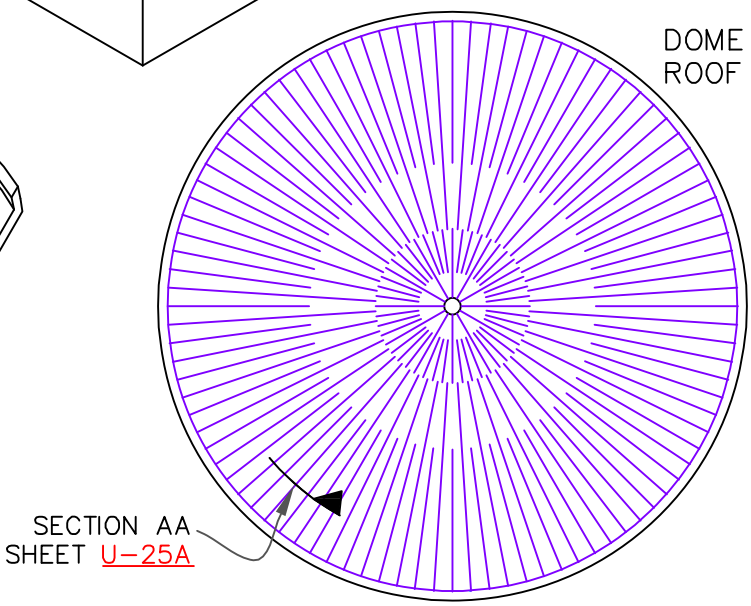
SURE–WELD TPO RIB: TYPICAL PROFILE

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–25A







CONCAVE/CONVEX ROOF SLOPES

AT COMPLEX GEOMETRIC SHAPES, WITH MULTI-DIRECTIONAL SLOPES, THE SHEET METAL ROOF IS NOT ONLY DIFFICULT TO INSTALL, BUT THE WATER-SHEDDING ABILITY OF METAL ROOF IS SERIOUSLY HAMPERED WITHIN THE CONCAVE (NEGATIVE) SLOPES. THE WATERPROOFED ROOF MEMBRANE WITH THE CONTOUR RIB IS A PRACTICAL SOLUTION.

TYPICAL PLAN OF DOME ROOF

WHERE CONCENTRATION OF STANDING SEAMS NEAR CENTER IN METAL SYSTEM IS EXTREMELY HARD TO FABRICATE & INSTALL, THE CONTOUR RIB INSTALLATION IS EXTREMELY SIMPLE & EASY TO INSTALL.

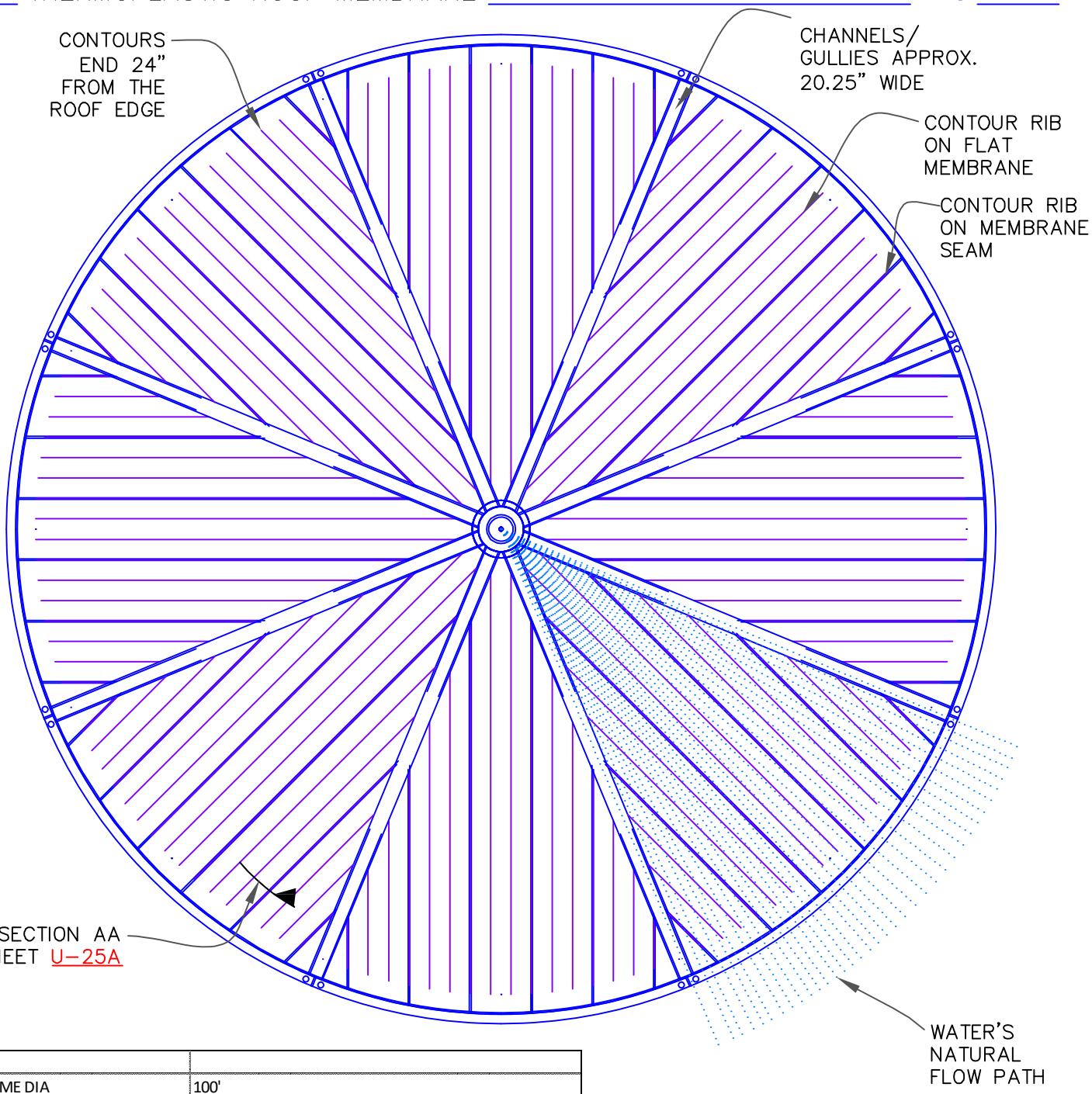
CARLISLE SYNTEC SYSTEMS

SURE-WELD TPO RIB:
VARIOUS APPLICATIONS

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO.
U-25B



DOME	
TYP. DOME DIA	100'
DOME AREA	8,550 S.F.
MEMBRANE	
ROLL WIDTH	81"
MEMBRANE SEAM WIDTH	2"
WELDED PORTION	1.5"
CHANNELS/GULLIES	PERFECTLY CUT 1/4TH WIDTH OF 81" ROLL (20.25")
APEX POINT	PERFECTLY CUT CIRCULAR SHAPE AS DESIGNED, APPRX. 37" DIA SHOWN
CONTOUR RIBS	
CONTOUR RIBS O.C.	26.333"
TOTAL LENGTH OF CONTOUR RIBS ON ENTIRE 100 DIA DOME	3256 LINEAR FEET (ADD % FOR DOME CURVE)

TYPICAL EXAMPLE OF 100' DIAMETER DOME ROOF PLAN SHOWS 81" WIDE ROLLS SHOWING CONTOUR RIBS @ 26.33" O.C.

NOTE: APEX MAY BE DESIGNED WITH SELF-CLEANSING ZINC STRIPS TO CUT DOWN STAINING AROUND LIGHTNING ROD ARRESTOR

CARLISLE SYNTEC SYSTEMS

SURE-WELD TPO RIB: EXAMPLE OF DOME WITH RIBS ALIGNED OVER MEMBRANE SEAMS

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-25C

Sure-Flex™ PVC Roofing Systems

Sure-Flex™ KEE HP PVC Roofing Systems

Sure-Flex™

Mechanically Fastened and Adhered Roofing Systems

TABLE OF CONTENTS

July 2024

Note: In addition to information listed in this section Specifiers and Authorized applicators should reference Spec Supplement and Design Reference Sections for other pertinent information.

CARLISLE SYNTEC SYSTEMS

Sure-Flex™ PVC Roofing Systems

Sure-Flex™ KEE HP PVC Roofing Systems

Sure Weld®/Sure-Flex™
Mechanically Fastened and Adhered Roofing Systems

July 2024

The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing system 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 Adhered and Mechanically Fastened Sure-Flex PVC Membrane Roofing Systems. 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.

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

Part I – GENERAL

1.01 Description

A. Mechanically Fastened Systems (Sure-Flex)

1. **The Sure-Flex Mechanically Fastened Roofing System** incorporates 50, 60 or 80-mil Polyester Reinforced Sure-Flex Polyvinyl Chloride (PVC) membrane (white, gray, light gray, slate gray and tan) or Polyester Reinforced Sure-Flex KEE HP Polyvinyl Chloride (PVC) Membrane (white, gray, light gray or tan). Either membrane is available in 10' wide field sheets and 5' perimeter sheets. Standard Polyester Reinforced membrane is also available in 81" wide field sheets and 40.5" perimeter sheets. Sure-Flex sheets are available in rolls in 75' or 100' rolls. All sheets are mechanically fastened over an approved insulation/underlayment to an acceptable roof deck with the appropriate Carlisle Fasteners and Fastening Plates. Adjoining sheets of Sure-Flex membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld. Membrane fastening requirements are outlined in Warranty Tables in Paragraph 1.05 of this Specification.

   NOTE: Either Roofing System may be specified using over an existing standing seam, flat seam or corrugated metal roof (mechanically fastened systems incorporate membrane securement into the structural purlins). **Refer to the Metal Retrofit Roofing System Specification**, published separately, for applicable requirements.

B. Adhered Roofing Systems (Sure-Flex)

1. The **Sure-Flex Adhered Roofing System** incorporates maximum 10' wide, 50-mil, 60-mil or 80-mil thick Polyester or Fiberglass reinforced Sure-Flex Polyvinyl Chloride (PVC) membrane (white, gray, light gray, slate gray and tan). Carlisle Insulation is mechanically fastened to the roof deck or secured with an approved adhesive and the membrane is fully adhered to the substrate with Sure-Flex Low-VOC Bonding Adhesive, CAV-GRIP PVC aerosol contact adhesive or HydroBond Water-Based Adhesive. Adjoining sheets of membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld.

   A KEE HP enhanced (white, gray, light gray, and tan) Sure-Flex PVC membrane with Polyester Reinforcement is available in 5' and 10' width.

   Polyester Reinforced membrane is available in widths of 40.5", 5', 81" and 10' wide (white, gray, light gray, slate gray and tan).

   Fiberglass Reinforced membrane is available in widths of 10' (white, gray, light gray and tan).

1.02 General Design Considerations

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

A. The maximum roof slope for Mechanically Fastened Roofing Systems is 18" in one horizontal foot. There are no maximum slope restrictions for the application of the Adhered Roofing System.

B. The mechanically fastened roofing system is **not acceptable** for installations on steel decks lighter than 22 gauge unless the steel deck is used in conjunction with lightweight concrete and a minimum of 360 pounds pullout per fastener is achieved with HP-X Fasteners into the steel deck below. An Adhered Roofing System may be specified or refer to the Metal Retrofit Roofing System Specification, published separately for other roofing options.

C. Certain petroleum based products, chemicals, and waste products may not be compatible with this roofing system. Contact Carlisle for verification of compatibility and recommendations concerning an acceptable roofing assembly.

D. Metal-Edge Systems and Copings should be designed in compliance with Section 1504.5 of the International Building Code and shall be tested in accordance with ANSI/SPRI ES-1.

E. Concentrated loads from rooftop equipment may cause deformation of insulation/underlayment and possible damage to the membrane if proper protection is not provided. A protection course or sleepers must be specified.

F. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

G. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.

H. For information regarding CRRC (Cool Roof Rating Council) and LEED™, refer to the applicable Product Data Sheets and **Design Reference DR 07 "CRRC/LEED Information".**

I. **Construction Generated Moisture / Vapor Drive**

1. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to **Design Reference DR-01 "Construction Generated Moisture"** included in the Carlisle Technical Manual.

2. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

NOTE: If left unaddressed, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth.

J. **Drainage**

1. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.

   Carlisle specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or the owner's design professional.

2. Small incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly **should be designed to prevent ponding** of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live load and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

3. **Tapered edge strips, crickets or saddles** are recommended where periodic ponding of water may occur. When the slope of the taper exceeds 2 inches to one horizontal foot, additional membrane securement at the base of the tapered edge strip will be required.

4. Subject to code requirement, it is recommended that a minimum roof slope of 1/8" per horizontal foot be provided to serve long-term aesthetics. On new construction projects, roof drains should be positioned in areas where maximum deflection is anticipated. Slopes greater than 1/8" per foot should be considered due to possible roof deflection.

K. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

2. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.

3. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

L. **Retrofit - Recover Projects** (when the existing roofing material is left in place)

1. The removal of existing wet insulation and membrane must be specified. The specifier shall select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.

2. Entrapment of water between old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends existing membrane be perforated to avoid potential moisture accumulation to allow for detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding non-reinforced PVC membrane).

3. If total removal of existing non-reinforced PVC membrane is not specified, existing membrane may be cut into maximum 10' x 10' sections, when the new insulation or membrane underlayment is to be mechanically fastened.

4. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

1.03 Quality Assurance

Building codes are above and beyond the intended purpose of this specification. The building **owner, owner's representative** or **Specifier** should verify 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, DORA (Directory of Roof Assemblies), Factory Mutual (FM) Approval Guide or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

A. When recovering or retrofitting an existing roof system, the addition of new insulation (type and thickness) may alter the fire performance characteristics of the assembly. Building owners or their designated representatives shall consult the local code enforcement agency to avoid potential code violation.

B. Carlisle recommends the use of Carlisle supplied products for use with Sure-Flex 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 **expressly disclaimed** by the Carlisle warranty.

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

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

E. 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.

F. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent subsequent damage to the membrane roofing system.

G. 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.

H. The solar reflectance of this roofing product may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure the maximum solar reflectance.

I. 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. Air pressurized buildings, 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. Cold storage buildings and freezer facilities.

3. Adhered Roofing System over 250' in height for projects with warranties up to 15 years.

4. Adhered Roofing System over 100' in height for projects with warranties greater than 15 years.

5. Mechanically Fastened Roofing System projects over 100' in height regardless of warranty duration.

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

7. Mechanically Fastened systems specified with a fastener length exceeding 12 inches.

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.

Shop drawings must include:

1. Outline of roof and size
2. Deck type (for multiple deck types)
3. Location and type of **all** penetrations
4. Perimeter and penetration details
5. Key plan (for multiple roof areas) with roof heights indicated
6. Sheet width and number of perimeter sheets for Mechanically Fastened systems
7. Fastener type, length and maximum spacing (for membrane securement) for Reinforced Mechanically Fastened systems.

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".**
When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to Carlisle for revision and approval prior to inspection and warranty issuance.

D. **As-Built Projects** (roofing systems installed prior to project approval by Carlisle)

The Carlisle Authorized Applicator may supply Carlisle with an As-Built drawing for a project completed prior to Carlisle's approval. The As-Built drawings:

1. Must conform to Carlisle's most current published specifications and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.
3. Must include the items identified in Paragraph 1.04.C.

NOTE: As-Built projects are not recommended for those projects referenced in Paragraph 1.04A in order to ensure Carlisle warranty requirements have been met.

E. **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. A Total 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 total 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.**

See Tables Below for information regarding Warranted Systems and Design Criteria:

TABLE I - Minimum Membrane Thickness for Various Warranty Options Identifies minimum membrane thickness for Reinforced membranes used in adhered or mechanically fastened roofing systems.

TABLE II - Mechanically Fastened Roofing Systems – PVC / KEE HP PVC Membrane Fastening Criteria - Steel/Concrete Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE III - Mechanically Fastened Roofing Systems – PVC / KEE HP PVC Membrane Fastening Criteria – Plywood / OSB Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE IV - Mechanically Fastened Roofing Systems – PVC / KEE HP PVC Membrane Fastening Criteria – Up tp 20 Yrs - Lightweight Insulating Concrete over Steel / Gypsum / Cementitious Wood Fiber Decks Identifies fastening density, field membrane width and number perimeter sheets required for the various wind zones. The assemblies are categorized based on various building height and specific wind speed warranty coverage.

TABLE V – Adhered Roofing Systems - Underlayment and Fastening Density for PVC / KEE HP PVC Assemblies with Warranties Up to 20 Yrs Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

TABLE VI - Adhered Roofing Systems - Underlayment and Fastening Density for PVC / KEE HP PVC Assemblies with Warranties - 25 to 30 YR
Identifies required underlayments for adhered roofing systems with Warranties from 25 to 30 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

Table I

Mechanically Fastened or Adhered Membrane Systems
Warranty Options (9)

Warranty Duration	Sure-Flex PVC or KEE HP PVC Membranes								
	Warranty Wind Speed Coverage						Minimum Membrane Thickness (2)	Additional Membrane Coverage	
	55, 72, 80 or 90 mph		100 mph		110 to 120 mph				
	Adhered	Mech. Fastened	Adhered	Mech. Fastened	Adhered	Mech. Fastened		Puncture	Hail
5,10, or 15 year	√	√	√	N/A(1)	√	N/A	Sure-Flex 50-mil (4)	See Below	See Below
20 year	√(3)	√	√	N/A	√	N/A	Sure-Flex 60 mil (4)(5)	See Below	See Below
25 year (7)	√	√	√	N/A	N/A	N/A	Sure-Flex 80-mil (4)(6)(8)	See Below	See Below
30 year (7)	√	√	√	N/A	N/A	N/A	Sure-Flex KEE HP PVC 80-mil	See Below	See Below

Notes: N/A = Not Acceptable √= Acceptable

(1) Contact Carlisle for specific requirements.
(2) All "T-Joints" must be overlaid with appropriate flashing material when using 80-mil PVC/KEE HP membrane.
(3) HydroBond Adhesive (PVC Only) may be used for projects with 20 year maximum warranty and wind speed coverage up to 90 mph.
(4) Sure-Flex FRS membrane can be used in lieu of Sure-Flex Polyester reinforced membrane for Adhered Roofing Systems Only.
(5) Sure-Flex KEE HP PVC 50-mil membrane can be used in lieu of Sure-Flex 60-mil membrane for Warranties Up to 20 Year.
(6) Sure-Flex KEE HP PVC 60-mil membrane can be used in lieu of Sure-Flex 80-mil membrane for Warranties Up to 25 Year.
(7) Enhancements may be required for certain flashing details. Published details must be referenced for applicable requirements.
(8) Sure-Flex PVC 60- or 80-mil membranes in Slate Gray are limited to Warranties Up to 20 Year.
(9) Low-VOC PVC Bonding Adhesive must be utilized.

Sure-Flex PVC and KEE HP PVC Membrane
Hail
- 1" Dia. Hail Coverage requires a minimum of 60-mil PVC or KEE HP PVC Adhered to cover board.
- 2" Dia. Hail Coverage requires 80-mil PVC or KEE HP PVC Adhered to cover board.

Additional Design Requirement:
- Cover board (SecurShield HD, SecurShield HD Eco, SecurShield HD Plus, SecurShield HD or StormBase Composite, DensDeck Prime, Dens Deck StormX Prime or Securock – Adhered Only).

Puncture
- Minimum 80-mil PVC with Polyester Reinforcement.

PVC / KEE HP PVC Membrane Fastening Criteria (All Warranties)
for Mechanically Fastening Roofing Systems
22 GA. Steel Deck or Structural Concrete Only

Table II

Caution: Projects with 25 or 30 year warranties an additional perimeter sheet is required beyond those listed in the table below.

-+Peak Gust Wind Speed Warranty	Max. Building Height	Min. Number of Perimeter Sheets			Field* Membrane Width	Perimeter* Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Building Distance from Coastline					
		Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	Up to 60'	1	2	3	10'	5'	12" O.C.
					81"	40.5"	12" O.C.
	61' to 100'	2	2	3	10'	5'	** See Note
					81"	40.5"	12" O.C.
72 MPH	Up to 60'	2	2	3	10'	5'	12" O.C.
					81"	40.5"	12" O.C.
	61' to 100'	3	4	4	10'	5'	** See Note
					81"	40.5"	12" O.C.
80 MPH	Up to 60'	3	3	4	10'	5'	12" O.C.
					81"	40.5"	12" O.C.
	61' to 100'	3	4	4	10'	5'	** See Note
					81"	40.5"	12" O.C.
90 MPH	Up to 60'	3	4	4	10'	5'	6" O.C.
					81"	40.5"	12" O.C.
	61' to 100'	4	5	5	10'	5'	** See Note
					81"	40.5"	12" O.C.

*Using HP-X Fasteners for steel decks, wood plank decks and minimum ¾" thick plywood decks and HD 14-10 or CD-10 for structural concrete decks.

** Structural Concrete Decks use 12" O.C. spacing utilizing HD 14-10 or CD-10. Steel Decks use 6" O.C. utilizing HP-X Fasteners. Steel decks use 12" O.C. spacing utilizing HP-Xtra Fasteners.

PVC / KEE HP PVC Membrane Fastening Criteria
(Up to 20 Year Warranty – Up to 60' Building Height)
for Mechanically Fastening Roofing Systems - Plywood or OSB Decks

Table III

Wood (Plywood or OSB) Decks **Peak Gust Wind Speed Warranty**	**Deck Type**	**Projected Pull-Out Values**	**Min. Number of Perimeter Sheets**			**Field Membrane Width**	**Perimeter Sheet Width**	**Fastening Density (Field & Perimeter Sheets)**
			Building Distance from Coastline					
			Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	7/16" OSB	210 lbs	2	3	3	10'	5'*	9" O.C.
			2	3	3	8'	5'*	12" O.C.
	15/32" 3-Ply Plywood	240 lbs	2	2	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3	3	10'	5'*	12" O.C.
			2	3	3	8'	5'*	12" O.C.
72 MPH	15/32" 3-Ply Plywood	240 lbs	2	2	3	8'	5'*	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	2	3	10'	6.5'	12" O.C.
	5/8" OSB	310 lbs	2	3.	3	10'	5'*	12" O.C.
			2	3	3	8'	5'*	12" O.C
80 MPH	*Contact Carlisle for Approval and Evaluation*							

*Maximum duration for OSB NOT to exceed 20 Years.

Table IV **PVC / KEE HP PVC Membrane Fastening Criteria**
Up to 20 Warranty for Mechanically Fastening Roofing Systems
Lightweight Insulating Concrete over Steel / Gypsum / Cementitious Wood Fiber

Peak Gust Wind Speed Warranty	Building Height 50' Max.	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field & Perimeter Sheets)
		Local Wind Speed					
	Deck Type	Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	Lightweight Concrete over Steel Deck	1	2	4	10'	5'	12" O.C.(1)
		2	3	4	81" (3)	40.5"	12" O.C.(2)
	Gypsum Deck or Cementitious Wood Fiber	2	3	N/A	10'	5' or 6'	9" O.C.
		2	3	4	81"	4'	12" O.C.

N/A is Not Acceptable

(1) For Buildings 51' to 75' with 10' field sheets – Fastening Density must be increased to 9" O.C. for field and perimeter sheets.
(2) Fasteners may be spaced at 18" O.C. in the field for buildings Up to 50' in height.
(3) Building Height may be Up to 75' in height.

Table IV - Additional Design Considerations (Up to 20 YR Warranty)

1- Membrane configuration and fastening density in Table above is based on HP-X Fasteners penetrating metal pan below Lightweight Insulating Concrete and for Polymer Gyptec Fasteners engaging into Gypsum and Cementitious Fiber Decks.
2-See **Design Reference DR-06 "Withdrawal Resistance Criteria"** for more information.

Table V — Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for Adhered PVC / KEE HP PVC Roofing

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment*	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1” (20 psi) Polyisocyanurate or 1” Polyisocyanurate Eco	16 (10)	12"(5)(6)	6"(5)	Carlisle Drip Edge, SecurEdge 200
	1-1/2" (20 psi) Polyisocyanurate or 1-1/2” Polyisocyanurate Eco	10			
	2"(20 psi) Polyisocyanurate or 2”(20 psi) Polyisocyanurate Eco	8			
	1/2” SecurShield HD or 1/2” SecurShield HD Eco (2)	12			
	1/4” DensDeck Prime or 1/4” Securock	12			
80 MPH	1/2” SecurShield HD Plus (2)	8	12"(5)(6)(7)	6"(5)(7)	Carlisle Drip Edge, SecurEdge 200 (11)
	1/2” HP Recovery Board (1)	16			
	2” SecurShield HD Composite	6			
	1/2" DensDeck Prime or 1/2” Securock (1)	8			
	1-1/2" (25 psi) Polyisocyanurate or 1-1/2” (25 psi) Polyisocyanurate (Eco)	10			
	2" (25 psi) Polyisocyanurate or 2”(25 psi) Polyisocyanurate Eco	8			
90 MPH	1/2" DensDeck Prime or 1/2” Securock (1)	12	6"(9)	6"(7)(8)	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000.
	1/2” SecurShield HD, 1/2” SecurShield HD Eco, 1-1/2" (20 psi) SecurShield Polyiso or 1-1/2” SecurShield Eco (2)	16			
	1/2” SecurShield HD Plus or 1/2” EcoStorm VSH (1)	12			
	2" (20 psi) SecurShield Polyiso, 2” (20-psi) SecurShield Eco or 2” SecurShield HD Composite	8			
	1-1/2” StormBase (OSB/Polyiso Composite)	8			
	1-1/2” Insulfoam HD Composite	16			
100 MPH	2” (25-psi) SecurShield Polyiso or 2” (25-psi) SecurShield Eco	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 200 (3)(4) or SecurEdge 2000 or 3000.
110 MPH	1-1/2” StormBase (OSB/Polyiso Composite) or 1/2” EcoStorm VSH (1)	16	FS	FS	SecurEdge 2000 or 3000
	1/2” SecurShield HD Plus (2)				
120 MPH	5/8" DensDeck Prime or 5/8” DensDeck StormX Prime or 5/8” Securock (1)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2” StormBase (OSB/Polyiso Composite) or 1/2” EcoStorm VSH (1)	17			
	1/2” SecurShield HD Plus (2)	24			
	2” SecurShield HD Composite	16			

FS = Full Spray or Ribbons @ 4" O.C.
***For Direct Application over Wood Decks and Lightweight Cellular Concrete, Refer to Roof Deck & Substrate Criteria Table.**

(1) For Steel decks (New or tear-off) cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(2) 1/2” SecurShield HD or 1/2” SecurShield HD Eco limited to 90 mph. 1/2” SecurShield HD Plus limited to 120 mph.
(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(5) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(6) Steel Decks - Field & Perimeter @ 6" O.C.
(7) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(9) Gravel Surface BUR – FS
(10) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40’.
(11) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(12) Gypsum Deck Bed Spacing @ 6” O.C.

Table V - Additional Design Considerations (Up to 20 YR Warranty)

1 - Minimum membrane thickness 60-mil PVC or 50-mil KEE HP PVC
2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5 - All “T-Joints” must be overlaid with Carlisle “T-Joint” Covers.
6 - For Building heights between 51-100', enhance the 12'-wide perimeter with 50% more fasteners and plates.
7 - See DR-05 for insulation fastening patterns.
* Projects where building height exceeds 100', shall be submitted to Carlisle for review.

Underlayment/Insulation & Required Attachment Assemblies
Table VI 25 YR or 30 YR Warranty for Adhered PVC / KEE HP PVC Roofing Systems

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' size board		
			Field	Perimeter	
55 or 72 MPH	1" to 2" (25 psi) Polyisocyanurate or Polyisocyanurate Eco	16	6" (3)(5)	6" (5)	Carlisle Drip Edge, SecurEdge 200
	1/2" HP Recovery Board (1) (9)				
	1/4" DensDeck Prime or 1/4" Securock				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)				
80 MPH	1-1/2" to 2" (25-psi) SecurShield Polyisocyanurate or SecurShield Eco	20	6" (4)(5)(6)	6" (5)(6)	Carlisle Drip Edge (7), SecurEdge 200 (7) (8) or SecurEdge 2000 or 3000
	1/2" DensDeck Prime or 1/2" Securock (2)	16			
	1/2" SecurShield HD Plus (2)				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	20			
90 MPH	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	24	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (2)	20			
	1/2" DensDeck Prime or 1/2" Securock (2)				
100 MPH	5/8" DensDeck Prime or 5/8" Dens Deck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)				
	2" SecurShield HD Composite (2)				
	1/2" SecurShield HD Plus (2)	24			

FS = Full Spray or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(2) Hail coverage offered with substrate.
(3) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.
(4) 80 mph over Structural Concrete - Field & Perimeter @ 6" O.C.
(5) Cementitious Wood Fiber & Wood – FS
(6) 80-mph warranty wind speed coverage over Gypsum Decks – Adhesive Ribbon spacing shall be at 4" O.C.
(7) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge200 Metal Fascia to perimeter wood nailers.
(8) Membrane securement is required at the base of the SecurEdge 200 waterdam.
(9) 1/2" Recovery Board limited to 55 mph.

Table VI - Additional Design Considerations (25 YR or 30 YR Warranty)

1 - Minimum membrane thickness 80-mil PVC or KEE HP PVC

2 - Building height shall not exceed 100'*
3 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
4 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
5 - All "T-joints" must be overlaid with Carlisle “T-Joint” Covers.
6 – New construction or complete tear-off of existing roofing material.
7- See DR-05 for insulation fastening patterns.
* Projects where building height exceeds 100' or warranty wind speed exceeds 100 mph, shall be submitted to Carlisle for review.

Table VII Minimum Perimeter Width For Insulation Attachment For All Warranties

Width of Perimeter	Building Height
4 feet	25 feet
8 feet	26 to 50 feet
12 feet	51 to 75 feet
16 feet	76 to 100 feet
24 feet	Greater than 100 feet

Note: This Table is for reference for Carlisle System Warranties and does not replace FM requirements for FM insured projects.

B. **Access for warranty service**

It shall be the owner's responsibility to expose the membrane in the event that warranty service is required when access is impaired. Such impairment includes, but is not necessarily limited to:

1. Design features, such as window washer systems, which require the installation of traffic surface units in excess of 100 pounds per unit.

2. Any equipment, ornamentation, building service units and other top surfacing materials which are not defined as part of this specification.

3. Photovoltaic and Mounting systems or other Rooftop equipment that does not provide Carlisle with reasonable access to the membrane system for purposes of warranty investigation and related repairs.

4. Severely ponded conditions.

CAUTION: APPLICATIONS SUCH AS WALKING DECKS, TERRACES, PATIOS OR AREAS SUBJECTED TO CONDITIONS NOT TYPICALLY FOUND ON ROOFING SYSTEMS WILL **NOT** BE ELIGIBLE FOR A MEMBRANE SYSTEM WARRANTY.

C. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.06 Job Conditions

A. On phased roofing, temporary closures should be provided to prevent moisture infiltration. When a temporary roof is specified, Carlisle 725-TR in conjunction with CCW-702, CCW 702LV or CAV-GRIP III Low-VOC Adhesive/Primer may be used. Refer to Product Section Part II for additional product information and **Specification Supplement G-08.**

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

C. On projects at high altitudes (6,000' and above) rapid flash-off (drying) of Adhesives will occur due to low atmospheric pressure.

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

E. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, the following criteria should be considered by the specifier:

   a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

   c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.

2. When a vapor retarder is specified, Carlisle 725TR Air and Vapor Barrier may be used. Refer to Part II "Products" for necessary information and **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier"** for product Installation.

F. 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 Factory Mutual'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.

G. When any of the Roofing Systems are specified on a portion of a roof, tie-ins to existing roofing membranes will be required. Depending on the type of the existing roofing system, the tie-in method will vary. Total isolation between two roofing systems or weep holes may be required to address moisture migration from one roofing system to the other. Prior to the selection of any tie-in detail, ensure the selected detail will not restrict drainage.

H. On new construction projects, located in colder climates, special consideration should be given to construction practices and the possible migration of hot, humid air and moisture generated during construction. Refer to Paragraph 1.02 I and **Design Reference DR-01 "Construction Generated Moisture**".

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 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 (4° C), outside storage boxes should be provided on the roof

for temporary storage of liquid adhesives and sealants. Adhesive and sealant containers should be rotated to maintain their temperature above 40° F (4° C). Refer to Product Data Sheets for individual products for temperature restrictions.

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

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

G. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store bundles flat and upright with the bottom of the bundles elevated (2” or more) above the finished surface.

H. Slit the insulation bundle packaging vertically down the center of the two short sides to prevent moisture accumulation within the package. Completely cover the bundle with a waterproof tarp and secure to prevent wind damage and / or displacement.

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 Membranes

A. **Sure-Flex Membranes**

1. General

a. The Sure-Flex PVC membrane (white) meets the ENERGY STAR requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of 0.86 and a 3-year aged reflectance of 0.63. The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of 0.89 and a 3-year aged emittance of 0.87 were achieved.

b. The Sure-Flex KEE HP PVC membrane (white) meets the ENERGY STAR requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of 0.82 and a 3-year aged reflectance of 0.71. The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of 0.89 and a 3-year aged emittance of 0.84 were achieved.

c. The Sure-Flex PVC membrane (white) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.89 was achieved and an SRI (solar reflectance index) of 108 was calculated using ASTM E1980.

d. The Sure-Flex KEE HP PVC membrane (white) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.89 was achieved and an SRI (solar reflectance index) of 103 was calculated using ASTM E1980.

2. Sure-Flex 50-mil, 60-mil or 80-mil thick **Polyester Reinforced PVC** (Polyvinyl Chloride) Membrane conforms to the following physical properties

a. Physical properties of the membrane are enhanced by a strong, polyester fabric that is encapsulated between the PVC based top and bottom plies. The combination of the fabric and PVC plies provide Sure-Flex Reinforced PVC membranes with high breaking strength, tearing strength, and puncture resistance.

b. Field membrane sheets are packaged in rolls 81" or 120” wide. Perimeter membrane sheets are

available in a width of 40.5" or 60” wide. 50-mil thick membrane is available in lengths of 100', 60-mil is available in 100' lengths and 80-mil is available in 75' lengths. Sure-Flex PVC Membrane is available in white, gray, light gray, slate gray and tan. Sure-Flex PVC KEE HP Membrane is available in white, gray, light gray, and tan.

OPTION: 60-mil Sure-Flex PVC or 60-mil Sure-Flex KEE HP (white color only) reinforced membrane is available with an optional APEEL Protective Film. APEEL Protective Film can be left in place for up to 90 days without affecting the integrity of the film, guarding the PVC/KEE HP membrane’s surface from scuffs and dirt accumulation during installation. Durable and easy to remove, APEEL Protective Film improves aesthetics and long-term reflectivity. Available 5’ and 10’ widths by 100’ long rolls. Also available, APEEL 6” Cover Tape, allowing 100% coverage of the PVC surface.

Sure-Flex Polyester Reinforced PVC Membrane				
Physical Property	**ASTM D4434 Requirement**	**50-mil Min.**	**60-mil Min.**	**80-mil Min.**
Thickness Over Scrim, in. (mm) ASTM D4434 optical method average of 3 areas	0.016 min. (0.40)	0.022 (0.559)	0.028 (0.711)	0.038 (0.965)
Weight, lbs/ft^2 (kg/m^2)	No requirement	0.33 (1.61)	0.40 (1.95)	0.55 (2.68)
Breaking Strength (MD X CD), lbf/in (kN/m) ASTM D751 grab method	275 min. (48)	320 x 300 (56 x 53)	330 x 300 (58 x 55)	360 x 330 (63 x 58)
Elongation break of reinforcement (MD x CD), % ASTM D751 grab method	25 min.	30 x 30	30 x 30	30 x 30
Seam Strength, min. ASTMD751 grab method (% of breaking strength)	>75	PASS	PASS	PASS
Tearing Strength (MD x CD), lbf (N) ASTM D751 proc. B, 8 in. x 8 in.	90 min. (400)	100 x 120 (445 x 534)	100 x 130 (445 x 578)	100 x 132 (445 x 587)
Low Temperature Bend, ASTM D2135, no cracks 5x at -40ºC	PASS	PASS (-40ºC)	PASS (-40ºC)	PASS (-40ºC)
Linear Dimensional Change, % ASTM D1204, 6 hours at 176ºF	+/- 0.5 max.	0.4	0.4	0.4
Ozone Resistance, no cracks 7x ASTM D1149, 100pphm, 168 hrs	PASS	PASS	PASS	PASS
Water Absorption Resistance, mass % ASTM D570, 166 hours at 158ºF	+/- 3.0 max.	2.0	2.0	2.0
Field Seam Strength, lbf/in. (kN/m) ASTM D1876 tested in peel	No Requirement	25 (4.4) min. 60 (10.5) max.	25 (4.4) min. 60 (10.5) max.	25 (4.4) min. 60 (10.5) max.
Water Vapor Permeance, Perms, ASTM E96 proc. B	No Requirement	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.
Puncture Resistance – Federal, lbf (kN) FTM 101C, method 2031	No Requirement	280	320	380
Puncture Resistance – Dynamic, J (ft-lbf) ASTM D5635	20 (14.7)	PASS	PASS	PASS
Puncture Resistance – Static, lbf (N) ASTM D5602	33 (145)	PASS	PASS	PASS
Xenon-Arc Resistance, no cracks/crazing 10x, ASTM G155 0.35 W/m^2 at 340-nm, 63ºC B.P.T. 12,600 kJ/m^2 total radiant exposure 10,000 hours	PASS	PASS	PASS	PASS
Properties After Heat Aging, ASTM D3045, 56 days at 176ºF Breaking Strength, % retained Elongation reinf., % retained	90 min. 90 min.	90 min. 90 min.	90 min. 90 min.	90 min. 90 min.
B.P.T. is black panel temperature				

3. Sure-Flex 50-mil, 60-mil or 80-mil thick Reinforced FRS PVC (Polyvinyl Chloride) Membrane is designed specifically for Fully Adhered applications and conforms to the following physical properties.

   a. Dimensional stability of the membrane is enhanced by fiberglass that is encapsulated between the PVC based top and bottom plies. The combination of fiberglass and PVC plies provide Sure-Flex FRS PVC membranes with enhanced dimensional stability for fully adhered roof systems using liquid applied bonding adhesives.

   b. Membrane sheets are packaged in 10’ wide rolls. 50-mil thick membrane is available in lengths of 100', 60-mil is available in 80' lengths and 80-mil is available in 65' lengths. Sure-Flex Reinforced FRS PVC Membrane is available in white, gray, light gray, and tan.

Sure-Flex Reinforced FRS PVC Membrane			
Physical Property	**Test Method**	**Property of Unaged Sheet**	**Property After ASTM D3045 aging 56 days @ 176° F**
Tolerance on Nominal Thickness, %	ASTM D 638	± 10	
Thickness over scrim, in. (mm) 50-mil & 60-mil 80-mil	ASTM D 4434 Optical Method (avg. of 3 areas)	 0.016 (0.406) min. 0.025 (0.635) min.	
Tensile Strength, psi (MPa) (machine & cross-machine direction)	ASTM D 638 (Grab Method)	1500 (10.4) min. 1900 (13.1) typical	90% min. retention of original breaking strength
Elongation at Break, % Machine direction Cross-machine direction	ASTM D 638	 250 min. (270 typical) 220 min. (250 typical)	 90% min. retention of original elongation
Tear Resistance, lbf (N)	ASTM D 1004	10 (45) min. 12 (53) typical	
Low Temperature Bend at -40° F (-40° C)	ASTM D 2136	Pass	
Linear Dimensional Change (shrinkage), % After 6 hours at 176° F (80° C)	ASTM D 1204	+/- 0.5 max. 0.1 typical	
Ozone resistance, 100 pphm, 168 hours	ASTM D1149	No cracks	
Resistance to water absorption After 7 days immersion 158° F (70° C) Change in mass, %	ASTM D 570	 3.0 max. 0.5 typical	
Seam strength, % of tensile strength	ASTM D638	75 min. 80 typical	
Water vapor permeance, Perms	ASTM E 96	0.10 max. 0.05 typical	
Puncture resistance (see supplemental section for additional puncture data)			
Resistance to xenon-arc weathering Xenon-Arc, 12,600 kJ/m² total radiant exposure, visual condition at 10X (ASTM D 4434 light & spray cycle)	ASTM G155 0.35 W/m² 63 ° C B.P.T. (10,000 hours)	 No cracks No crazing	
B.P.T. is black panel temperature			

4. Sure-Flex 50-mil, 60-mil or 80-mil thick **KEE HP PVC** Polyester Reinforced Membrane is designed for **Fully Adhered or Mechanically Fastened applications** and conforms to the following physical properties.

   a. Physical properties of the membrane are enhanced by a strong, polyester fabric that is encapsulated between the KEE HP based top and bottom plies. The combination of the fabric and KEE HP plies provide Sure-Flex KEE HP Polyester Reinforced membranes with high breaking strength, tearing strength, and puncture resistance.

   b. Field membrane sheets are packaged in 5’ and 10’ wide rolls. 50-mil thick membrane is available in lengths of 100', 60-mil is available in 100' lengths and 80-mil is available in 75' lengths. Sure-Flex KEE HP Membrane is available in white, gray, light gray, slate gray and tan.

Sure-Flex KEE HP Polyester Reinforced Membrane				
PHYSICAL PROPERTY	**ASTM D4434 Requirement**	**50-mil**	**60-mil**	**80-mil**
Thickness Over Scrim, in. (mm) ASTM D4434 optical method average of 3 areas	0.016 min. (0.40)	0.024 (0.61)	0.029 (0.74)	0.036 (0.91)
Weight, lbs/ft^2 (kg/m^2)	No requirement	0.33 (1.61)	0.40 (1.95)	0.55 (2.68)
Breaking Strength (MD X CD), lbf/in (kN/m) ASTM D751 grab method	275 min. (48)	290 x 290 (51 x 51)	320 x 300 (56 x 52)	330 x 320 (58 x 56)
Elongation break of reinforcement (MD x CD), % ASTM D751 grab method	25 min.	30 x 30	30 x 30	30 x 30
Tearing Strength (MD x CD), lbf (N) ASTM D751 proc. B, 8 in. x 8 in.	90 min. (400)	120 x 125 (534 x 556)	120 x 125 (534 x 556)	140 x 150 (623 x 667)
Low Temperature Bend, ASTM D2135, no cracks 5x at -40ºC	PASS	PASS (-46ºC)	PASS (-46ºC)	PASS (-46ºC)
Linear Dimensional Change, % ASTM D1204, 6 hours at 176ºF	+/- 0.5 max.	0.4 typ.	0.4 typ.	0.4 typ.
Ozone Resistance, no cracks 7x ASTM D1149, 100pphm, 168 hrs	PASS	PASS	PASS	PASS
Water Absorption Resistance, mass % ASTM D570, 166 hours at 158ºF	+/- 3.0 max.	1.25	0.87	0.89
Puncture Resistance – Dynamic, J (ft-lbf) ASTM D5635	20 (14.7)	PASS	PASS	PASS
Puncture Resistance – Static, lbf (N) ASTM D5602	33 (145)	PASS	PASS	PASS
Xenon-Arc Resistance, no cracks/crazing 10x, ASTM G155 0.35 W/m^2 at 340-nm, 63ºC B.P.T. 12,600 kJ/m^2 total radiant exposure 10,000 hours	PASS	PASS	PASS	PASS
Properties After Heat Aging, ASTM D3045, 56 days at 176ºF Breaking Strength, % retained Elongation reinf., % retained	90 min. 90 min.	90 min. 90 min.	90 min. 90 min.	90 min. 90 min.
B.P.T. is black panel temperature				

2.03 Insulations/Underlayments

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.

2. Multiple layers of insulation are recommended with all joints staggered between layers.

3. For minimum recommended R-Values, previously published by American Society of Heating and Air-Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.

4. For Insulation fastening pattern and densities refer to Carlisle Applicable Details and **Design Reference DR-05 "Insulation Fastening Patterns"**.

5. Carlisle Insulation/underlayment must be specified for all Total System Warranty projects or when the insulation is to be covered by the Carlisle Warranty. Any of the Carlisle Insulation/Underlayment may be specified subject to design restrictions included with each table.

B. **Carlisle Polyisocyanurate**

Table B1 **Polyisocyanurate** (See below for product descriptions)

Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability		
			Adhered	Mechanically Fastened	Ballasted
Carlisle InsulBase Polyisocyanurate, Carlisle InsulBase Eco, Carlisle InsulBase HD Eco	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle InsulBase NH Polyisocyanurate	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle SecurShield Polyisocyanurate, Carlisle SecurShield Eco	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield NH Polyisocyanurate	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield HD Composite Polyisocyanurate (SS HD)	2"	C1289, Type IV, Grade 2 or 3	√	√	N/A
Carlisle StormBase Composite (OSB)	1.5"	C1289, Type V, Grade 2 or 3	√	√	N/A

Design Restrictions

- Extended Warranty, those with longer duration, higher wind speed, or puncture coverage, may require the use of a cover board over Polyiso Insulation, refer to Warranty Tables in Paragraph 1.04 for applicable requirements.
- Maximum Flute Spanability shall be limited to 2-5/8" when 1" Minimum Polyiso Insulation is to be used.
- Minimum thickness of insulation board may be restricted by wind speed coverage and warranty duration, refer to Tables V and VI in Paragraph 1.05.
- The use of HD Polyiso Composite roof insulation is not recommended for Ballasted Applications.

*1.5" minimum for adhered systems. 1" minimum for mechanically fastened systems or as a base layer for adhered.

Notes: N/A = Not Acceptable √ = Acceptable

SecurShield HD is listed in Paragraph E4 below.

a. **Carlisle InsulBase Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available.

b. **Carlisle InsulBase Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to glass-reinforced felt (GRF) facers, meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. UL and FM approved for direct application over steel decks, polyiso provides the highest R-value per inch of any commercially available insulation product.

c. Carlisle InsulBase HD Eco – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2” thick, 4’ x 4’ and 4’ x 8’ panels with an R-value of 2.5. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

d. **Carlisle InsulBase NH Polyisocyanurate** - A foam core insulation board covered on both sides with a glass-reinforced felt meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from ½” to 4 inches. InsulBase NH contains zero halogenated flame retardants.

e. **Carlisle SecurShield Polyisocyanurate–** A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

f. Carlisle SecurShield Eco – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to high performance coated glass facers (CGF). ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi), available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. Ideal for use in adhered membrane systems. Achieves a UL Class A fire rating direct to combustible deck.

g. Carlisle SecurShield NH Polyisocyanurate - A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from ½ inch to 4 inches. SecurShield NH contains zero halogenated flame retardants.

h. **Carlisle SecurShield HD Composite Polyisocyanurate** – Composite insulation panel comprised of 1/2-inch high-density (109 psi max) Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type IV, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 2” to 4.5”. 4’ x 4’ panels are also available.

i. **Carlisle StormBase Polyisocyanurate Composite (OSB)** – Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt facer and laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 1-1/2” to 4”.

C. **EPS: Expanded Polystyrene**

Table C1	**EPS: Expanded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
InsulFoam I	1”	C578 Type I	N/A	N/A	√
InsulFoam VIII	.75”	C578 Type VIII	N/A	N/A	√
InsulFoam II	.75"	C578 Type II	N/A	N/A	√
InsulFoam IX	.75"	C578 Type IX	N/A	N/A	√
InsulFoam HD Composite (SecurShield HD)	1.5”	C578 Type (I, VIII, II, or IX)	√	√	N/A
InsulLam (Various Cover Boards)	1.5"	C578 Type (I, VIII, II. or IX)	√	N/A	N/A
InsulFoam SP	1"	C578 Type VIII	√ (1)	√	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2” SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - (1) Adhered assemblies using Sure-Seal SAT or Sure-Tough SAT.					
Notes: N/A = Not Acceptable √ = Acceptable					

R-Tech Fanfold Recover Board is listed in Paragraph E4 below.

1. **InsulFoam I –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type I. Nominal density of 1.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

2. **InsulFoam VIII –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type VIII. Nominal density of 1.25 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from ¼” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

3. **InsulFoam II –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type II. Nominal density of 1.5 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

4. **InsulFoam IX –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type IX. Nominal density of 2.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

5. **InsulFoam HD Composite –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 1/2” thick SecurShield HD. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

6. **InsulLam –** InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB),1/2” DensDeck Prime, 1/2” Securock, or 1/2" HP Recovery Board. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

7. **InsulFoam SP –** A closed-cell lightweight expanded polystyrene (EPS) with a factory-laminated fiber glass facer. Nominal density of 1.25 lbs/cubic ft (pcf), and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or ballasted membranes. Can also be used in Adhered systems using Sure-Seal or Sure-Tough SAT Membranes.

D. **XPS: Extruded Polystyrene –** Available through Carlisle is dimensionally stable with high thermal and low water absorption performance capability. XPS is available in varying compressive strengths thicknesses and sizes. Refer to specific product data sheets for physical properties and additional technical information.

Table D1	**XPS: Extruded Polystyrene** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
Thermapink 18	.75"	Refer to Product Data Sheet	N/A	N/A	√
Thermapink 25	1"	Refer to Product Data Sheet	N/A	N/A	√
Foamular 400	1"	Refer to Product Data Sheet	N/A	N/A	√
Dow Styrofoam Deckmate Plus	1"	Refer to Product Data Sheet	N/A	N/A	√
Design Restrictions					
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2" SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - Refer to related products listed in **Spec Supplement P-01 "Related Products"** for other products which may be suitable for use. Carlisle must be contacted for specific requirements.					
Notes: N/A = Not Acceptable √ = Acceptable					

1. **Thermapink 18 or 25 Extruded Polystyrene**
2. **Foamular 400 Extruded Polystyrene**
3. **Dow Styrofoam Deckmate Plus Extruded Polystyrene**

E. **Carlisle Vacuum Insulated Panel (VIP)**

Table E1 **Vacuum Insulated Panel (VIP)** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
Carlisle Optim-R VIP	*1.6"	C1484	√	N/A
Design Restrictions				
*2.6” minimum for total installed system including an additional 2 layers of 1/2” SecurShield HD panels; 1 layer on top and 1 layer on bottom of Optim-R. For adhered systems only. Note: Optim-R VIP cannot be cut or punctured.				
Notes: N/A = Not Acceptable √ = Acceptable				

1. **Optim-R Vacuum Insulated Panel (VIP) –** a high R-Value vacuum insulated panel (VIP) used to provide a low-profile solution when height restrictions exist, such as windows, doors, equipment curbs, etc. Provides an R-38 insulating value in a 2.6” system thickness with up to 35% infill (non-VIP material). Available in 23.6” x 23.6” and 23.6” x 47.2” board sizes.

F. **Cover Boards / Slip Sheets**

Table F1	**Cover Boards** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
SecurShield HD, SecurShield HD Eco	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
SecurShield HD Plus	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
InsulBase HD, InsulBase HD Eco	.5"	C1289-06, Type II, Class 1, Grade 3	N/A	√	N/A
Securock Cover Board	.25"	Refer to Product Data Sheet	√	√	N/A
EcoStorm VSH	.5"	Refer to Product Data Sheet	√	√	N/A
HP Recovery Board	.5"	C208 Grade 2	√	√	√
DensDeck StormX Prime	.625"	C1177	√	√ (1)	N/A
DensDeck Prime	.25"	C1177	√	√ (1)	N/A
DensDeck	.25"	C1177	N/A	√ (1)	N/A
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√	√
HP Protection Mat	6 oz	Refer to Product Data Sheets	N/A	√	√

Design Restrictions

- HP Recovery Board and R-Tech Fanfold not recommended for direct use over Type B and F steel decks.
- Securock Cover Board, HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or DensDeck may not be used directly over New or Existing Lightweight Insulating Concrete Decks OR Structural Concrete.
- Due to some warranty restrictions, DensDeck Prime, DensDeck StormX Prime and DensDeck not recommended for use directly over existing roofing membrane without prior written approval from Carlisle. Contact Carlisle for specific requirements.
- R-Tech Fanfold primarily for use in existing roof re-covers applications or directly over structural or lightweight insulating concrete.
- HP Protection Mat may be used for Ballasted systems over Lightweight Insulating Concrete with a Maximum Warranty duration of up to 15 years. To be used for Mechanically fastened on new construction projects with Lightweight Insulating Concrete, Fiber Cement or Gypsum Deck a Maximum Warranty duration of up to 15 years.

(1) Permitted with roofs with slopes greater than 2" per foot for compliance with external fire codes, refer to UL listings or contact Carlisle.
(2) Acceptable for some roof system designs, Contact Carlisle for recommendations.

Notes: N/A = Not Acceptable √ = Acceptable

1. **SecurShield HD** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer meeting ASTM C1289, Type II, Class 4, Grade 1, for use as a cover board or recover board. Available 1/2" thick 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

   Features Ready Flash, a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

2. **SecurShield HD Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of ½" high-density, closed-cell polyisocyanurate foam core bonded to a premium performance coated glass facer (CGF) specifically designed for use as a cover board, meeting ASTM C1289, Type II, Class 4, Grade 1. Provides 5 times the R-value at one-fifth the weight of traditional gypsum cover boards. Achieves a UL Class A fire rating direct to combustible deck. Available in 1/2" thick, 4' x 4' (5.5 lbs) and 4' x 8' (11 lbs) panels with an R-value of 2.5.

3. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer, meeting ASTM C1289, Type II, Class 4, Grade 1. Specifically designed for use as a cover board or recover board. Available 1/2" thick 4' x 4' (6.5 lbs) and 4' x 8' panel (13 lbs) with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4' x 8' board.

4. **InsulBase HD** – a closed-cell polyisocyanurate foam core insulation board covered on both sides with glass-reinforced felt (GRF) facer meeting ASTM C 1289, Type II, Class 1, Grade 3. The product is available in 4' x 4' and 4' x 8' standard sizes with a thickness of one-half inch with an R-value of 2.5. ASTM C1289, Type II, Class 1, Grade 3.

5. **InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in

1/2” thick, 4’ x 4’ and 4’ x 8’ panels with an R-value of 2.5.. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

6. **Securock Cover Board –** A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier. Available in 1/4” to 5/8” thick and 4’ x 4’ or 4’ x 8’ size boards. Long uninterrupted runs (>200’) may require slight gapping due to thermal expansion.

7. **EcoStorm VSH Cover Board –** an engineered composite building material made from a proprietary blend of plastic and cellulose fiber sourced from post-industrial and post-consumer waste streams. EcoStorm VSH is a durable, extremely moisture and mold resistant building material with a core that does not disintegrate or delaminate in the presence of water. Available in 1/2” thick and 4’ x 8’ size board.

8. **DensDeck StormX Prime** – a reinforced gypsum cover board with an enhanced, moisture-resistant core and coated glass mat facers on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. DensDeck StormX Prime is extremely durable and is approved for use in assemblies meeting FM’s Very Severe Hail (VSH) Classification. Available in 5/8” thickness and 4’ x 4’ or 4’ x 8’ size boards.

9. **DensDeck Prime** – gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4” to 5/8” and 4’ x 4’ or 4’ x 8’ size boards.

10. **DensDeck Cover Board** – gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in 1/4” to 5/8” and 4’ x 4’ or 4’ x 8’ size boards.

11. **R-Tech FanFold Recover Board –** Closed-cell lightweight expanded polystyrene (EPS) with polymeric laminated faces which meets ASTM C 578, while metallic side used with EPDM. Available in thicknesses of 3/8” to 3/4” with coverage 4’ x 50’ (2 squares). 4’ x 8’ units are also available.

12. **HP Protection Mat –** A nominal 6-oz per square yard UV resistant polypropylene needle punched fabric used either above the membrane as a slip-sheet for ballast or as an underlayment to the membrane. Available 15’ x 300’ roll (4500 square foot) weighing 0.06 lbs per square foot.

2.04 RELATED MATERIALS

A. **Sure-Flex Flashing (for use with Sure-Flex PVC Polyester Reinforced, FRS, and KEE HP Membrane Assemblies)**

1. **Sure-Flex PVC non-reinforced Flashing** is 60-mil thick (white, gray, light gray, slate gray and tan) and available in rolls **12" and 24" wide by 50' long**. Flashing is used for inside/outside corners and field fabricated pipe flashings when use of pre-molded accessories is not feasible.

2. **Sure-Flex PVC Reinforced Cover Strip:** A 8” wide, nominal 60-mil and 80-mil thick, polyester reinforced PVC membrane. Used for stripping in rows of fasteners and plates and covering the butt joints of Sure-Flex PVC membranes. Available in rolls 8" wide by 75' long in colors of white, gray or tan. Also available in 60-mil in rolls of 8" wide by 100' long in white only.

3. **Sure-Flex KEE HP Reinforced Cover Strip:** A 8” wide, nominal 60-mil and 80-mil thick, polyester reinforced KEE HP PVC membrane. Used for stripping in rows of fasteners and plates and covering the butt joints of Sure-Flex KEE HP PVC membranes. Available in rolls 8" wide by 75' long in colors of white, gray or tan, also available in 60-mil in rolls of 8” wide by 100’ long in white only.

4. **Sure-Flex PVC Pressure-Sensitive Cover Strip:** A 6” wide, nominal 35-mil thick non-reinforced KEE HP flashing laminated to a nominal 35-mil, fully cured, pressure-sensitive, synthetic rubber adhesive. Used for stripping in flat metal edgings (i.e. drip edge) of Sure-Flex PVC and KEE HP PVC membranes. Available in rolls 6" wide by 100' long in colors of white, gray or tan. Used in conjunction with PVC Step 1 Activator and PVC Step 2 Primer.

5. **Sure-Flex PVC “T” Joint Cover:** A 4-1/2" diameter, 60-mil thick (white) or 40-mil (gray or tan), pre-cut non-reinforced PVC flashing used to overlay “T” joints at field splices when 80-mil Sure-Flex PVC membrane is used.

6. **APEEL Cover Tape:** A 6"-wide, 1,640' long roll of APEEL Protective Film used to protect areas of Sure-Flex PVC/KEE HP membranes where APEEL Protective Film has been removed (around details) or was not factory applied (seams). APEEL Cover Tape allows contractors to keep 100 percent of the PVC/KEE HP surface clean during installation and is applied using the APEEL Cover Tape Applicator.

7. **Sure-Flex PVC Yellow Pressure-Sensitive Warning Strip:** a nominal 30-mil-thick, non-reinforced membrane flashing laminated to a nominal 30-mil-thick, fully cured, synthetic rubber, pressure-sensitive adhesive and is available in 6"-wide by 100'-long rolls. Pressure-Sensitive Warning Strip can be applied to Sure-Flex PVC or KEE HP systems to provide a visual warning of an impending hazard (e.g., roof edge, deep drain sump, skylight, etc.).

8. **Sure-Flex PVC Contour Rib Profile:** Used to obtain the appearance of standing seam metal roofing with the performance of a PVC single-ply membrane. The Contour Rib Profile measures 1-1/4” tall and 2-1/8” wide, including the welding flanges, while the vertical profile is a substantial 3/8” thick. The profile has a continuous 1/8” diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8” fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray, light gray, slate gray and tan, 10’ lengths and packaged 20 per carton.

9. **Pre-Molded Accessories:**

   a. **Sure-Flex PVC Inside Corners:** A pre-molded flashing for inside corners. Available in white, gray or tan; 60-mil thick.

   b. **Sure-Flex PVC Outside Corners:** A pre-molded flashing for outside corners. Available in white, gray or tan; 60-mil thick.

   c. **Sure-Flex PVC Curb Wrap Corners**: Fabricated flashings are made of 60-mil thick reinforced Sure-Flex KEE HP PVC Detail membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height. Three sizes are available to fit curbs up to 3' by 3' in size. One curb requires 4 corners for a complete installation. PVC Curb Wrap Corners are packaged in boxes containing twelve corners. Custom sizes are available as a special order product requiring lead time.

d. **PVC Universal Corners:** a pre-molded flashing for use in a variety of corner details, including inside and outside corners. Available in white, tan, gray, and light gray; 60-mil thick.

e. **Sure-Flex PVC Pipe Flashings:** A pre-molded (white, tan, gray and light gray) pipe flashing used for pipe penetrations. Available for 3/4" – 8" diameter pipes with clamping rings included.

f. **Sure-Flex PVC Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Flex Membrane for pipes 1" – 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Available in white, gray or tan.

g. **Sure-Flex PVC Square Tubing Wraps:** Fabricated flashings made of 60-mil thick reinforced Sure-Flex membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration. Available for 3", 4" and 6" diameter square tubing. Available in white and gray.

h. **Sure-Flex PVC Molded Sealant Pockets:** A pre-fabricated, interlocking, 2-piece, injection molded, flexible pocket with a rigid PVC vertical wall and pre-formed deck flanges. Used in conjunction with White One-Part Pourable Sealer for waterproofing pipe clusters or other odd shaped penetrations. Pockets can be adjusted from 11.5” to 7.5” in length by 6” in width by following the cutting lines molded in the pocket. Available in white only.

B. PRIMERS, ADHESIVES, SEALANTS AND CLEANERS

Refer to Product Data Sheets for material coverage rates and proper usage. Prior to the use of any of the products listed below, consult the Safety Data Sheets for applicable cautions and warnings.

1. Sure-Flex Products

a. **Low-VOC PVC Bonding Adhesive**: A high-strength solvent based adhesive that allows bonding of PVC and KEE-enhanced PVC membrane to various porous and non-porous substrates. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Hydrobond Water-Based Adhesive:** A wet lay-in, one-sided dispersion adhesive. Compatible with only Sure-Flex PVC smooth-backed and FleeceBACK membranes, this product is ideal for bonding only PVC membranes to various porous and non-porous substrates (cannot be used with any KEE or KEE HP PVC bareback membranes). Coverage rates vary between 100-133 square foot per gallon using roller or spray applications.

c. **CAV-GRIP PVC Aerosol Contact Adhesive:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: adhering PVC bareback membranes to a variety of horizontal substrates and vertical walls (cannot be used with any KEE or KEE HP bareback membranes), as well as adhering FleeceBACK membranes to vertical walls. Coverage rate is approximately 1,500-2,000 sq. ft. per #40 cylinder and 3,000-4,000 sq. ft. per #85 cylinder as a primer, in a single sided application; 400 sq. ft. per #40 cylinder and 800 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided applications.

d. **Sure-Flex PVC Cut-Edge Sealant:** A clear-colored sealant used to seal cut edges of reinforced Sure-Flex membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied. Use of Cut-Edge Sealant to seal cut edges of PVC or KEE HP PVC Membranes is not required.

e. **Water Cut-Off Mastic:** Used as mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).

f. **Universal Single-Ply Sealant:** A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counterflashing, coping, and scupper details.

g. **White One-Part Pourable Sealer:** A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Sealant Pockets. Packaged in four 1/2 gallon pouches per plastic bucket. One pouch will fill 122 cubic inches of volume within a molded sealant pocket.

h. **PVC and KEE HP Membrane Cleaner:** Used to prepare PVC and KEE HP PVC membranes that have been exposed to the elements for approximately 7 days prior to heat welding or to remove general construction dirt. Approximate coverage rate of 400 square feet per gallon (one surface).

i. **Sure-Flex Low-VOC PVC Step 1 Activator:** A high-strength, solvent-based activator that allows PVC Pressure-Sensitive (PS) Cover Strip to be bonded to Sure-Flex PVC or KEE HP membranes. Low-VOC PVC Step 1 Activator meets the < 250 gpl VOC content requirements of the OTC Model Rule. It is specially formulated using a blend of VOC-exempt and non-exempt solvents and follows the state of California Clean Air Act of 1988 (updated in 1997) as further regulated by California's Air Quality Control Districts listing VOC limitations.

j. **Sure-Flex Low-VOC PVC Step 2 Primer:** A high-solids-content, polymer based splice primer. This product is applied to KEE HP and PVC membranes to improve the adhesion of PVC Pressure-Sensitive Cover Strip. Low-VOC PVC Step 2 Primer meets the < 250 gpl VOC content requirements of the OTC Model Rule.

k. **Sure-Flex PVC Step 2 Primer:** A high-solids-content, clear (translucent color), polymer-based splice primer used to prepare KEE HP and PVC membranes to be bonded to PVC Pressure-Sensitive Cover Strip.

2.05 Fastening Components

A. **Fasteners**

The following Table illustrates criteria for fastening of Carlisle Insulation with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Insulation Fastening Criteria

Deck Type	Carlisle Fasteners (1)	Min. Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel or Lightweight Insulating Concrete over Steel	ASAP or InsulFast™	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10	1"	Note (2)	7/32"
	HD 14-10	1"	Note (2)	3/16"
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP, ASAP or InsulFast	Min. 1" (3)	N/A	N/A
Cementitious Wood Fiber	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (4)	N/A
Gypsum	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (2)	7/16", 1/2" or 9/16" (5)

Notes: N/A = Not Applicable

(1) For Adhered Systems, only 3" diameter insulation fastening plates can be used for insulation attachment.
(2) The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most cementious wood fiber decks do not require pre-drilling; however, Carlisle should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.

(5) Pilot hole size may be varied to maximize pullout resistance.

All Fasteners listed below can be used with Sure-Flex Roofing Systems. Refer to the applicable specification for specific requirements.

1. **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. It is used on minimum 22 gauge steel decks or minimum 15/32" CDX plywood decks. It is also designed to offer an optimum combination of driving performance, back-out and corrosion resistance with excellent pullout performance.

2. **HP-Xtra Fastener:** An oversized diameter #22 (.315") steel, threaded fastener used in conjunction with Piranha Xtra Plates for membrane securement into minimum 22 gauge steel or wood decks on Mechanically Fastened Roofing Systems.

3. **HP Fastener:** A threaded E-coat square head fastener **for insulation attachment only**. Used into steel, wood plank, minimum 15/32" thick plywood or minimum 7/16" thick oriented strand board (OSB).

4. **Pre-Assembled ASAP Fastener**: Carlisle's InsulFAST Fastener pre-assembled with a 3" diameter plastic plate used for **insulation attachment only** on Adhered and Mechanically Fastened Roofing Systems. Installed using OMG Roofing Products Fastening Tool.

5. **InsulFast Fastener**: A threaded Phillips drive fastener used with Carlisle Insulation Plates for **insulation attachment** to steel or wood decks.

6. **CD-10 Fastener:** A hammer-driven, non-threaded E-Coat fastener for use with structural concrete decks rated 3,000 psi or greater.

7. **HD 14-10 Concrete Fastener:** A #14 threaded fastener with a #3 Phillips drive used for minimum 3,000 psi concrete decks.

8. **Polymer Gyptec Fastener:** A glass-filled nylon auger fastener designed for securing insulation and/or membrane to specialty decks such as cement wood fiber or gypsum.

9. **Lite-Deck Fastener:** A deep, coarse threaded fastener used to secure insulation to gypsum and cementitious wood fiber decks in conjunction with Lite-Deck Plates.

B. **Fastening Plates**

1. **Piranha Plate**: A 2-3/8" diameter metal barbed fastening plate used with Carlisle HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement. This plate can be used for membrane or insulation securement on Mechanically Fastened Roofing Systems.

2. **Piranha Xtra Plate**: A 2-3/8" diameter metal barbed fastening plate with an oversized hole for use with Carlisle HP-Xtra Fasteners for membrane securement on Mechanically Fastened Roofing Systems.

3. **Seam Fastening Plate**: A 2" diameter metal plate used for insulation attachment on Mechanically Fastened Systems or membrane securement at angle changes on Adhered Systems in conjunction with the appropriate Carlisle Fastener.

4. **Insulation Fastening Plate**: A nominal 3-inch metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

5. **SecurFast Insulation Fastening Plates:** A nominal 2-7/8" hexagon metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

6. **Accutrac Insulation Plates:** A nominal 3" square, recessed or flat bottomed, metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener. Flat bottom plate is used with manufactured Philips Head fasteners only.

7. **Sure-Flex PVC Oval Barbed Plate:** A 2-3/4" x 1-1/2" oval metal barbed fastening plate for use with Carlisle HP-X fasteners for securement of 10' wide PVC and KEE HP PVC membranes on Mechanically Fastened Roofing Systems.

2.06 Insulation Securement Adhesive

A. **Flexible FAST Adhesive:** A spray (full coverage) or bead-applied, two-component polyurethane, construction grade, low-rise expanding foam adhesive used for attaching approved insulations to compatible roof decks or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.

B. **Flexible FAST Dual Tank:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. FAST Dual Tanks utilize an HFO blowing agent. HFO (hydrofluoroolefin) blowing agents are widely recognized as the next-generation environmentally friendly blowing agent, replacing their HFC (hydrofluorocarbon) predecessor. When extruded at 12" on center the coverage rate is 3,500 to 3,700 sq.ft. per set of Dual Tanks.

C. **Flexible FAST Dual Cartridge and 5-gallon Jug Adhesive:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. When extruded at 12" on center the coverage rate is 400-600 sq.ft. per carton of Dual Cartridges or 2,000-2,500 sq.ft. per set of 5-gallon Jug Adhesive.

D. **OlyBond 500 Bag in a Box** – A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates. Packaged in 5-gallon boxes of Part A and Part B formulations that are applied using a mechanical dispenser system. Applied in 1/2" to 3/4" beads or ribbons at the rate of 1 gallon per 150-250 square feet for 12" o.c. bead spacing. Perimeter bead spacing patterns and acceptable insulation and deck types are listed in the applicable Product Data Sheet.

E. **OlyBond 500 BA Spot Shot** - A two-component, polyurethane construction grade, low-rising expanding adhesive designed for bonding insulation to various substrates. Applied in 1/2" to 3/4" beads or ribbons using a portable 1:1 applicator (oversized, dual-cartridge caulking gun). Refer to the Product Data Sheet for bead spacing with reference to building height.

2.07 Vapor/Air Barrier

A. **General**

If insulation is to be adhered to the vapor retarder with Flexible FAST Adhesive, the vapor retarder must be

compatible and shall be fully adhered to the substrate. Available products include Carlisle's VapAir Seal 725TR Air and Vapor Barrier, VapAir Seal MD Air and Vapor Barrier and spray or roller applied butyl coatings. Installation requirements for Carlisle's VapAir Seal 725TR Air and Vapor Barrier are identified in **Spec Supplement G-08 "Application Procedures** for Carlisle's VapAir Seal 725TR Air and Vapor Barrier/Temporary Roof" and Carlisle's VapAir Seal MD Air and Vapor Barrier are identified in **Spec Supplement G-12 "Application Procedures for Carlisle's VapAir Seal MD Air and Vapor Barrier**" in the Carlisle Technical Manual.

B. **Carlisle VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to a 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with Flexible FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

B. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23' long (460 square feet).

C. **Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application.

D. **CCW-702 Primer and 702LV Primer (Low-VOC)** - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., DensDeck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

E. **CCW-702WB** – a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, DensDeck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

2.08 Metal Accessories, Edgings, Coping, And Terminations

A. General

Products listed below can be used with any of the available Carlisle Roofing Systems. Refer to the applicable Carlisle details and installation instruction manuals for specific installation criteria.

B. Products

a. **Sure-Flex PVC Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 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, light gray, slate gray and tan.

4. **SecurEdge 200 Fascia**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI ES-1 certified.

5. **SecurEdge 2000 Standard Fascia:** An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI ES-1 certified. Also available in **SecurEdge 2000 Extended Fascia** (Up to 13" Face Height) and **Securedge 2000 Canted Fascia**.

6. **SecurEdge 3000 Roof Edge System**: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 32, 40, 50 or 63-mil thick aluminum or 24 gauge steel snap-on

fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI ES-1 certified. Also available in **SecurEdge 3000XT Roof Edge System** (Up to 13" Face Height).

7. **SecurEdge 4000:** A two-piece assembly that includes a continuous cleat and a decorative fascia cover. Available in pre-painted Kynar 500-coated 0.40" formed aluminum and 24-gauge Galvalume steel, this product features 22-gauge pre-punched cleats with fasteners spaced at 12" on center. ANSI/SPRI ES-1 certified.

8. **Termination Bar:** A 1" wide and 98-mil thick extruded aluminum bar pre-punched 6" on center which incorporates a sealant ledge to support Universal Single Ply Sealant and provide increased stability for membrane terminations.

9. **SecurEdge Term Bar Fascia:** A 1.75" wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040" aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12' lengths for fewer joints/seams, fewer sections to handle and faster installation.

10. Refer to **Spec Supplement P-01 "Related Products"** for other edgings and coping materials.

2.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance, once a month or more, is necessary to service rooftop equipment.

1. Walkway Types

a. **Sure-Flex PVC Heat Weldable Walkway Rolls:** Manufactured from specially compounded PVC, offering superior tear, puncture and weather resistance. Designed to protect Sure-Flex (PVC/KEE HP) membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Flex (PVC/KEE HP) membranes using an automated heat welder or hand held heat welder. Walkway Rolls are 36" wide by 60' long and are nominal 80-mil and 110-mil thick. Available in gray only.

d. **Sure-Flex PVC Crossgrip Walkway Rolls:** Manufactured from PVC and may be used in lieu of standard Sure-Flex PVC Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip PVC Walkway Rolls are effective for winds up to 55 mph. Rolls are 36" wide by 33' long, available in white, gray and yellow.

e. **Carlisle's Interlocking™ Rubber Pavers**: 24" X 24" X 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in black and terra cotta.

f. **Hanover Ballast and Lightweight Ballast Pavers:** The standard, 24" x 24" x 1-13/16" thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2" x 23-1/2" x 1-1/4" thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

2.10 OTHER CARLISLE ACCESSORIES

Refer to **Spec Supplement P-01 "Related Products"** for additional accessories.

Part III – EXECUTION

Prior to commencing with the installation of any of the Sure-Flex PVC Membrane Systems refer to Paragraph 1.05 "Warranty Tables" for applicable components and proper securement method suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are considered to be beyond the scope of this specification.

3.01 General

A. Safety Data Sheets (SDS) must be on location at all times during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

B. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

C. A proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.

3.02 Roof Deck/Substrate Criteria

A. Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system, as well as construction loads and live loads, in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

B. Withdrawal resistance tests are strongly suggested to determine the suitability of a roof deck. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual proper procedures for conducting pullout tests.

C. Defects in the substrate must be reported and documented to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Applicator shall not proceed with installation unless defects are corrected.

D. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation. (Migrating warm air through gaps left unsealed can result in condensation and weakening of the insulation bottom facer leading to possible board dislodgement.)

E. **For all projects** (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.

F. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

G. For direct application over an acceptable roof deck/substrate or when HP Protective Mat is specified and approved by Carlisle as the membrane underlayment in accordance with the Roof Deck and Substrate Criteria Table, the substrate must be smooth, steel trowel finished (structural concrete), free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material.

H. The following chart identifies the acceptable roof decks/substrates and the minimum underlayment requirements, Tables in Paragraph 1.05 for specific acceptable underlayment types, based on warranty duration:

Roof Deck & Substrate Criteria

Acceptable Roof Deck/Substrate	PVC / KEE HP PVC Membrane	
NEW CONSTRUCTION	Adhered	Mechanically Fastened
Steel (min. 22 gauge) (1)(2), Wood Plank (3/4" min.), or Fibrous Cement	Insulation	Insulation
Structural Concrete (min. 3000 psi)	Direct Application	Insulation
Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application (5)	Direct Application (5)
Lightweight Insulating Concrete	Direct Application (10)	Insulation
RETROFIT / NO TEAR-OFF	Adhered	Mechanically Fastened
Existing Smooth Surface BUR (3)(8) or Mineral Surface Cap Sheet	Insulation	Insulation
Gravel Surfaced BUR (3)(4) or Coal Tar Pitch (3)(4)(12)	Insulation	Insulation
Modified Bitumen (11)	Insulation	Insulation
Existing Single-Ply (11)	Insulation	Direct Application (6)
Sprayed-in-place Urethane	Complete Tear-off Required	Complete Tear-off Required
RETROFIT / TEAR-OFF	Adhered	Mechanically Fastened
Existing roof material removed (regardless of deck type)	Insulation	Insulation

Notes:
(1) Local codes must be consulted regarding thermal barrier requirements.
(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge. Refer to the Metal Retrofit Roofing System Specification, published separately, for installation options.
(3) Loose gravel must be removed to avoid entrapment of moisture.
(4) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.
(5) Maximum Warranty Duration of 20 Years.
(6) An approved underlayment is required over existing ballasted (ballast removed) single-ply systems and PVC roofing systems of any type.
(7) Direct application permitted over smooth surfaced modified bitumen. To reduce the probability of cold welds, membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where splices intersect modified bitumen field seams, 6" wide Sure-Flex Flashing must be heat welded over intersections.
(8) Existing Type III or IV smooth asphalt BUR Only.
(9) Possible staining/discoloration of the membrane may result when installing this system directly over existing smooth surfaced BUR or modified bitumen. If aesthetics are critical, an approved insulation should be specified beneath the membrane.
(10) New approved cellular lightweight insulating concrete must have a minimum compressive strength of 225 psi. Except when the lightweight concrete is poured over slotted steel decks, pressure relief vents must be installed every 2,000 square feet. Direct application is not permitted where lightweight concrete is poured over an existing roofing material. Equilibrium moisture content after hydration/curing shall not exceed 12%.
(11) Maximum warranty available 20 YR with 55 MPH peak gust wind speed coverage. Carlisle may be contacted for other warranty options.
(12) If insulation is specified to be secured to an existing coal tar pitch roof with Carlisle Flexible FAST Adhesive or hot asphalt, minimum 1.5” thick Polyisocyanurate is the required minimum thickness when white membrane is specified.

I. **On retrofit - recover projects**, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation of type specified so it is relatively flush (+/- 1/4") with the existing surface.

1. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding non-reinforced PVC membrane).

2. If total removal of existing PVC membrane is not specified, existing non-reinforced membrane may be cut into maximum 10' x 10' sections, when the new insulation or membrane underlayment is to be mechanically fastened.

3. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

8. When installing this roofing system over an existing **gravel surfaced built-up roof**, **loose gravel must be removed**. Power brooming is recommended by Carlisle to remove the loose gravel, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent insulation from bridging.

9. On retrofit projects, all existing phenolic insulation must be removed.

10. Refer to table above for other Recover/Retro-fit considerations.

J. **Vapor Retarder Installation**

For Carlisle's Vapor Retarder refer to **Spec Supplement G-08 "Application Procedures for 725TR Air and Vapor Barrier".** Follow the respective vapor retarder manufacturer's recommended installation procedures and the specifier's instructions for the installation of the product specified. When insulation is to be set in adhesive, verify compatibility with Carlisle when Vapor Retarder by others is specified.

K. **Wood Nailers**

a. Install wood nailers in locations that have been designated by the specifier and as approved by Carlisle. Refer to **Design Reference DR-08 "Wood Nailers and Securement Criteria" for** Wood Nailer Criteria.

b. Wood nailers are not covered by the Carlisle Warranty.

3.03 Insulation/Underlayment

A. **General**

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the dew point.

2. For new construction projects in cold climate regions, the use of vapor retarders or air barriers is strongly recommended to protect insulation from moisture generated during construction.

3. Multiple layers of insulation are recommended with all joints staggered between layers.

4. Do not install more insulation/underlayment than can be covered by membrane in the same day.

5. All insulation boards must be butted together with no gaps greater than 1/4". Gaps greater than 1/4" are not acceptable.

6. Restrictions:

a. Carlisle Roofing Systems cannot be specified in conjunction with Phenolic Insulation.

b. Fiberglass insulation cannot be specified even if overlaid with additional insulation or membrane underlayment.

c. For all Thermoplastic Roofing Assemblies, the use of insulation by others is not acceptable when a Carlisle Membrane System Warranty is specified. Carlisle insulation must be used.

d. The direct application of Sure-Flex Membrane over expanded or extruded polystyrene insulation is not permitted.

3.04 Insulation Attachment

A. **General**

1. Prior to proceeding with insulation securement refer to Warranty Tables, Paragraph 1.05, for attachment method and appropriate fastening density required for the specific Carlisle Warranty.

B. **Adhered Roofing Systems**

1. **Mechanical Attachment**, insulation fastening density will vary based on insulation type, thickness, and required warranty. Warranty Tables in Paragraph 1.05 should be referenced for fastening density and the appropriate Carlisle detail may be consulted to identify acceptable fastening pattern.

   a. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Refer to **Design Reference DR-05 "Insulation Fastening Patterns"** for fastening pattern reference.

   b. When insulation securement is to comply with Factory Mutual (FM) approvals, follow the requirements of the specifier concerning additional securement at the roof perimeter and corners. Also refer to **Design Reference DR-05 "Insulation Fastening Patterns" for** various fastening patterns.

   c. On Reroof/No Tear off projects with a maximum roof height of 40', any Carlisle Insulation (i.e., 1/2" SecurShield HD, HP Recovery Board, Polyisocyanurate less than 1-1/2" thick) may be secured at the minimum rate of 11 Fasteners per 4' x 8' board (5 Fasteners per 4' x 4' board).

   d. When Oriented strand board (OSB) is specified for membrane underlayment, utilize Stormbase OSB/Polyiso Composite, mechanically fastened to the deck at the rate 17 fasteners for 4 x 8 board in accordance with Carlisle Details. When positioning OSB, butt edges and stagger joints of adjacent panels.

2. **Adhesive attachment**, Carlisle Urethane Adhesive Full Spray (Flexible FAST) or Bead (Flexible FAST or Olybond) may be used. When bead adhesive is specified bead spacing will vary based on Warranty coverage, refer to Warranty Tables, Paragraph 1.05 and appropriate Carlisle Details. CAUTION: Apply adhesive bead so that the distance from the edge of the board does not exceed half the bead spacing (i.e. within 6" of bead spacing of 12" O.C.).

   a. **CAUTION: Do not apply urethane adhesives directly to un-weathered asphalt, (new or residual).**

   b. **CAUTION: Especially in cold regions on tear-off projects or new construction gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.**

   c. On FM Global insured projects, consult FM Global's local representative concerning the use of adhesive to attach insulation to steel decks.

   d. Check to ensure the substrate is clean, free of debris, other contaminants, and dry. Adhesive cannot be applied to a wet or a damp surface.

   e. Apply Adhesive over the dry substrate area at the coverage rates indicated in **Spec Supplement G-03 "Insulation Attachment with Flexible FAST Adhesive".**

   f. Allow the adhesive to rise up approximately 1/8" and develop strings prior to setting insulation boards into adhesive.

      Note: String-time is measured by touching the adhesive with a splice wipe and looking for development of "strings" of adhesive as you pull the splice wipe out of the adhesive. With Flexible FAST Adhesive, string time is generally around 1-1/2 – 2 minutes after application at room temperature.

   g. **Walk the boards into the adhesive and roll using the 30" wide, 150 pound segmented steel roller** to ensure full embedment. Optimal set up time should be approximately 5 to 7 minutes.

      CAUTION: Walking on the boards immediately after placement in adhesive can cause slippage/movement

until the adhesive has started to set up.

On roofs with a slope greater than 1/2" in 12", begin adhering insulation at the low point and work upward to avoid slippage.

A person should be designated to walk/roll-in all boards and trim/slit or apply weight as needed to ensure adequate securement.

h. Refer to **Spec Supplement G-02 "Flexible FAST Adhesive Equipment and Set-Up Requirements"** and **G-03 "Insulation Attachment with Flexible FAST Adhesive"** for application procedures and coverage rates.

3. **Alternate attachment method**, the specifier may select an alternate insulation attachment that incorporates a solid mopping of the insulation with hot asphalt (ASTM D312, Type III or IV). If the attachment method is to be covered by the Carlisle Warranty, Carlisle must be contacted for specific requirements. Upon review and acceptance by Carlisle, the maximum warranty coverage available is limited to 15 Year with maximum Peak Gust Wind Speed Coverage of 55 mph, for other warranties contact Carlisle.

   a. Extruded or Expanded Polystyrene insulation are not acceptable when this alternate attachment method is specified.

   b. The existing gravel surfaced built-up roof must be scraped to remove all loose gravel. Large blisters that may prevent continuous embedment of insulation must be repaired. The surface of the substrate must also be dry and clear of foreign material.

   c. On coal tar pitch, when deemed compatible by the specifier, minimum 1.5" Polyisocyanurate is the required membrane underlayment when using darker heat weldable membranes (tan or gray). If Sure-Flex white membrane is used, minimum 1" thick Polyisocyanurate is required.

   d. For successful attachment, proper asphalt temperatures must be maintained and the specifier's requirements concerning the installation of a base sheet (where required) and quantity of hot asphalt must be followed.

   e. The maximum insulation board size shall not exceed 4' X 4'. Trim insulation boards around crickets and saddles to ensure continuous embedment.

   f. Care must be exercised to prevent contamination of the top surface of the insulation. Asphalt oozing through insulation joints must be wiped from the surface. Contact with fresh asphalt can result in discoloration of the Sure-Flex membrane.

   g. A grid shall be installed subdividing the roof in individual sections of 2400 square feet. Required for warranties up to 10 year with wind speed coverage up to 55mph.

   h. The wood nailers are installed relatively flush with the insulation surface and the membrane is to be fastened with seam fastening plates and Carlisle HP or HP-X fasteners on 12" o.c. For wood nailer installation, refer to **Design Reference DR-08 "Wood Nailers and Securement Criteria**".

C. **Mechanically Fastened Roofing Systems**

1. **Carlisle Fasteners and Fastening Plates are required for insulation securement**. Refer to Insulation Fastening Criteria Table in Paragraph 2.05, for appropriate fastener and deck penetration. The fastener can be used with either a 2" diameter Seam Fastening Plate or 2-3/8" diameter Pirahna/Pirahna Xtra Plates OR 3" diameter Insulation Fastening plate.

2. **Any Carlisle approved insulation or cover board** shall be mechanically fastened to the roof deck at the minimum rate of **1.25 fasteners and plates per every 8 square feet** (5 fasteners in a 4 x 8 board) for minimum 1-1/2" thick insulation and coverboards. Insulation less than 1-1/2" thick requires the use of 8 fasteners and plates in a 4' x 8' board (1 per 4 square feet).

   CAUTION: Carlisle Polyisocyanurate Insulation with a thickness less than 1.5" installed over an existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation.

3. Use of DensDeck, DensDeck Prime and Dens Deck StormX Prime should be limited to assemblies with slopes

greater than 2” per foot to ensure compliance with external fire codes.

3.05 Membrane Placement and Securement

A. General

1. **Ensure** that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.

2. **Sweep** all loose debris from the substrate.

3. If aesthetics are of concern, protection should be specified to avoid discoloration of the white membrane surface resulting from adhesive residue or excess foot traffic.

4. In addition to the primary membrane securement (Bonding for Adhered and Fastening for Mechanically Fastened Assemblies), additional membrane securement is required at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope or combined slopes exceed 2" in one horizontal foot, and at other penetrations in accordance with the applicable Carlisle details. Refer to Paragraph F for additional membrane securement.

B. Membrane Placement

Maximum 10’ wide Sure-Flex Membrane is fully adhered or mechanically fastened to an approved insulation or substrate.

1. **Position** Sure-Flex membrane over the acceptable substrate. For a mechanically fastened assembly, ensure proper number of perimeter sheets are positioned along the perimeter of the roof as outlined in Paragraph 1.05 “Warranty Tables”.

2. **Position** field sheets perpendicular to the steel deck flutes in Mechanically Fastened Applications.

3. **Place** adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum overlap width. It is recommended all overlaps be shingled to avoid bucking of water.

C. Membrane Securement / Bonding - Adhered Roofing System

1. **Adhere** Sure-Flex membrane to an acceptable substrate with Carlisle Bonding Adhesive. CAV-GRIP PVC aerosol adhesive may be utilized with Sure-Flex PVC membranes (cannot be used with any KEE or KEE HP bareback membranes). Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Adhesive must be applied to both the membrane and the surface to which it is being bonded.

2. On projects at high altitudes (6,000' and above), rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

3. **Fold** membrane sheet back so half the underside is exposed. Sheet fold should be smooth without wrinkles or buckles.

4. **Stir** Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.

5. **Apply** Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be heat welded over adjoining sheet.

   When using **Sure-Flex Low-VOC Bonding Adhesive**, a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate) shall be achieved. **Apply** adhesive evenly, without globs or puddles with a plastic core, medium nap paint roller to achieve continuous coating of both surfaces. A 9-inch roller will easily fit into the 5-gallon containers.

   A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained. Backrolling is required.

CAUTION: Due to solvent flash-off, condensation may form on freshly applied Bonding Adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of Bonding Adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat at the coverage rate which is approximately half the coverage rate stated above to the previously coated surface when conditions allow for continuing.

NOTE: When Aqua Base 120 is specified refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for application methods and warranty requirements.

6. **Allow** adhesive to flash-off until it does not string but remains tacky to a dry finger touch.

   CAUTION: Care must be exercised to ensure proper drying. Avoid thin areas of adhesive because over drying can occur and proper adhesion may not be achieved.

7. **Roll** the coated membrane into the coated substrate while avoiding wrinkles.

8. **Brush** down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.

9. **Fold** back the unbonded half of the sheet and repeat the bonding procedures. **Apply** Bonding Adhesive to the remaining exposed underside of membrane and adjacent substrate and complete this section as described above.

10. **Install** adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch heat weld. It is recommended that all splices be shingled to avoid bucking of water.

    CAUTION: If aesthetics is of concern, protect completed sections of the roof so Bonding Adhesive will not discolor the membrane surface. Do not place Bonding Adhesive containers or their lids directly on the surface of the Sure-Flex membrane, to avoid rust stains.

D. **Membrane Securement / Fastening - Mechanically Fastened Roofing Systems**

1. Sure-Flex PVC and KEE HP membranes shall be mechanically attached to the structural deck with specified Carlisle Fasteners and designated Plates, for fastening densities and numbers of perimeter sheets refer to Warranty Tables, Paragraph 1.05.
2. Membrane Fastening Selection Table:

Membrane Fastener Selection

Deck Type	Carlisle Fasteners*	Carlisle Plate	Min. Penetration
Steel or Lightweight Insulating Concrete over Steel**	HP-X	Piranha Plates	3/4"
	HP-Xtra	Piranha-Xtra Plates	
Structural Concrete, rated 3,000 psi or greater	CD-10	Piranha Plates	1"
	HD 14-10	Piranha Plates	
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB**	HP-X	Piranha Plates	Min. 1"
	HP-Xtra	Piranha-Xtra Plates	
Cementitious Wood Fiber	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"
Gypsum	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"

Refer to Warranty Tables in Paragraph 1.05 for fastening densities and number of perimeter sheets.
*Determine proper fastener length for deck penetration, refer to Table 2.05B.
** For Mechanically Fastened PVC and KEE HP PVC Assemblies, 2-3/4" x 1-1/2" Oval Metal Barbed Fastening Plates can be used in conjunction with HP-X Fasteners for membrane securement. (Not recommended for Insulation Securement)

3. On steel decks, membrane shall be positioned with seams perpendicular to the steel deck flutes. This allows the external forces on the roof assembly to be distributed between multiple steel deck panels. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual.

4. Perimeter Sheets

The number of perimeter sheets and fastener spacing is dependent on the building height, wind zone location and warranty duration as outlined in Warranty Tables in Paragraph 1.05.

The roof perimeter is defined as all edges of each roof section (i.e., parapets, building expansion joints at adjoining walls, penthouse walls, etc.). When multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 10'. Perimeter sheets are not required at the base of the wall at the lower level.

Note: Expansion joints, control joints and fire walls in the field of the roof or roof ridges with slopes less than 3" to the horizontal foot are not considered as part of the roof perimeter.

For Sure-Flex membranes, perimeter sheets can be formed by using individual 40.5” or 5’-0” wide sheets.

a. **Individual perimeter sheets** (PVC - 40.5” or 5’ wide)(KEE HP PVC – 5’ wide)

Position membrane along the perimeter of the roof over the acceptable insulation/underlayment. The perimeter membrane width from line of securement to line of securement should be approximately 3’-6” to 4’-0” wide.

b. **Fastening Plates Method**

In lieu of the RUSS securement method, position a row of seam fastening plates in the locations identified in Paragraph 4.b.1 and 4.b.2, secure plates with appropriate fastener and overlay plates with 6” wide Pressure-Sensitive Sure-Weld Cover Strip (TPO Only) overlay the plates as follows:

1) Projects with Warranties greater than 20 Years OR Sure-Flex projects regardless of warranty duration center 6” wide section of PVC/KEE HP PVC membrane (equal thickness to the deck membrane) over the plates and heat weld the field sheets. Cut edge sealant is not required for PVC or KEE HP PVC.

Note: Perimeter sheets can also be formed by positioning Rhinobond plates placed along the center of a field membrane (if heat induction welder is available on job-site). Refer to “Attachment I” for additional information

c. **Building with Special Conditions:**

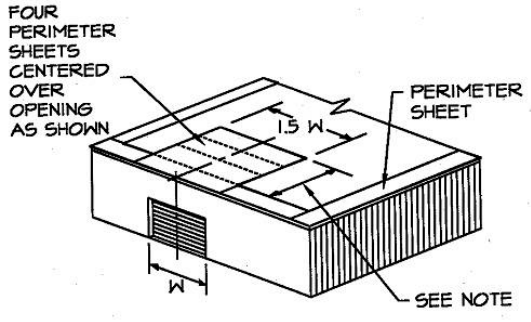
Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities) will typically require additional perimeter membrane securement, an increased fastening density or other enhancement.

d. **Buildings with large openings**

When any wall contains major openings with a combined area which exceeds 10% of the total wall area on which the openings are located, four (4) perimeter sheets (centered over the opening) must be specified as shown.

As an option to the above perimeter securement, an adhered membrane section may be used in lieu of the mechanically fastened membrane at large openings in accordance with the Carlisle Specification for the Sure-Flex Adhered Roofing System.

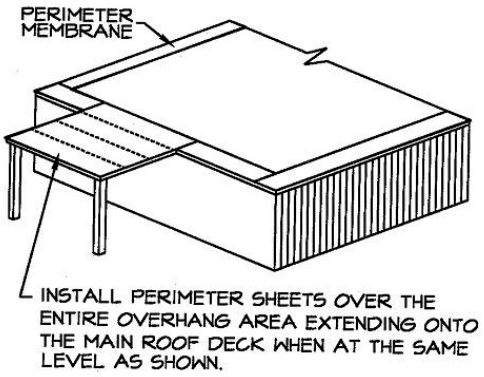
NOTE: Depth of perimeter area, noted above, shall not be less than 2.5 times the width of the opening.



e. **Buildings with overhangs**

The membrane must be specified with perimeter sheets installed over the entire overhang area extending onto the main roof deck when at the same level.

As an option, an adhered membrane section may be used in lieu of the mechanically fastened membrane at building overhangs in accordance with the Carlisle Specification for the Sure-Flex Adhered Roofing System.



5. **Field Membrane**

a. **Position** adjoining field membrane sheets to allow an approximate overlap of 5-1/2" at those locations where Fastening Plates are located (along the length of the membrane); at the same time overlap end roll sections (the width of the membrane) a minimum of 2".

b. **Secure the membrane** at the approved fastening density with the required Carlisle Fastener and Fastening Plates.

c. For installation of membrane with fullness, tighten the sheet between fasteners as follows:

1) Unroll sheets and position.

2) Place a fastener and plate in one end of the sheet on the appropriate fastener mark. Go to the opposite end of the sheet, pull it tight and place a fastener and plate at the appropriate mark. Place the remaining fasteners into the sheet.

3) Proceed to weld the sheet in place and continue across the roof.

6. **Prevention of membrane distortion during windy conditions:**

a. Unroll sheet approximately 5' and position edge of membrane with overlap line on adjacent sheet.

b. Install fasteners along the 5' exposed edge.

c. While the 5' of exposed membrane is being fastened, begin welding the overlapped edge using the Automatic Heat Welder.

d. As sheet is being welded and fastened concurrently, unroll membrane. Unroll only enough membrane to stay a few feet ahead of welding and fastening process. This reduces amount of unsecured membrane to be distorted by wind.

e. Continue this process for each adjoining sheet.

E. Additional Membrane Securement

1. Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches to one horizontal foot, and at all penetrations as identified on the Carlisle details.

2. Securement may be achieved as follows:

   a. On Mechanically Fastened Roofing Systems, Carlisle's Piranha Fastening Plates are used to secure the membrane with the appropriate Carlisle Fastener at the base of walls and penetrations and flashed as shown on the applicable Carlisle detail (excluding OSB, cementitious wood fiber and gypsum decks where the required Carlisle Fastener is installed with the associated 2" diameter plate). On **Adhered Roofing Systems**, Carlisle standard 2" diameter Seam Fastening Plates may be used in lieu of Piranha Plates.

   b. Securement of the membrane shall be a maximum of 12 inches on center. Fasteners shall be positioned 6 inches minimum to 9 inches maximum from the inside or outside corner.

   c. On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

   d. After securing the membrane, flash in accordance with the appropriate detail.

3.06 Heat Welding Procedures

A. General

1. APEEL Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat welding, the APEEL Protective Film can be left in place for up to 90 days.

2. Heat weld the Sure-Flex membrane sheets using the Automatic Heat Welder or Hot Air Hand Welder and silicone roller.

3. When roof slope exceeds 5" per horizontal foot, use of the Automatic Heat Welding Machine may become more difficult; use of the Hand Held Hot Air Welder is recommended.

4. **Check the surfaces** of the membrane to be heat welded to ensure they are properly prepared.

   The surfaces to be heat welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned with Weathered or PVC and KEE HP Membrane Cleaner (Weathered Membrane Cleaner should not be used to clean Sure-Flex PVC or KEE HP). Weathered or PVC and KEE HP Membrane Cleaner should be wiped dry with a clean HP Splice Wipe prior to welding. No residual dirt or contaminants should be evident.

B. Automatic and/or Hand Held Heat Welder Equipment

1. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for:

   a. Temperature Settings.
   b. Equipment Set-up.
   c. Additional Information.

C. Membrane Welding

1. Prepare the Automatic Heat Welder and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2. Position the Automatic Heat Welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

3. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap. Machine will begin moving along the seam immediately.

4. Weight plates provided on Automatic Welders must be utilized.

5. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

6. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Sure-Flex membrane sheets.

   When using **80-mil** Sure-Flex Membrane, a **PVC "T"-Joint Cover** must be applied over all "T" joint splice intersections.

7. To remove the Automatic Heat Welder from the finished splice, disengage and pull the nozzle from the seam area, the machine will stop automatically.

8. Mark the end of the heat welded seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Heat Welder is stopped and restarted.

9. Perform a test weld, at least, at the start of work each morning and afternoon. Test welds should be made if any changes in substrate or weather conditions occur.

D. **Preventing Membrane Creeping During Welding**

1. The operator of automatic welding equipment must apply foot pressure to the membrane, keeping the membrane tight under the welder. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

E. **Test Cuts**

1. Perform a test weld at least at the start of work each morning and afternoon. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

F. **Seam Probing**

1. A cotter pin puller (blunt or dull for PVC or KEE HP PVC Membranes) or Carlisle Seam Probe is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

G. **Seam Sealing**

Cut-Edge Sealant is not required on cut edges of Sure-Flex membrane (Horizontal or Vertical).

3.07 Welding Problems/Repairs

A. A Hand Held Hot Air Welder and a 2" wide silicone roller must be used when repairing the Sure-Flex membrane. When the **entire** heat welded **seam** is to be **overlaid**, an **Automatic Heat Welder** may be used.

B. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned with Weathered or PVC and KEE HP Membrane Cleaner (Weathered Membrane Cleaner should not be used to clean Sure-Flex PVC or KEE HP PVC Membrane). The membrane can typically be repaired with standard cleaning methods. In cases where the standard cleaning method is not sufficient, the following procedures must be used.

1. Scrub the area to be welded with a "Scotch Brite" Pad and Weathered or PVC and KEE HP Membrane Cleaner.

2. Clean all residue from the area to be welded with a Splice Wipe or a clean natural fiber (cotton) rag.

3. Weld the new membrane to the cleaned area using standard welding procedures.

C. Clean all residue from the area to be welded with a Splice Wipe or clean natural fiber (cotton) rag.

D. Weld the new membrane to the cleaned area using standard welding procedures.

E. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller. Depending on conditions, a splice overlay may be required.

F. Position the hand held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

G. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test weld areas must be repaired by overlaying the damaged area with a separate piece of Sure-Flex reinforced membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

H. **Probe** all edges of the overlay once cooled to ensure a proper weld has been achieved.

I. Cut-Edge Sealant is not required on cut edges of Sure-Flex Membranes.

Note: The same overlay repair procedures may be used for punctures in the Sure-Flex membrane.

3.08 Flashings

For other requirements which must be complied with in order for Carlisle warranty to be issued, refer to Spec Supplement G-05 "Flashing Considerations / Metal Work".

A. **General Considerations**

1. The height of new wall flashing must extend above the anticipated water level or slush line.

2. On 15 or 20-year Warranty projects, Carlisle's Termination Bar, in conjunction with Water Cut-Off Mastic, must be specified under all metal counterflashings and surface mounted reglets.

3. To comply with various warranty options, flashing material must equal the required minimum membrane thickness but shall not be less than 60-mils thick. For projects with 25 year or greater warranties Carlisle Pre-Fabricated accessories must be used unless prohibited by a specific field condition.

4. **On retrofit projects**

   Bitumen-based roof cement and asphaltic-based flashing material, if allowed to remain in contact with the membrane, will cause severe membrane discoloration and for PVC and KEE HP PVC membranes, promote premature plasticizer migration. Existing wall and curb flashing must be removed or concealed with a new acceptable substrate.

   a. The specifier must examine structural supports for rooftop equipment to determine if reasonable access to the membrane beneath the equipment is provided. Carlisle should be consulted for clarification when access to the membrane system will be restricted.

   b. When hot pipes or other similar penetrations exceed 140° F (60° C) (PVC/KEE HP PVC), they must be designed to incorporate an insulated metal collar and rain hood designed to maintain a surface temperature less than 140° F (60° C) (PVC/KEE HP PVC).

5. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Flex **reinforced** membrane. Sure-Flex non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets and scuppers as well as inside and outside corners when the use of pre-molded accessories is not feasible.

6. When possible, all reinforced membrane splices are heat welded with the Automatic Heat Welder. The Hand Held Hot Air Welder should be utilized in hard to reach areas, smaller curbs, vertical splices and when using non-reinforced membrane.

   a. The new Sure-Flex membrane flashing must not conceal weep holes or cover existing throughwall flashing.

   b. Install surface mounted reglets and compression bar terminations directly to the wall surface.

7. In areas where metal counterflashing or surface mounted reglets are used as vertical terminations, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

B. **Application of Bonding Adhesive**

1. Membrane shall be adhered to vertical surfaces with Sure-Flex Bonding Adhesive. CAV-GRIP PVC aerosol adhesive may be utilized with Sure-Flex PVC membranes (cannot be used with any KEE or KEE HP bareback membranes). Bonding Adhesive shall be applied continuously, without globs or puddles.

2. **Allow** adhesive to flash-off until it is tacky but will not string or transfer to a dry finger touch.

3. Roll the membrane into the adhesive.

4. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

5. Terminate the edges of the installed membrane in accordance with Carlisle's applicable details.

6. When Carlisle termination bar is used beneath the counter-flashing, bonding adhesive can be eliminated when the flashing height is 18” or less.

C. **Walls, Parapets, Curbs, Skylights, etc.**

The flashing height must be calculated so that the Sure-Flex membrane flashing includes a minimum 1-1/2 inch heat weld beyond the Fastening Plates.

1. Fasten at angle change as identified in Paragraph 3.05, Additional Membrane Securement, with the required Carlisle Fastener and plate.

2. Flash the fasteners/plates with a separate piece of Sure-Flex reinforced membrane; apply heat and crease the flashing into the angle change before attaching it to the vertical surface.

D. **Metal Edge Terminations**

Factory-fabricated metal edge systems must be secured to the wood nailer as specified by the manufacturer. Shop-fabricated edging must be installed in compliance with appropriate Carlisle Detail using Carlisle PVC Coated Metal in order to achieve ES-1 Compliance. Refer to the appropriate Universal Details for other flashing options and requirements.

E. **Roof Drains**

1. Sure-Flex membrane may extend into the drain sump when the slope of the sump is less than 3" to one horizontal foot.

   When the drain sump is greater than 3" to one horizontal foot, additional membrane securement must be installed.

2. Only drain strainers that have been approved by the specifier in accordance with applicable codes may be used.

F. **Sure-Flex Contour Rib Profiles**

1. The Contour Rib Profile is recommended for use with FleeceBACK® PVC adhered roofing systems.

2. The Sure-Flex Contour Rib Profiles should be positioned parallel to the laps of the installed PVC roofing system and parallel with the roof slope where possible.

3. Ensure that all welding surfaces are clean and dry. Inspect all seam areas for proper weld prior to installing Sure Flex Contour Rib Profile.

4. Contour Rib Profile spacing can be individually determined to achieve the desired appearance.

5. Connecting multiple ribs is achieved by using fiberglass pins. Insert a pin half-way into the end of one profile. Connect the adjoining rib by inserting the exposed end of the pin into the alignment hole. Repeat previous steps for additional PVC Contour Rib profiles.

6. Consult the Sure Flex Contour Rib Profile installation guides for instructions on proper installation techniques.

G. **Other Penetrations**

On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

1. **Pipes, Round Supports, etc.**

   a. Flash pipes with Molded Pipe Flashings or Split Pipe Seals where their installation is possible. Molded pipe flashings cannot be cut and patched; deck flanges cannot be overlapped or installed over angle changes.

   b. Where Molded Pipe Flashings or Split Pipe Seals cannot be installed, APPLY FIELD FABRICATED PIPE FLASHING using Sure-Flex non-reinforced membrane.

2. **Flexible Penetrations** (braided cables, conduits, wires, etc.) must be enclosed in a stable "goose neck." Apply a Split Pipe Seal or field fabricated pipe flashing to flash the goose neck.

3. **Hot pipes** that exceed 140° F (60° C) (PVC/KEE HP PVC), must utilize an insulated metal collar and rain hood, flashed with a field fabricated pipe flashing.

4. For **pipe clusters** or unusually shaped penetrations, a Molded Sealant Pocket and White One Part Sealant must be utilized.

5. **Existing Roof Tie-Ins** for PVC or KEE HP PVC membranes refer to applicable Carlisle details for tie-ins.

6. **Flashing of Difficult Penetrations,** refer to **Spec Supplement G-13 for "LIQUISEAL Liquid Flashing"** for additional information and specific requirements.

H. **APEEL Protective Film (Optional)**

When the optional APEEL Protective Film is utilized on PVC/KEE HP, remove and discard the APEEL Protective Film after the installation of the entire PVC/KEE HP Roofing System is complete.

3.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to **Spec Supplement G-06 "Roof Walkway Installation".**

3.10 Daily Seal

On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration. Refer to **Spec Supplement G-07 "Daily Seal & Clean Up".**

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle Authorized Roofing Applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information, which has subsequently been made available.
Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

SPECIFICATION ATTACHMENT
TPO/PVC ROOFING SYSTEMS

PVC Mechanically Fastened Roofing Systems
Induction Welding (RhinoBond / Isoweld) Attachment Method

"Attachment I"

July 2024

This is an alternate method for securing the Carlisle's Sure-Flex (PVC/KEE HP PVC) membrane and is intended to be used in conjunction with the Carlisle's PVC Mechanically Fastened Specification and Details.

A. Description

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt PVC coating. The RhinoBond or Isoweld Plates are installed with HP-X Fasteners to secure an acceptable insulation to minimum 22 gauge steel deck or minimum 15/32" thick plywood.

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

Induction Welding (Rhinobond/Isoweld) Attachment Method Limited to 30 Year Maximum Warranty and Wind Speed Coverage Up to 120 mph. Perimeter enhancements will be required on systems greater than 72 mph and/or projects over 50' in height. Contact Carlisle for requirements for enhancements.

Table I **Induction Welded - Membrane Systems Warranty Options**

Years	Sure-Flex PVC Membranes		
	Warranty Wind Speed	Minimum Membrane Thickness (1)	Additional Puncture Coverage
	55, 72, 80, 90, 100, 110, or 120 mph		
5,10, or 15 year	√ (2)	Sure-Flex 50-mil	Not Available
20 year	√ (2)	Sure-Flex 60-mil	Not Available
25 or 30 year	√ (2)	Sure-Flex 80-mil	Available

Notes: √= Acceptable

(1) All "T-Joints" must be overlaid with appropriate flashing material when using 80-mil PVC/KEE HP membrane.

(2) Perimeter calculation is .4 x height of building. The minimum perimeter width is 8-feet up to a 20-year warranty and 16-feet for 25-30-year warranty.

(3) Perimeter enhancements required for wind speed coverage greater than 72mph and/or projects over 50’ in height. Contact Carlisle for requirements.

Table II

Induction Welded – Induction Plate Density for Induction Welded Roofing Systems (Up to 20 YR Warranty)

Peak Gust Wind Speed Warranty	Max. Building Height	Minimum Perimeter Width	Induction Weld Plate Density		
			Field	Perimeter	Corners
55 MPH	Up to 50'	8’	6	8	8
72 MPH	Up to 50'	8’	6	8	8
80 MPH	Up to 50'	8’	8	10	10
90 MPH	Up to 50'	8’	8	12	12
100 MPH	Up to 50'	8’	8	12	16
110 MPH	Up to 50'	8’	10	16	16
120 MPH	Up to 50'	8’	10	16	20

Table III

Induction Welded – Induction Plate Density for Induction Welded Roofing Systems (Up to 30 YR Warranty)

Peak Gust Wind Speed Warranty	Max. Building Height	Minimum Perimeter Width	Induction Weld Plate Density		
			Field	Perimeter	Corners
55 MPH	Up to 50'	16’	8	10	10
72 MPH	Up to 50'	16’	8	10	10
80 MPH	Up to 50'	16’	10	12	12
90 MPH	Up to 50'	16’	10	12	12
100 MPH	Up to 50'	16’	10	16	20
110 MPH	Up to 50'	16’	12	16	24
120 MPH	Up to 50’	16’	12	16	24

B. Products/Heat Welding Equipment

Products listed in "Part II” of the Carlisle Sure-Flex PVC Mechanically Fastened Roofing System Specification can be used as part of this alternate securement method in conjunction with the RhinoBond or Isoweld Welding Plates.

1. **RhinoBond or Isoweld 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-X Fasteners to attach the roofing assembly and is activated using the RhinoBond or Isoweld Induction Welding Tool.

2. **RhinoBond or 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 or Isoweld 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 on 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 Magnet 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 Magnet.

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

Caution: To avoid false welds and ensure adequate membrane attachment to the plates, induction tool calibration and test welds (along with the proper positioning of the induction welder over the plate and placement of the magnet) must be performed prior to the start of work each day. All test welds must be completed using the exact components of the assembly to be installed.

1. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond or Isoweld Plates per 4' x 8' board in the designated field and eight HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area.

   Note: Avoiding fastener overdrive to prevent plate from deforming.

2. Place Sure-Flex membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.

3. Place RhinoBond Induction Tool over the RhinoBond PVC Welding Plate, under the roofing membrane OR Place the Isoweld Induction Tool over the Isoweld PVC Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

4. Activate induction welding tool and leave in place until heating cycle is complete.

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

6. 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 "Part III" of the PVC Mechanically Fastened Roofing System Specification.

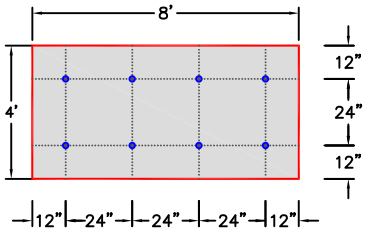
2. Base wall securement and securement around roof penetrations as well as flashings of walls and penetrations must comply with Carlisle requirements for the PVC Mechanically Fastened Roofing System.

G. Associated Installation Details

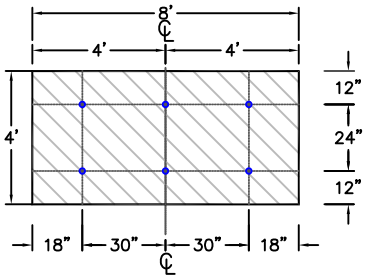
End of Section

NOTES:

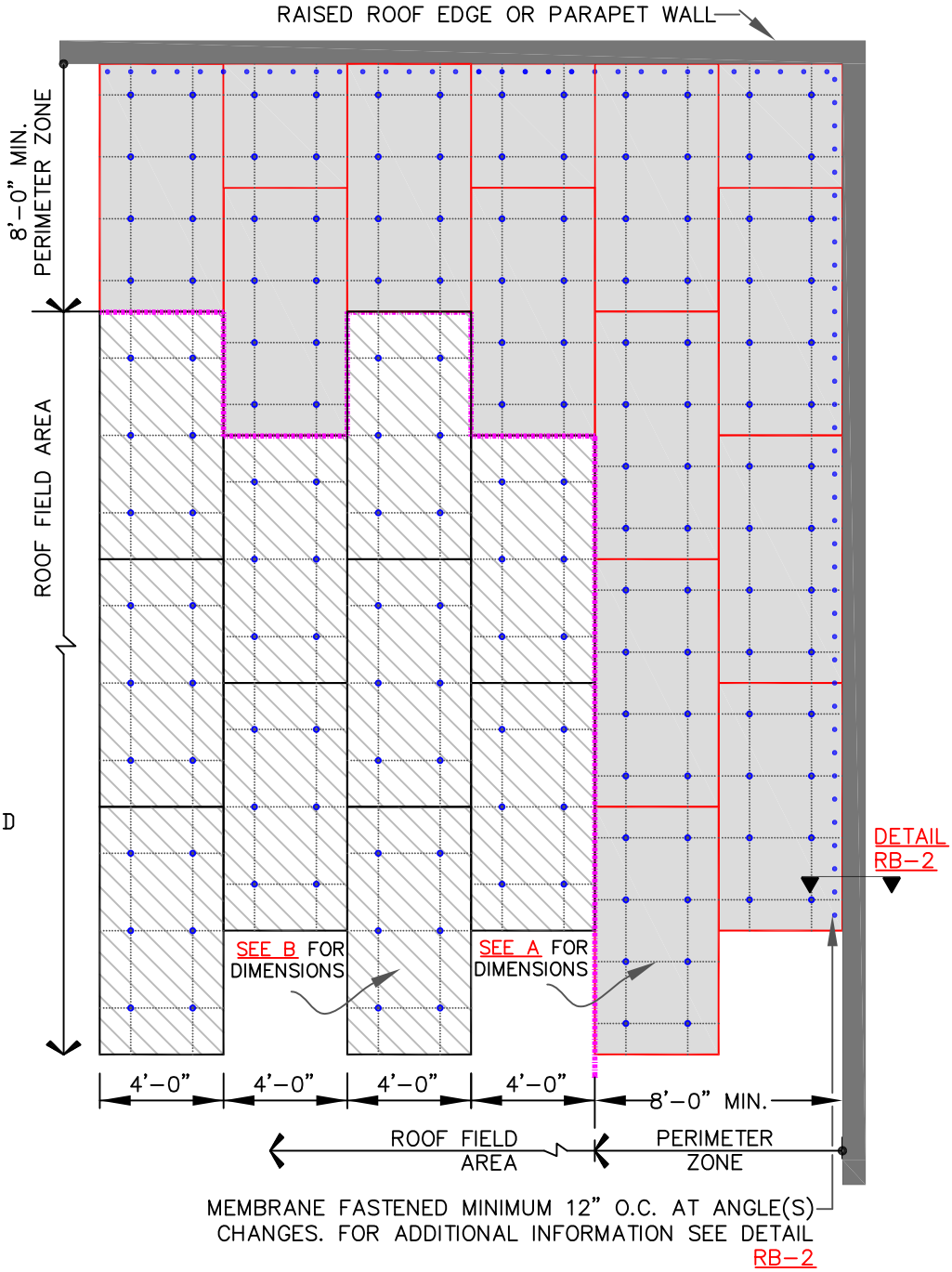
1. RhinoBond METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL RB-2

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & RhinoBond FASTENER PLATE

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

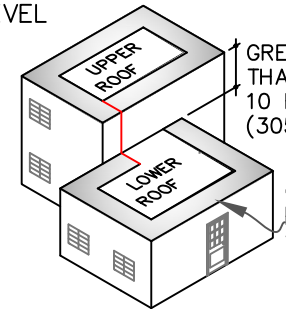
RhinoBond ATTACHMENT METHOD - NUMBER OF FASTENERS AND LOCATIONS

For additional information, refer to Specifications

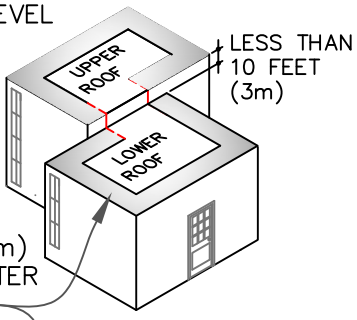
DETAIL NO.
RB-1
RhinoBond

ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

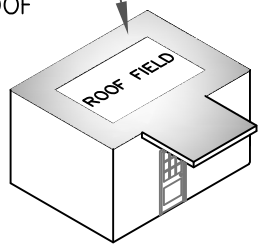
SPLIT LEVEL ROOFS



SPLIT LEVEL ROOFS

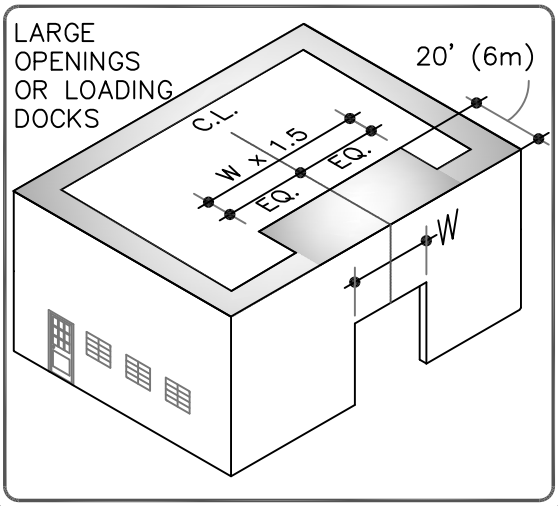


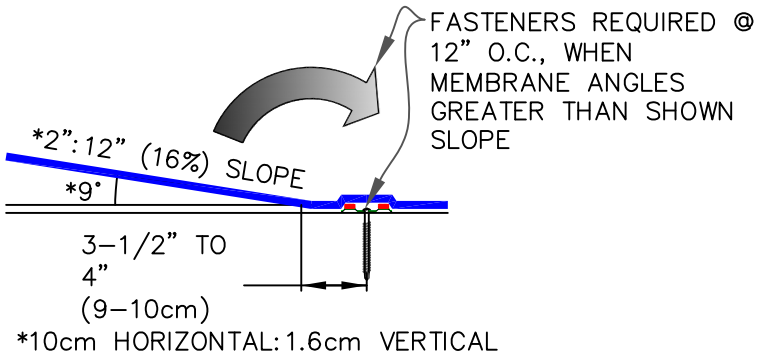
CANOPY ROOF



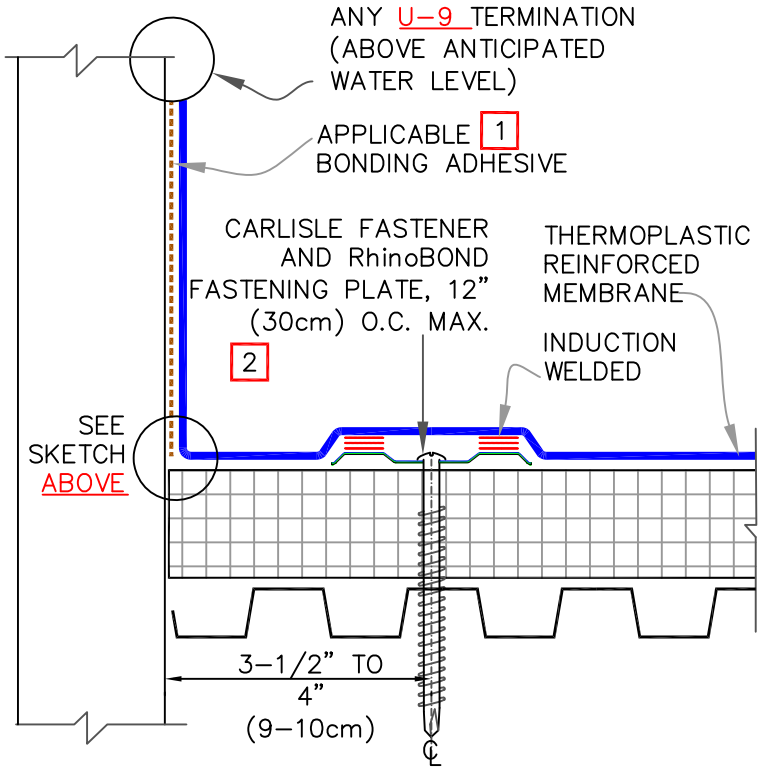
MAIN ROOF EXTENDING ON THE SAME LEVEL

LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



ANGLE CHANGE SECUREMENT

NOTES:

1. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.

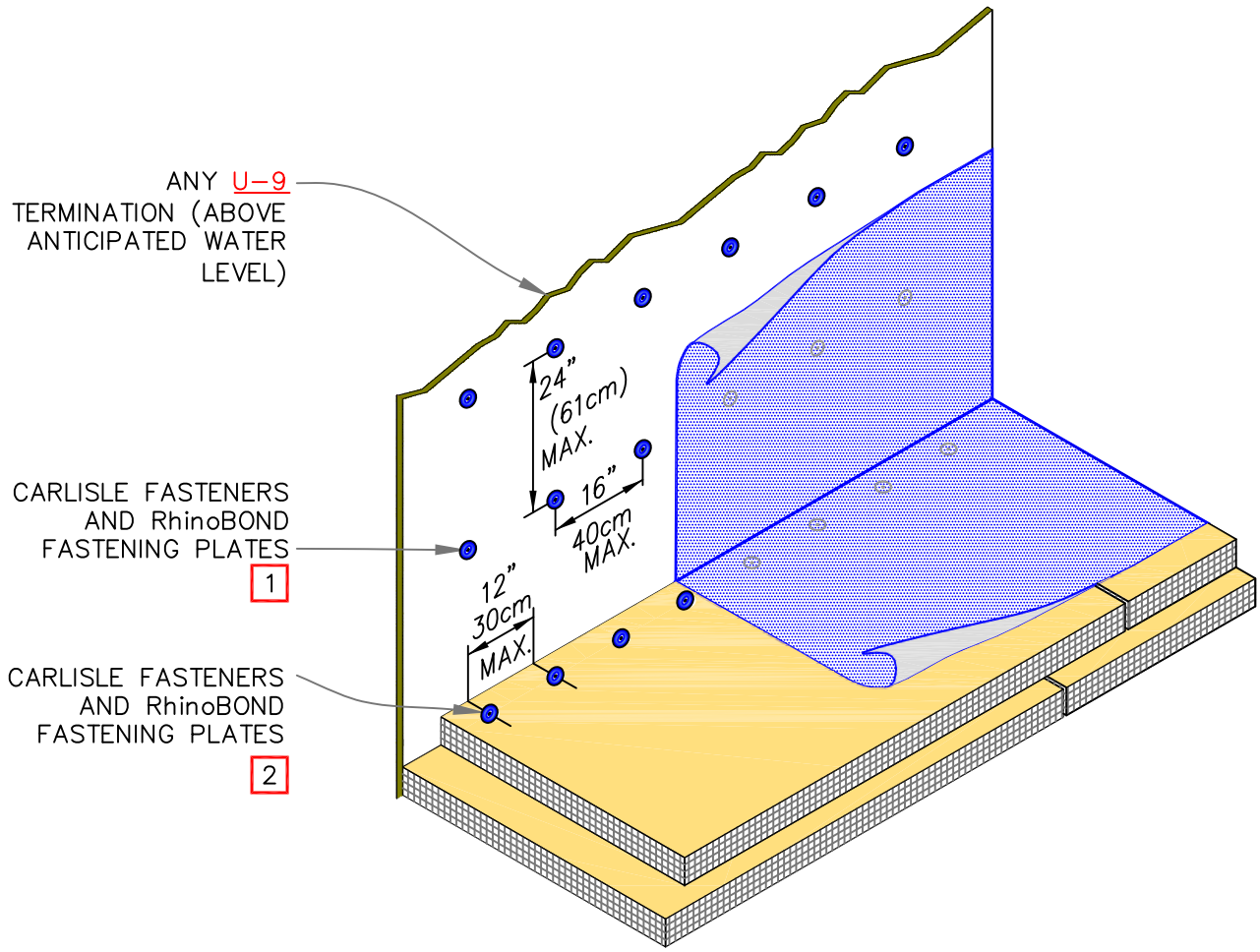
2. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ANGLE CHANGE SECUREMENT METHOD WITH RhinoBond PLATES

For additional information, refer to Specifications

DETAIL NO.
RB-2
RhinoBond



NOTES:

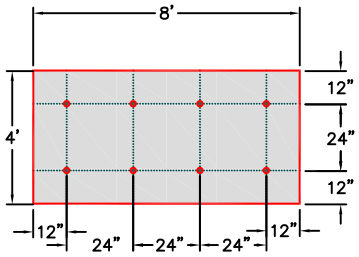
1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

2. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.

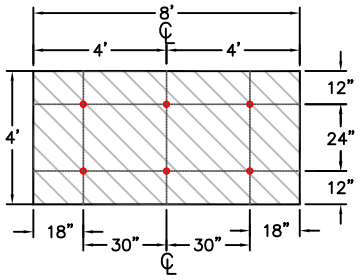
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	RhinoBond WALL ATTACHMENT For additional information, refer to Specifications	DETAIL NO. RB-3 RhinoBond

NOTES:

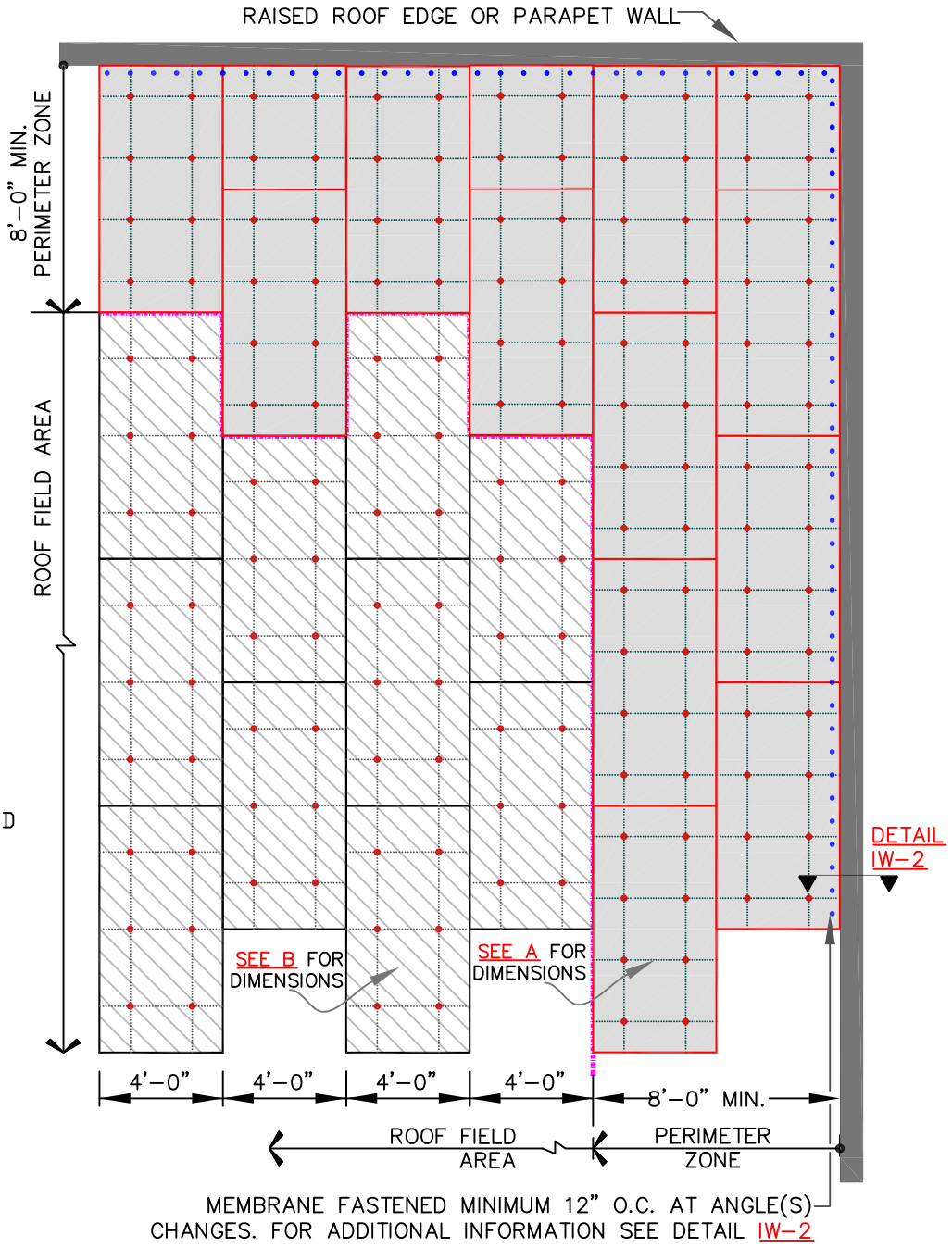
1. Isoweld METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL IW-2

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & INDUCTION WELD FASTENER PLATE

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 — SEE NOTE(S)

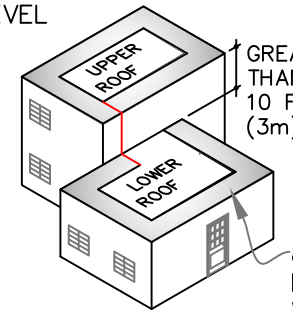
ISOWLED ATTACHMENT METHOD – NUMBER OF FASTENERS AND LOCATIONS

For additional information, refer to Specifications

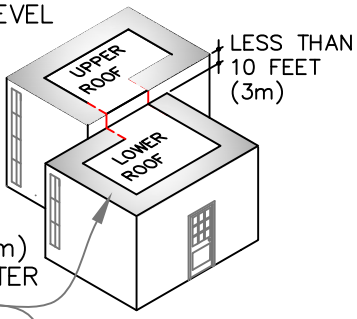
DETAIL NO.
IW-1
Isoweld Attachment

ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

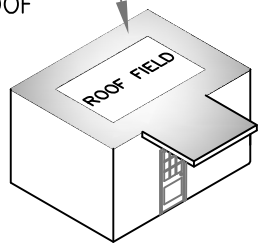
SPLIT LEVEL ROOFS



SPLIT LEVEL ROOFS

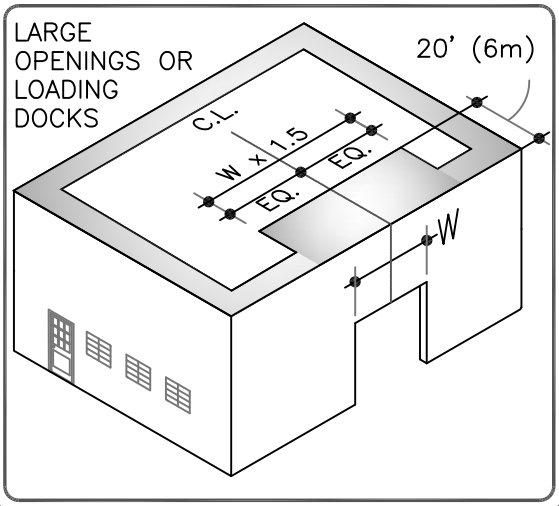


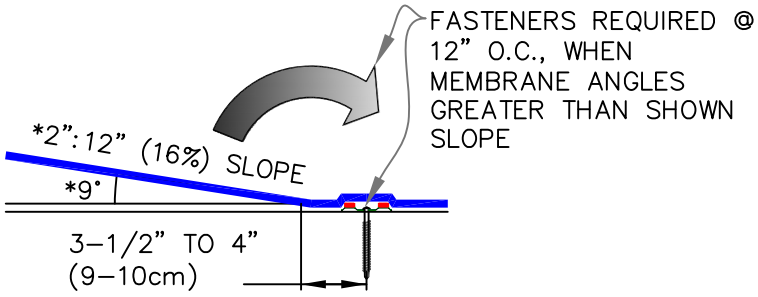
CANOPY ROOF



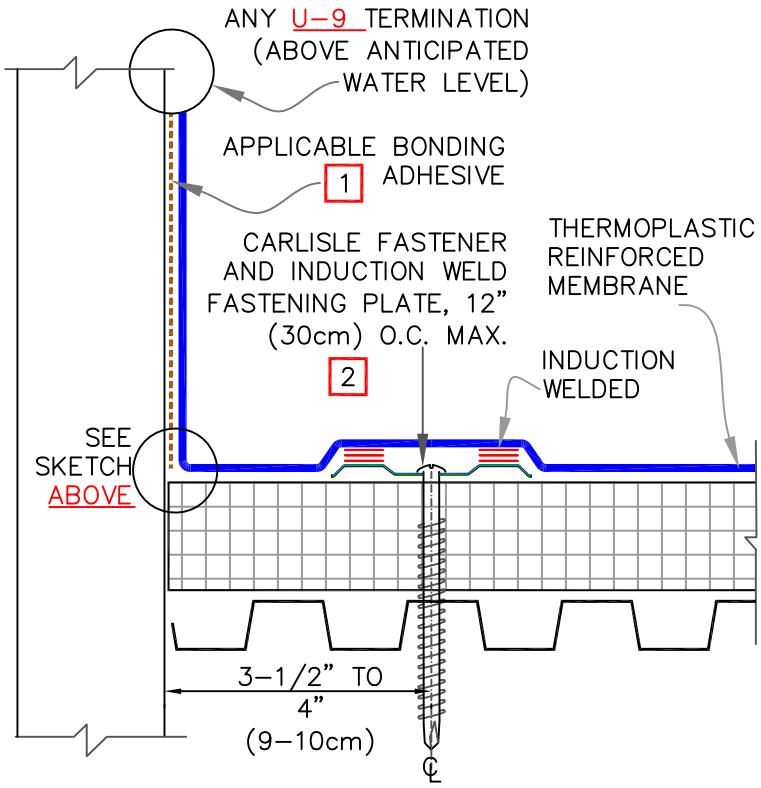
MAIN ROOF EXTENDING ON THE SAME LEVEL

LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



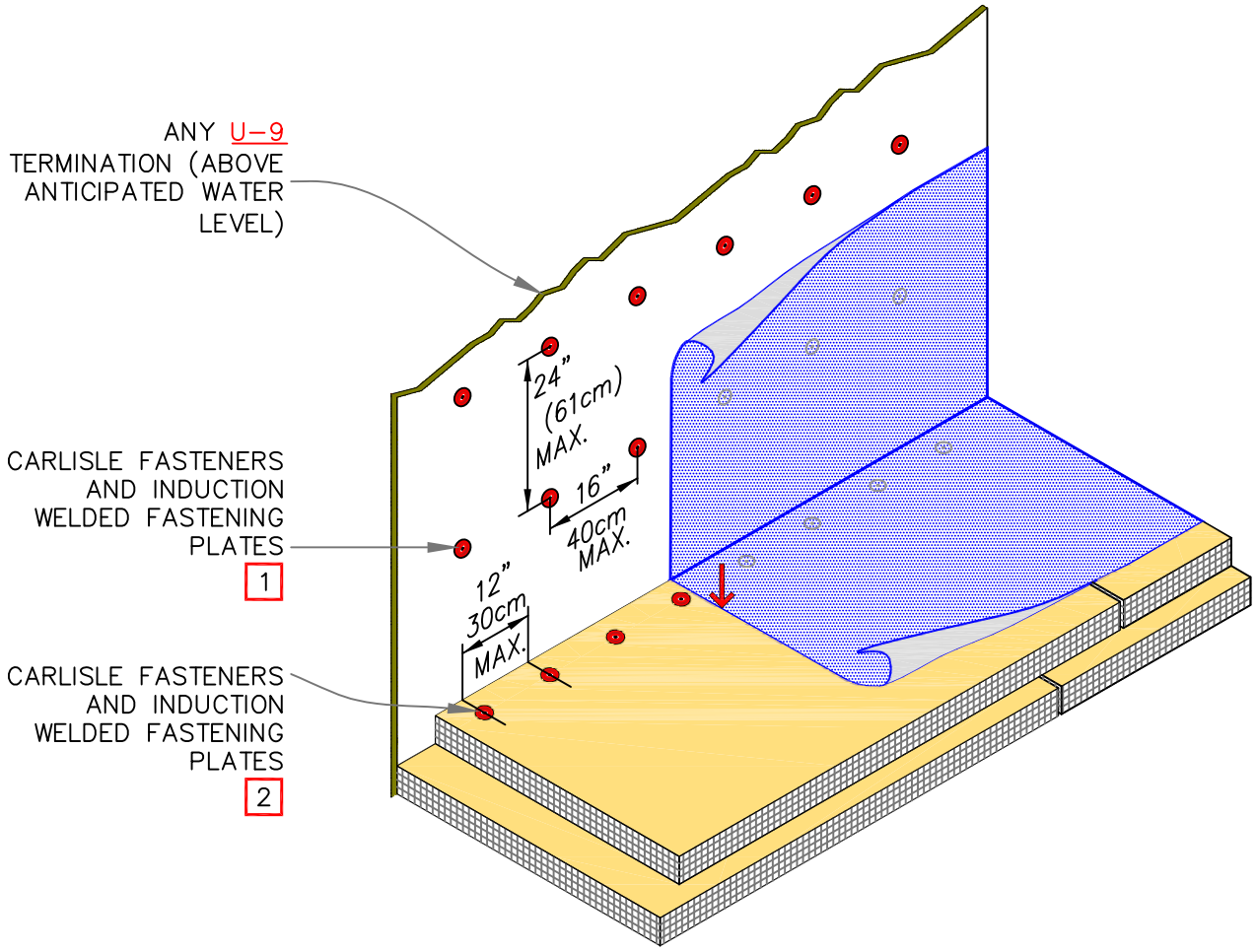
ANGLE CHANGE SECUREMENT

NOTES:

1. SURE–WELD MEMBRANE REQUIRES SURE–WELD BONDING ADHESIVE AND SURE–FLEX MEMBRANE REQUIRES SURE–FLEX BONDING ADHESIVE.

2. HP–X FASTENERS AND INDUCTION WELD PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	ANGLE CHANGE SECUREMENT METHOD WITH ISOWELD PLATES For additional information, refer to Specifications	DETAIL NO. IW–2 Isoweld Attachment

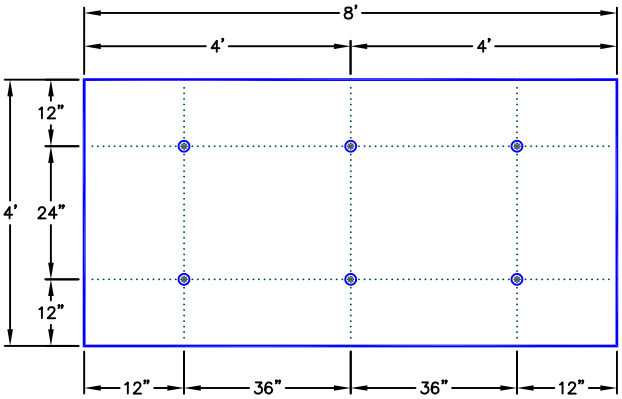


NOTES:

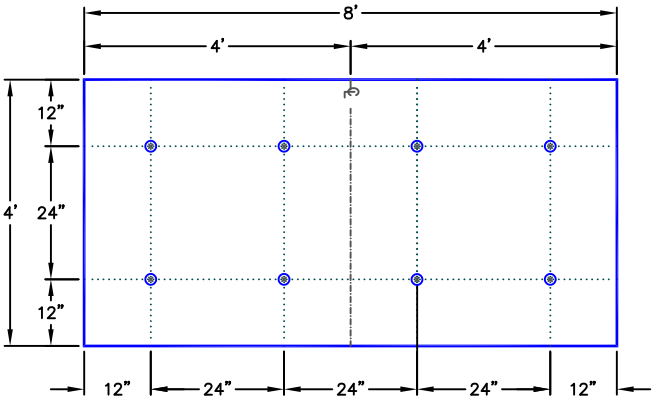
1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

2. HP-X FASTENERS ARE REQUIRED OVER STEEL AND WOOD DECKS.

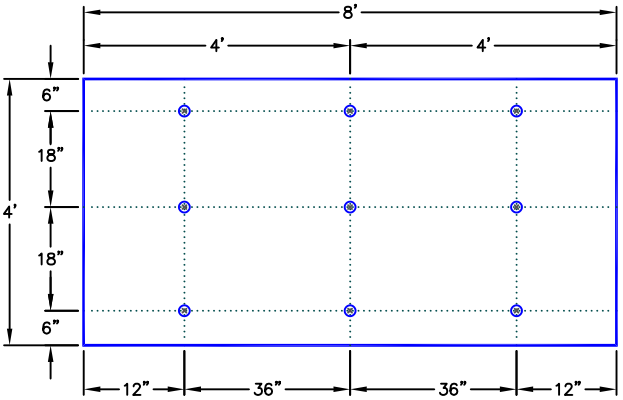
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	ISOWELD WALL ATTACHMENT For additional information, refer to Specifications		DETAIL NO. IW-3 Isoweld Attachment



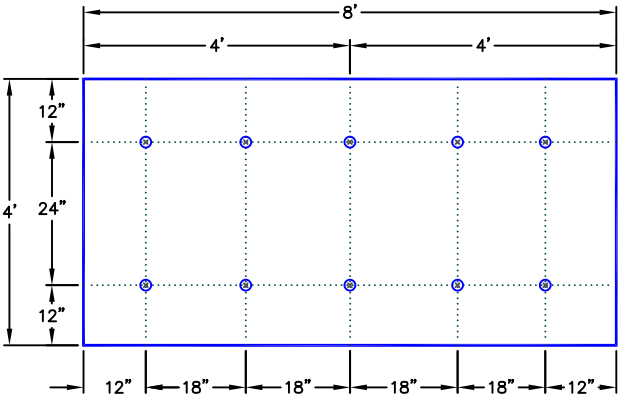
6 FASTENERS PER 4'X8' BOARD



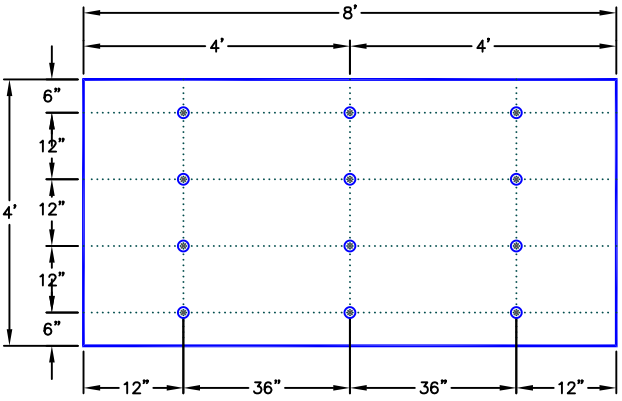
8 FASTENERS PER 4'X8' BOARD



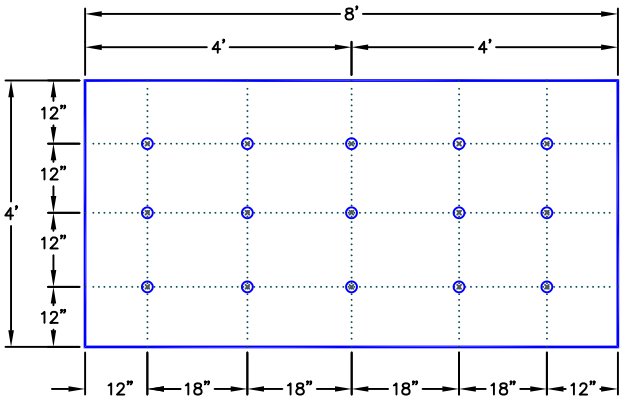
9 FASTENERS PER 4'X8' BOARD



10 FASTENERS PER 4'X8' BOARD



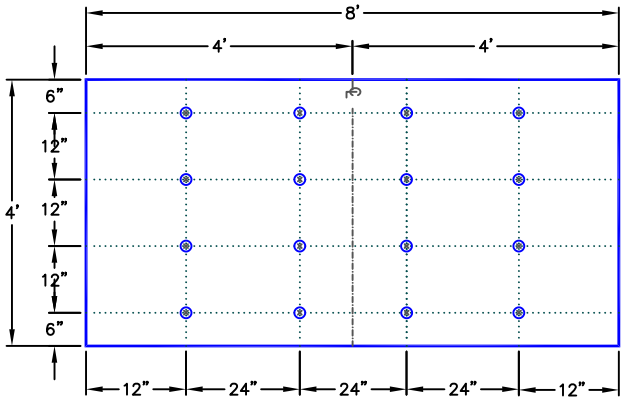
12 FASTENERS PER 4'X8' BOARD



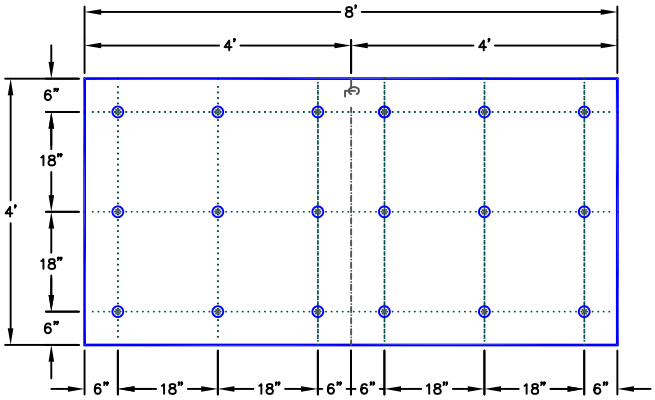
15 FASTENERS PER 4'X8' BOARD

NOTE: FOR FM INSURED PROJECTS, CONSULT FM GLOBAL PRIOR TO INSTALLATION.

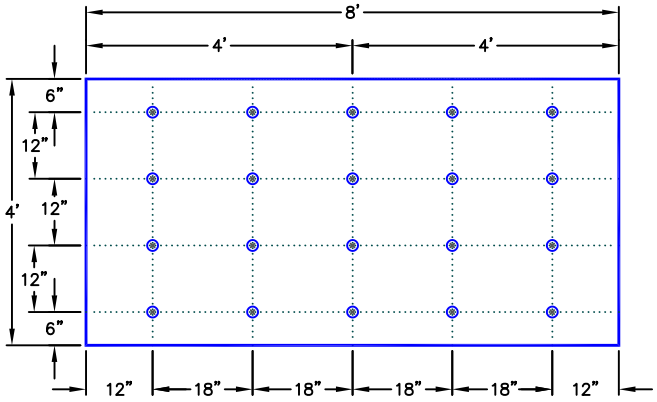
THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–1 Induction Welding



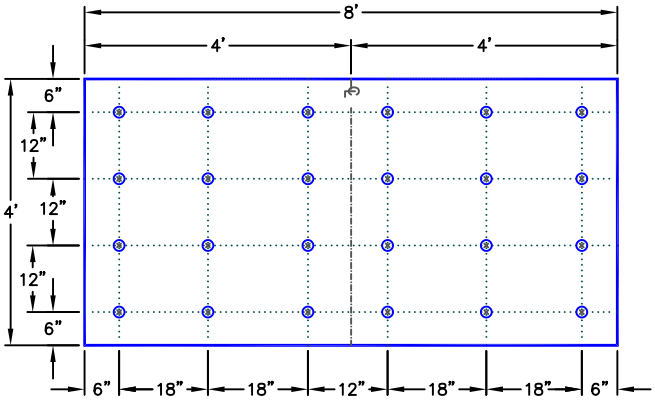
16 FASTENERS PER 4'X8' BOARD



18 FASTENERS PER 4'X8' BOARD



20 FASTENERS PER 4'X8' BOARD



24 FASTENERS PER 4'X8' BOARD

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–2 Induction Welding

Sure-Flex™ PVC Roofing Systems

Sure-Flex™ KEE HP PVC Roofing Systems

Sure-Flex™

Mechanically Fastened and Adhered Roofing Systems

Installation Details

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July 2024

Terminations

Parapet Flashing

Tie-Ins

Inside / Outside Corners

Sealant Pocket

Through-Wall Scupper

Lightning Rods

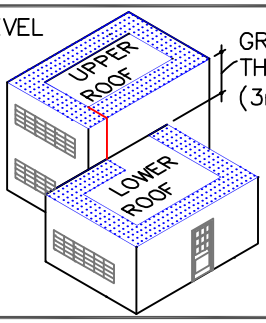
Sleeper

Accessories

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

PERIMETER ZONES

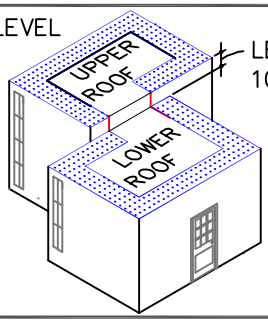
SAME LEVEL ROOF



GREATER THAN 10 FT (3m)

1

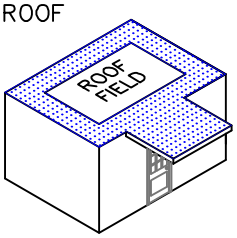
SPLIT LEVEL ROOFS



LESS THAN 10 FT (3m)

2

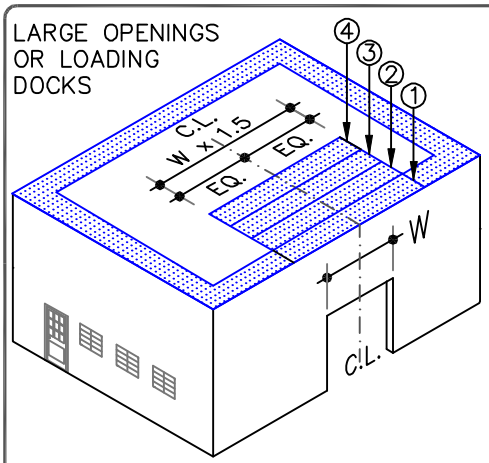
CANOPY ROOF



INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG (PROJECTION ROOF) AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

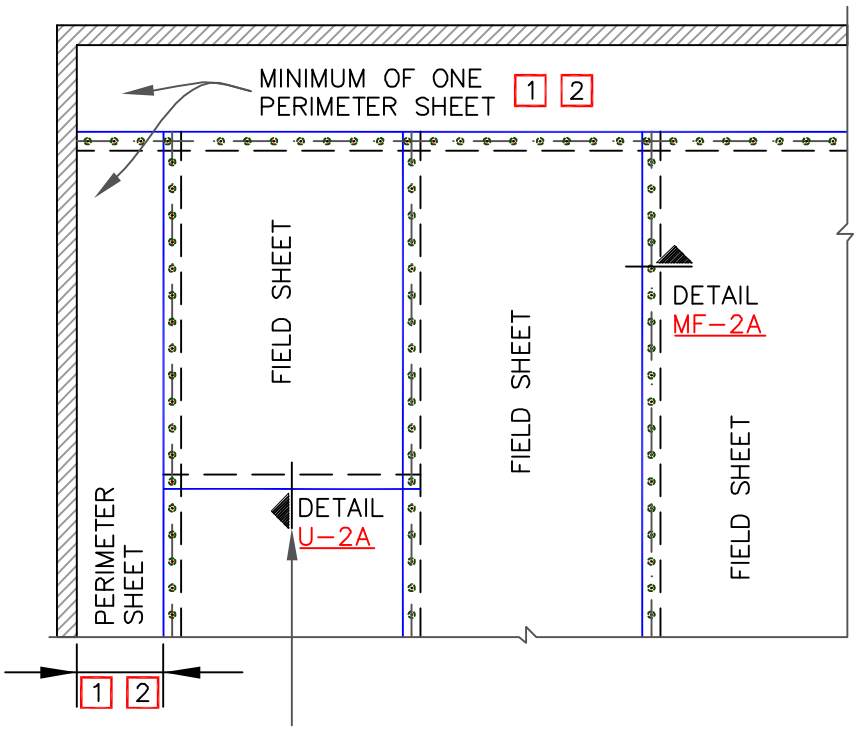
3

LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

4



END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (5cm) MINIMUM. PER DETAIL U–2A

NOTES:

1. PERIMETER SHEETS:

   1.1. WHEN USING 10' (3m) WIDE FIELD SHEETS, 5' (1.5m) WIDE PERIMETER SHEETS ARE UTILIZED.

   1.2. WHEN USING 81" (2.1m) WIDE FIELD SHEETS, 40.5" (1m) WIDE PERIMETER SHEETS ARE UTILIZED.

2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.

CARLISLE SYNTEC SYSTEMS

MEMBRANE SECUREMENT

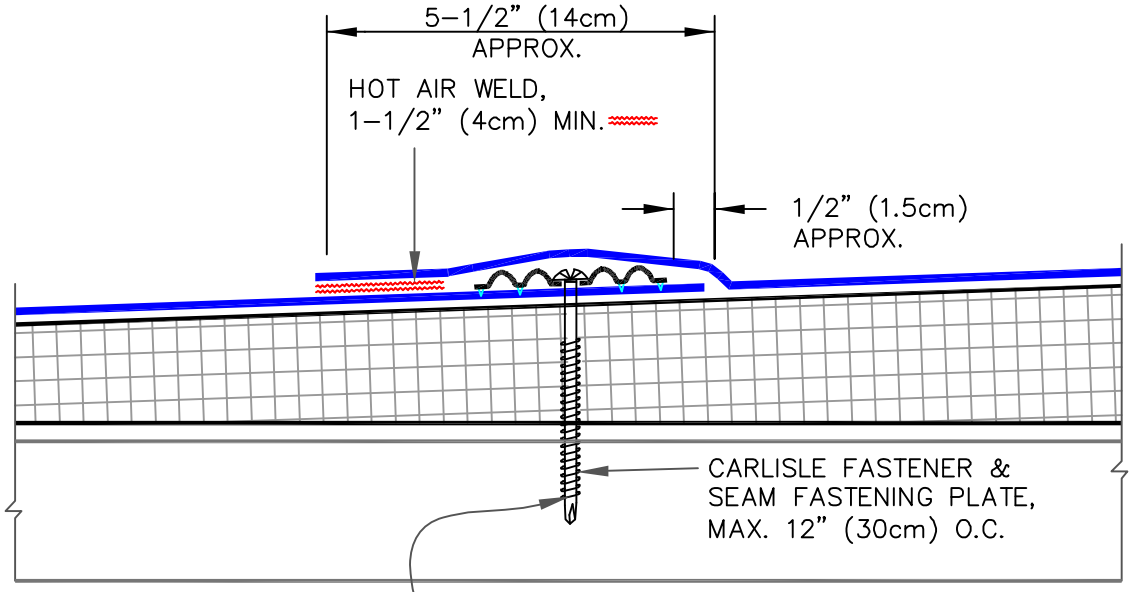
MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO.

MF–2

MF (Mechanically Fastened)

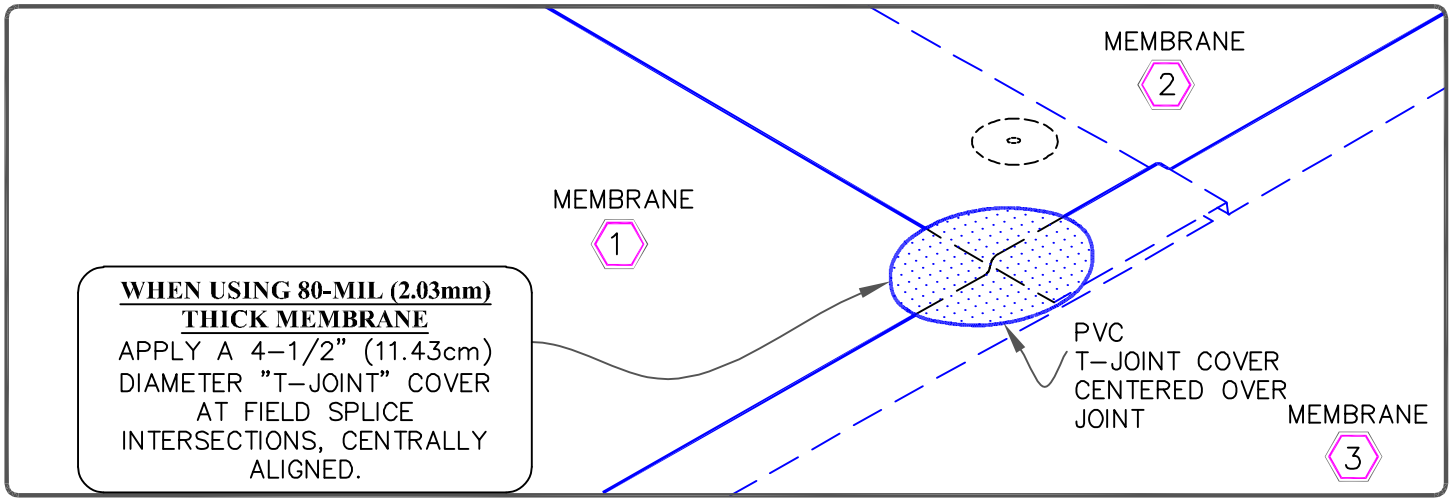


NOTE:

1. POSITION SEAM FASTENING PLATES BEYOND NON–REINFORCED ENCAPSULATED EDGE.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

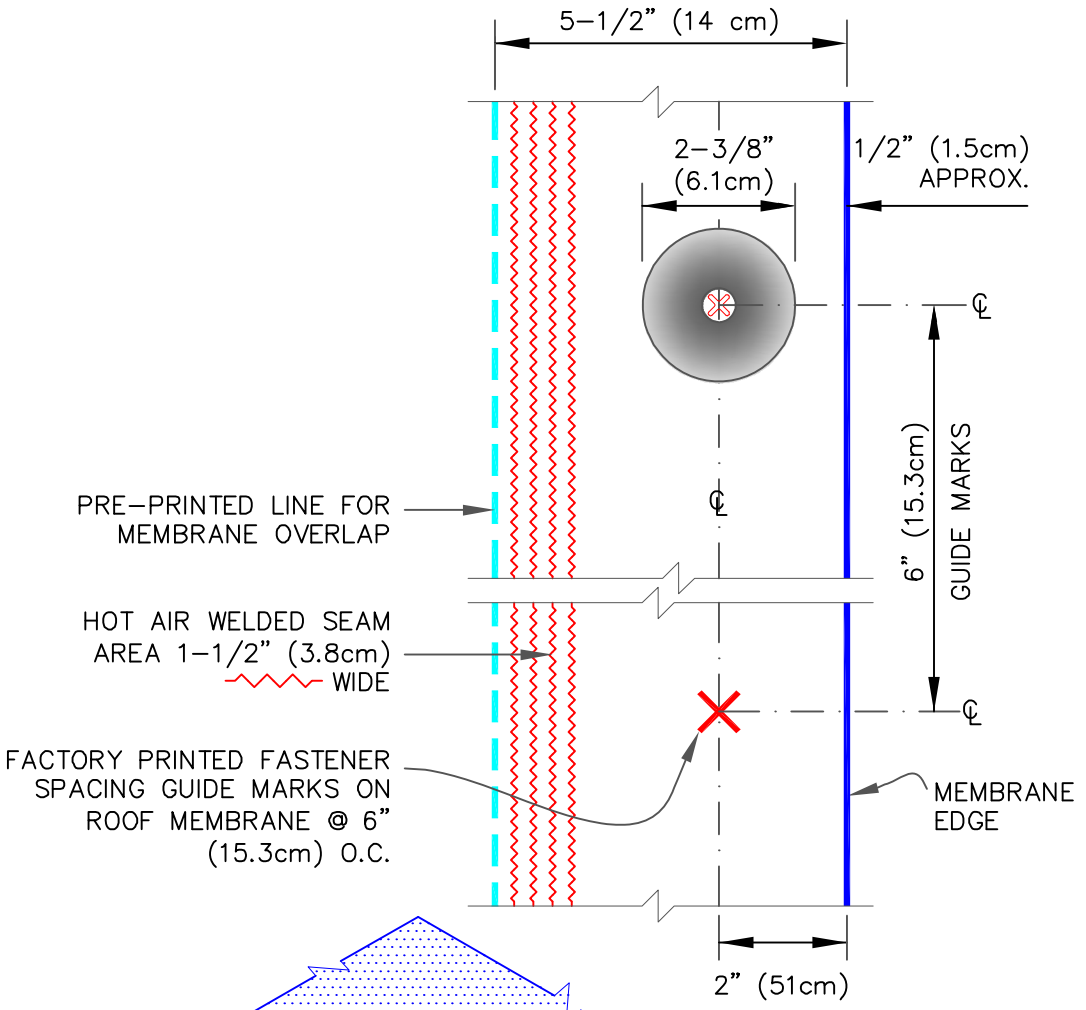


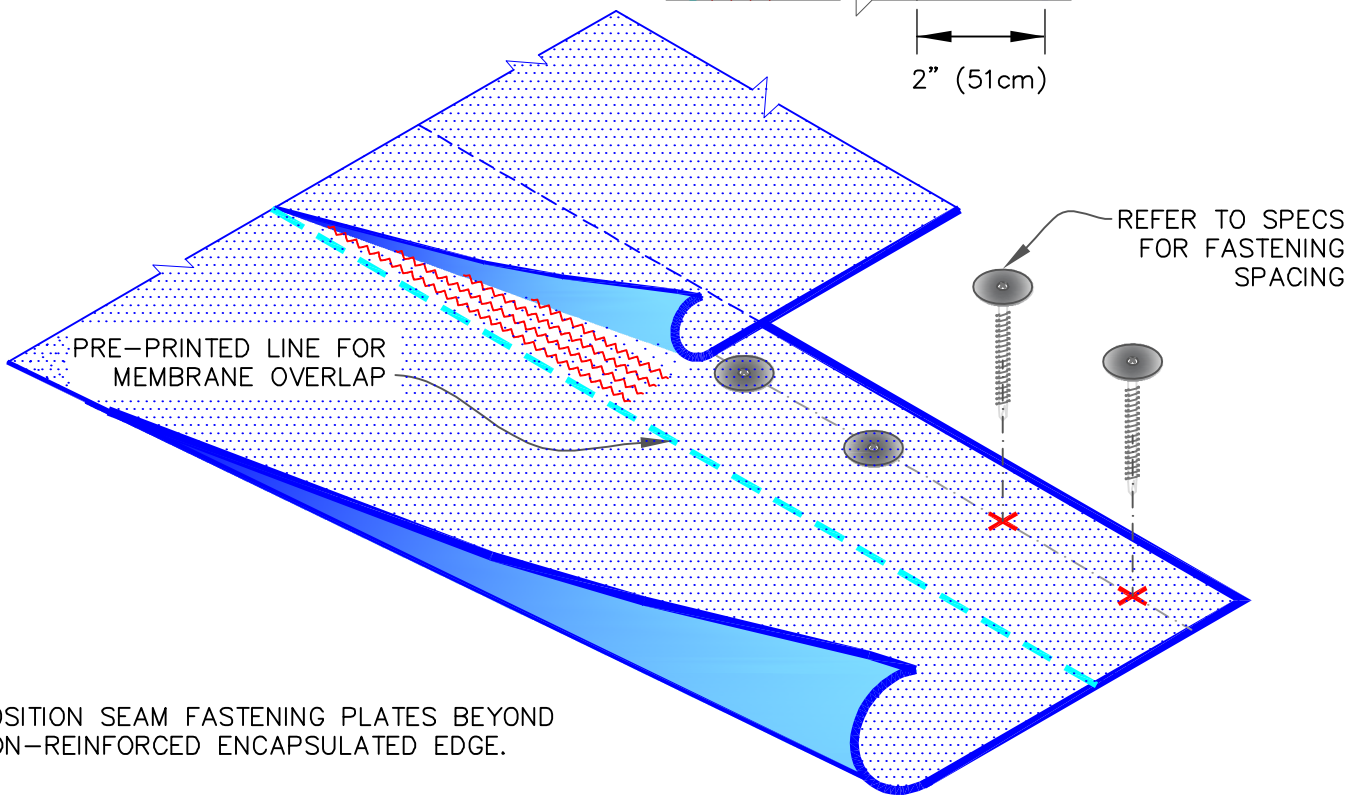
CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM
PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
MF–2A
MF (Mechanically Fastened)





NOTE:

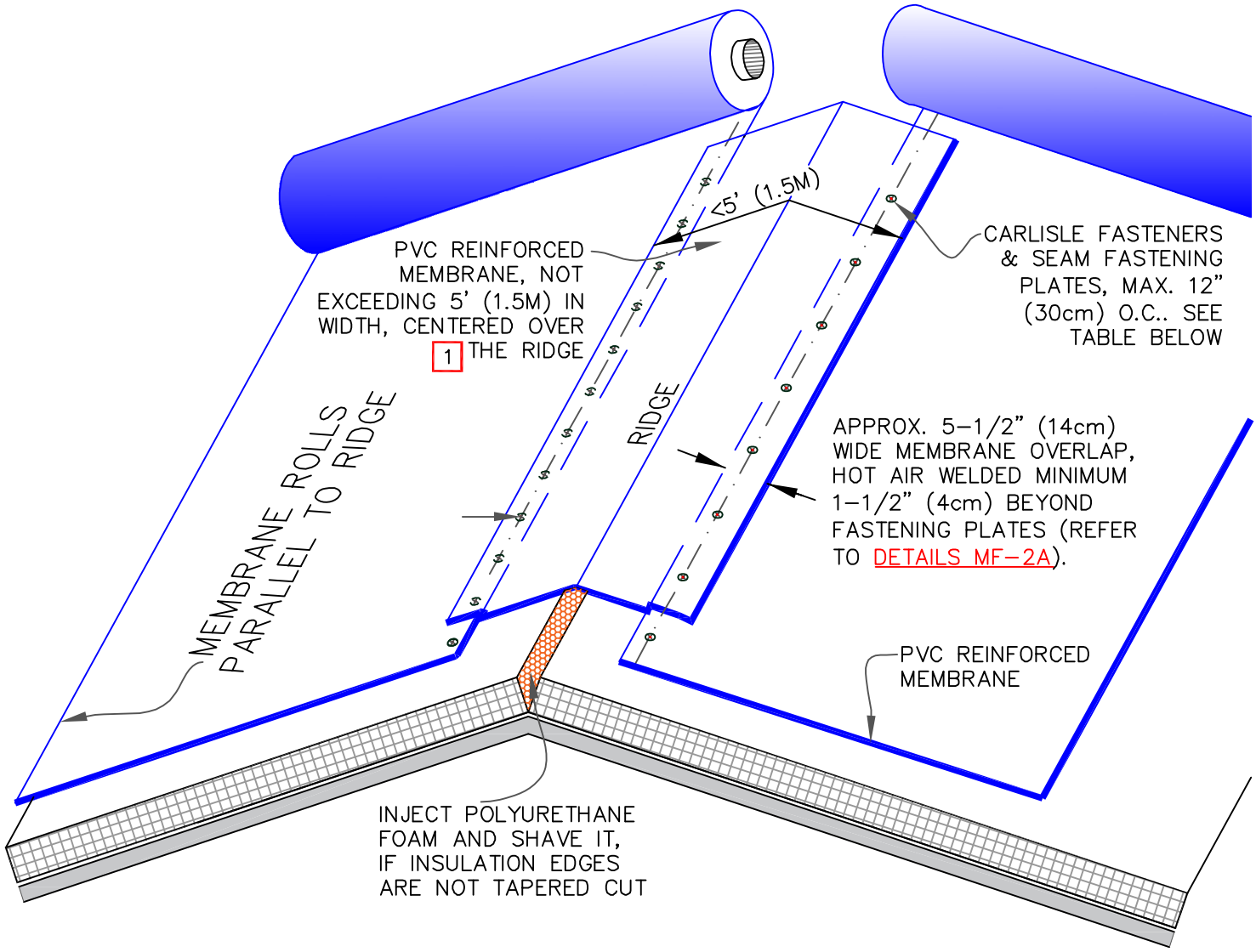
1. POSITION SEAM FASTENING PLATES BEYOND NON–REINFORCED ENCAPSULATED EDGE.

CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM
PAGE 2 OF 2

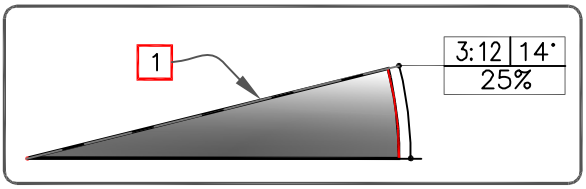
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
MF–2A
MF (Mechanically Fastened)



NOTES

1. RIDGE MEMBRANE ATTACHMENT IS ONLY REQUIRED WHEN ROOF SLOPE EXCEEDS 3" (7.5cm) TO 12" (30.5cm) HORIZONTAL.
2. POSITION FASTENING PLATES 1/2" (1.5cm) MINIMUM TO 1" (2.5cm) MAXIMUM FROM THE EDGE OF THE DECK MEMBRANE.
3. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.



FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

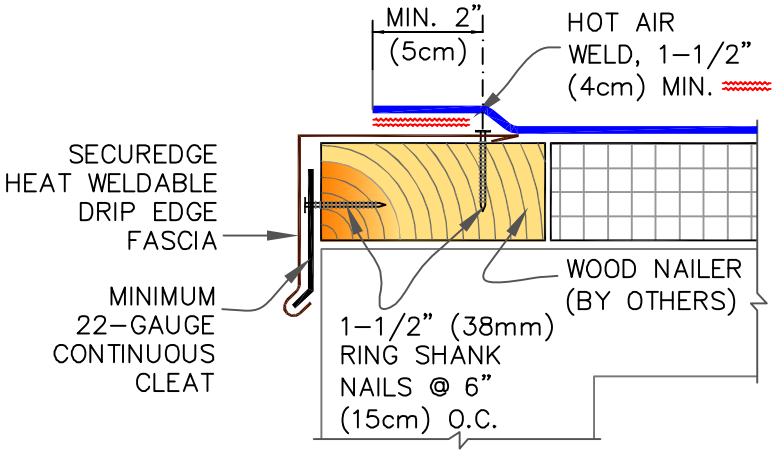
CARLISLE SYNTEC SYSTEMS

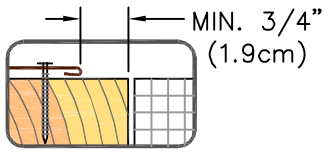
RIDGE MEMBRANE ATTACHMENT

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. MF-22

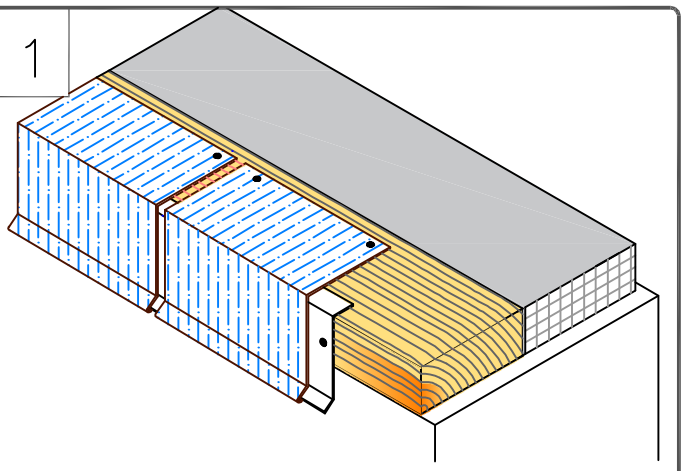
MF (Mechanically Fastened)





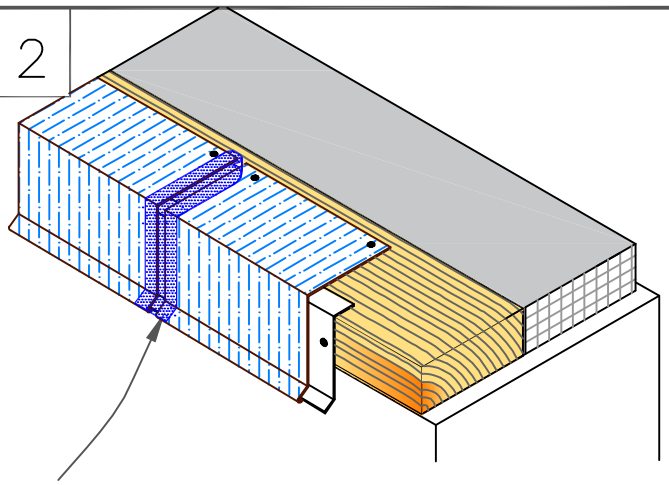
SEQUENCE:
1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.

1



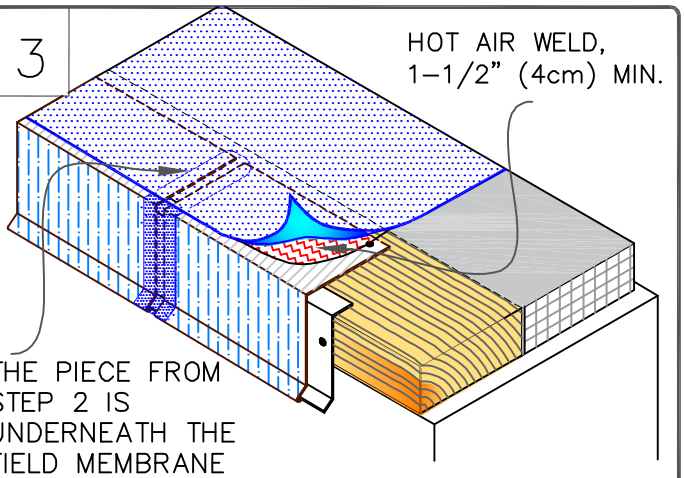
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"–1/4" (0.5–1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



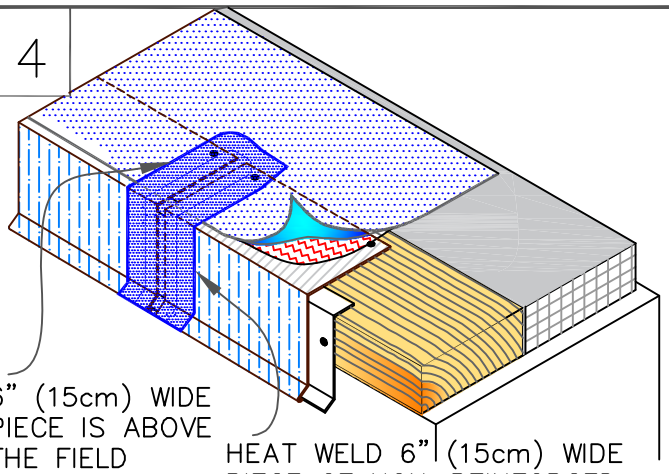
HEAT WELD 3" (7.5cm) WIDE PIECE OF REINFORCED PVC MEMBRANE OVER JOINT

3



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

4



HEAT WELD 6" (15cm) WIDE PIECE OF NON–REINFORCED MEMBRANE OVER JOINT, CENTERED ABOVE STEP 2 PIECE

CARLISLE SYNTEC SYSTEMS

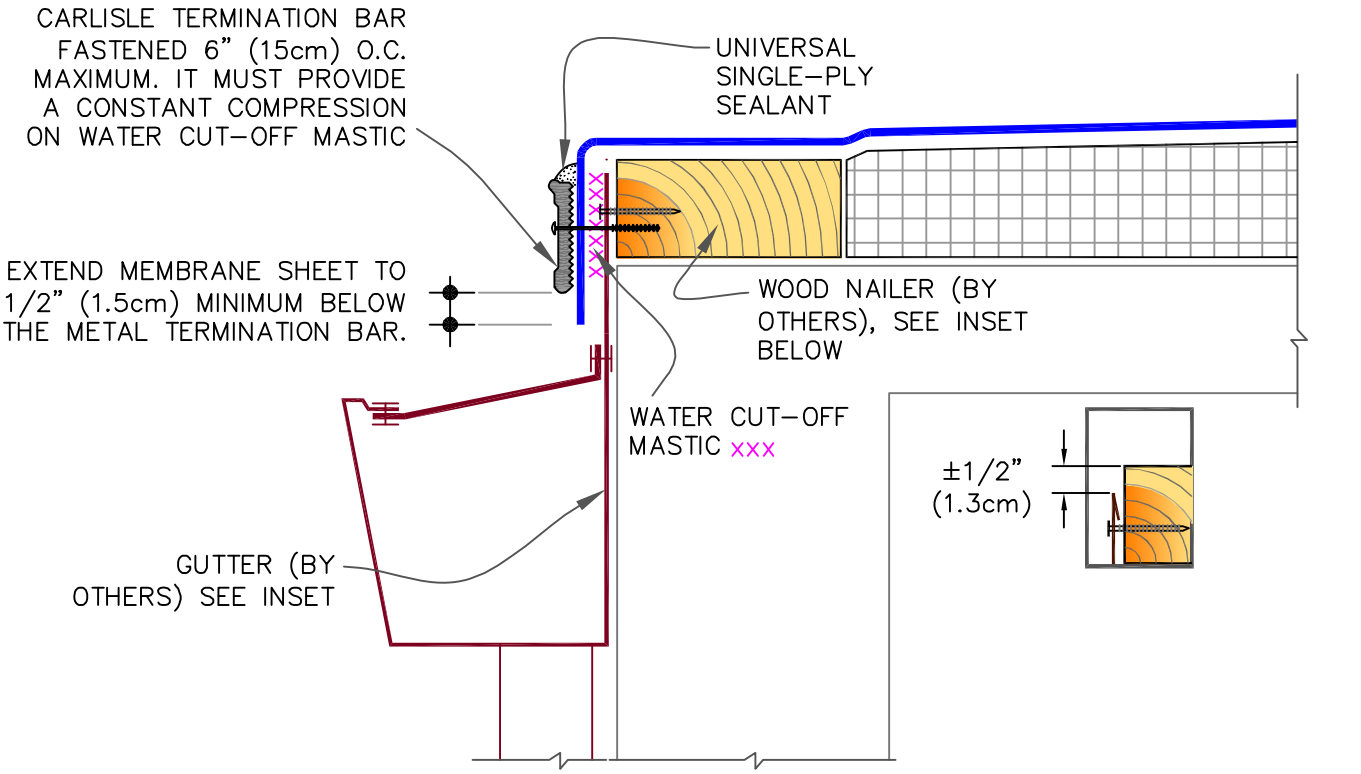
SecurWELD COATED DRIP EDGE FASCIA

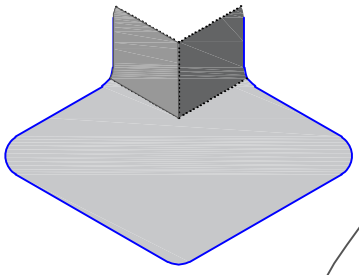
MAXIMUM WARRANTY: 30 YEARS

TP

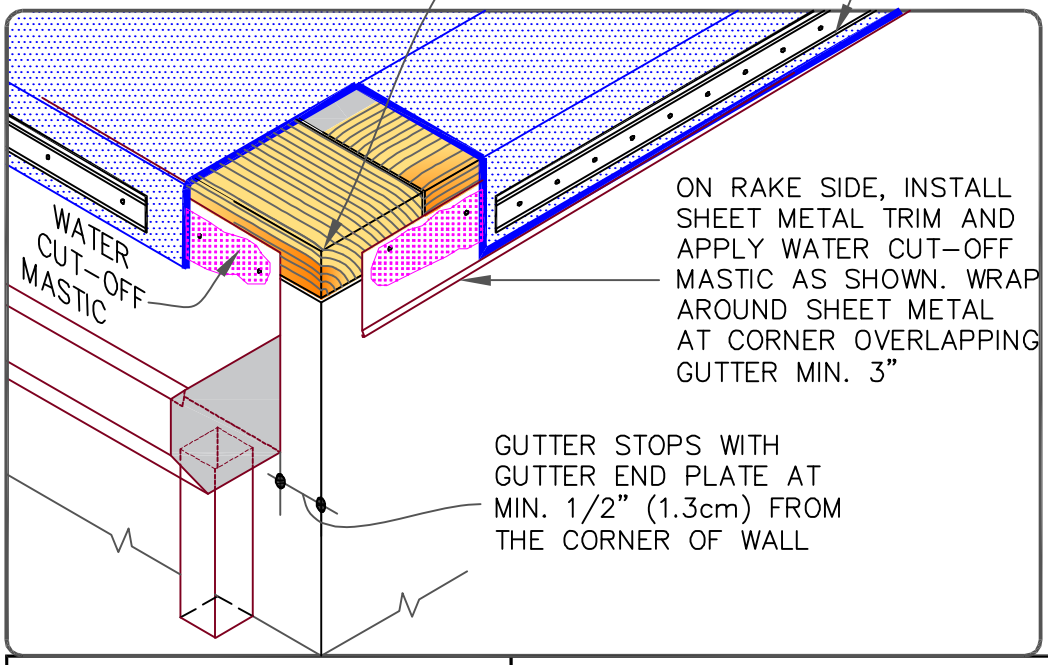
DETAIL NO.
U–1B

U (Universal Detail)





60-MIL (1.52mm) THICK PVC, UNIVERSAL CORNER CAN BE USED FOR AT TOP CORNER. CUT AS SHOWN IN DETAIL U-15G



DESIGNER MAY USE CARLISLE SECUREDGE TERMINATION BAR WITH FASCIA COVER ALSO

COLORED COVER

CARLISLE SYNTEC SYSTEMS

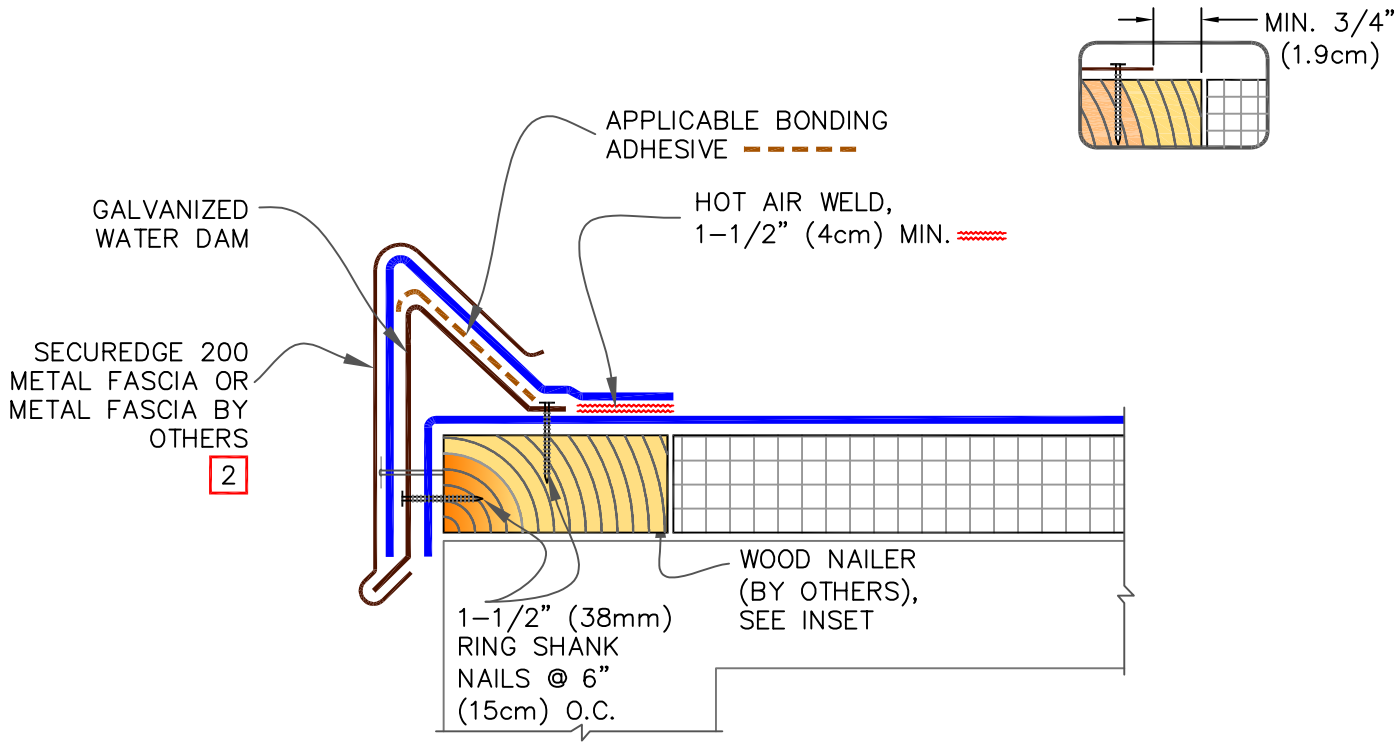
METAL BAR EDGE TERMINATION

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

U-1C

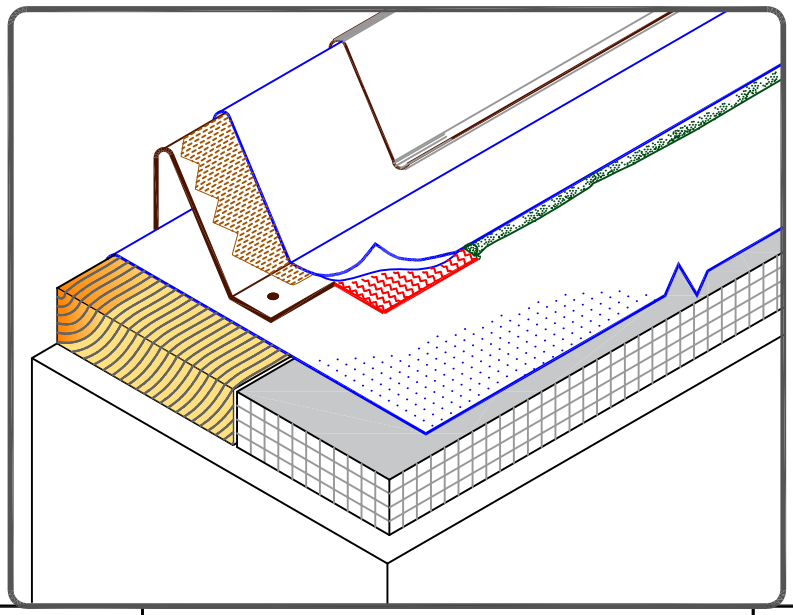
U (Universal Detail)



NOTES:

1. REFER TO SecurEdge 200 INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.

2. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



CARLISLE SYNTEC SYSTEMS

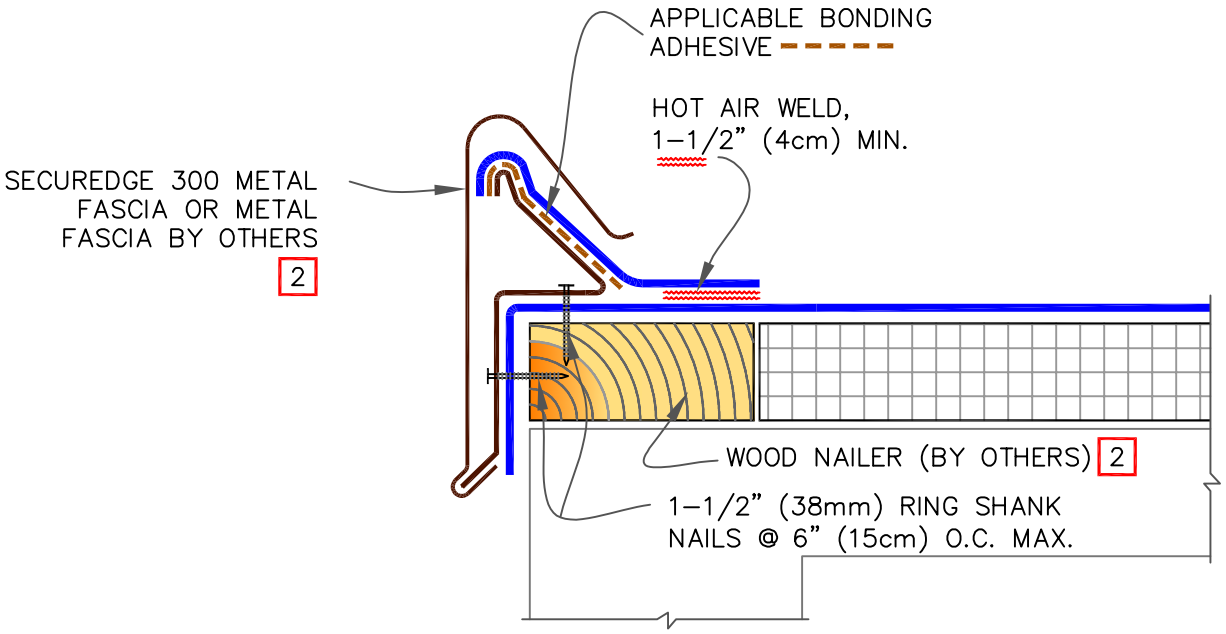
CARLISLE SecurEdge 200

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

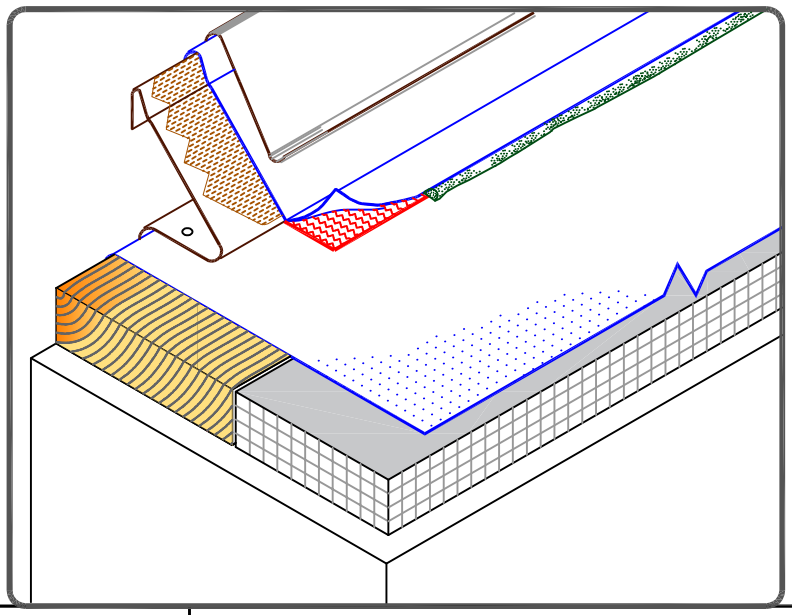
U–1D

U (Universal Detail)



NOTES:

1. REFER TO SECUREDGE 300 INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF SECUREDGE DECK FLANGE.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



CARLISLE SYNTEC SYSTEMS

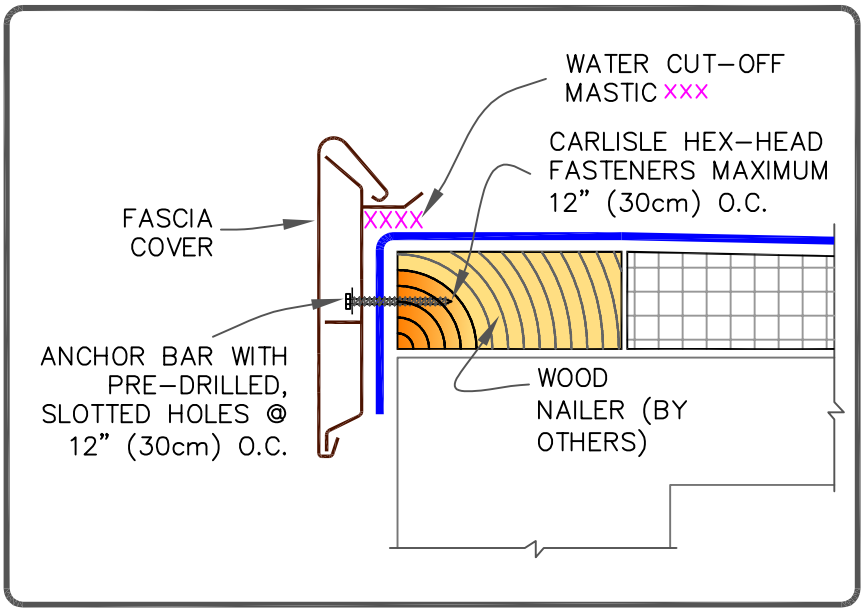
CARLISLE SecurEdge 300

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

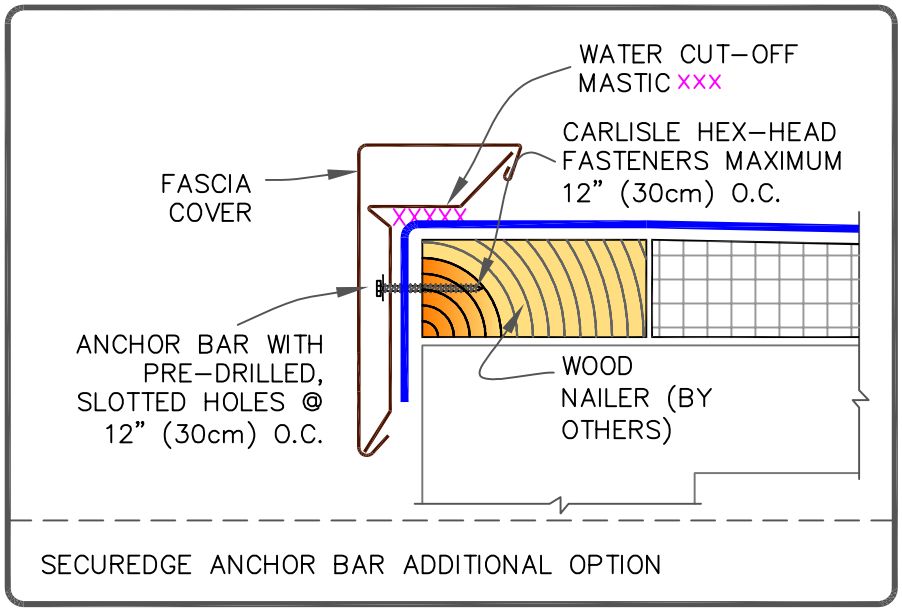
U–1E

U (Universal Detail)

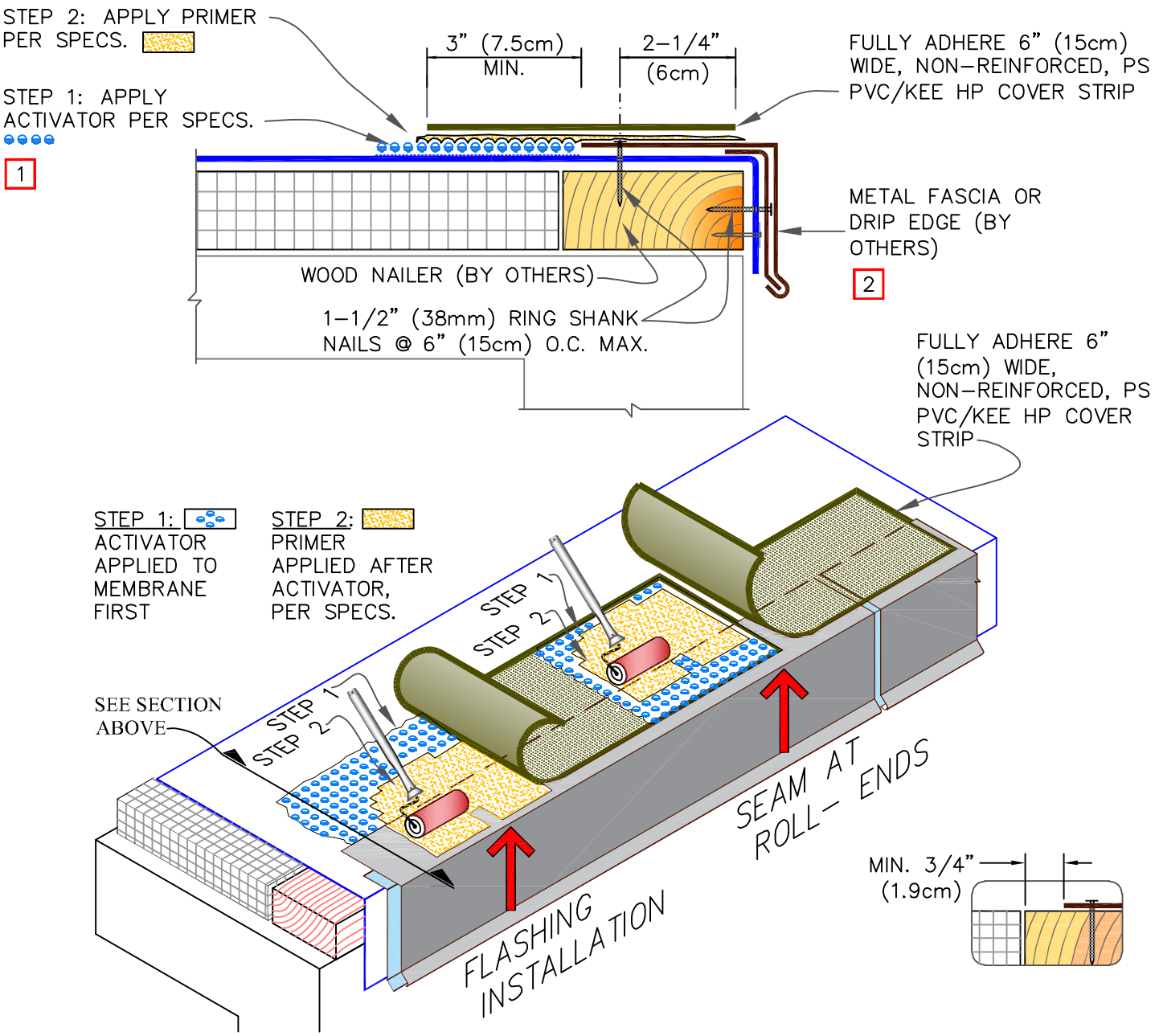


NOTES:

1. REFER TO SECUREDGE INSTALLATION INSTRUCTION MANUAL FOR THE STEP BY STEP INSTALLATION PROCEDURES AND FOR THE VARIOUS PRODUCT FEATURES AVAILABLE.
2. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SECUREDGE MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.
3. ENSURE ROOF SLOPES AWAY FROM SECUREDGE .



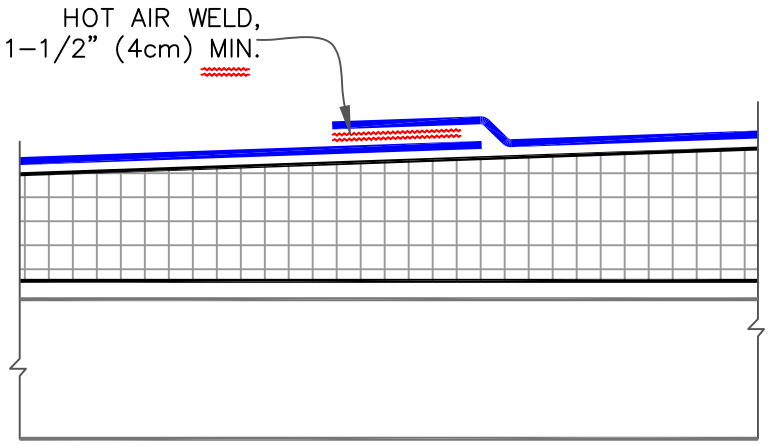
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 2000 & 3000	TP	DETAIL NO. U–1F
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

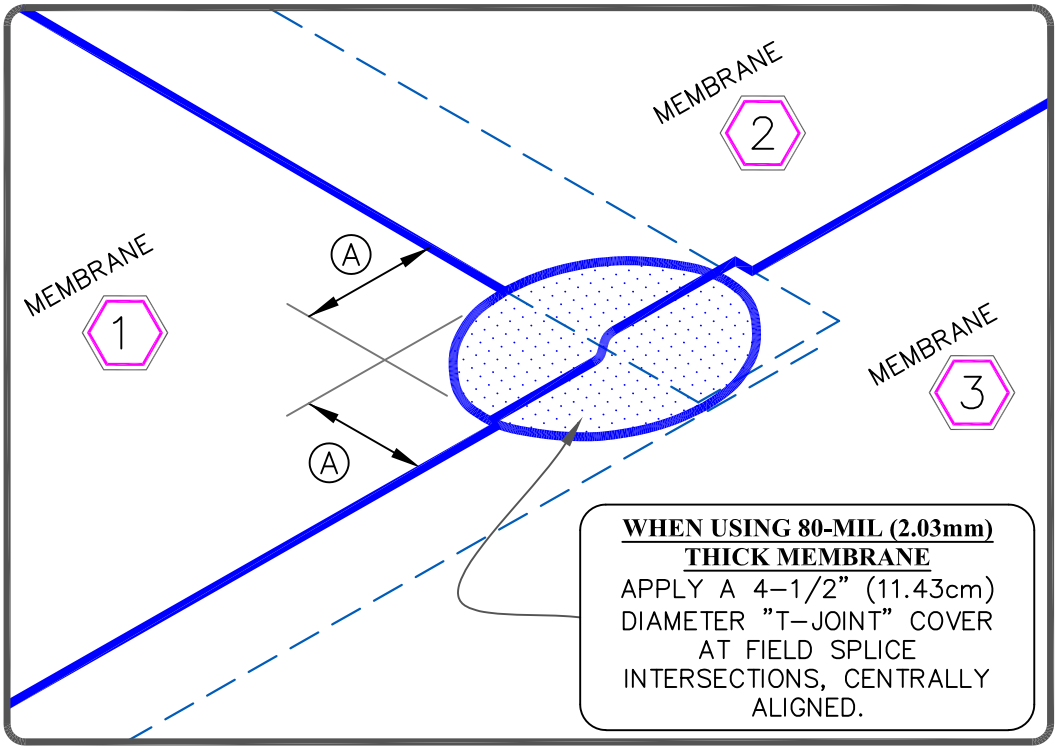


NOTES:

1. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH PVC & KEE HP MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.
2. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
3. TO ENSURE PVC PRESSURE-SENSITIVE COVER STRIP CONFORMS TO STEPS-OFF, HEAT COVER STRIP AT SPLICE INTERSECTIONS PRIOR TO ROLLING.
4. THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE. REFER TO COATED EDGE METAL DETAILS.

CARLISLE SYNTEC SYSTEMS	PRESSURE-SENSITIVE PVC/KEE HP COVER STRIP	DETAIL NO. U-1G
	MAXIMUM WARRANTY: 30 YEARS	U (Universal Detail)





DIMENSIONS		cm	
A	2–1/4"	6	MIN.

NOTE:

1. WHEN USING 60–MIL (1.52mm) MEMBRANE, MAXIMUM WARRANTY IS 20 YEARS.

CARLISLE SYNTEC SYSTEMS

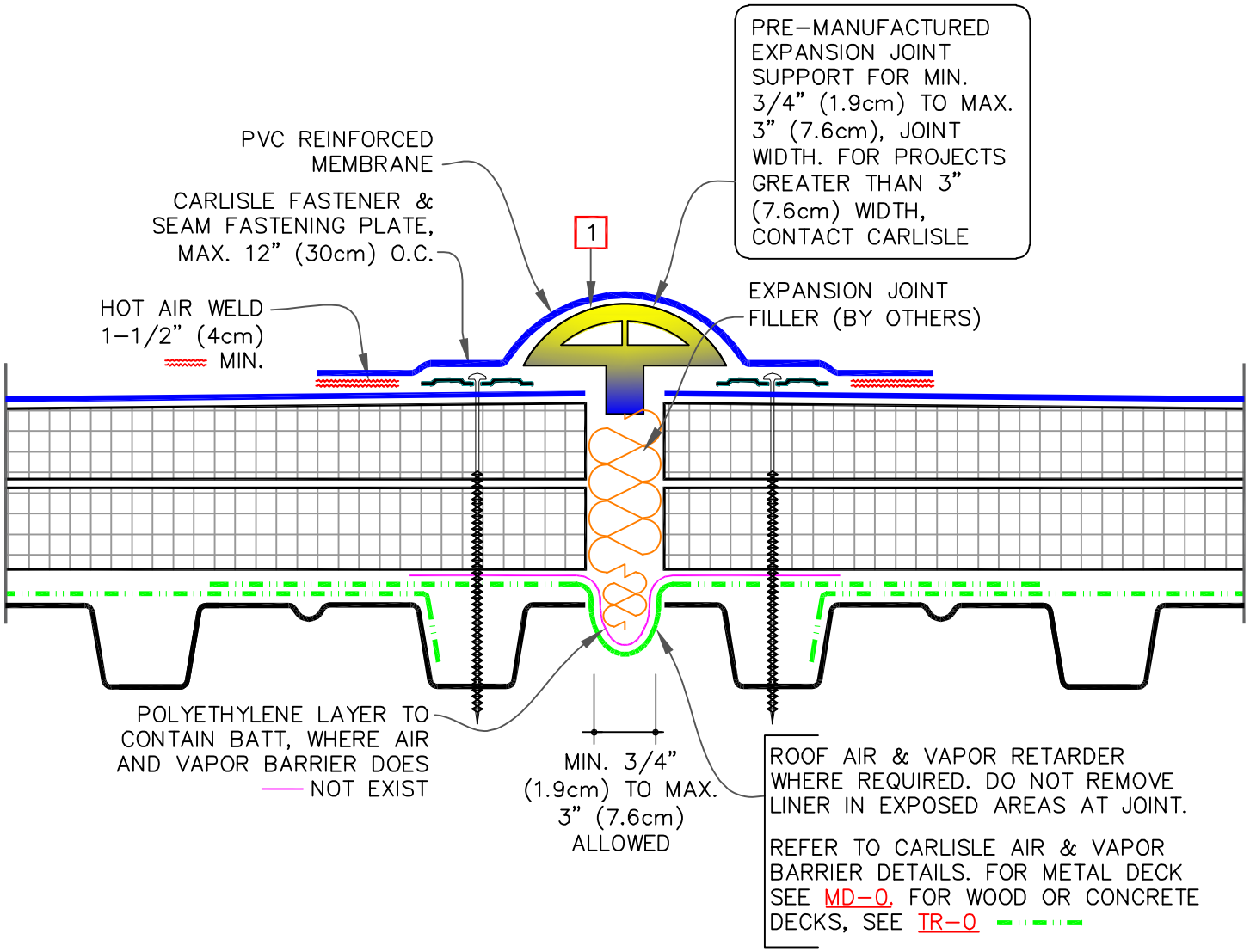
PVC/KEE HP MEMBRANE SPLICE

MAXIMUM WARRANTY: 30 YEARS (SEE NOTE 1)

DETAIL NO.

U–2A

U (Universal Detail)



NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. WHEN THE EXPANSION JOINT INTERSECTS WITH A COATED METAL DRIP EDGE, THEN COATED METAL SHOULD BE GAPPED AND THE U–1B DETAIL BE FOLLOWED. DRIP EDGE BY OTHERS SHOULD ALSO BE GAPPED.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

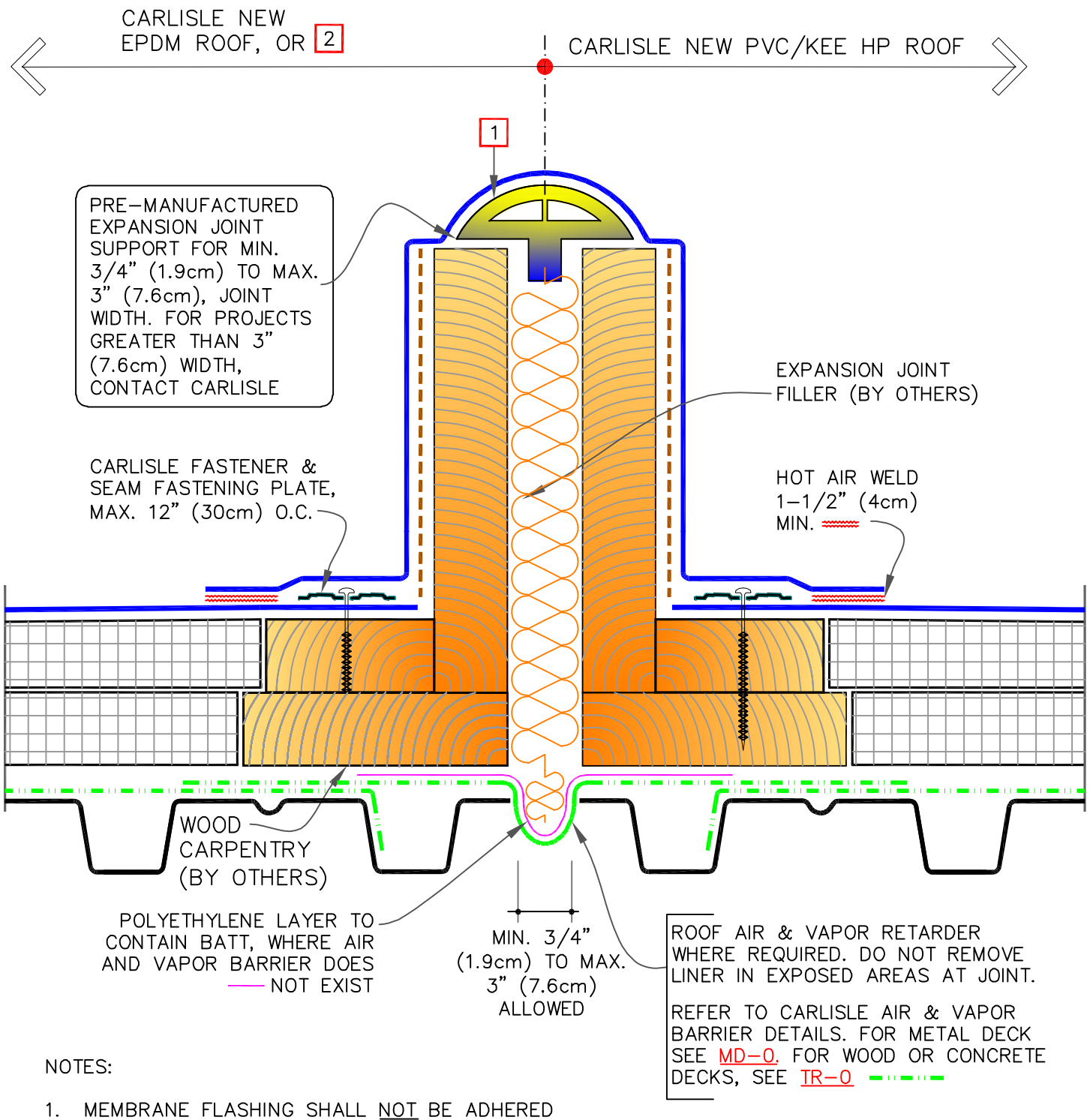
CARLISLE SYNTEC SYSTEMS

DECK–TO–DECK ROOF EXPANSION JOINT

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–3A

U (Universal Detail)



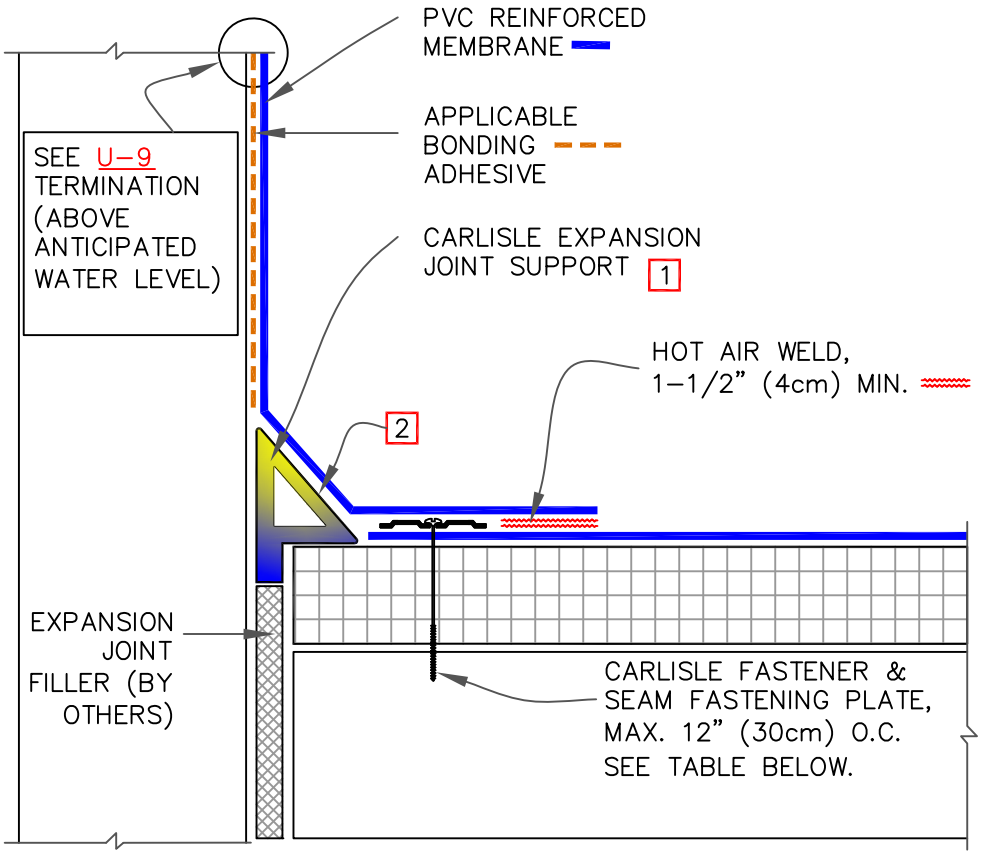
NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. IN CASE THE ROOF TYPE IS DIFFERENT, DESIGNER TO PROVIDE ROOF TYPE AND ITS CONDITION TO CARLISLE TO DEVELOP TIE-IN DETAIL ON THIS SIDE ACCORDINGLY.

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK CURBED ROOF EXPANSION JOINT	TP	DETAIL NO. U-3A.1
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

CAUTION

WHEN A WARRANTY WIND SPEED GREATER THAN 90MPH IS SPECIFIED, CARLISLE FASTENERS AND SEAM FASTENING PLATES SHALL NOT EXCEED 6" (15cm) ON CENTER FOR ADHERED MEMBRANE ASSEMBLIES.



NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (2cm) AND SHALL NOT EXCEED 2" (5cm).
2. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

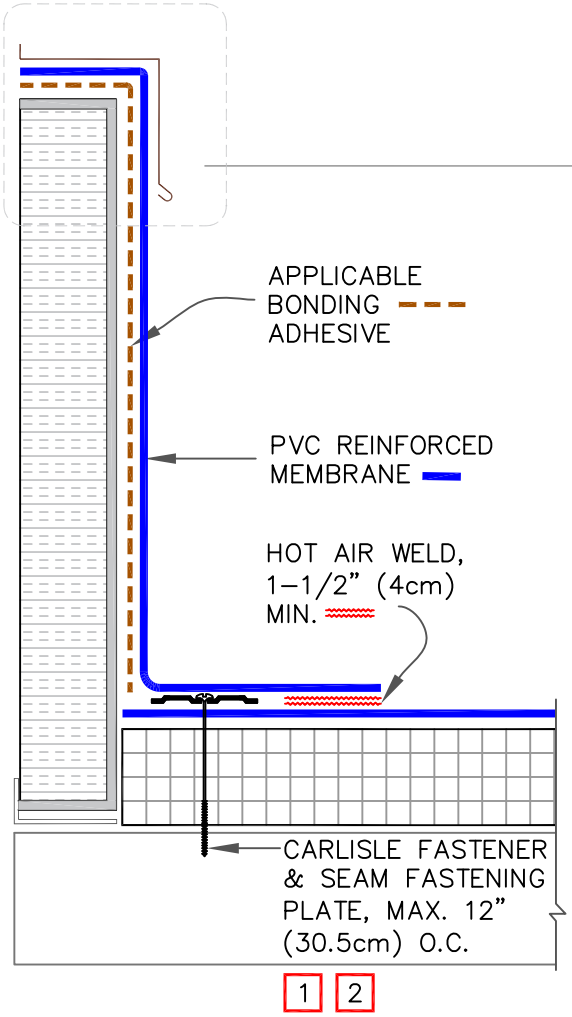
DECK-TO-WALL EXPANSION JOINT

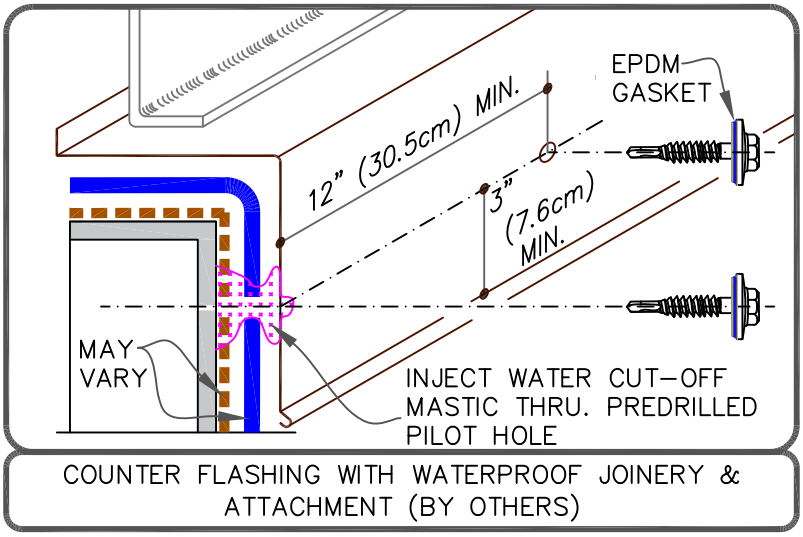
MAXIMUM WARRANTY: 30 YEARS

TP

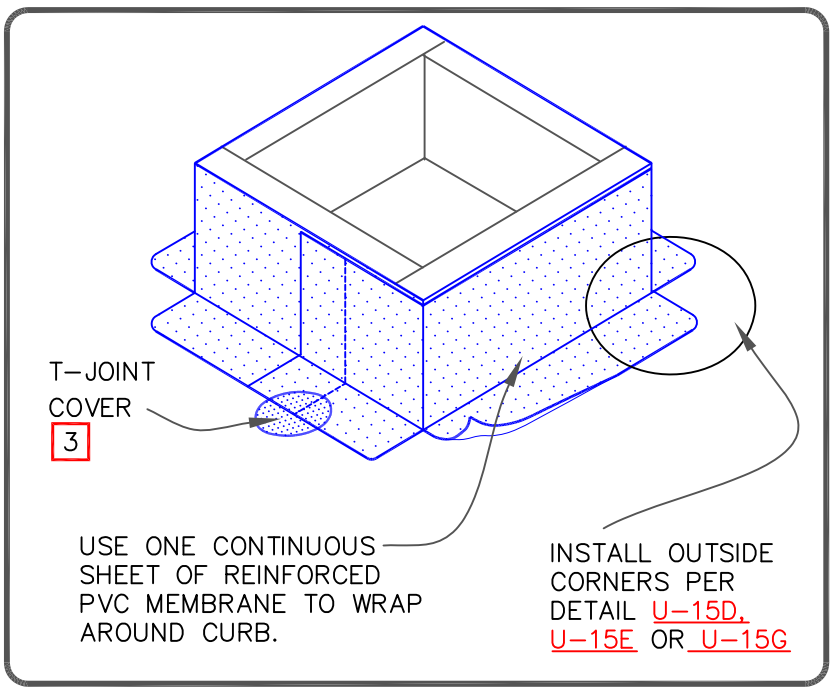
DETAIL NO. U-3B

U (Universal Detail)





PVC ONLY (NOT KEE HP)
IN LIEU OF BONDING ADHESIVE, THE CURB FLASHING MAY BE INSTALLED IN CAV GRIP PVC.



NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
2. MECHANICAL SECUREMENT MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
3. WHEN USING 80 MIL (2.03mm) THICK CURB FLASHING, THE INTERSECTIONS BETWEEN SPLICES MUST OVERLAID WITH A PVC "T-JOINT" COVER.

CARLISLE SYNTEC SYSTEMS

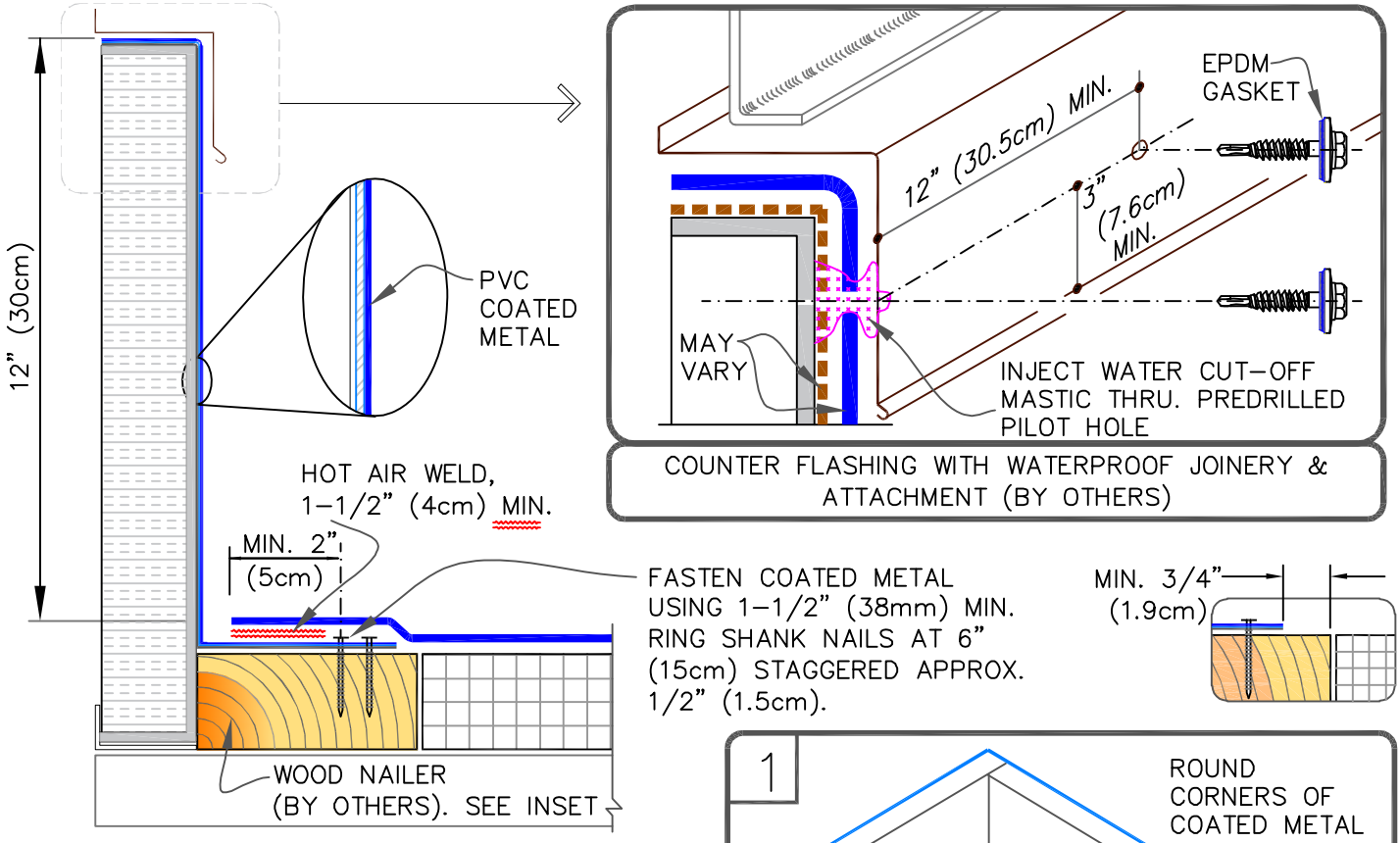
CURB FLASHING WITH PVC MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO.
U-5A

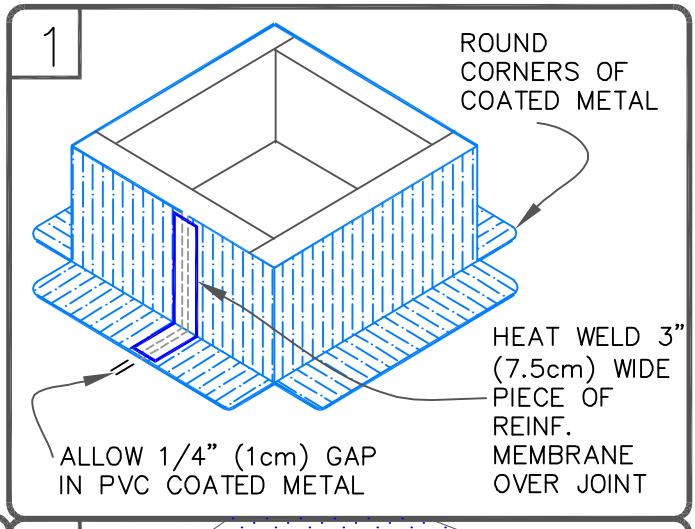
U (Universal Detail)

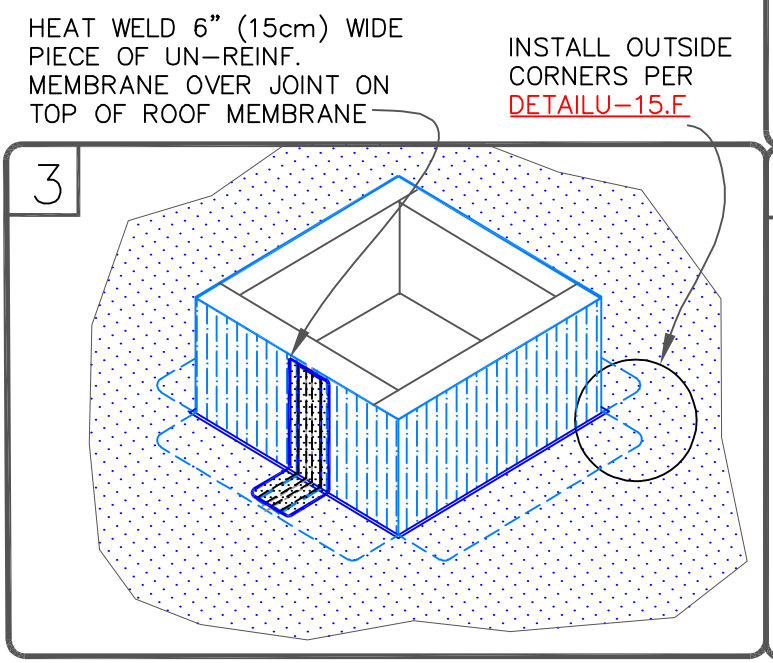


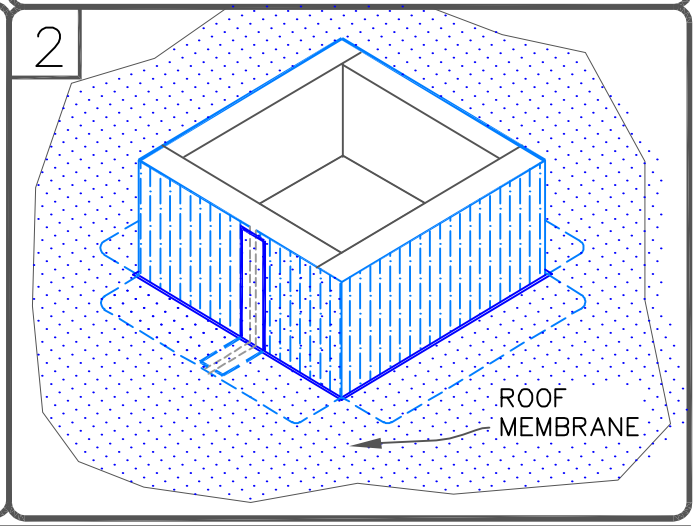
COUNTER FLASHING WITH WATERPROOF JOINERY & ATTACHMENT (BY OTHERS)

SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.







CARLISLE SYNTEC SYSTEMS

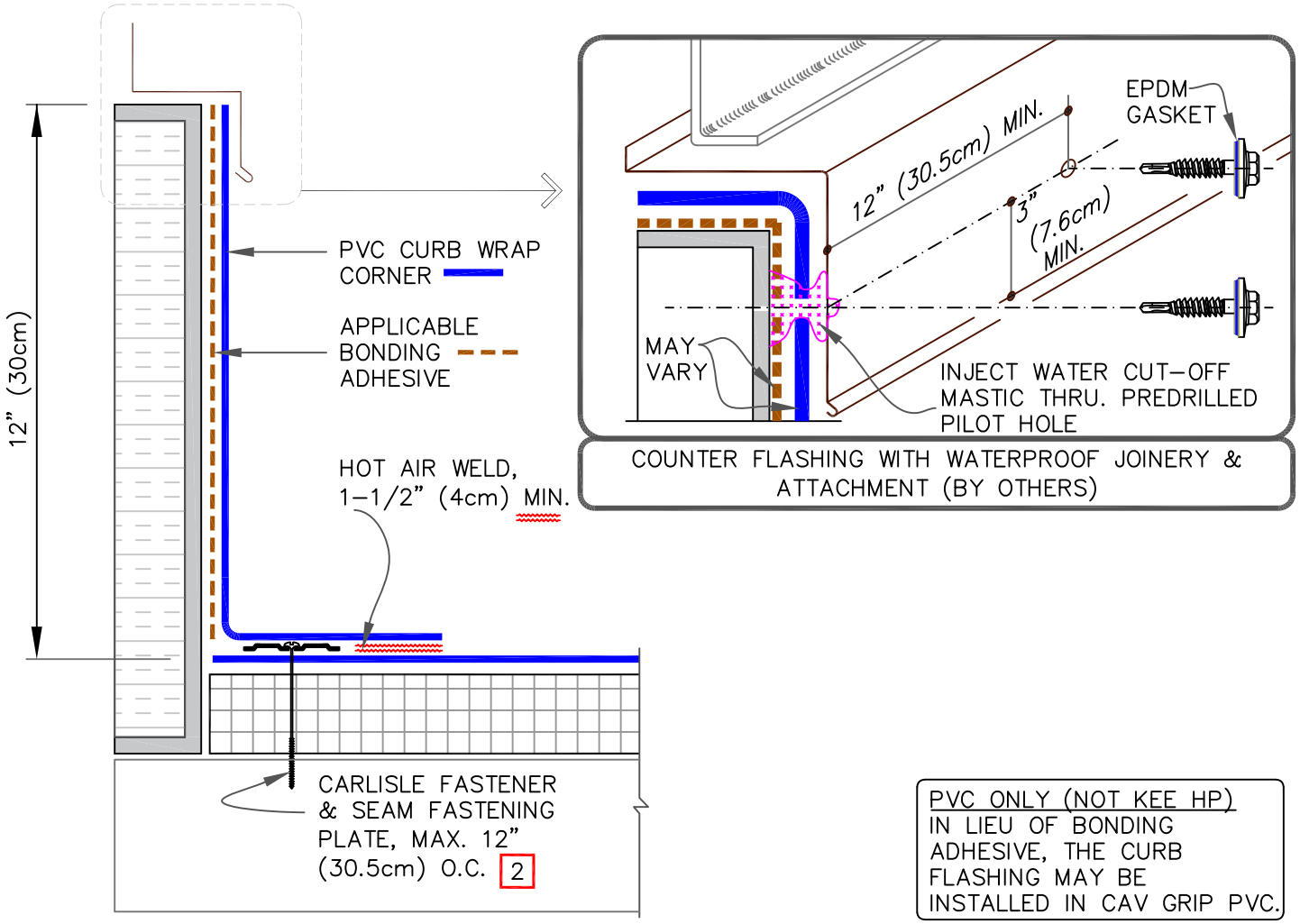
CURB FLASHING WITH PVC COATED METAL

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

U–5B

U (Universal Detail)



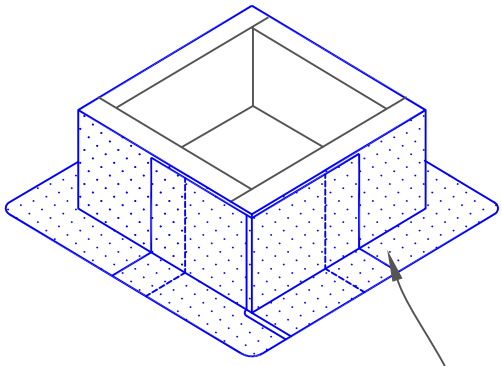
PVC ONLY (NOT KEE HP)
IN LIEU OF BONDING ADHESIVE, THE CURB FLASHING MAY BE INSTALLED IN CAV GRIP PVC.

NOTES:

1. FOUR CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (91cmX 91cm). FOR LARGER CURBS USE THE PVC CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF PVC MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).



USE ONE PVC CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

CFA (CERTIFIED FABRICATED ACCESSORIES)

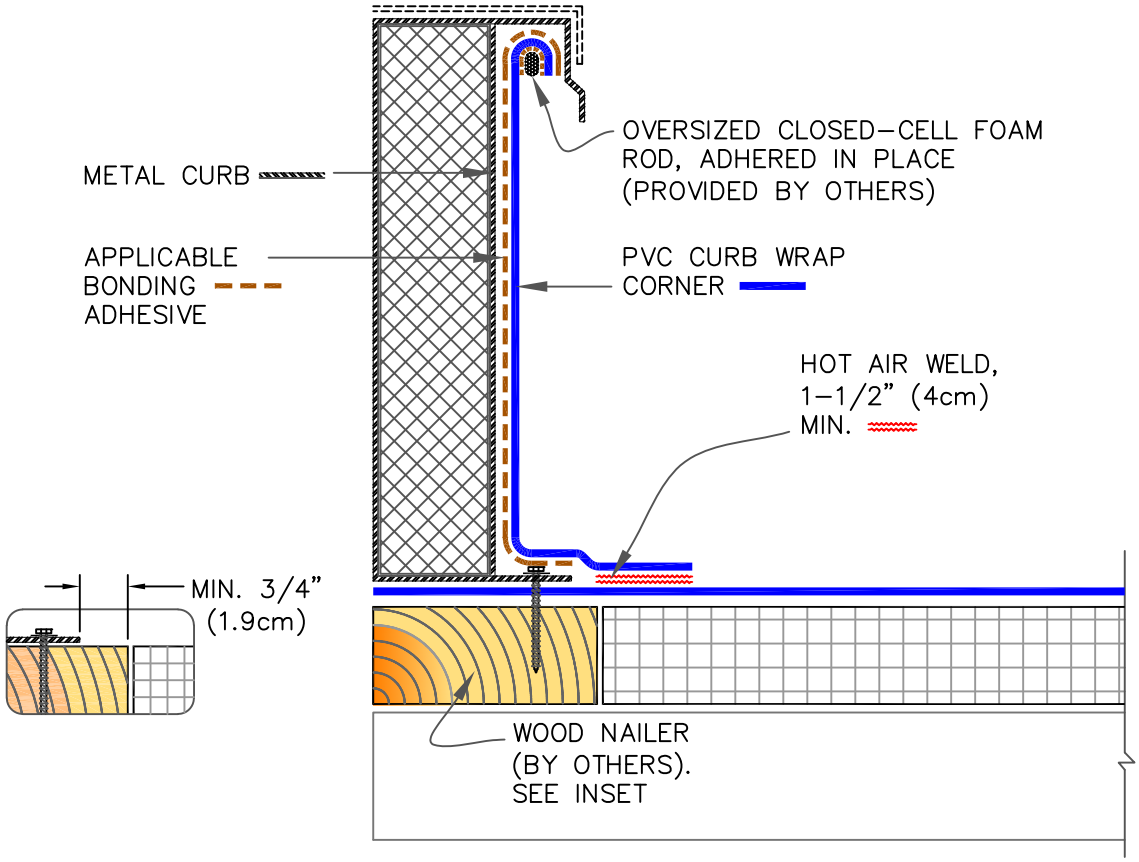
CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH CFA PVC CURB WRAP CORNERS

MAXIMUM WARRANTY: 30 YEARS

TP

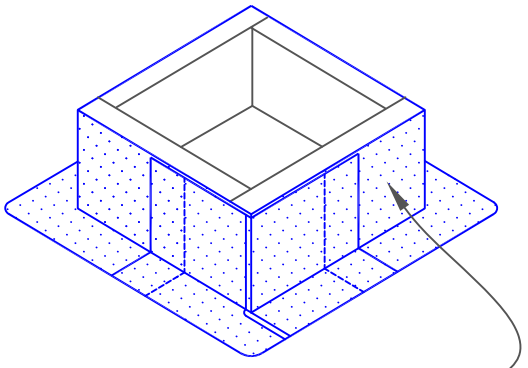
DETAIL NO.
U5-C
U (Universal Detail)



PVC ONLY (NOT KEE HP)
IN LIEU OF BONDING ADHESIVE, THE CURB FLASHING MAY BE INSTALLED IN CAV GRIP PVC.

NOTES:

1. FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (90cmX 90cm). FOR LARGER CURBS USE THE PVC CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF PVC.
2. IF CURB WRAP CORNER IS NOT USED, THEN USE DETAIL U-15G FOR OUTSIDE CORNERS.
3. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
4. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).



USE ONE PVC CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

CARLISLE SYNTEC SYSTEMS

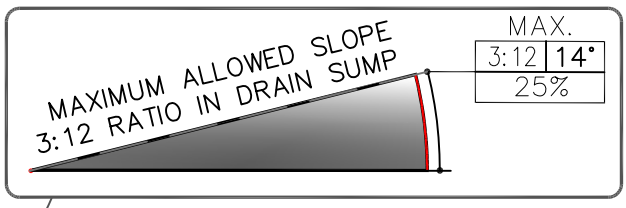
SELF-FLASHING CURB WITH CFA PVC CURB WRAP CORNERS

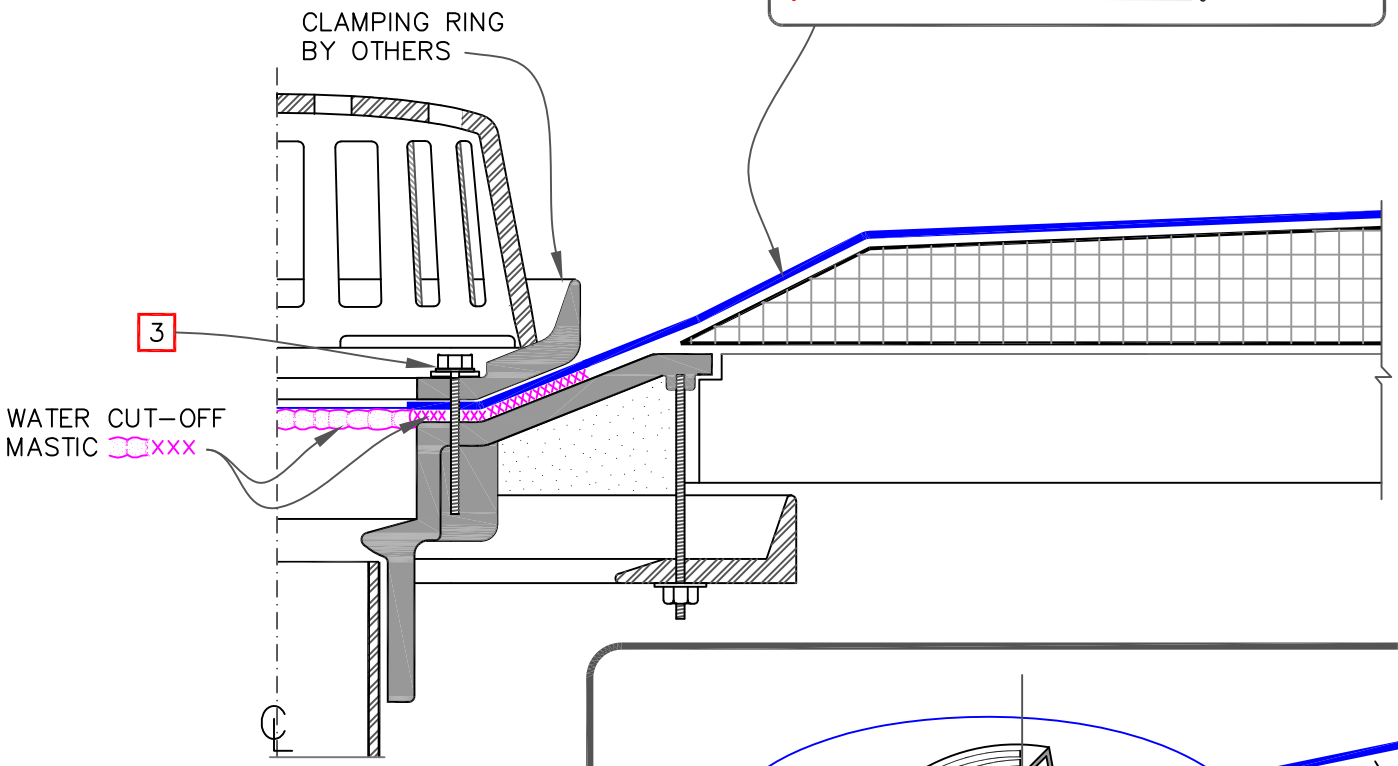
MAXIMUM WARRANTY: 30 YEARS

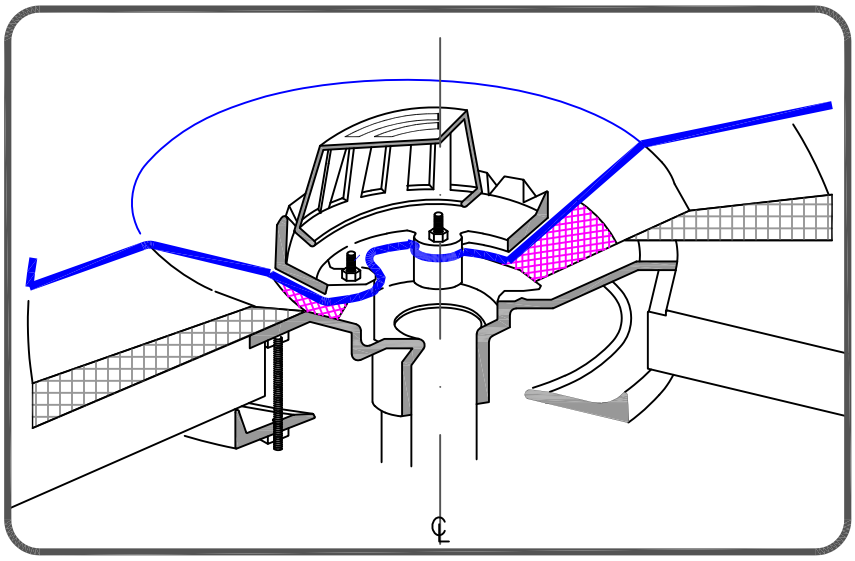
TP

DETAIL NO. U-5D

U (Universal Detail)

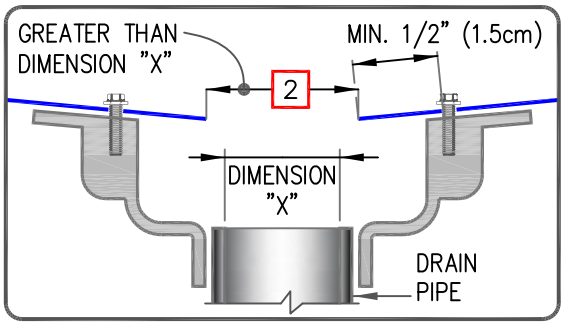






NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.



CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE LESS THAN 3" TO ONE HORIZONTAL FOOT

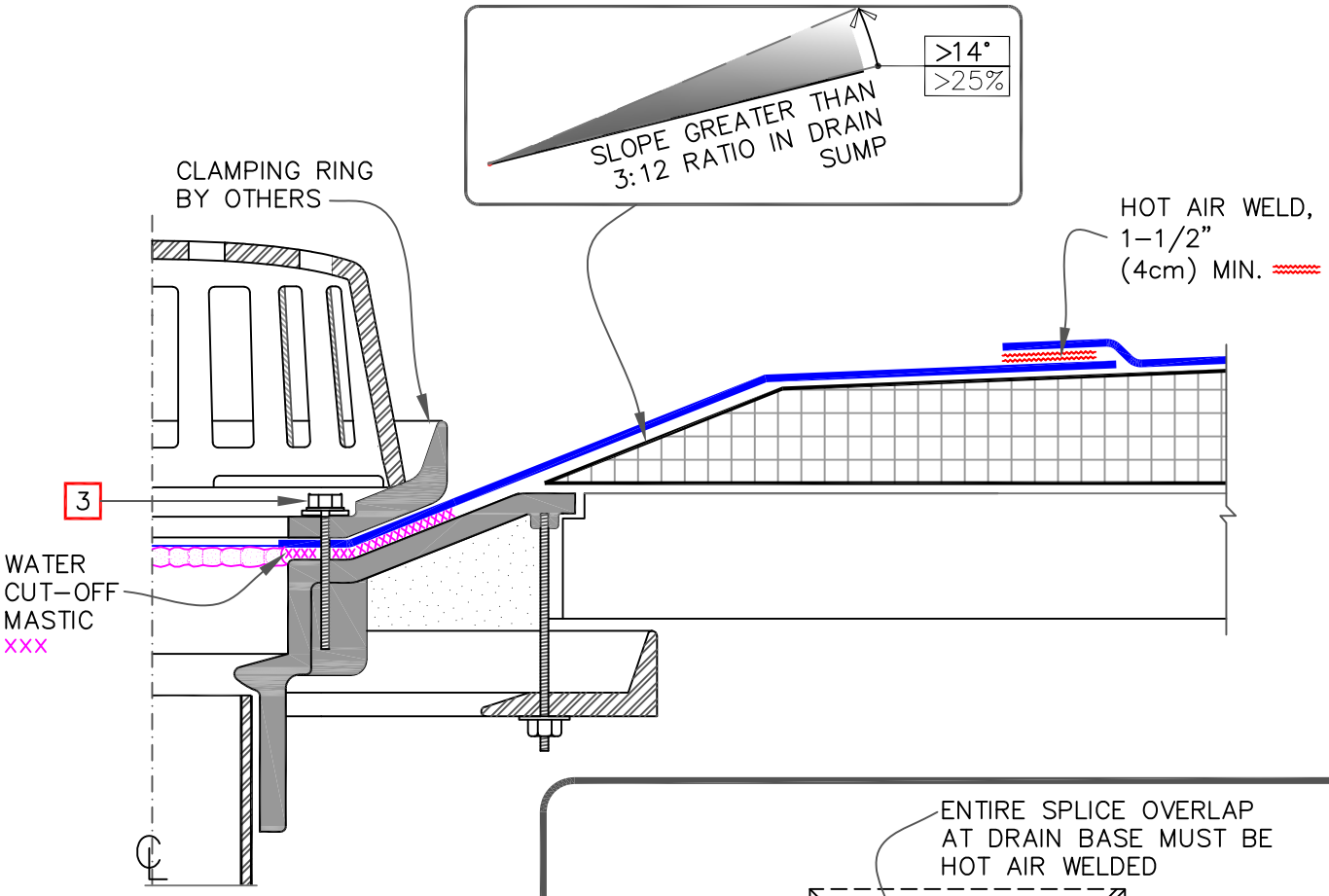
MAXIMUM WARRANTY: 30 YEARS

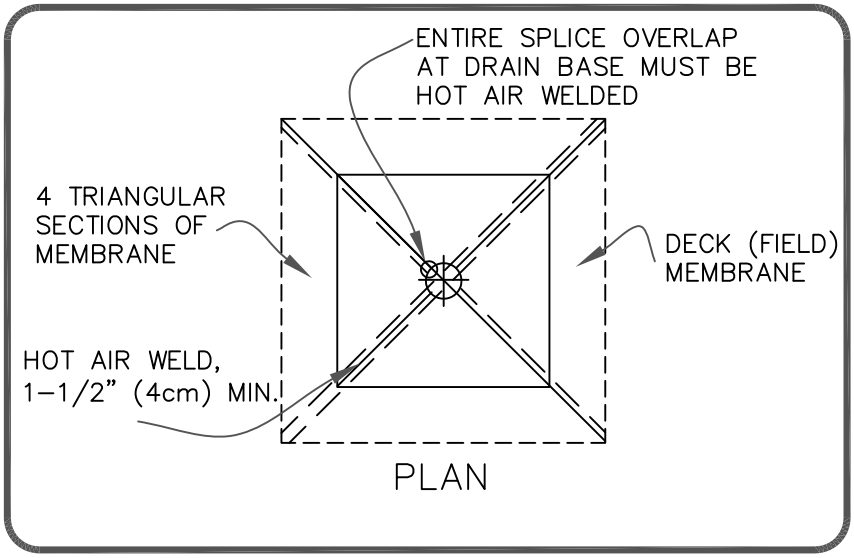
TP

DETAIL NO.

U-6A

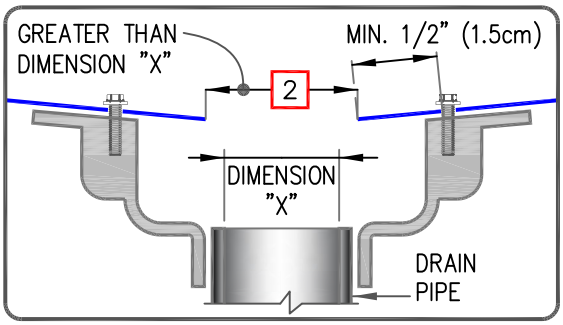
U (Universal Detail)





NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.



CARLISLE SYNTEC SYSTEMS

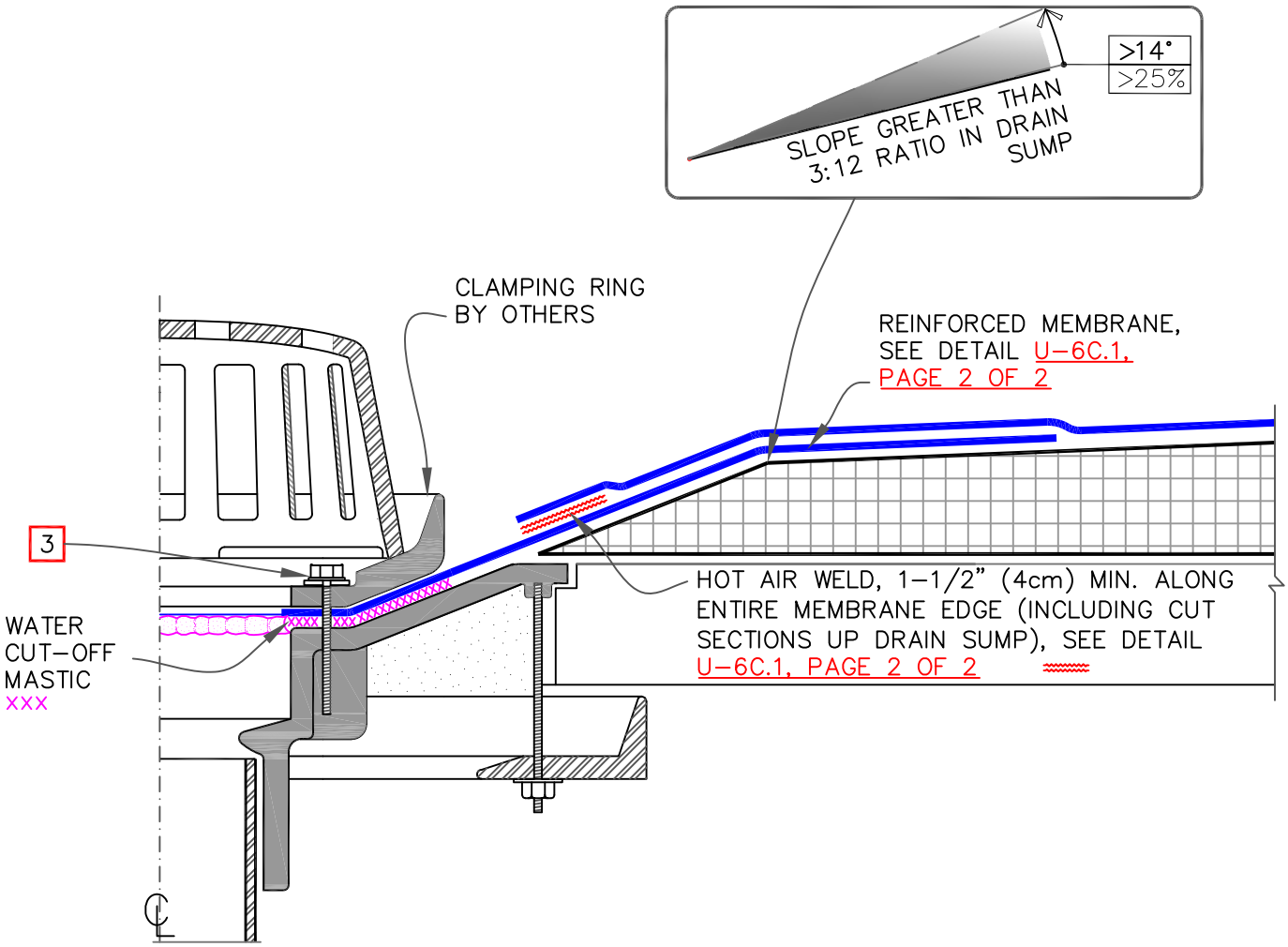
ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 1)

MAXIMUM WARRANTY: 30 YEARS

TP

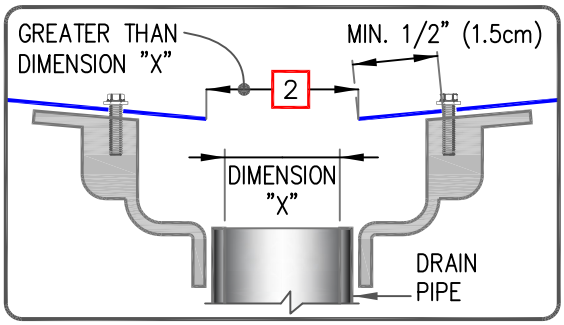
DETAIL NO. U–6B

U (Universal Detail)

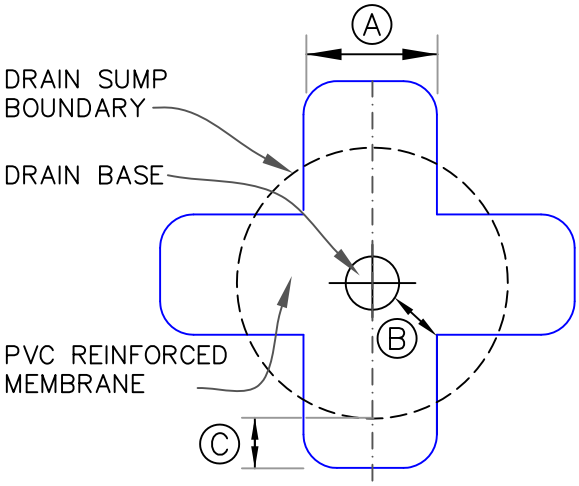


NOTES:

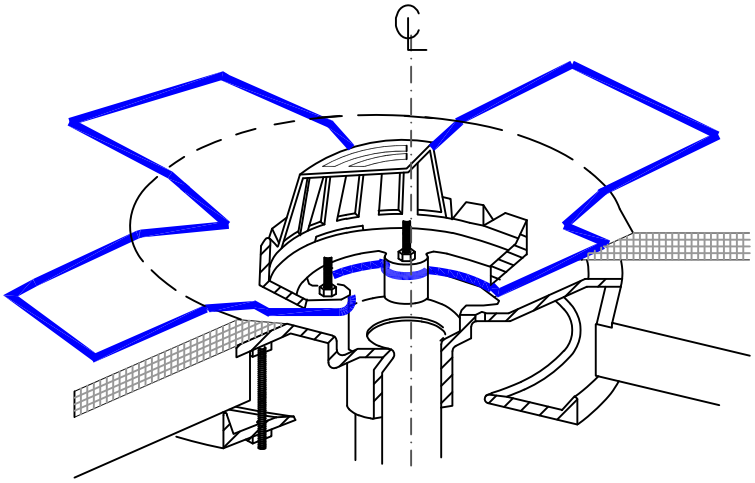
1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.



CARLISLE SYNTEC SYSTEMS	ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 2), PAGE 1 OF 2	TP	DETAIL NO. U-6C
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

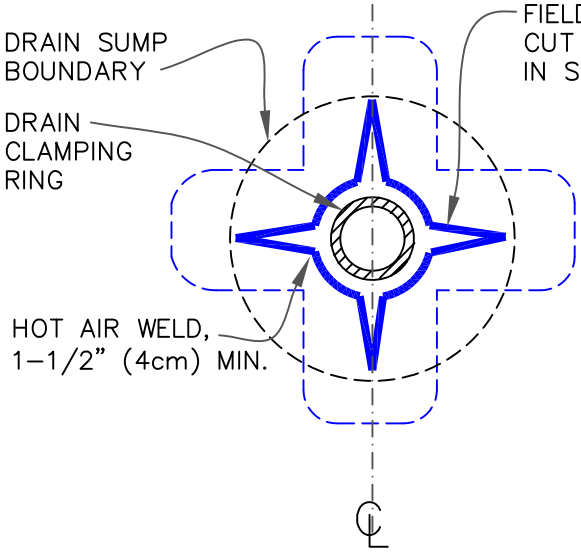


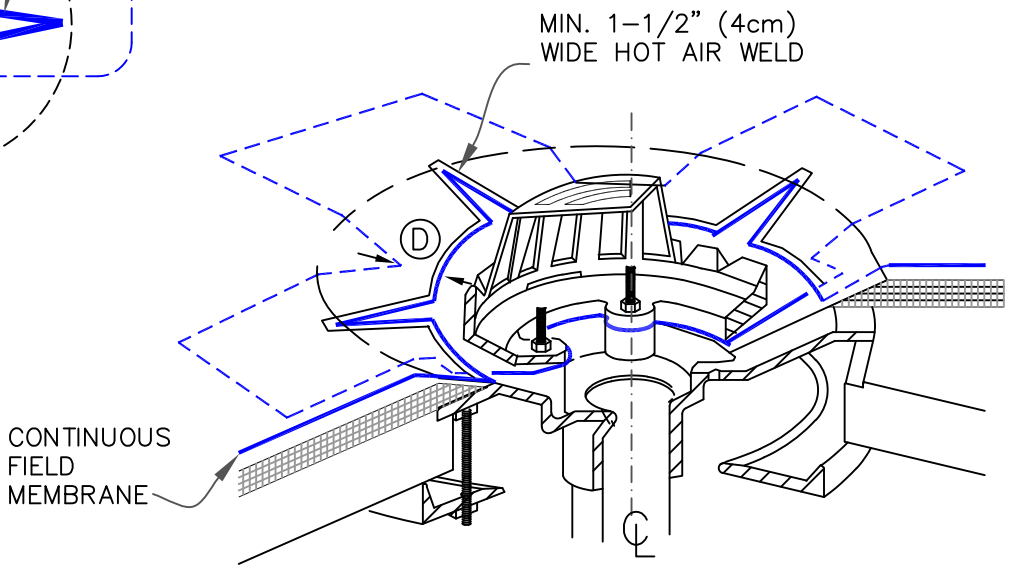
CUT SECTION OF PVC REINFORCED MEMBRANE AS SHOWN AND POSITION INTO DRAIN SUMP. EXTEND MEMBRANE OUT OF DRAIN SUMP APPROXIMATELY 6" (15cm) (ROUND CORNERS).



EXTEND PVC MEMBRANE ONTO MEMBRANE SECTION POSITIONED AT DRAIN SUMP AND CUT AS SHOWN TO LAY FLAT IN SUMP. HOT AIR WELD A MINIMUM OF 1–1/2" (4cm) COMPLETELY SURROUNDING AREA.

DIMENSIONS		cm	
A	12"	30	MIN.
B	6"	15	MIN.
C	6"	15	APPROX.
D	3"	7.5	MIN.





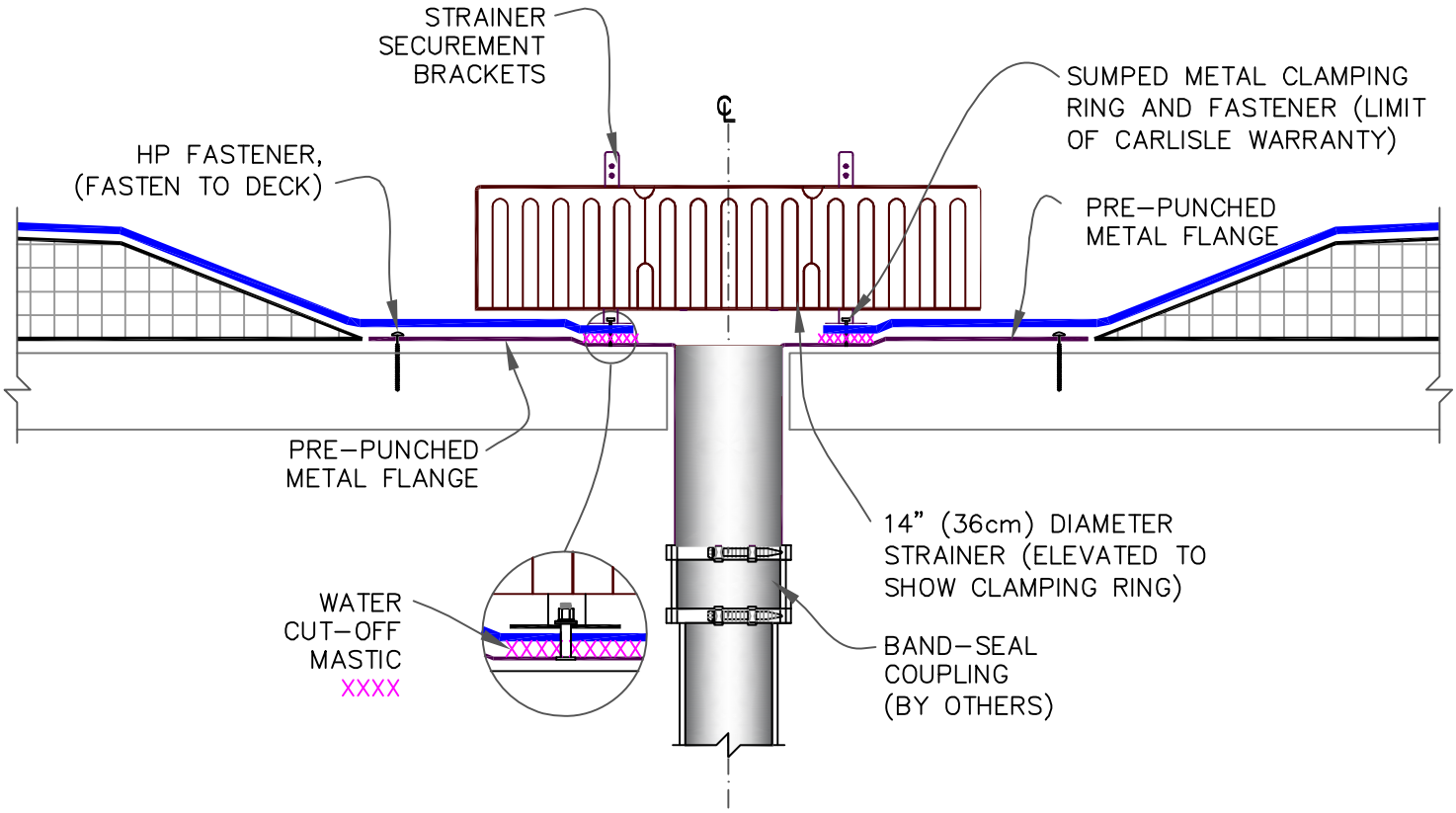
CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 2), PAGE 2 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–6C

U (Universal Detail)



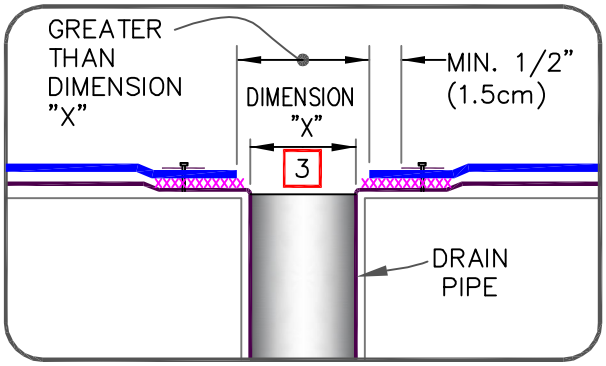
NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

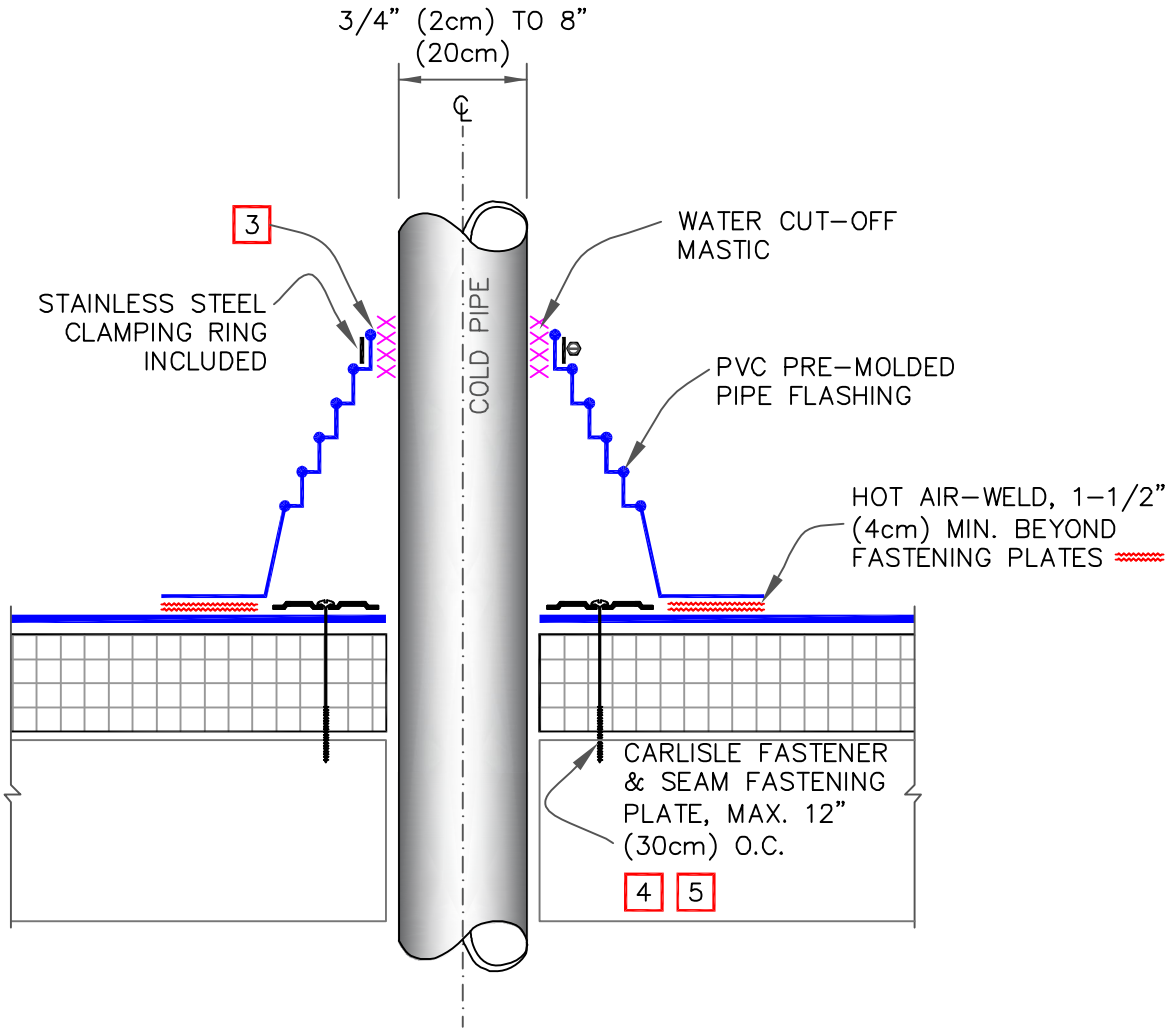
2. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.

3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.

4. INSULATION TAPER SHALL NOT BE GREATER THAN 6" (15cm) IN 12" (30cm) HORIZONTAL.



CARLISLE SYNTEC SYSTEMS	ADD-ON DRAIN	TP	DETAIL NO. U-6D
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE-MOLDED PIPE FLASHING.

2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C).

3. PRE-MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.

4. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH PVC REINFORCED MEMBRANE / PVC CUT-EDGE SEALANT. REFER TO DETAIL U8B.

5. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

PRE-MOLDED PIPE FLASHING

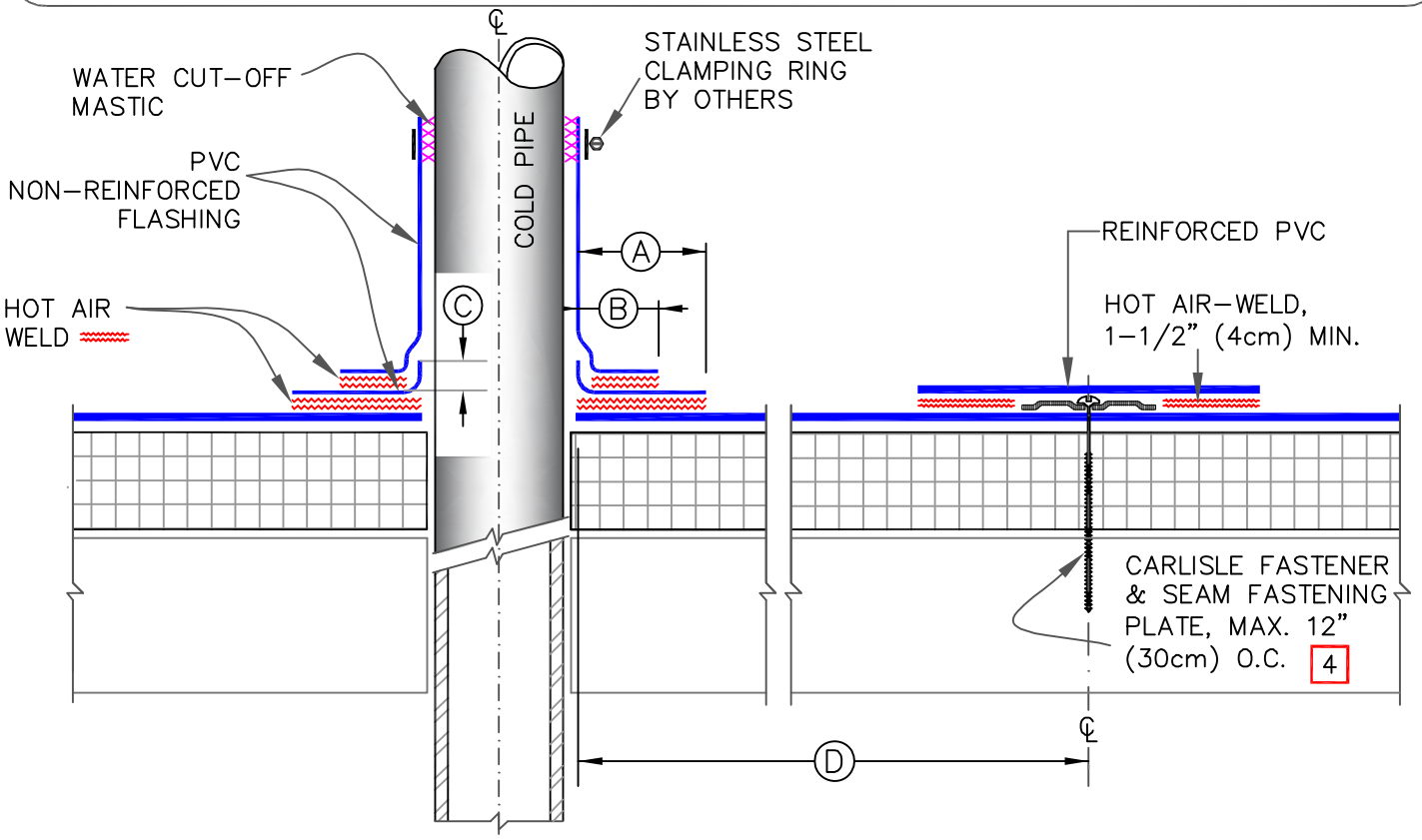
MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-8A

U (Universal Detail)

CAUTION DETAIL NOT FOR USE ON 25 OR 30-YEAR WARRANTY PROJECTS, PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE PIPE FLASHINGS SHALL CONFORM WITH PVC UNIVERSAL DETAILS U-8A, U-8E



DIMENSIONS		cm	
A	1-1/2"	4	TO
	2"	5	
B	1"	2.5	MIN.
C	1/2"	1.5	MIN.
D	12"	30	APPROX.

NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING FIELD FABRICATED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C).
3. PVC NON-REINFORCED FLASHING WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2" (4cm) VERTICAL HOT AIR WELD. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR PIPES WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (15cm) IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
4. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

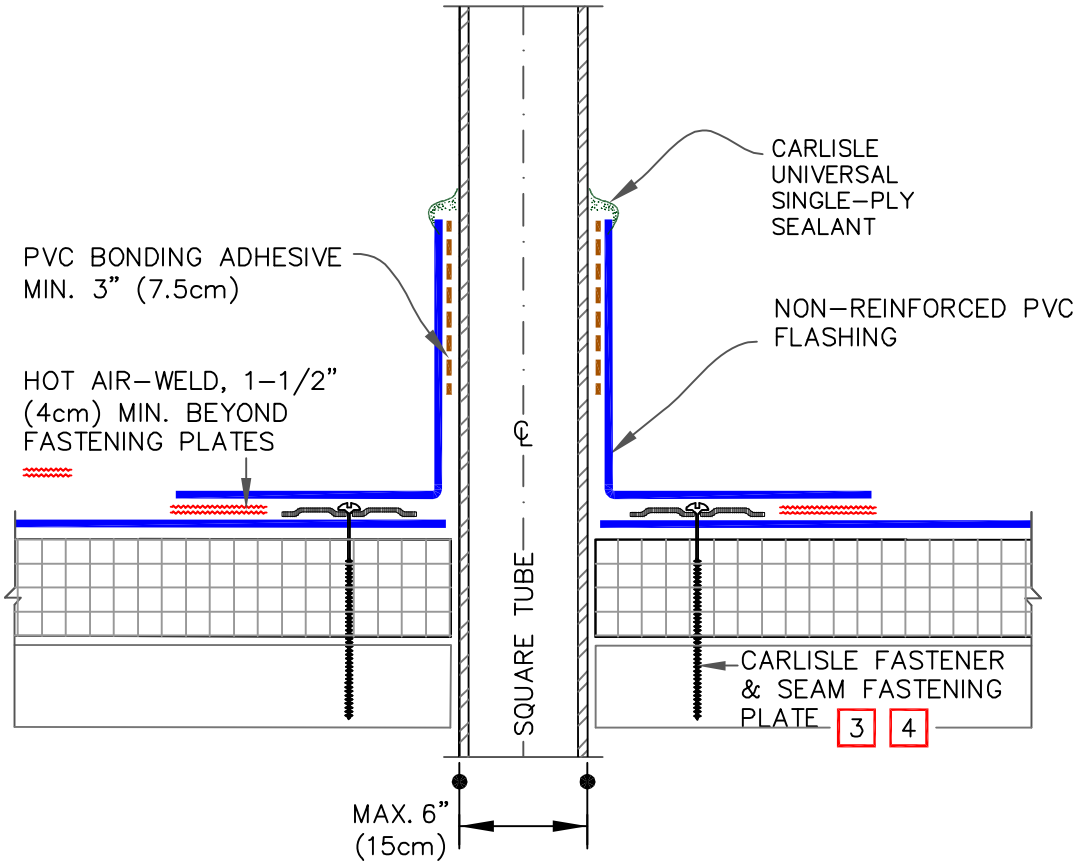
FIELD-FABRICATED PIPE FLASHING

WARRANTY: SEE WARRANTY NOTE

TP

DETAIL NO. U-8B

U (Universal Detail)

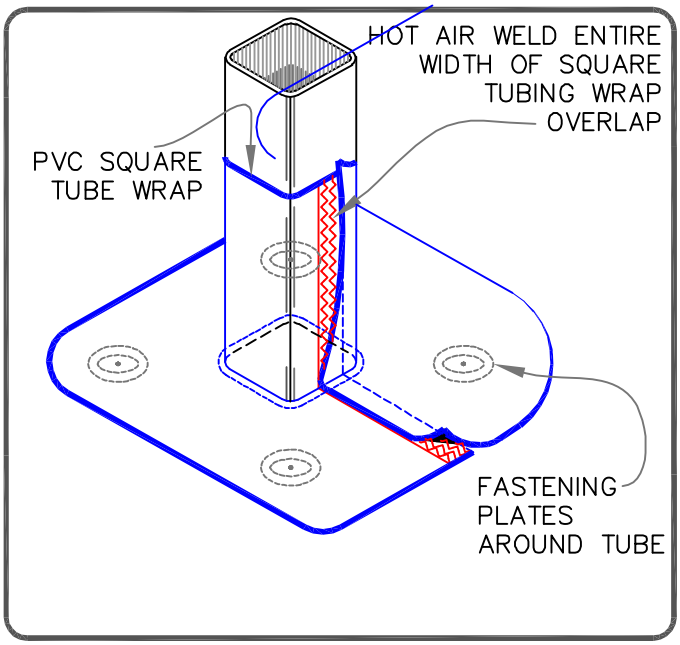


FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE–FABRICATED SQUARE TUBE WRAP.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C).
3. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR TUBE SIDE DIMENSIONS UP TO 6" (15cm).
4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEM. SEE TABLE FOR MECHANICALLY FASTENED ROOF ASSEMBLY.



CARLISLE SYNTEC SYSTEMS

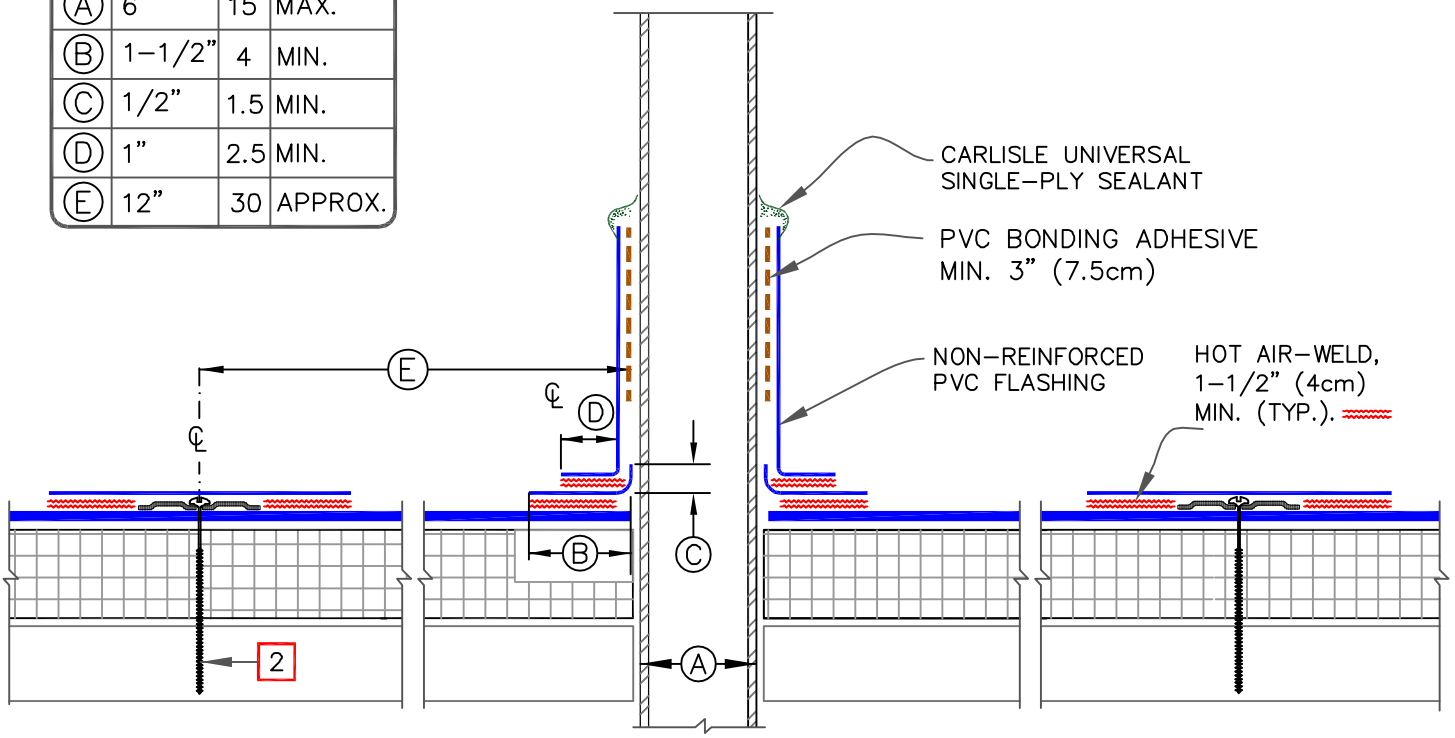
CFA CERTIFIED PRE–FABRICATED SQUARE TUBE WRAP

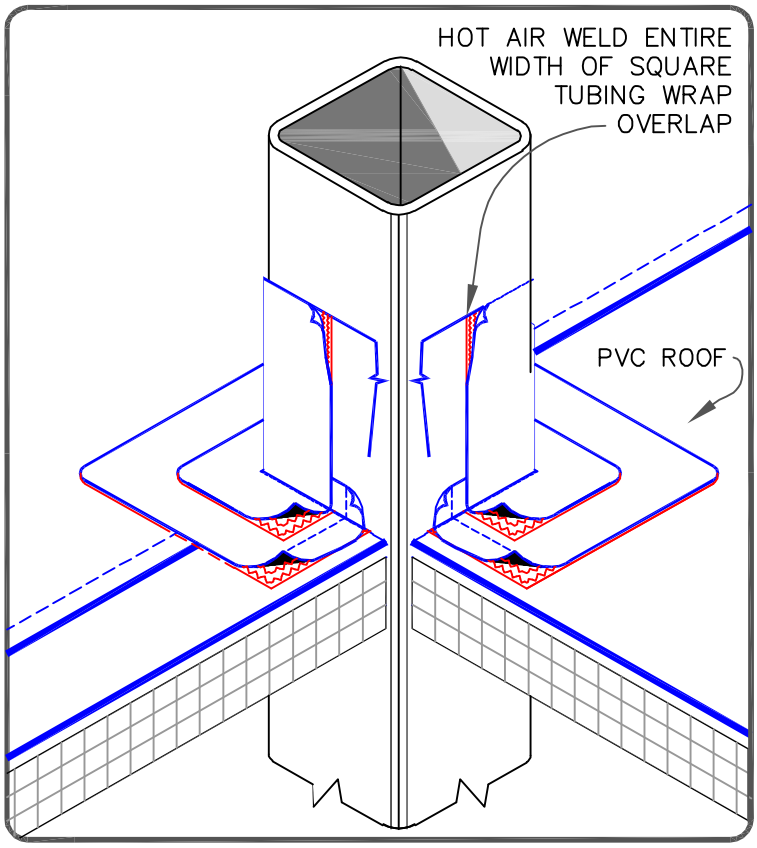
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–8C

U (Universal Detail)

DIMENSIONS		cm	
Ⓐ	6"	15	MAX.
Ⓑ	1–1/2"	4	MIN.
Ⓒ	1/2"	1.5	MIN.
Ⓓ	1"	2.5	MIN.
Ⓔ	12"	30	APPROX.





FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE–FABRICATED SQUARE TUBE WRAP.

2. CARLISLE FASTENERS & SEAM FASTENING PLATES FOR MECHANICALLY FASTENED SYSTEM (NOT REQUIRED ON ADHERED SYSTEM). SEE TABLE ABOVE.

CARLISLE SYNTEC SYSTEMS

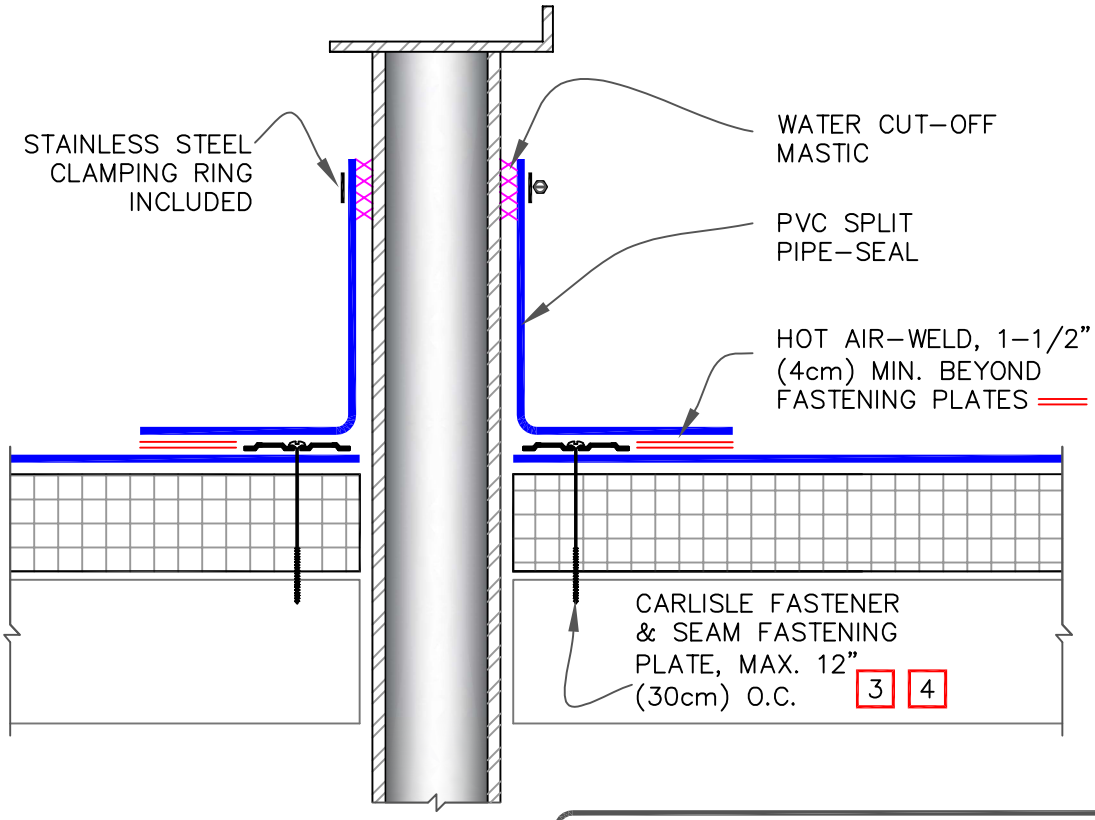
FIELD–FABRICATED SQUARE TUBE FLASHING

MAXIMUM WARRANTY: 20 YEARS

TP

DETAIL NO. U–8D

U (Universal Detail)

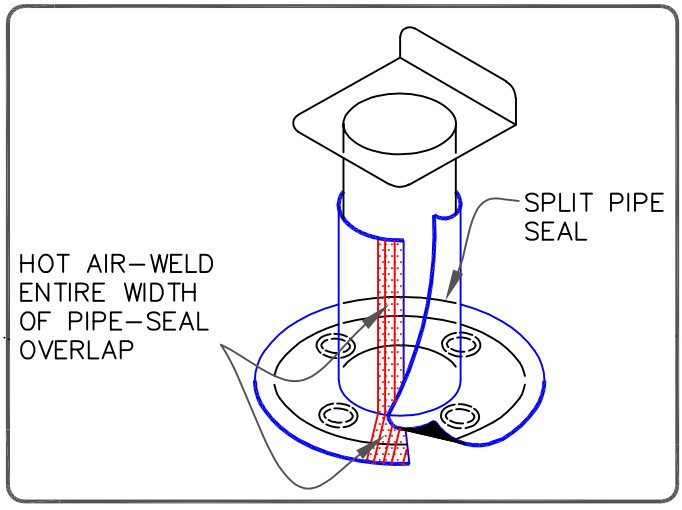


NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING SPLIT PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C).
3. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH PVC REINFORCED MEMBRANE/CUT–EDGE SEALANT. REFER TO DETAIL U–8B.
4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).
5. T–JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY PREFABRICATED ACCESSORIES. FOR ALL ADDITIONAL COLORS IT IS REQUIRED TO COVER T–JOINTS.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



CARLISLE SYNTEC SYSTEMS

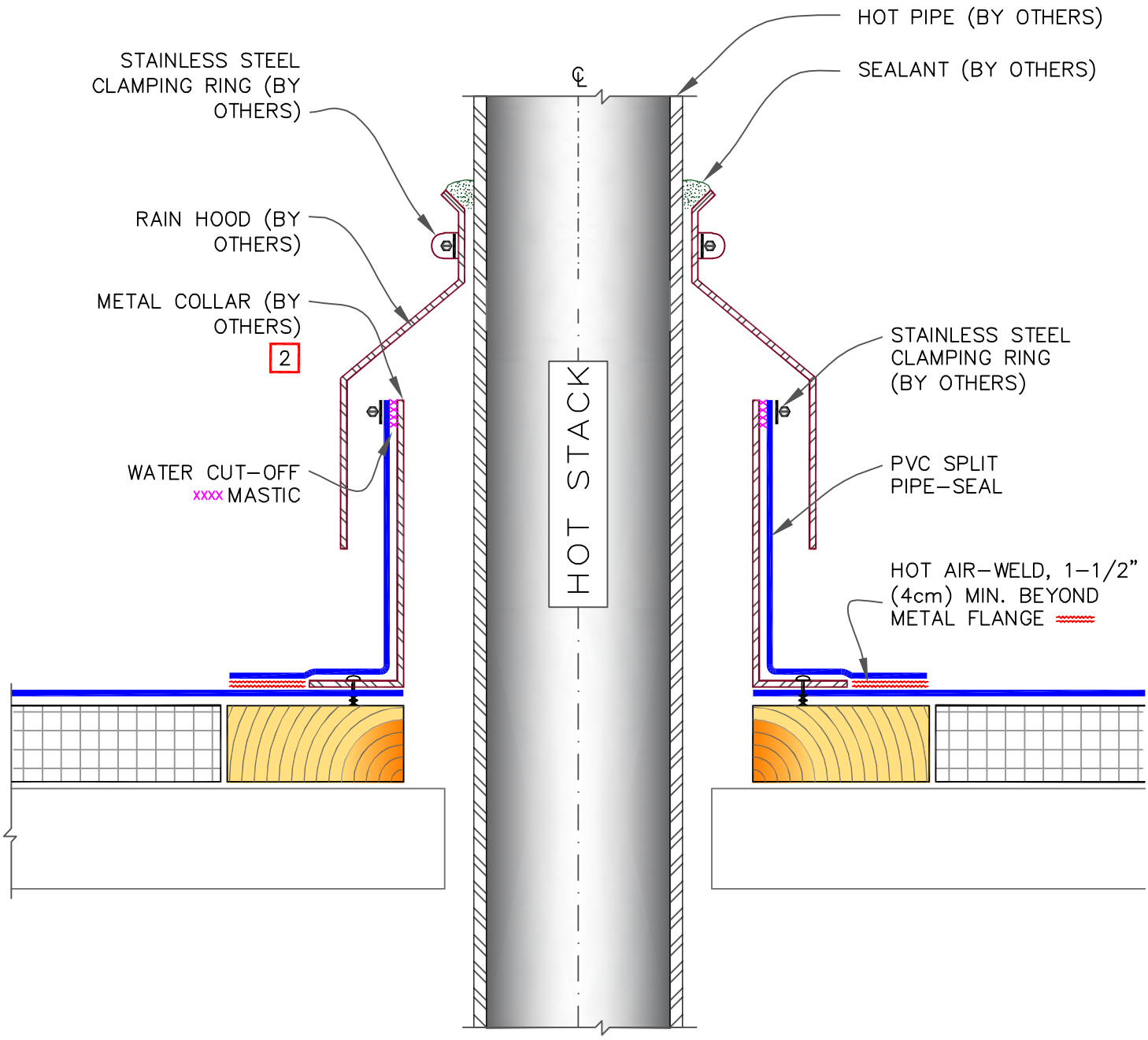
CFA CERTIFIED PRE–FABRICATED SPLIT PIPE SEAL

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U–8E

U (Universal Detail)

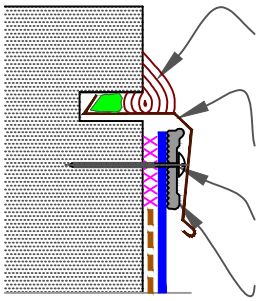


NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PIPE FLASHING.
2. TEMPERATURE OF THE METAL COLLAR MUST NOT EXCEED 140˚F (60˚C).
3. ENSURE, NO HOT GASES OR STEAM LEAK OR INFILTRATE INTO ROOF ASSEMBLY.

CARLISLE SYNTEC SYSTEMS	CFA CERTIFIED HOT PIPE FLASHING	TP	DETAIL NO. U–8F
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

9A MECHANICAL TERMINATION WITH COUNTER FLASHING



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

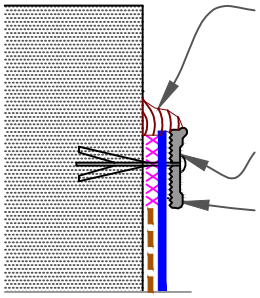
METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

THREADED FASTENERS OR CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 30 YEARS | **SEE INSET A**

9B MECHANICAL TERMINATION



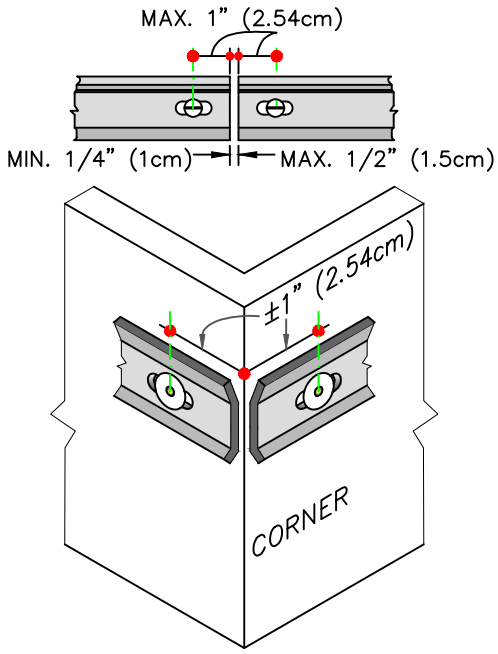
CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

CARLISLE HP TERM BAR NAIL–IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 20 YEARS | **SEE INSET A**

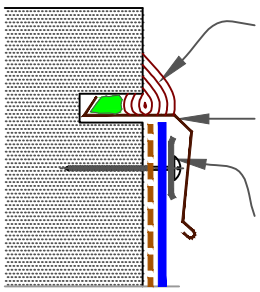
INSET A



NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. DETAIL 9D MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

9C COUNTER FLASHING TERMINATION



CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

FASTEN MEMBRANE @ 12" (30cm) O.C. MAX. USE GALVANIZED WASHERS, MIN. 1", (2.54cm) DIAMETER

NOTE:

1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER–FLASHING, USE EPDM WASHERS, APPLY WATER CUT–OFF MASTIC UNDER THE COUNTER–FLASHING OR CAULK THE FASTENER HEADS.

WARRANTY UP TO 10 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT–OFF MASTIC– MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

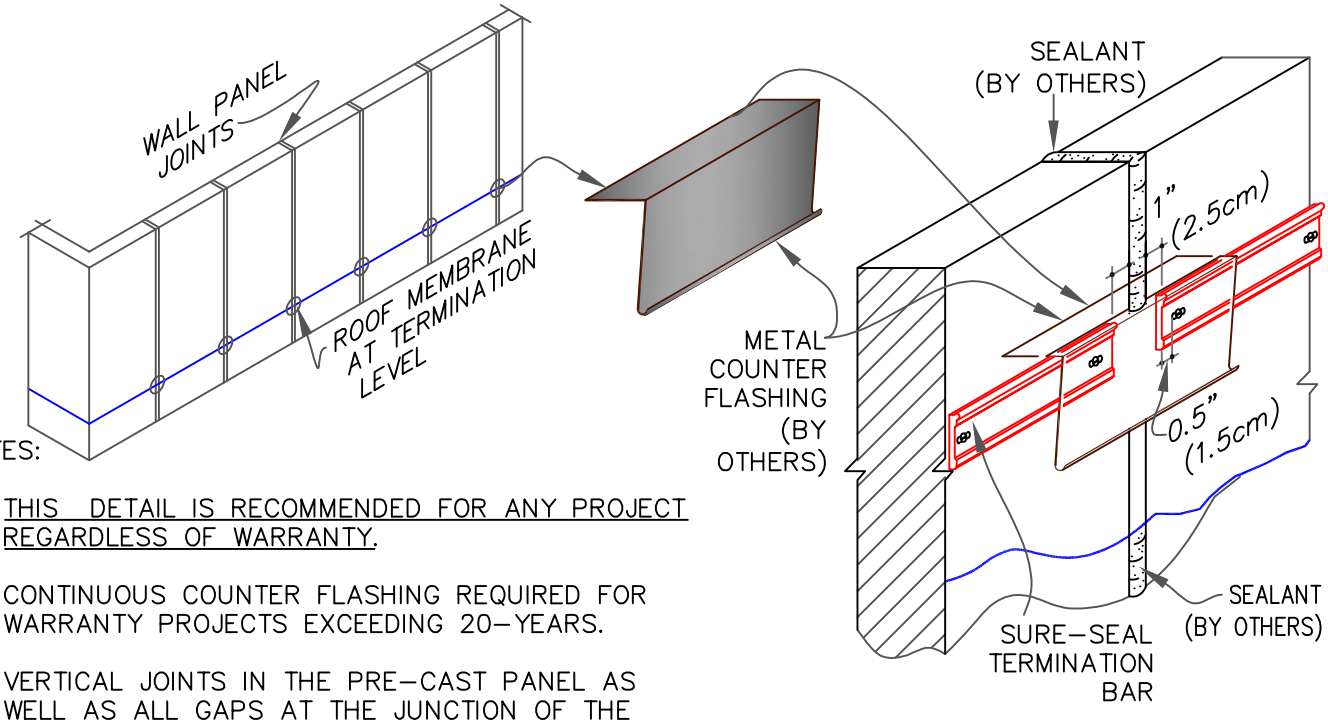
MEMBRANE TERMINATIONS (PAGE 1 OF 3)

WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. U–9

U (Universal Detail)

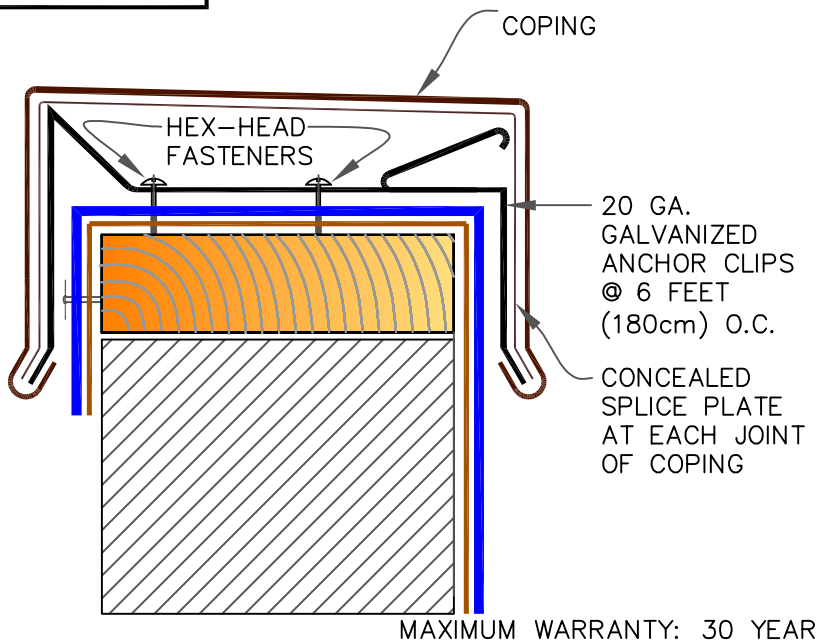
9D MECHANICAL TERMINATION AT VERTICAL JOINTS



NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.

9E SecurEdge 200 & 300 COPINGS



NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. REFER TO 3D DETAIL ON DETAIL U-9F.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.

MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

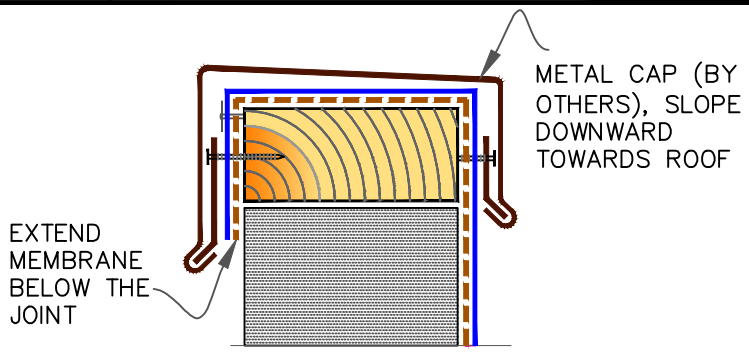
MEMBRANE TERMINATIONS (PAGE 2 OF 3)

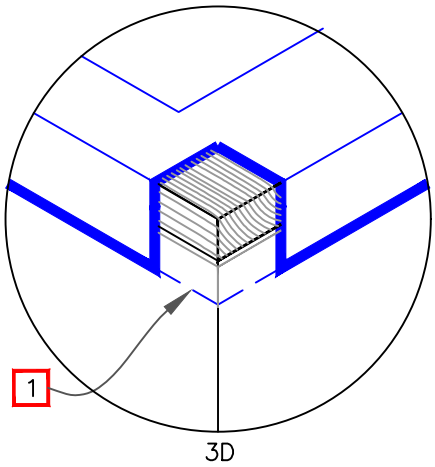
WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. U-9

U (Universal Detail)

9F SHEET METAL COPING (BY OTHERS)

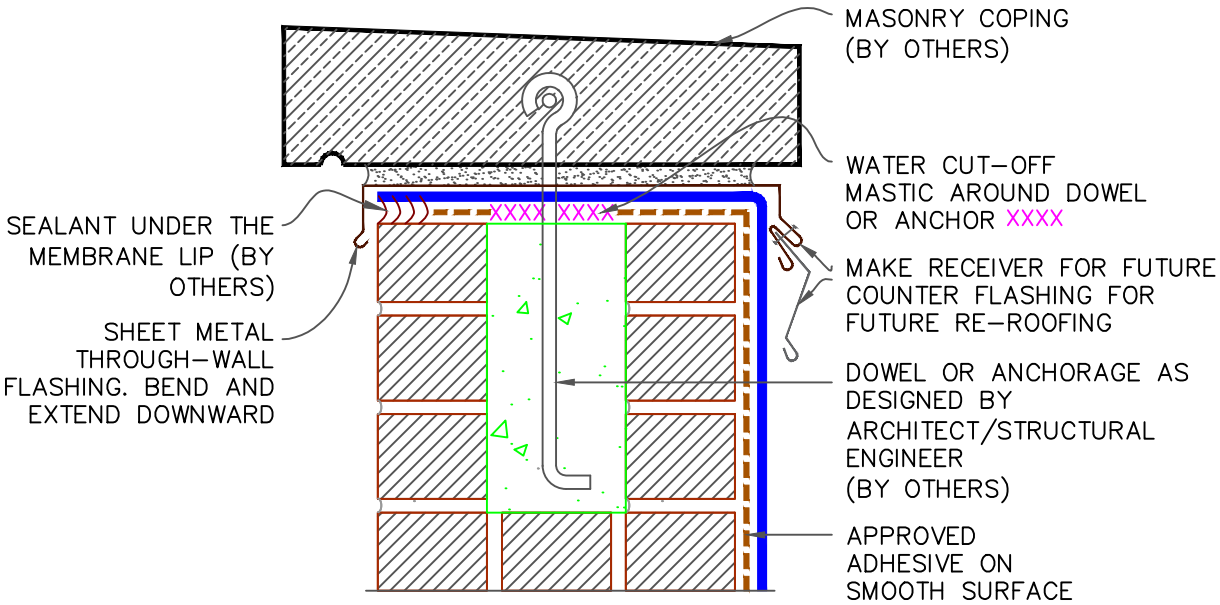




NOTES:

1. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE.
2. WARRANTY AS PROVIDED (BY OTHERS).

9G MASONRY COPINGS (BY OTHERS)



MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

XXX WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 3 OF 3)

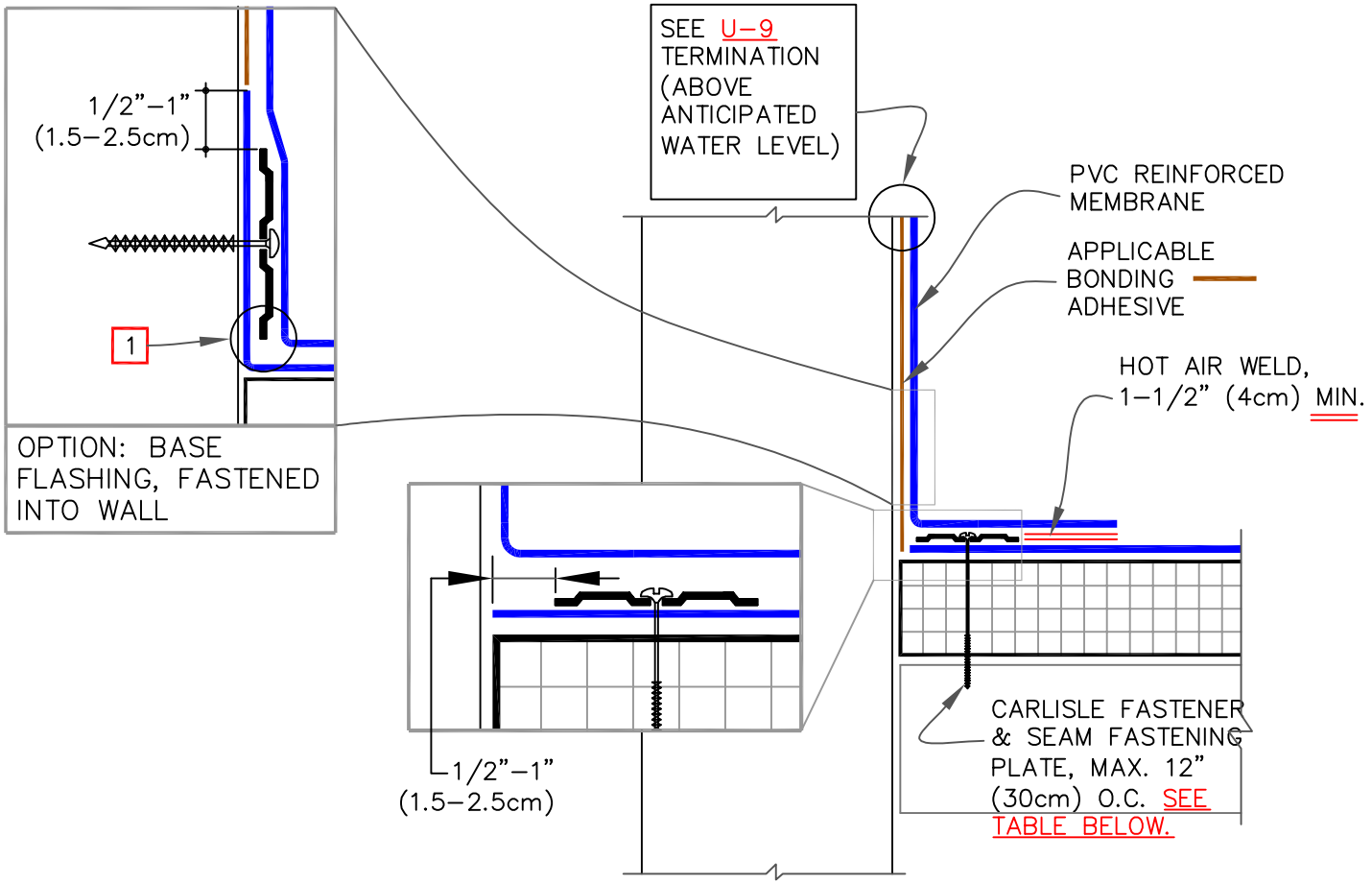
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-9

U (Universal Detail)

CAUTION

FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ALL SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS.



NOTE:

1. CARE MUST BE TAKEN TO PRESS THE MEMBRANE TIGHTLY INTO THE ANGLE CHANGE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE MEMBRANE IN THE PROPER POSITION.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

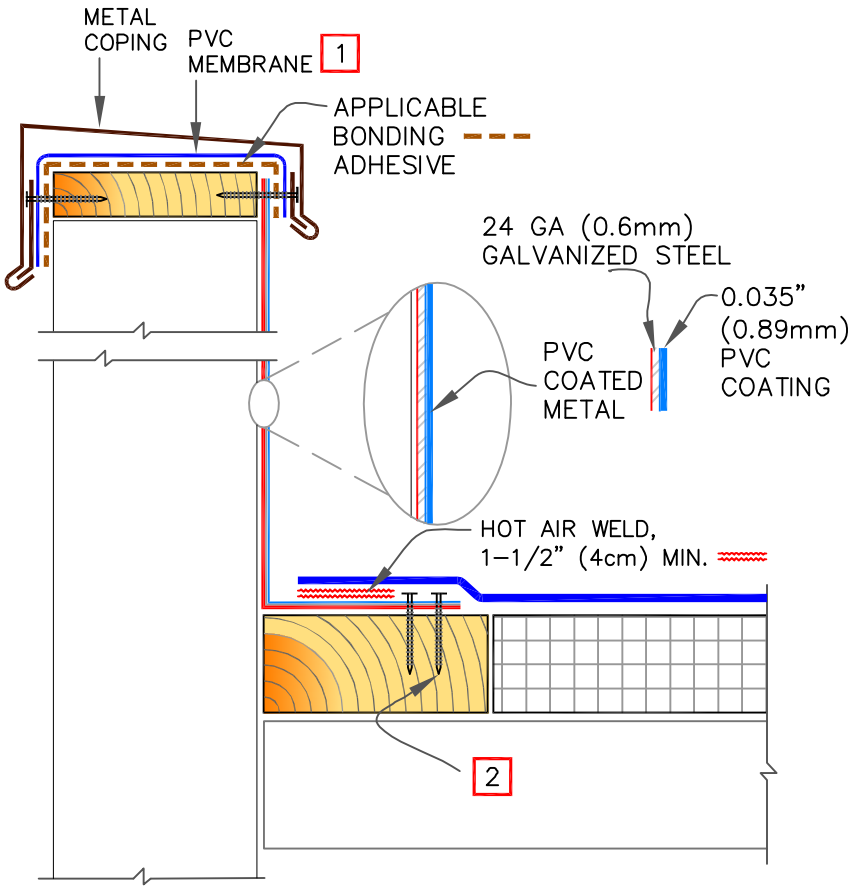
CARLISLE SYNTEC SYSTEMS

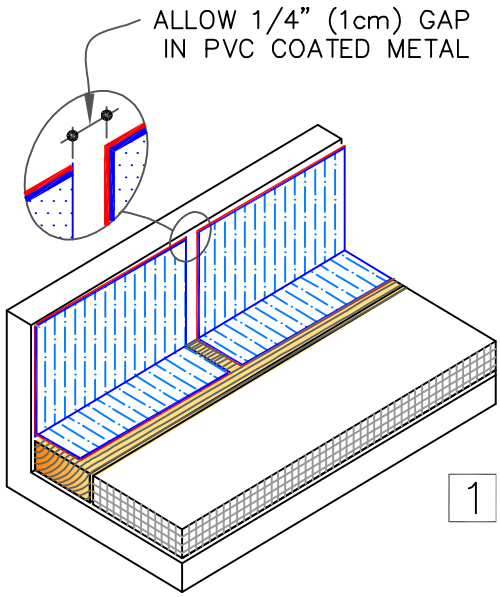
PARAPET BASE FLASHING: FASTENED INTO DECK OR WALL

MAXIMUM WARRANTY: 30 YEARS. SEE CAUTION ON TOP OF PAGE.

TP

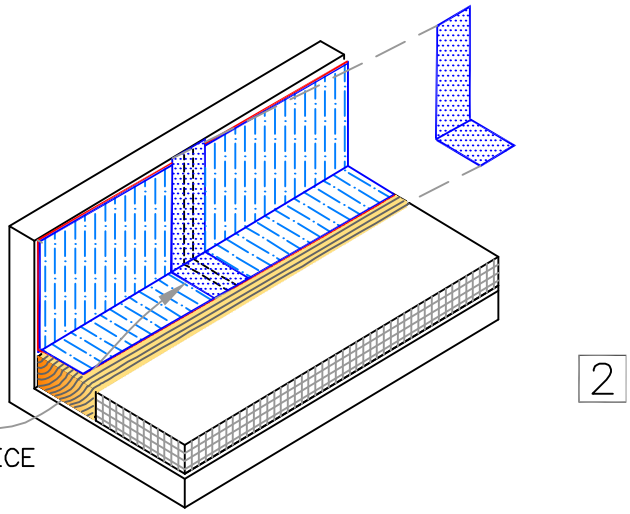
DETAIL NO.
U–12A
U (Universal Detail)





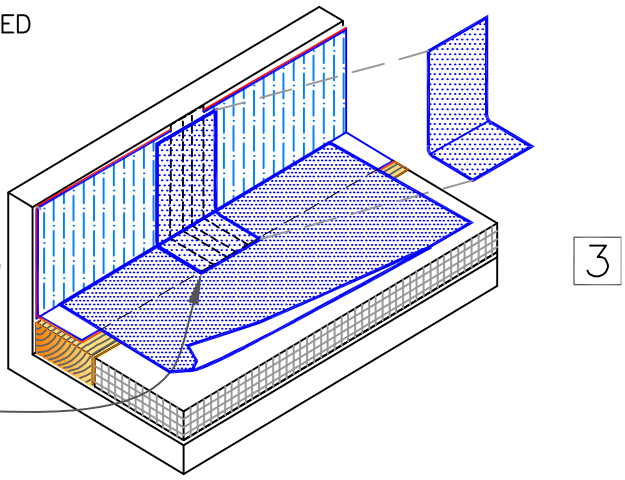
SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.



NOTES:

1. PLACE A LAYER OF PVC MEMBRANE UNDER THE METAL CAP TO PROTECT AGAINST MOISTURE INFILTRATION AT JOINTS.
2. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1–1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).



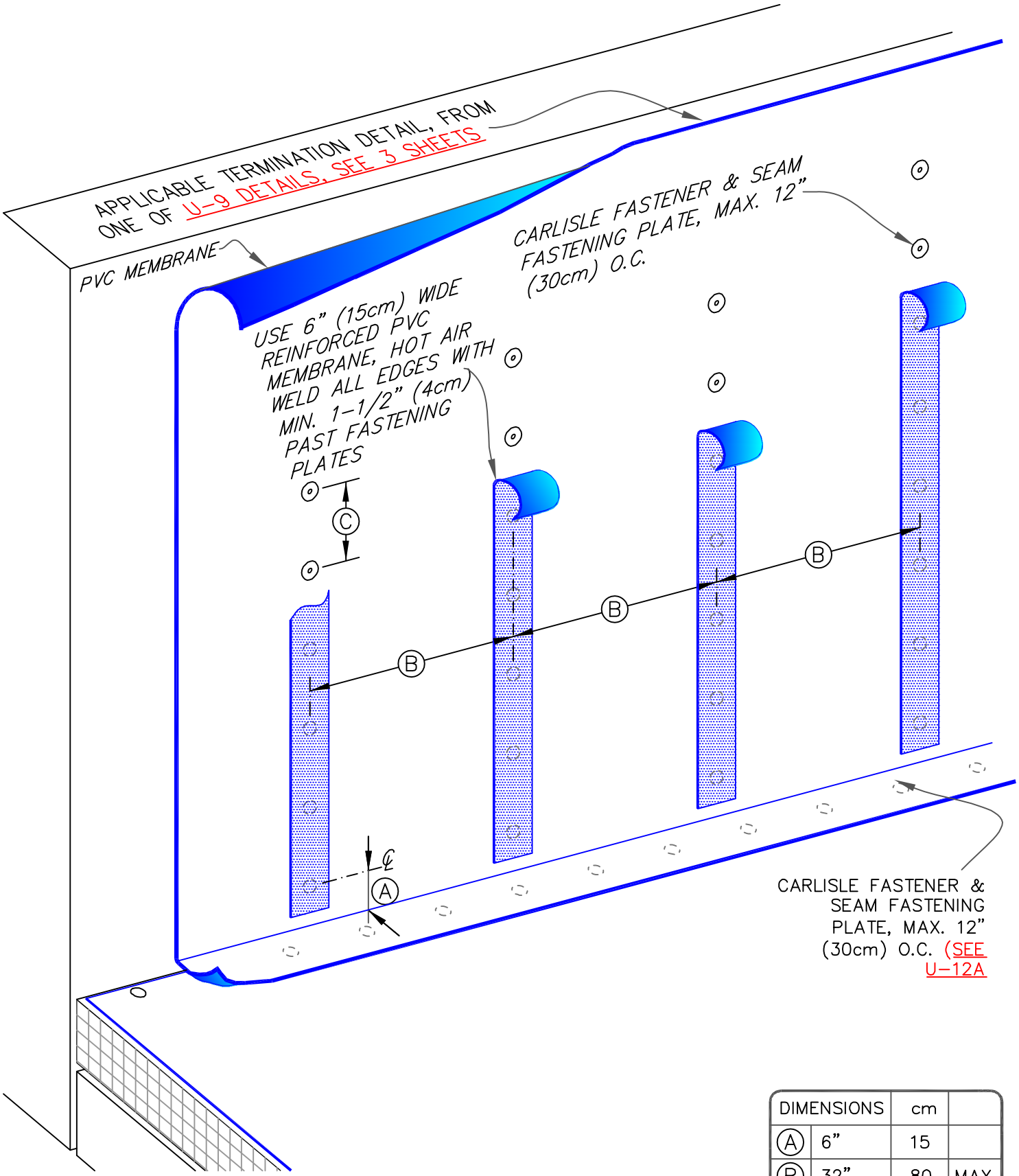
CARLISLE SYNTEC SYSTEMS

PVC COATED METAL WALL FLASHING

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–12C

U (Universal Detail)



DIMENSIONS		cm	
A	6"	15	
B	32"	80	MAX.
C	12"	30	MAX.

CARLISLE SYNTEC SYSTEMS

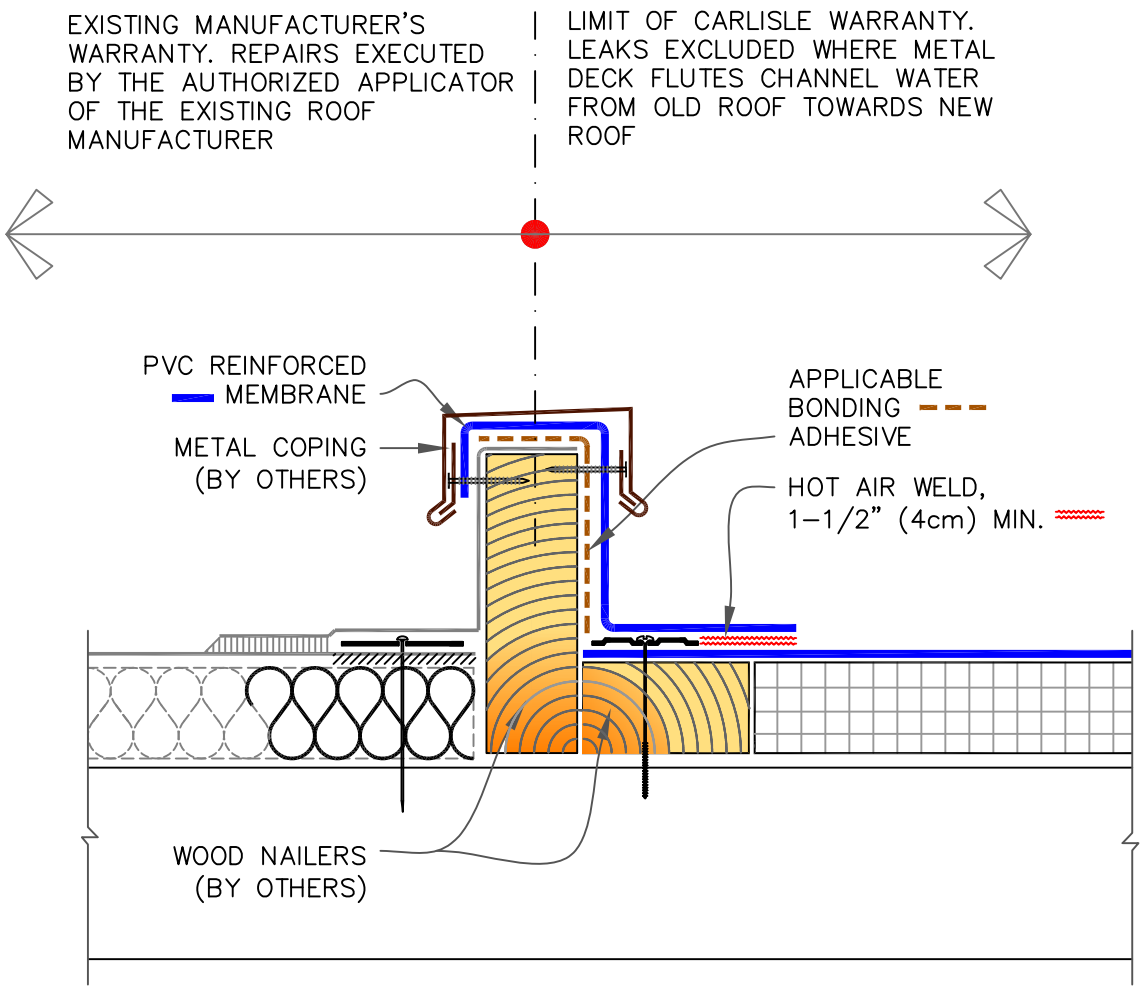
PARAPET FLASHING / NO ADHESION – ANY HEIGHT OPTION

MAXIMUM WARRANTY: 30 YEARS

TP

DETAIL NO. U-12F

U (Universal Detail)



NOTES:

1. POSITION MEMBRANE FASTENING PLATES 1/2" (1.5cm) TO 1" (2.5cm) FROM EDGE OF DECK MEMBRANE.
2. ENSURE THE LOCATION OF CURB WILL NOT IMPEDE THE FLOW OF WATER AT EXISTING ADJACENT ROOF.

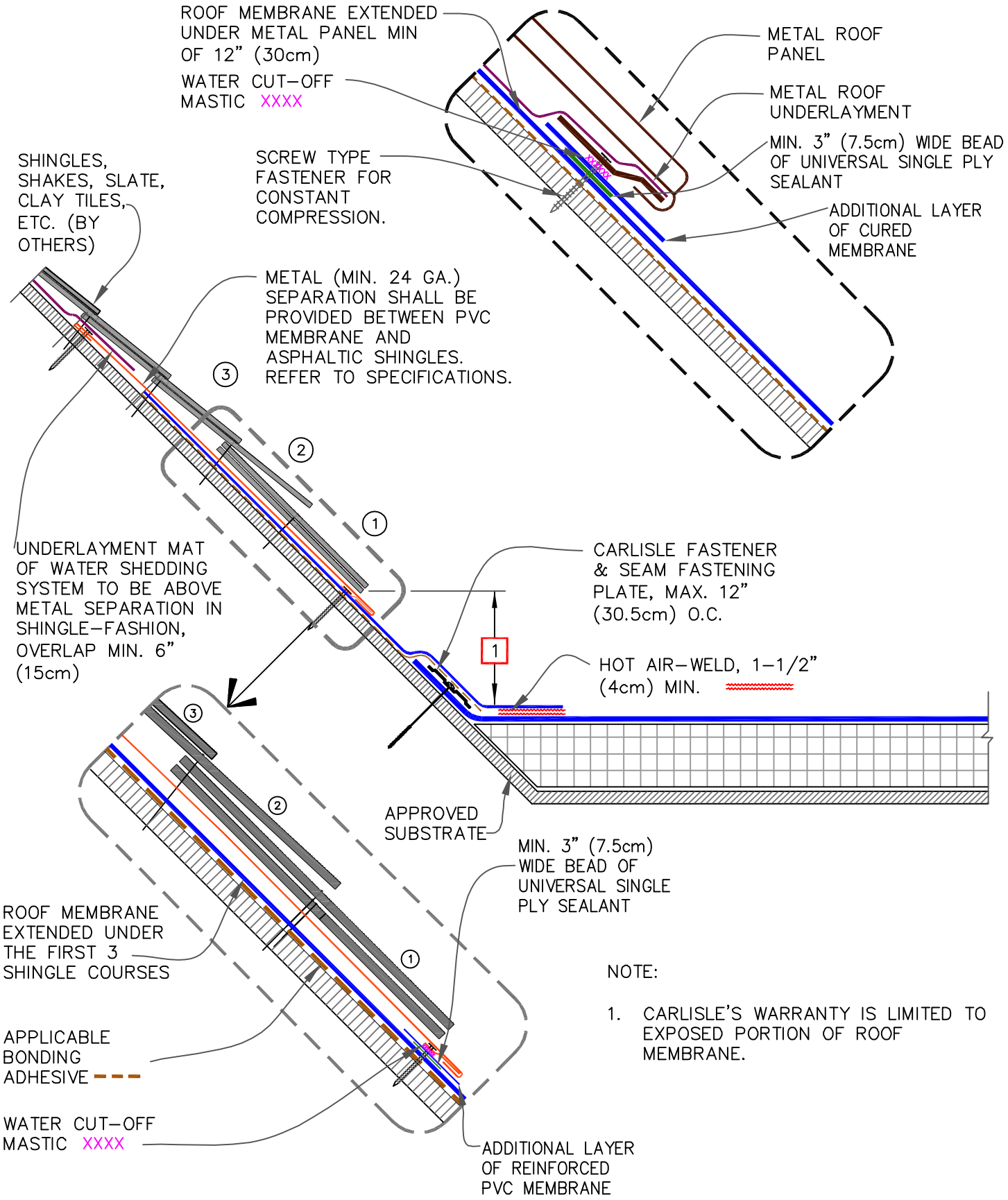
PVC ONLY (NOT KEE HP)
IN LIEU OF BONDING ADHESIVE, THE CURB FLASHING MAY BE INSTALLED IN CAV GRIP PVC.

CARLISLE SYNTEC SYSTEMS

PVC TIE–IN TO EXISTING SINGLE PLY ROOF WITH CURB

MAXIMUM WARRANTY: 30 YEARS

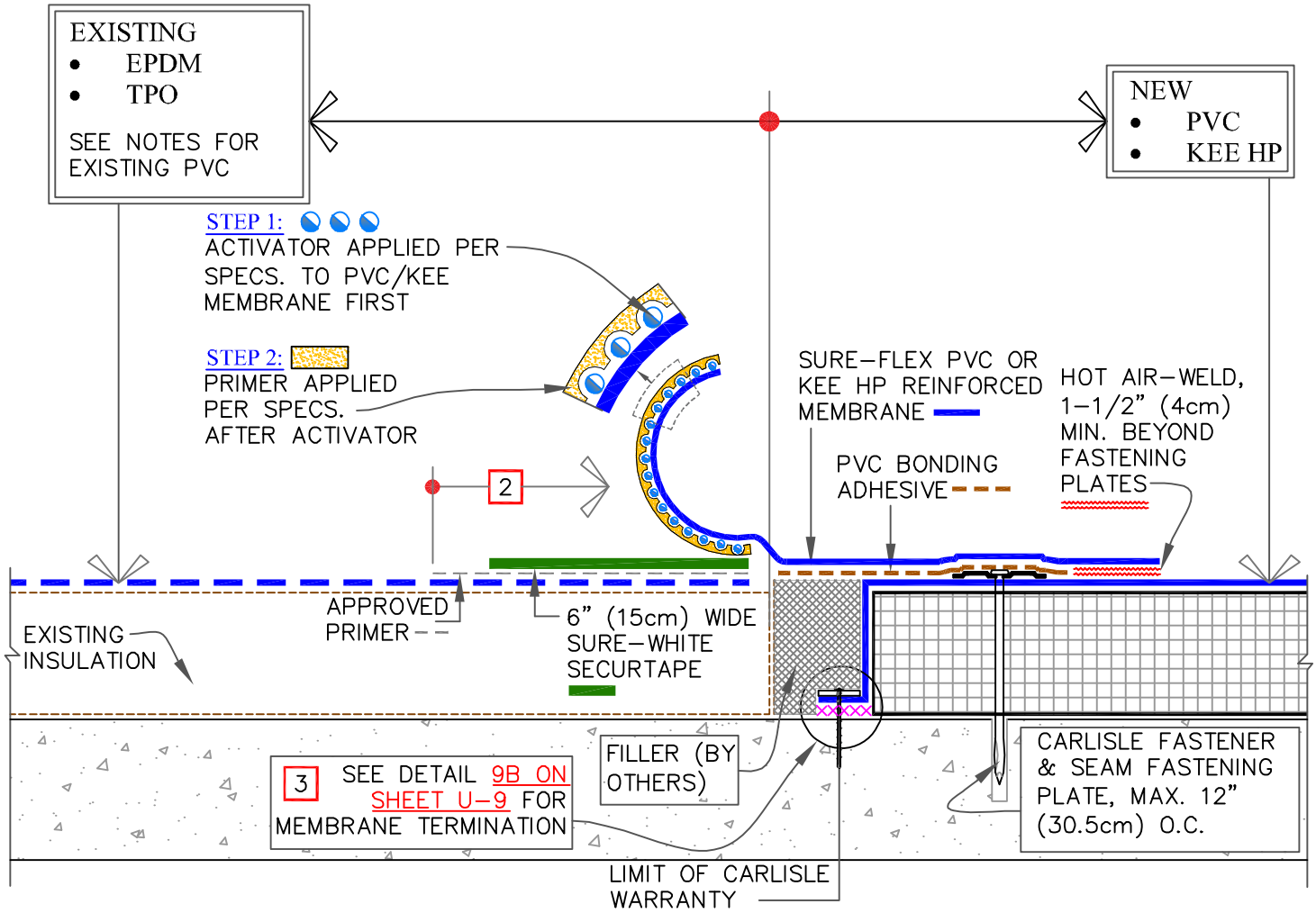
DETAIL NO.
U–13C
U (Universal Detail)



NOTE:

1. CARLISLE'S WARRANTY IS LIMITED TO EXPOSED PORTION OF ROOF MEMBRANE.

CARLISLE SYNTEC SYSTEMS	PVC TIE-IN TO SHINGLED OR METAL PANEL ROOF MAXIMUM WARRANTY: 30 YEARS	TP	DETAIL NO. U-13F U (Universal Detail)



NOTES:

1. ON EXISTING WARRANTED ROOFS, SEEK WRITTEN APPROVAL OF ITS MANUFACTURER FOR ACCEPTANCE OF THIS DETAIL. FOR EXISTING BALLASTED SYSTEMS BY OTHERS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.

2. EXISTING EPDM/PVC MEMBRANES: CLEAN THE SEAMING AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY. APPLY APPROVED PRIMER.

   EXISTING PVC OR KEE MEMBRANES: IF EXISTING MEMBRANE IS NOT ACCEPTABLE FOR WELDING, UTILIZE STEP 1 ACTIVATOR AND STEP 2 PRIMER PROCESS.

3. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION. WHEN RE-ROOFING OVER PRECAST CONCRETE, APPLY LIBERAL BEAD OF WATER CUT-OFF MASTIC IN JOINTS TO PREVENT MOISTURE MIGRATION.

WHEN USING 80-MIL (2.03mm) THICK MEMBRANE
APPLY A 4-1/2" (11.43cm) DIAMETER "T-JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.

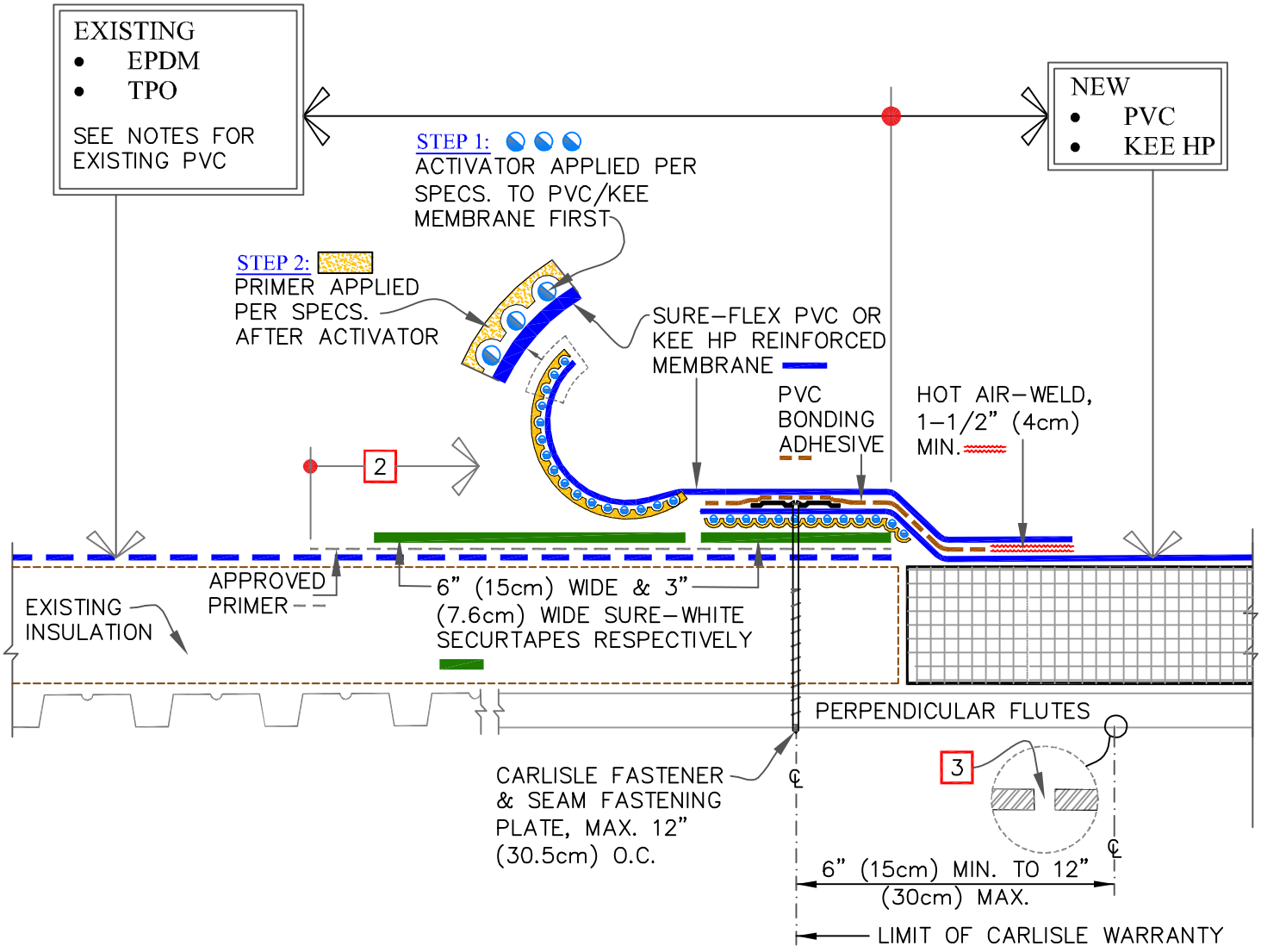
CARLISLE SYNTEC SYSTEMS

PVC/KEE HP TIE-IN TO EXISTING SINGLE-PLY ROOF MEMBRANES ON CONCRETE DECK

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. U-13G

U (Universal Detail)



NOTES:

1. ON EXISTING WARRANTED ROOFS, SEEK WRITTEN APPROVAL OF ITS MANUFACTURER FOR ACCEPTANCE OF THIS DETAIL. FOR EXISTING BALLASTED SYSTEMS BY OTHERS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.

2. EXISTING EPDM/PVC MEMBRANES: CLEAN THE SEAMING AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY. APPLY APPROVED PRIMER.

   EXISTING PVC OR KEE MEMBRANES: IF EXISTING MEMBRANE IS NOT ACCEPTABLE FOR WELDING, UTILIZE STEP 1 ACTIVATOR AND STEP 2 PRIMER PROCESS.

3. IF FLUTES ARE PERPENDICULAR, DRILL 3/8" (1cm) DIAMETER WEEP HOLES INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE TIE-IN.

WHEN USING 80-MIL (2.03mm) THICK MEMBRANE
APPLY A 4-1/2" (11.43cm) DIAMETER "T-JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.

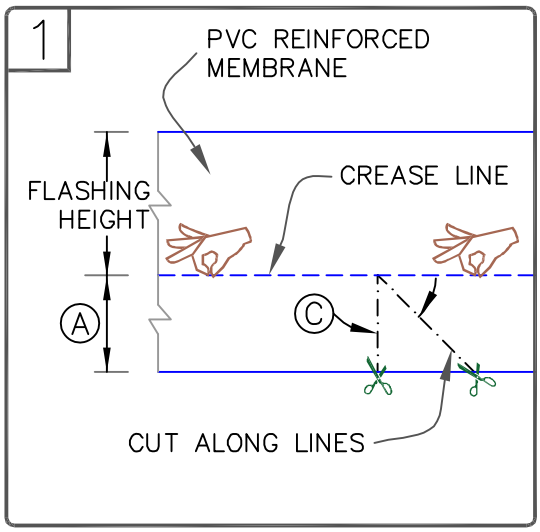
CARLISLE SYNTEC SYSTEMS

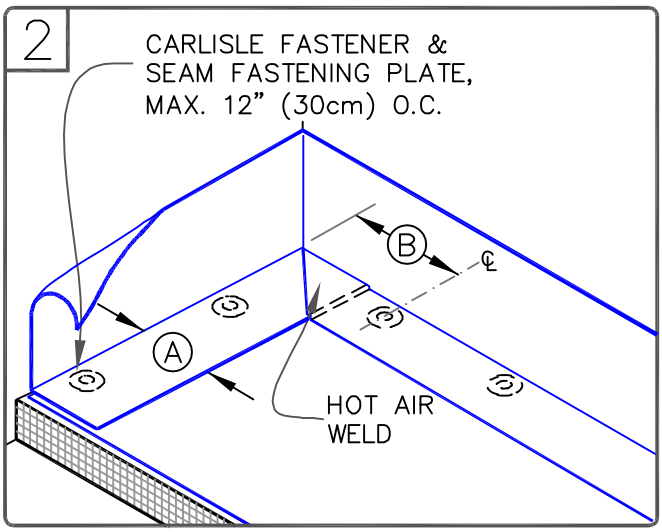
PVC/KEE HP TIE-IN TO EXISTING SINGLE-PLY ROOF MEMBRANES ON METAL DECK

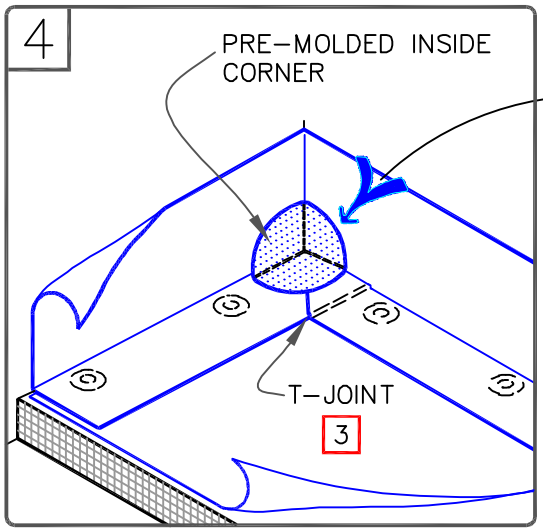
MAXIMUM WARRANTY: 20 YEARS

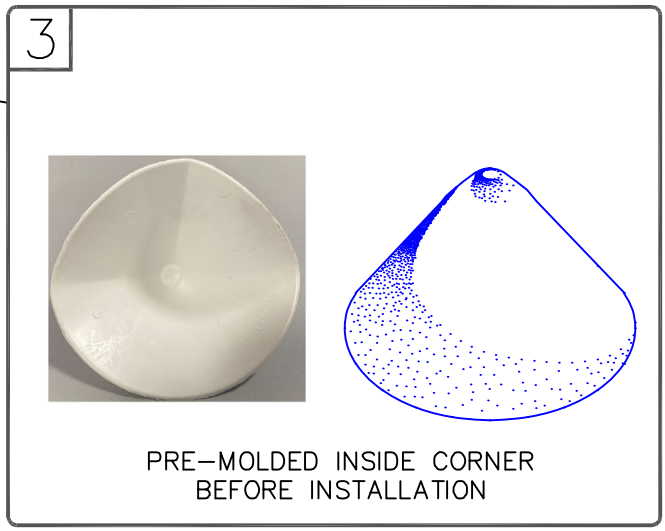
DETAIL NO. U-13H

U (Universal Detail)









WHEN USING 80-MIL (2.03mm) THICK MEMBRANE
APPLY A 4-1/2" (11.43cm) DIAMETER "T-JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.

NOTES:

1. POSITION FASTENING PLATES 6" TO 9" (15 TO 23cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"-9"	15-23	
C	45-DEGREES APPROX.		

CARLISLE SYNTEC SYSTEMS

PRE-MOLDED INSIDE CORNER FLASHING

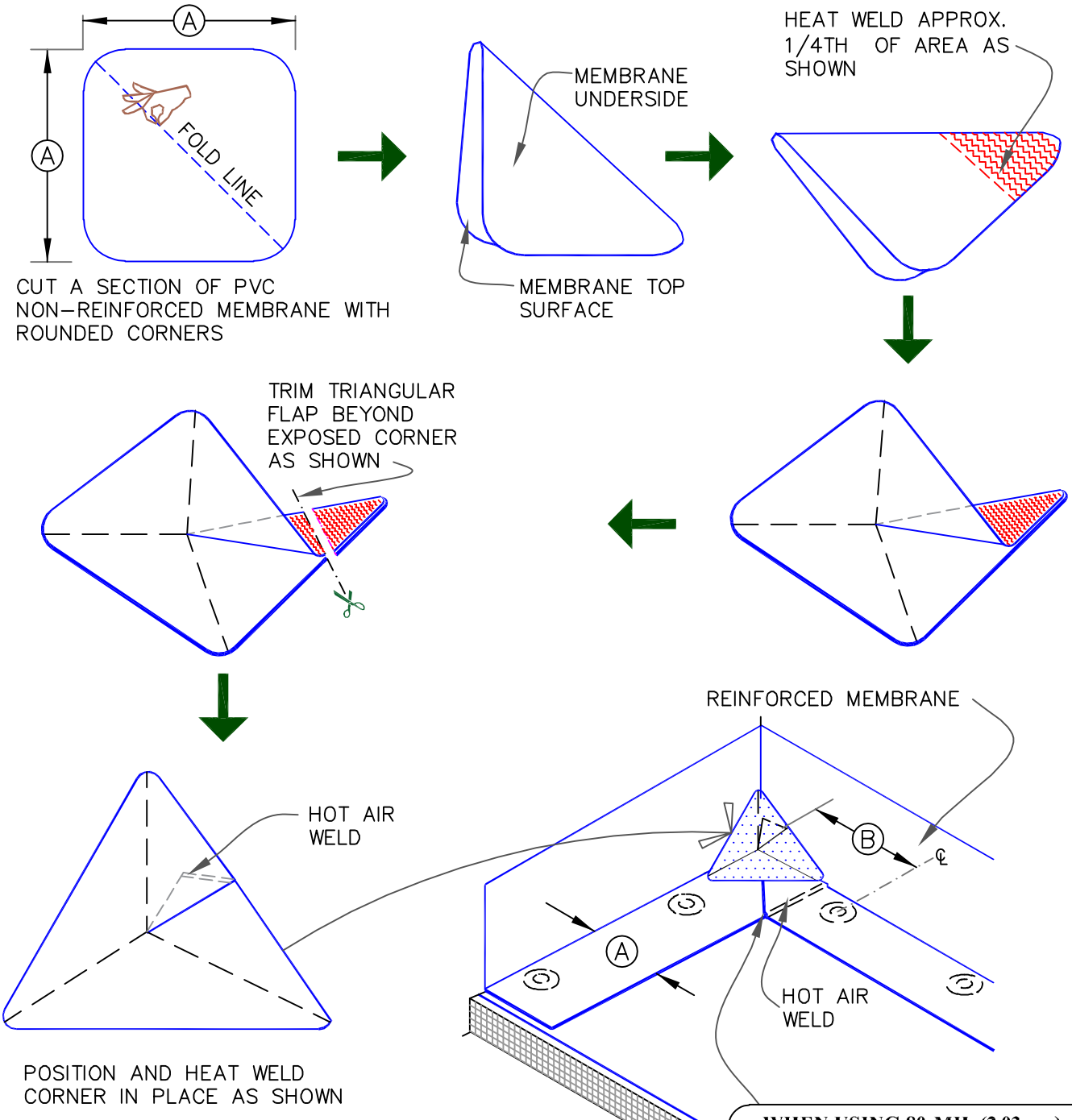
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-15A

U (Universal Detail)

CAUTION

DETAIL NOT FOR USE ON 25 OR 30–YEAR WARRANTY PROJECTS, PRE–FABRICATED/PRE–MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH PVC UNIVERSAL DETAIL U–15A OR U–15G.



DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"–9"	15–23	

WHEN USING 80-MIL (2.03mm) THICK MEMBRANE

APPLY A 4–1/2" (11.43cm) DIAMETER "T–JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED INSIDE CORNER FLASHING

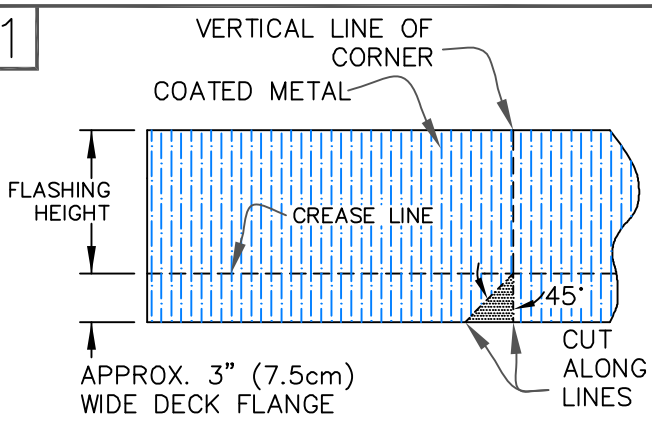
MAXIMUM WARRANTY: 20 YEARS. SEE CAUTION ON TOP OF PAGE

TP

DETAIL NO. U–15B

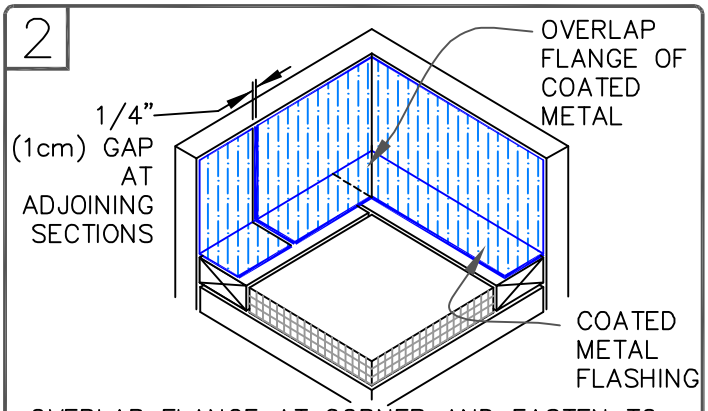
U (Universal Detail)

1



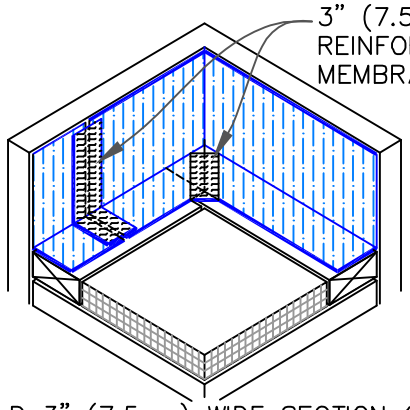
CREASE COATED METAL FLASHING ALONG DASHED LINES AFTER CUTTING AND REMOVING SHADED TRIANGLE.

2



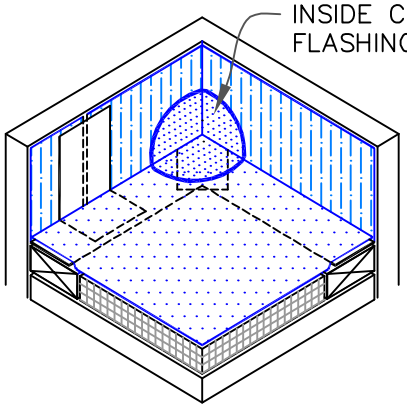
OVERLAP FLANGE AT CORNER AND FASTEN TO WOOD NAILERS USING 1–1/2" (4cm) RING SHANK NAILS SPACED 6" (15cm) O.C., STAGGERED 1/2" (1.5cm).

3



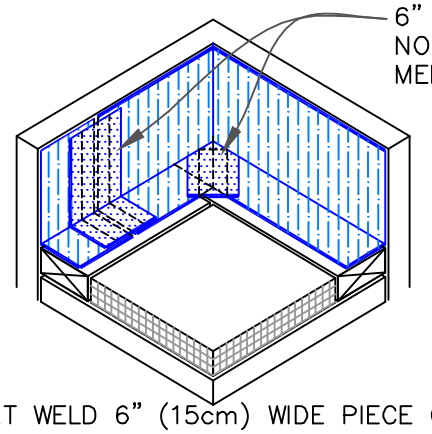
HEAT WELD 3" (7.5cm) WIDE SECTION OF REINFORCED MEMBRANE OVER VERTICAL JOINT IN COATED METAL AND OVER CUT EDGE AT CORNER AS SHOWN.

4



INSTALL FIELD MEMBRANE AND HEAT WELD TO FLANGE OF COATED METAL. ALSO INSTALL INSIDE CORNER FLASHING PER DETAILS: U–15A OR U–15B OR U–15G

5



HEAT WELD 6" (15cm) WIDE PIECE OF NON–REINFORCED MEMBRANE OVER 3" WIDE REINFORCED MEMBRANE, AFTER ROOF MEMBRANE INSTALLATION

SEQUENCE:

1. 3" (7.6cm) REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP 6" (15.2cm) NON–REINFORCED MEMBRANE STRIPPING.

NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1–1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. COORDINATE THIS DETAIL WITH U–12C FOR ADDITIONAL INFORMATION.

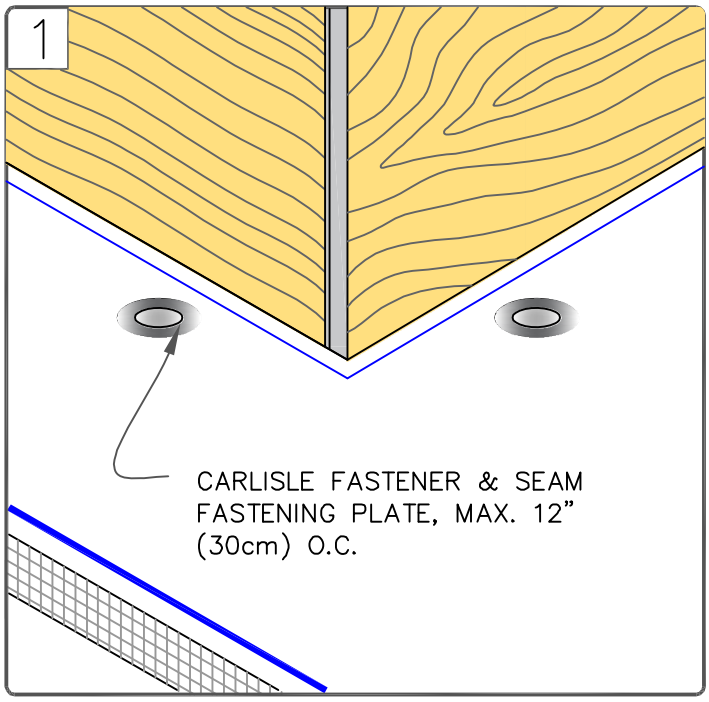
CARLISLE SYNTEC SYSTEMS

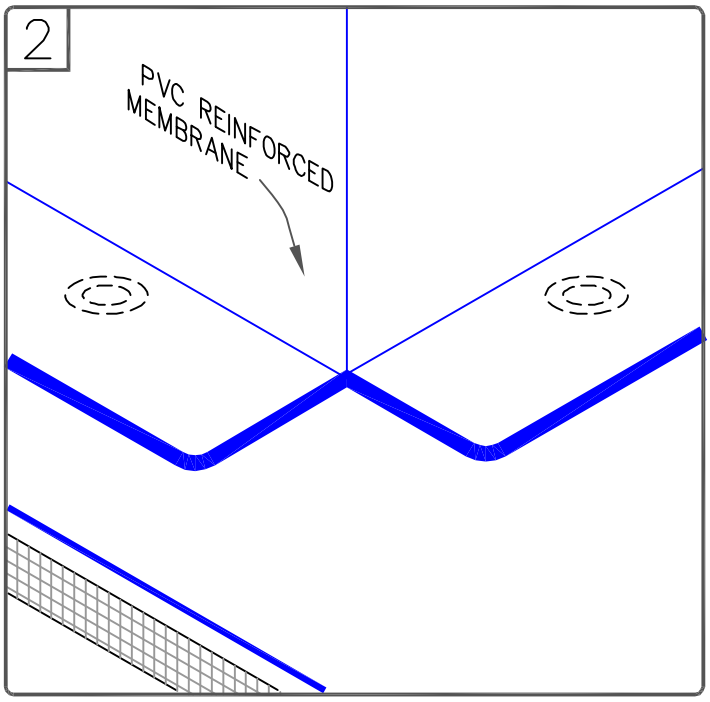
INSIDE CORNER WITH PVC COATED METAL WALL FLASHING

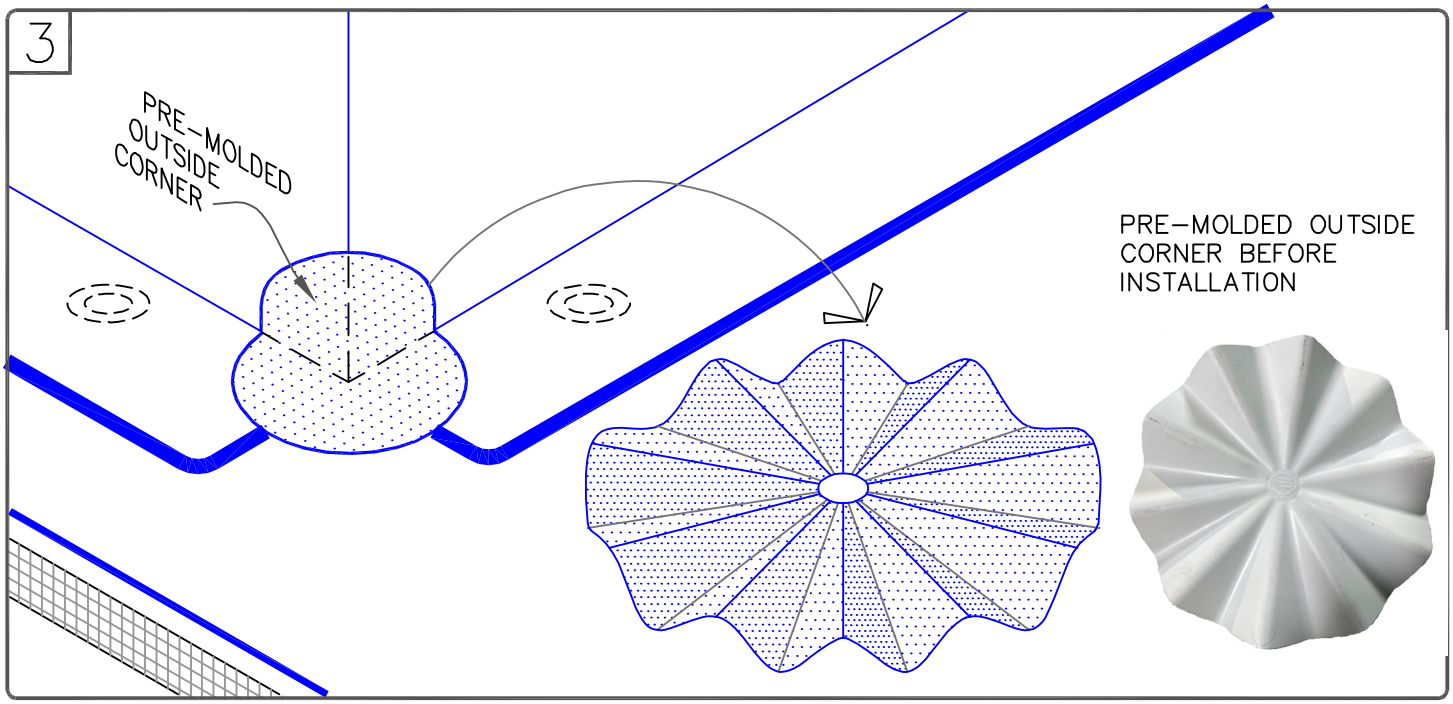
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U–15C

U (Universal Detail)







NOTES:

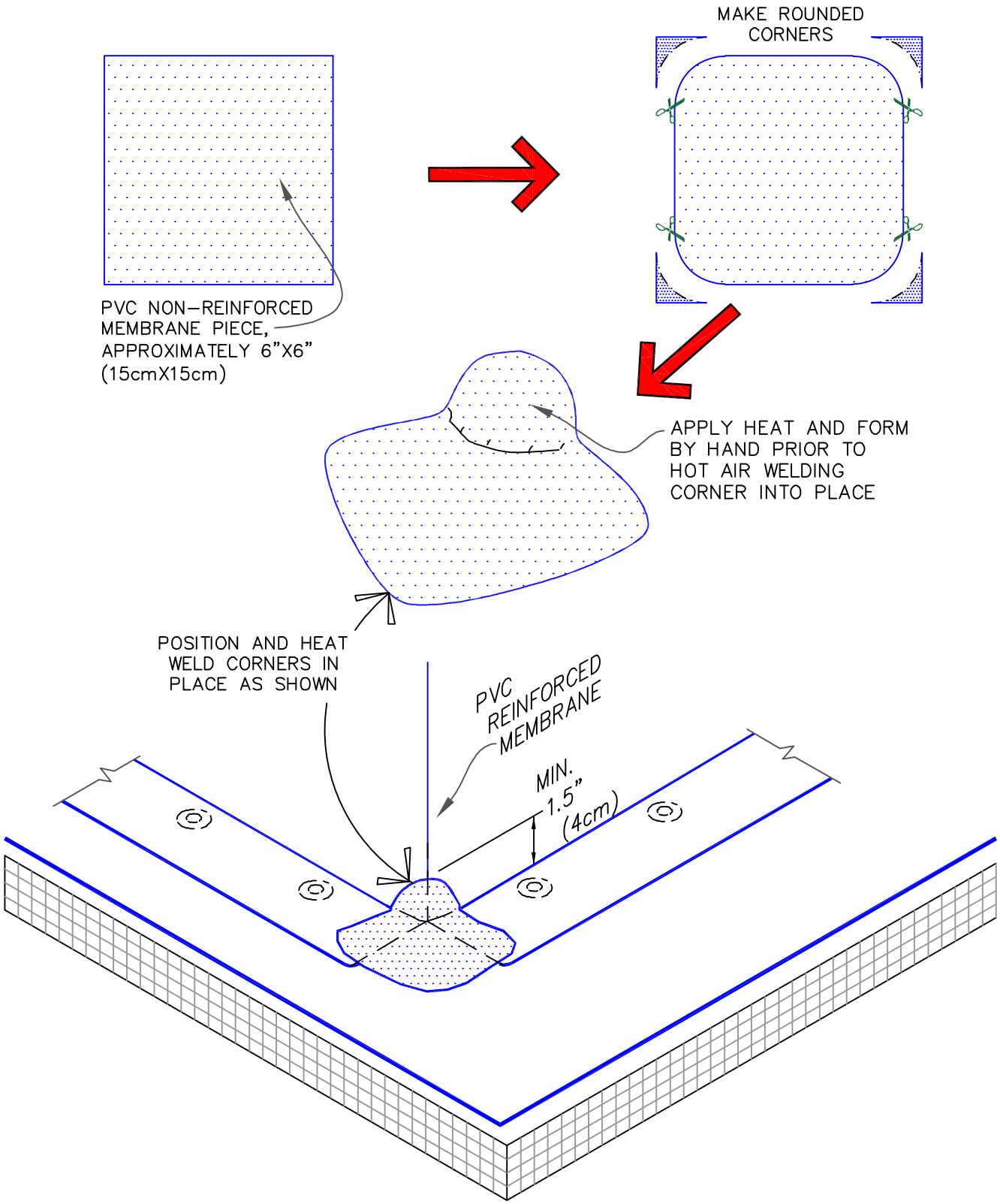
1. POSITION FASTENING PLATES 6"(15cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

CARLISLE SYNTEC SYSTEMS	PRE-MOLDED OUTSIDE CORNER FLASHING	TP	DETAIL NO. U-15D
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

CAUTION

DETAIL NOT FOR USE ON 25 OR 30–YEAR WARRANTY PROJECTS, PRE–FABRICATED/PRE–MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH PVC UNIVERSAL DETAIL U–15D OR U–15G.



CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED OUTSIDE CORNER FLASHING

MAXIMUM WARRANTY: 20 YEARS

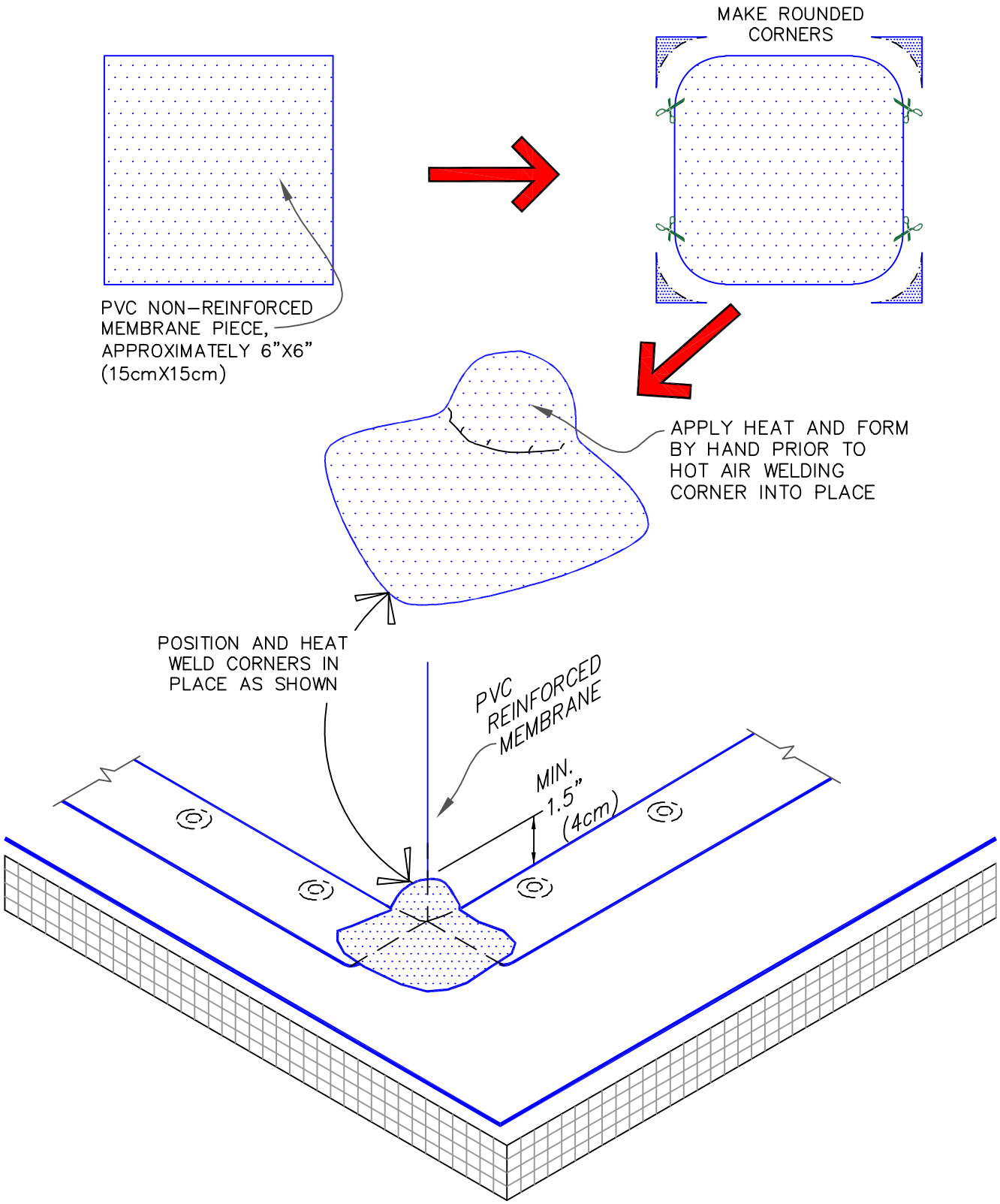
DETAIL NO.

U–15E

U (Universal Detail)

CAUTION

DETAIL NOT FOR USE ON 25 OR 30–YEAR WARRANTY PROJECTS, PRE–FABRICATED/PRE–MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH PVC UNIVERSAL DETAIL U–15D OR U–15G.



CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED OUTSIDE CORNER FLASHING

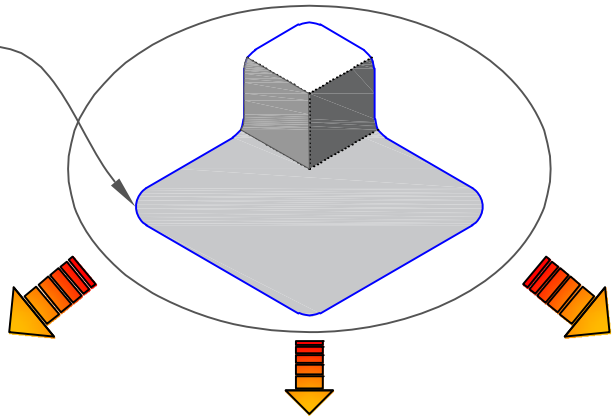
MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.

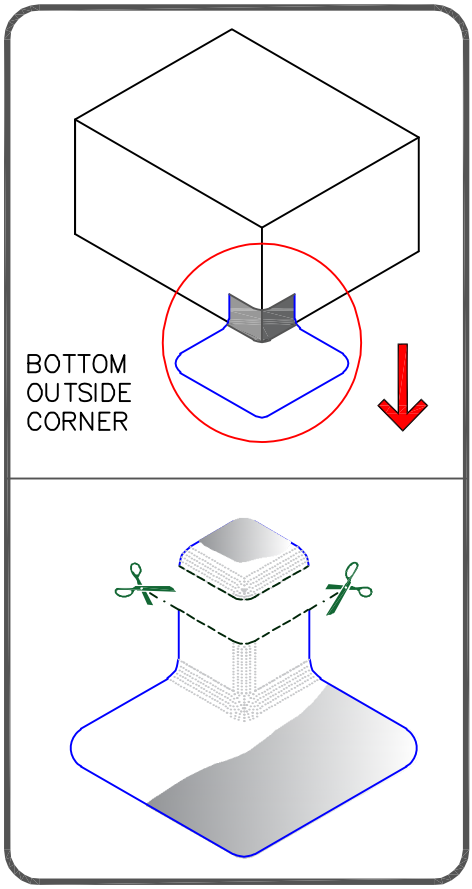
U–15E

U (Universal Detail)

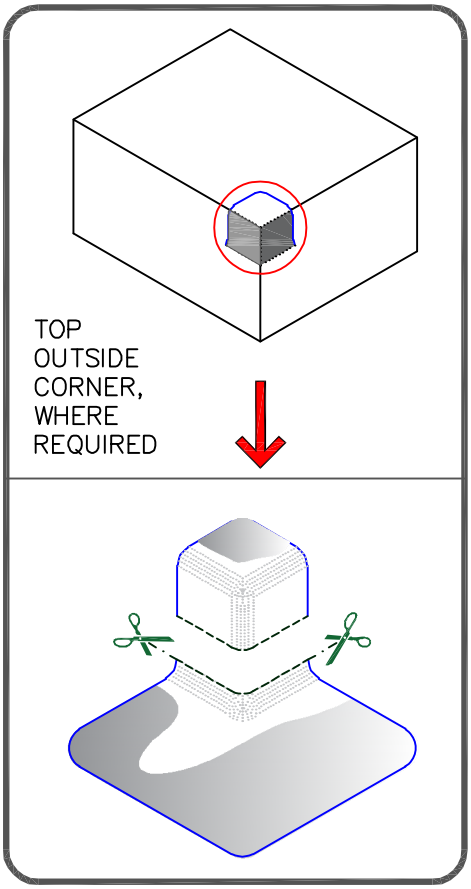
60–MIL (1.52mm) THICK PVC, UNIVERSAL CORNERS CAN BE USED FOR 3 DIFFERENT CORNER CONDITIONS AS SHOWN BELOW



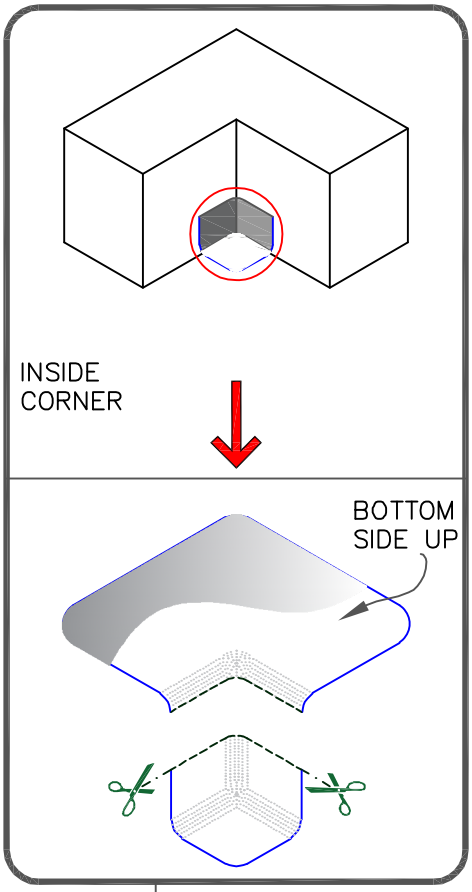
OPTION A



OPTION B

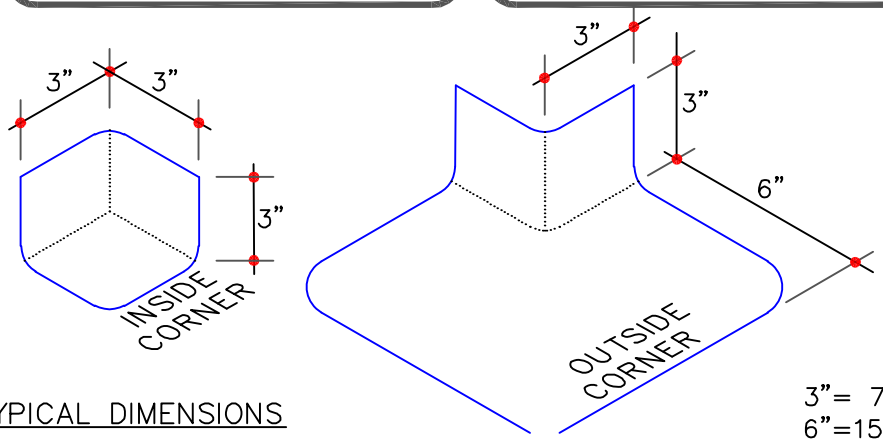


OPTION C



NOTES:

1. ROOF SYSTEMS MUST NOT HAVE FIELD FABRICATED OR BUILT–IN CANT STRIP.
2. REFER TO TECHNICAL DATA BULLETINS FOR COLOR AVAILABILITY.



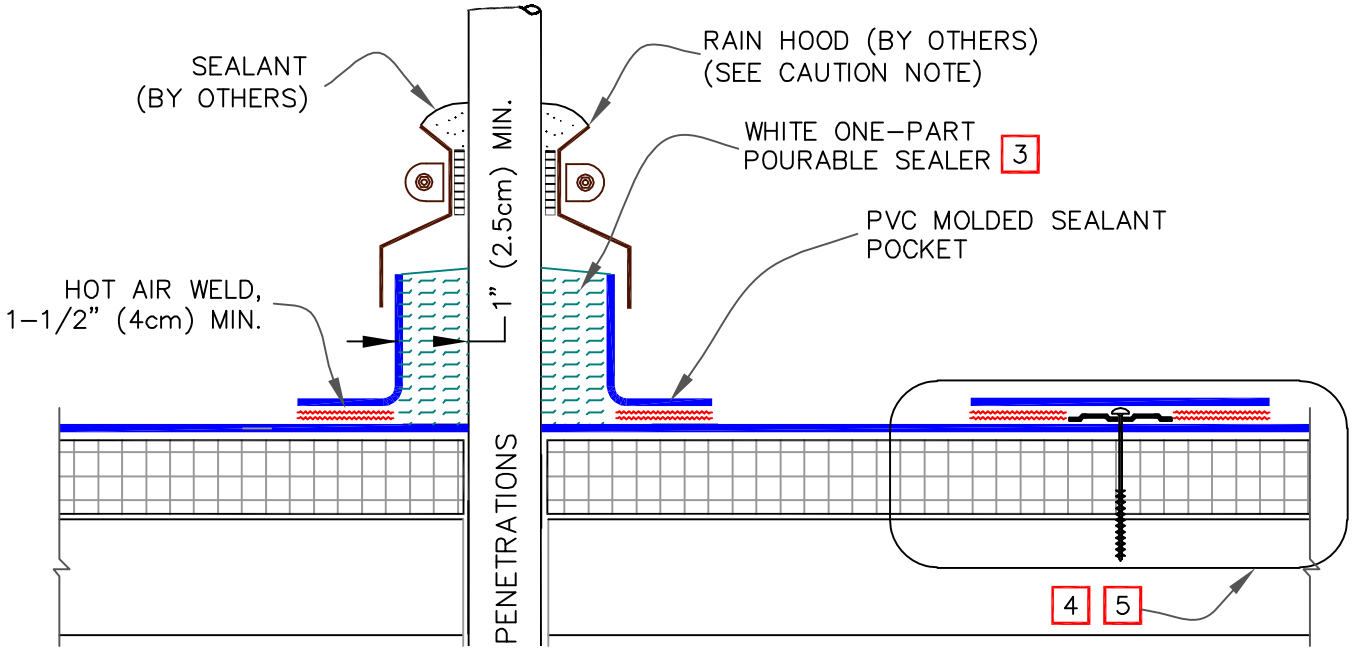
TYPICAL DIMENSIONS

3"= 7.5cm
6"=15cm

CARLISLE SYNTEC SYSTEMS	PVC UNIVERSAL CORNERS–COMBINATION INSIDE & OUTSIDE CORNERS MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. U–15G U (Universal Detail)

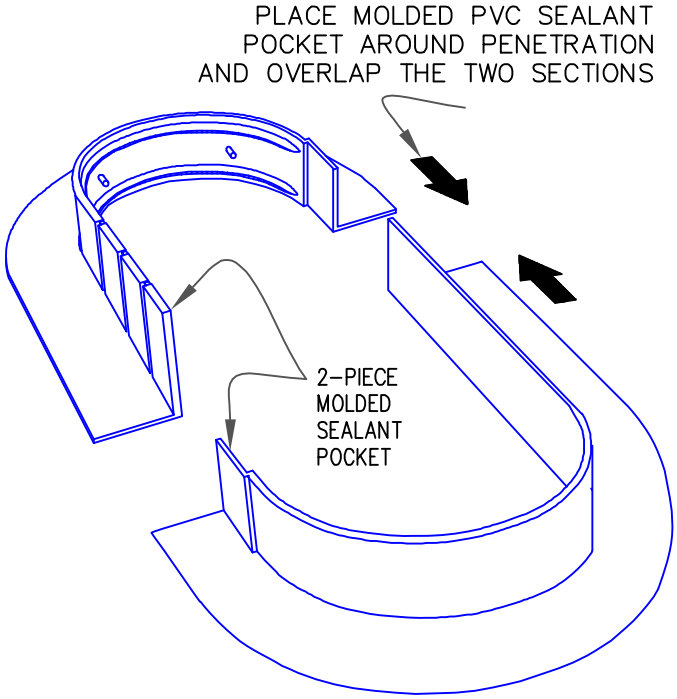
CAUTION

MOLDED SEALANT POCKETS MUST BE USED WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30–YEAR WARRANTIES.



NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 140˚ F (60˚ C).
2. PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS, EXCLUDING PVC MEMBRANE PRIOR TO FILLING WITH SEALANT.
3. FILL POCKET COMPLETELY WITH WHITE ONE–PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY–FASTENED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER FASTENERS AND PLATES.



REFER TO PRODUCT DATA SHEET FOR STEP–BY–STEP INSTALLATION PROCEDURES

CARLISLE SYNTEC SYSTEMS

MOLDED SEALANT POCKET

MAXIMUM WARRANTY: 30–YEAR. SEE CAUTION AT THE TOP OF PAGE.

TP

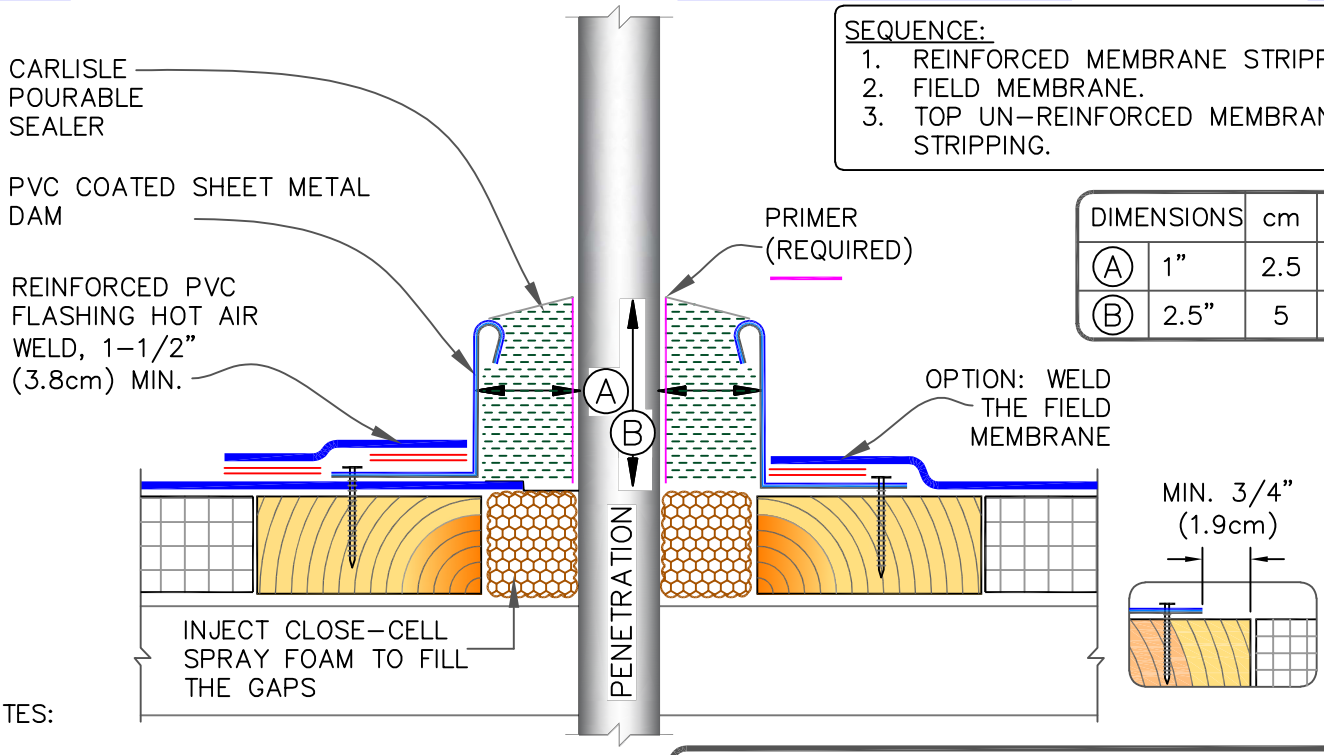
DETAIL NO.

U–16A

U (Universal Detail)

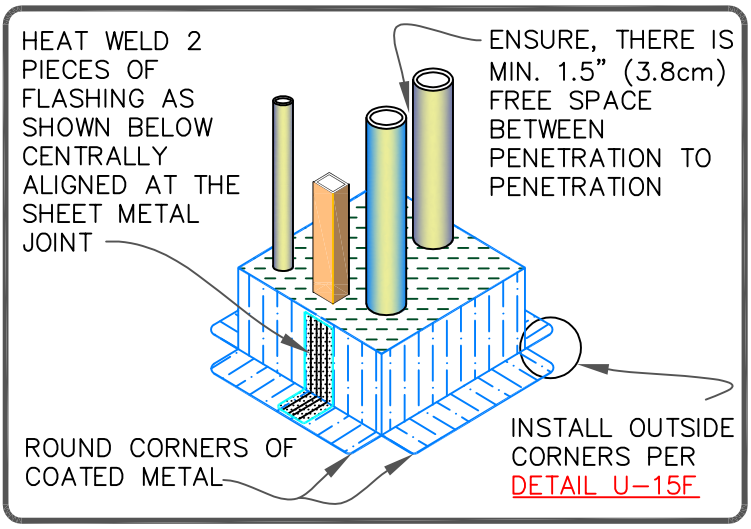
SEQUENCE:
1. REINFORCED MEMBRANE STRIPPING.
2. FIELD MEMBRANE.
3. TOP UN-REINFORCED MEMBRANE STRIPPING.

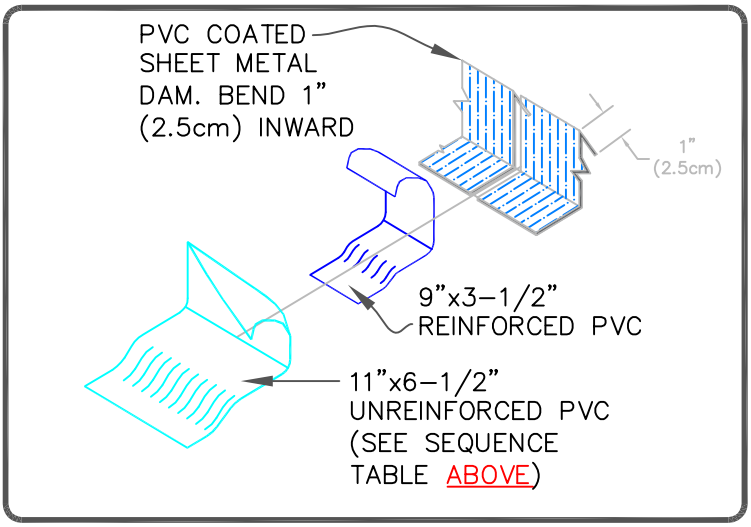
DIMENSIONS	cm	
(A) 1"	2.5	MIN.
(B) 2.5"	5	MIN.



NOTES:

1. TEMPERATURE OF PENETRATIONS MUST NOT EXCEED 140° F (60° C).
2. PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT..
3. FILL POCKET COMPLETELY WITH WHITE ONE-PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY-ATTACHED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (152mm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (305mm) ON CENTER MAXIMUM. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS SEALANT POCKET DIAMETER EXCEEDS 18" (305mm).
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER TYPES OF FASTENERS AND PLATES.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46 CM) IN DIAMETER. REFER TO SPECIFICATIONS.
7. WHEN ANY ONE SIDE OF THE FIELD FABRICATED POURABLE SEALER POCKET EXCEEDS 12" (30 CM) USE WOOD BLOCKING TO ANCHOR SHEET METAL.



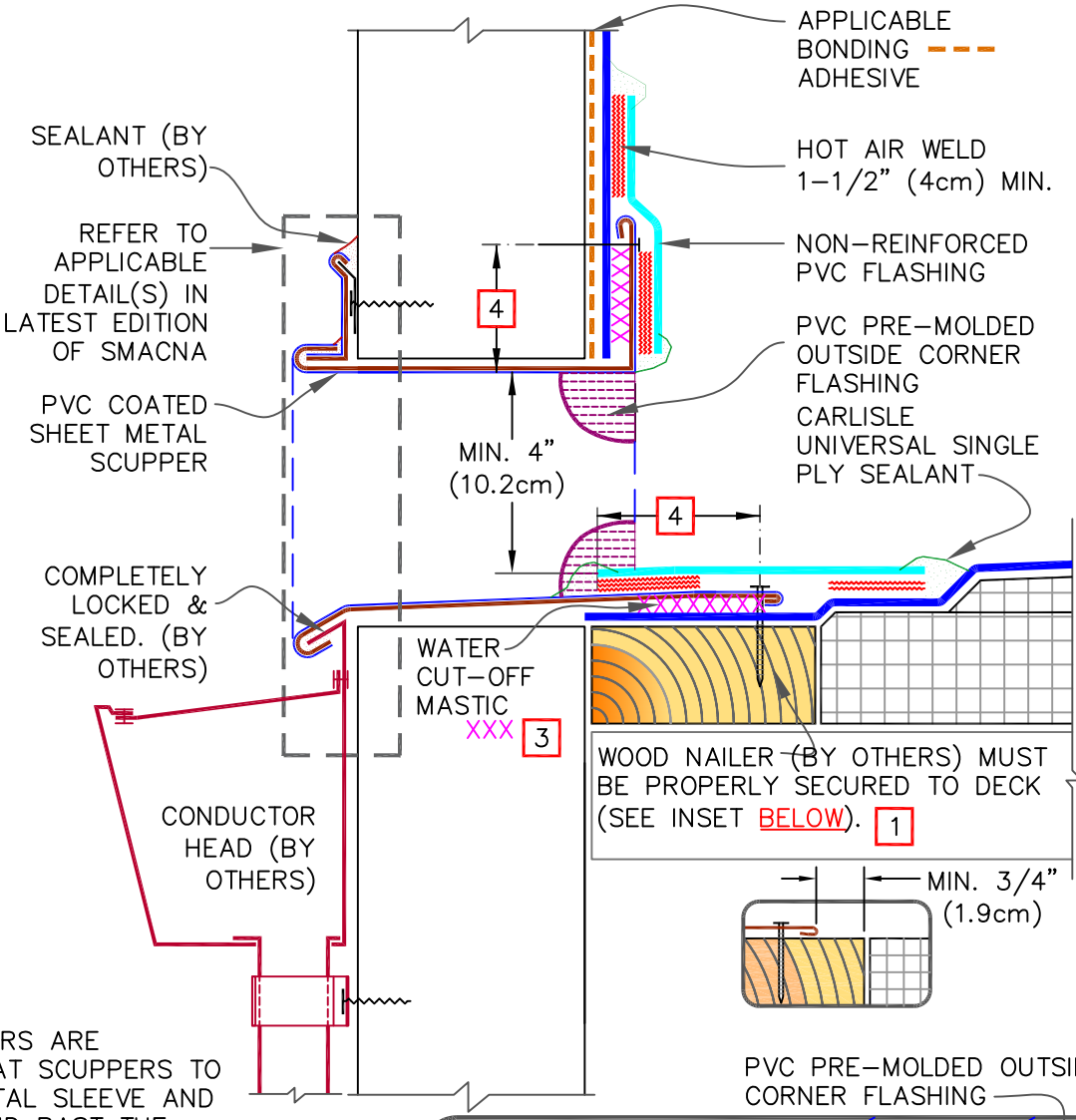


CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PVC COATED METAL POCKET

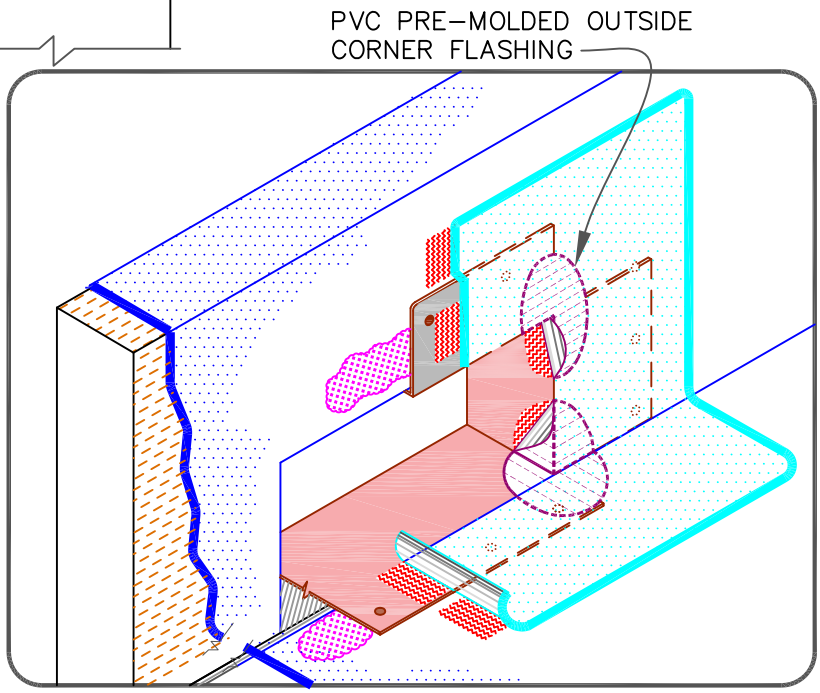
DETAIL NO. U-16B

U (Universal Detail)



NOTES:

1. WOOD NAILERS ARE INSTALLED AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. METAL SCUPPER BOX MUST HAVE FOLDED FLANGE CORNERS FULLY COVERED BY OUTSIDE CORNER FLASHING.
3. WATER CUT–OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. SCUPPER FLANGES MUST BE TOTALLY COVERED BY NON–REINFORCED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.



CARLISLE SYNTEC SYSTEMS

PREFABRICATED SCUPPER WITH PVC COATED METAL

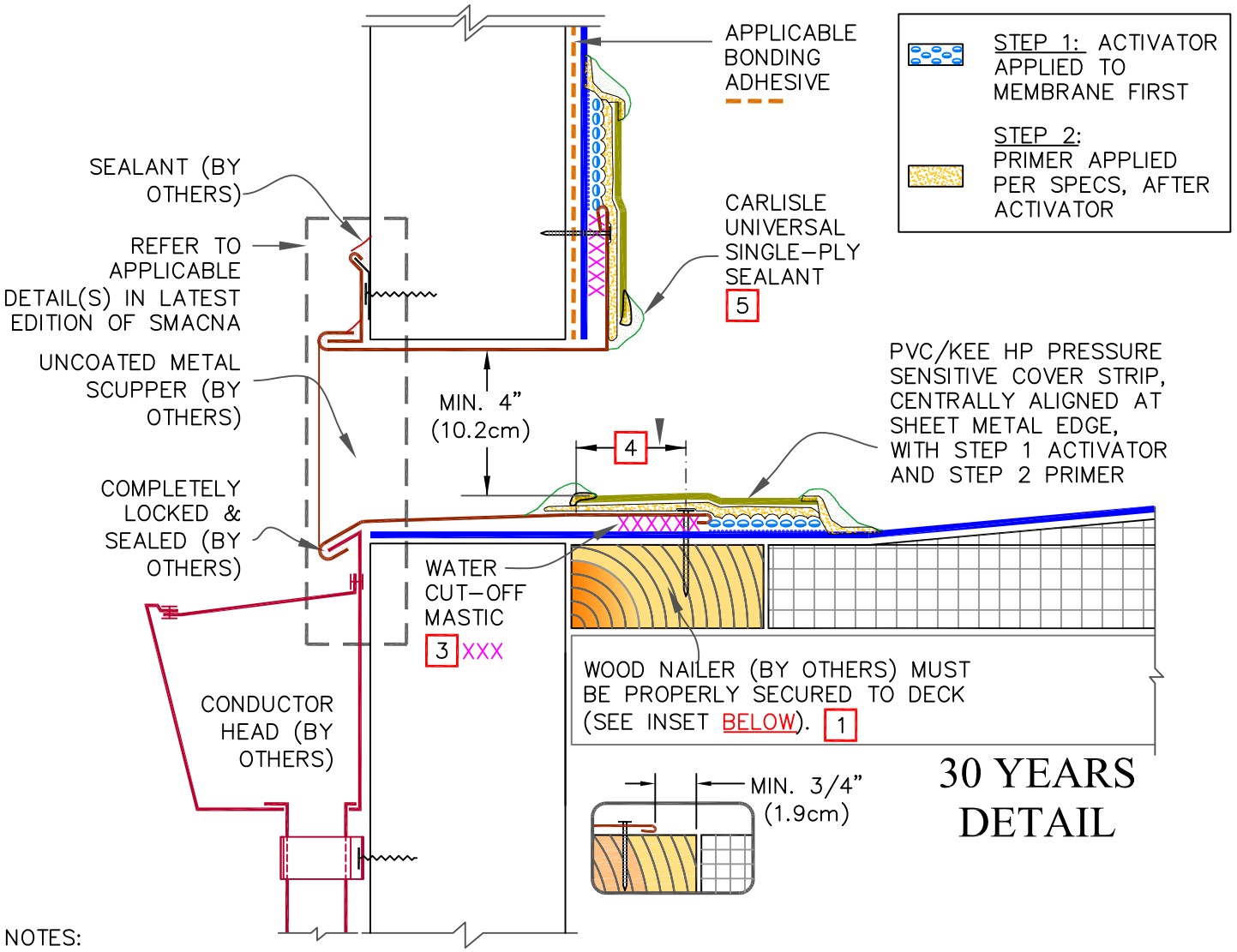
MAXIMUM WARRANTY: 30 YEARS, SEE INSET FOR 20 YEARS

TP

DETAIL NO.

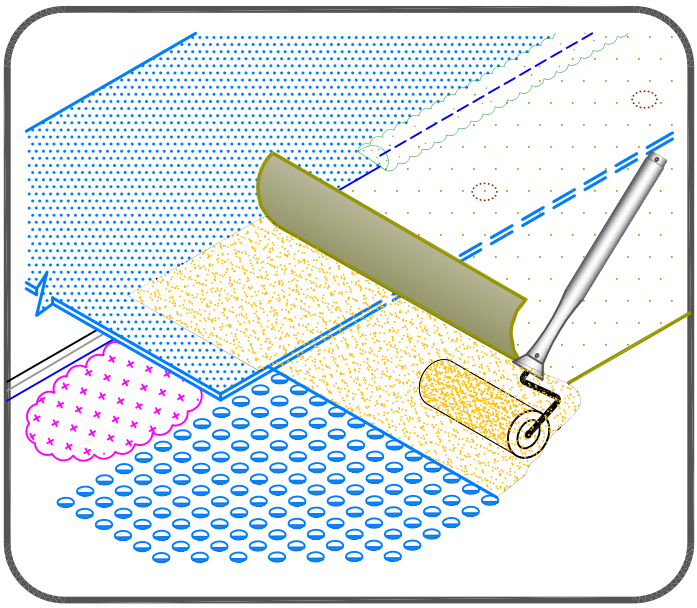
U–18A

U (Universal Detail)



NOTES:

1. WOOD NAILERS ARE INSTALLED ONLY AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
3. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
4. PRESSURE SENSITIVE COVER STRIP MUST EXTEND A MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.
5. UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. PVC STEP 2 PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.

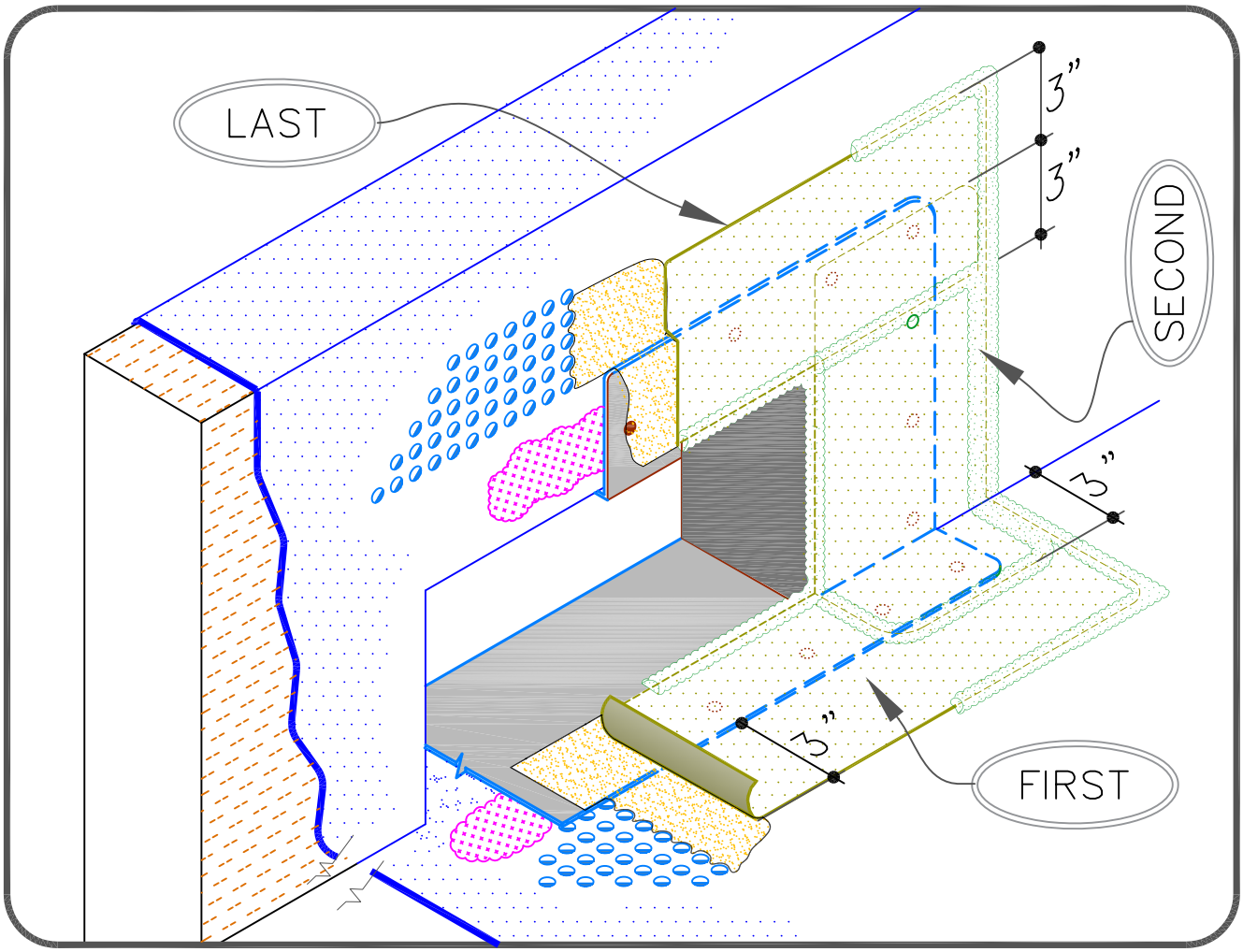


CARLISLE SYNTEC SYSTEMS

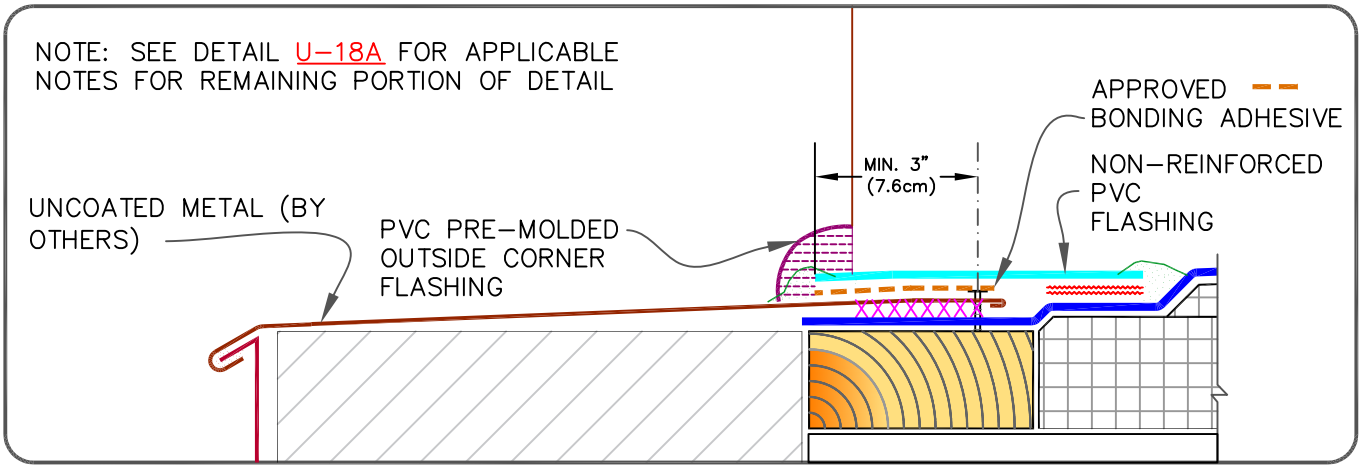
SCUPPER WITH UNCOATED METAL
PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
U-18B
U (Universal Detail)

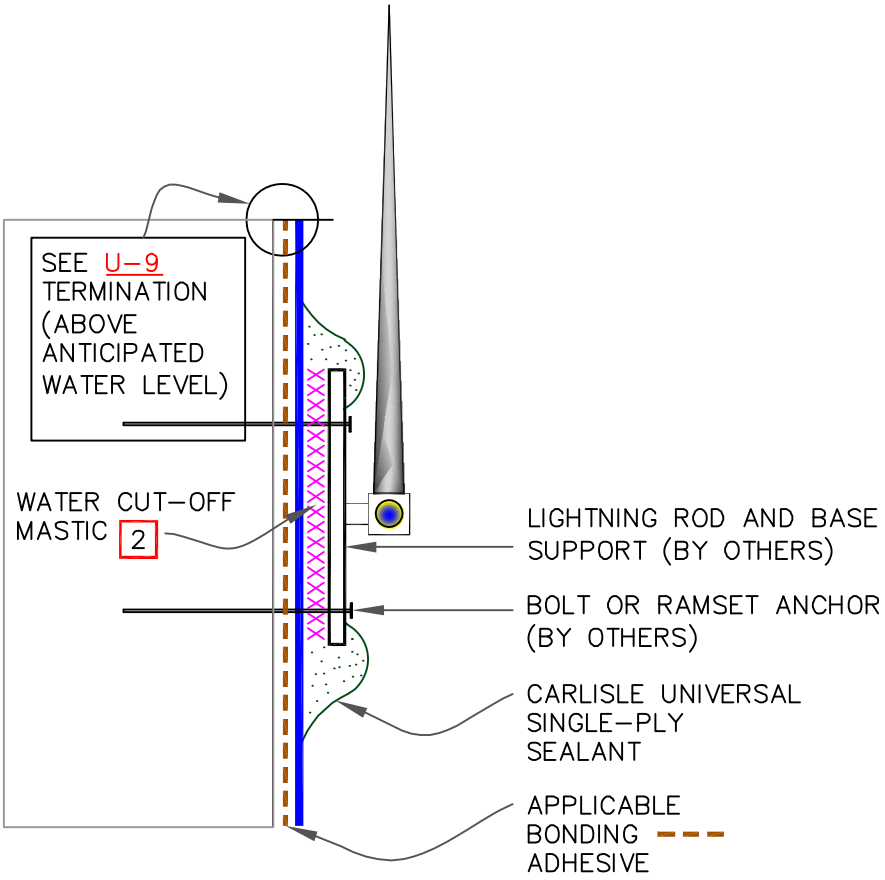


30 YEARS DETAIL



OPTION FOR 20 YEARS DETAIL

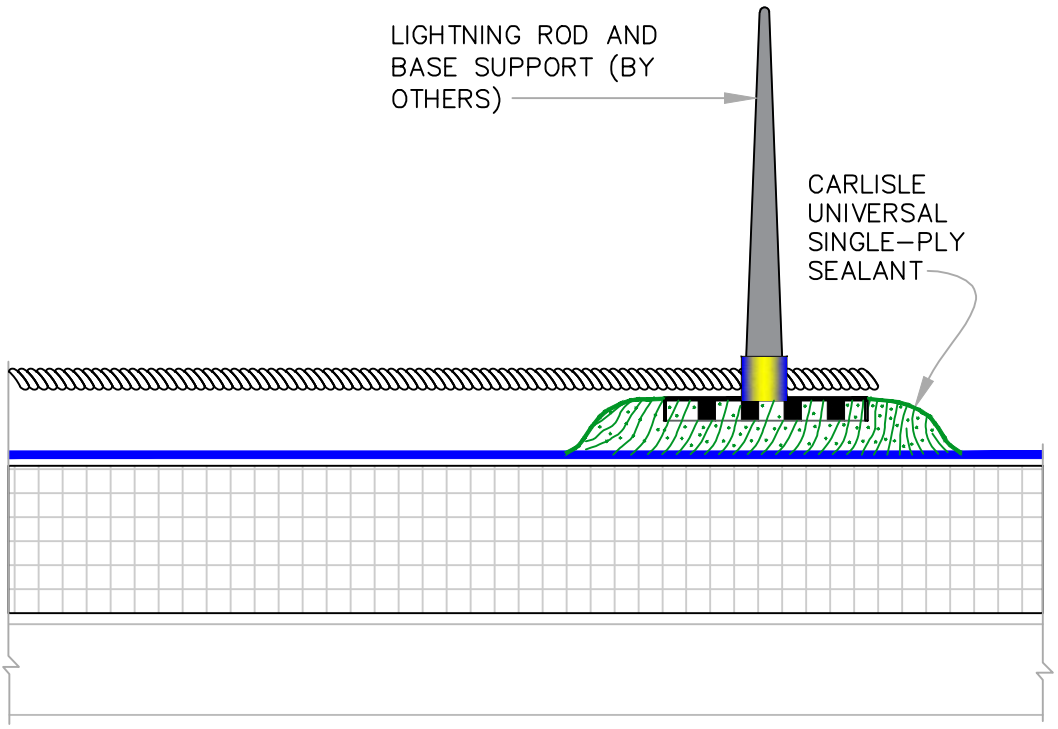
CARLISLE SYNTEC SYSTEMS	SCUPPER WITH UNCOATED METAL PAGE 2 OF 2	TP	DETAIL NO. U–18B
	MAXIMUM WARRANTY: SEE EACH DETAIL		U (Universal Detail)



NOTES:

1. DETAIL MAY BE USED FOR ANY FASTENER PENETRATION (E.G., ACCESS LADDER, ANCHOR SUPPORT TO PARAPET).
2. WATER CUT–OFF MASTIC MUST BE UNDER CONSTANT COMPRESSION.
3. DETAIL UNACCEPTABLE FOR HORIZONTAL APPLICATION ON ROOF DECK.
4. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT PARAPET (VERTICAL ATTACHMENT)	TP	DETAIL NO. U–20A
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)



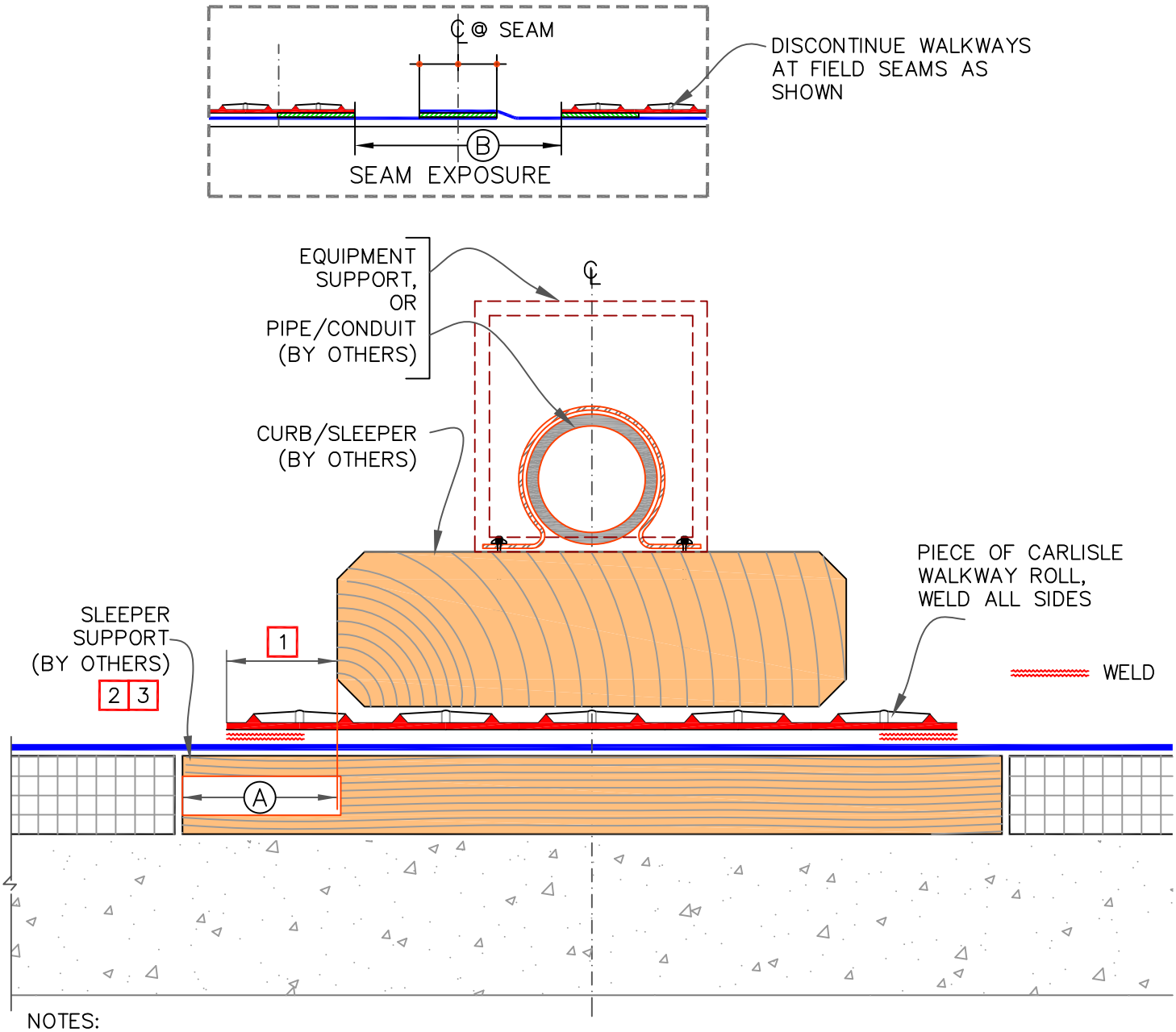
NOTES:

1. CLEAN EXPOSED MEMBRANE SURFACE WITH WEATHERED MEMBRANE CLEANER (WHEN USING TPO) AND PVC MEMBRANE CLEANER (WHEN USING PVC OR KEE HP) AND ALLOW TO DRY.

2. WHEN USING TPO MEMBRANE, APPLY TPO PRIMER TO THE MEMBRANE SURFACE PRIOR TO THE APPLICATION OF UNIVERSAL SINGLE-PLY SEALANT.

3. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT DECK LEVEL MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. U-20B THERMOPLASTIC UNIVERSAL



NOTES:

1. SLEEPER MUST BE LARGE ENOUGH TO SUPPORT WEIGHT OF EQUIPMENT WITHOUT INDENTING INSULATION. EXTEND SLEEPER OUT AS REQUIRED BY STRUCTURAL ENGINEER TO DISTRIBUTE SUBJECT LOAD OR AT LEAST EXTEND OUT MIN. 3" (7.5cm).
2. ENSURE SCREW/ANCHOR HEADS IN TOP SURFACE OF WOOD BLOCKING ARE RECESSED TO PROTECT MEMBRANE.
3. SLEEPER SUPPORT NOT REQUIRED UNDER CONDUIT OR PIPE SUPPORTS.
4. CONSULT STRUCTURAL ENGINEER AND/OR SPECIFIER TO AVOID WATER PONDING DUE TO DECK DEFLECTION.
5. RAISE CONDUITS AND PIPES ABOVE THE REGIONAL SNOW LINE WHEN SLOPE OF THE ROOF CAN LEAD TO SLIDING SNOW.

DIMENSIONS		cm	
A	3"	7.5	MIN. ALL SIDES
B	8"	20	

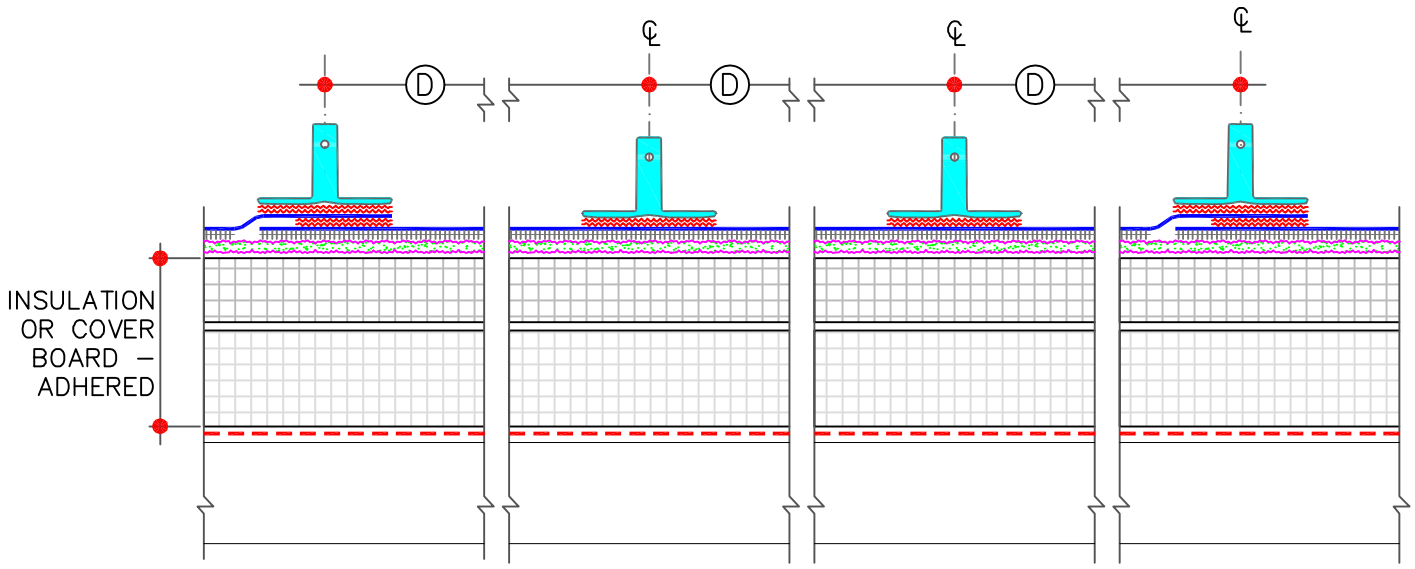
CARLISLE SYNTEC SYSTEMS

SLEEPER

MAXIMUM WARRANTY: 30 YEARS

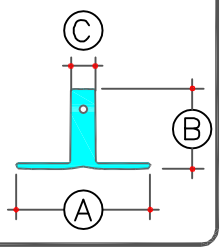
DETAIL NO. U–24

U (Universal Detail)



SECTION AA: CONTOUR RIB PROFILE

CONTOUR RIB		
DIMENSIONS		cm
Ⓐ	1–3/4"	4.5
Ⓑ	1–1/4"	3
Ⓒ	1/2"	1
Ⓓ	VARIES	



PVC REINFORCED MEMBRANE

APPROVED ADHESIVE

HOT AIR WELD (REFER TO SPECS)

AIR/VAPOR BARRIER (WHERE REQUIRED)

CARLISLE SYNTEC SYSTEMS

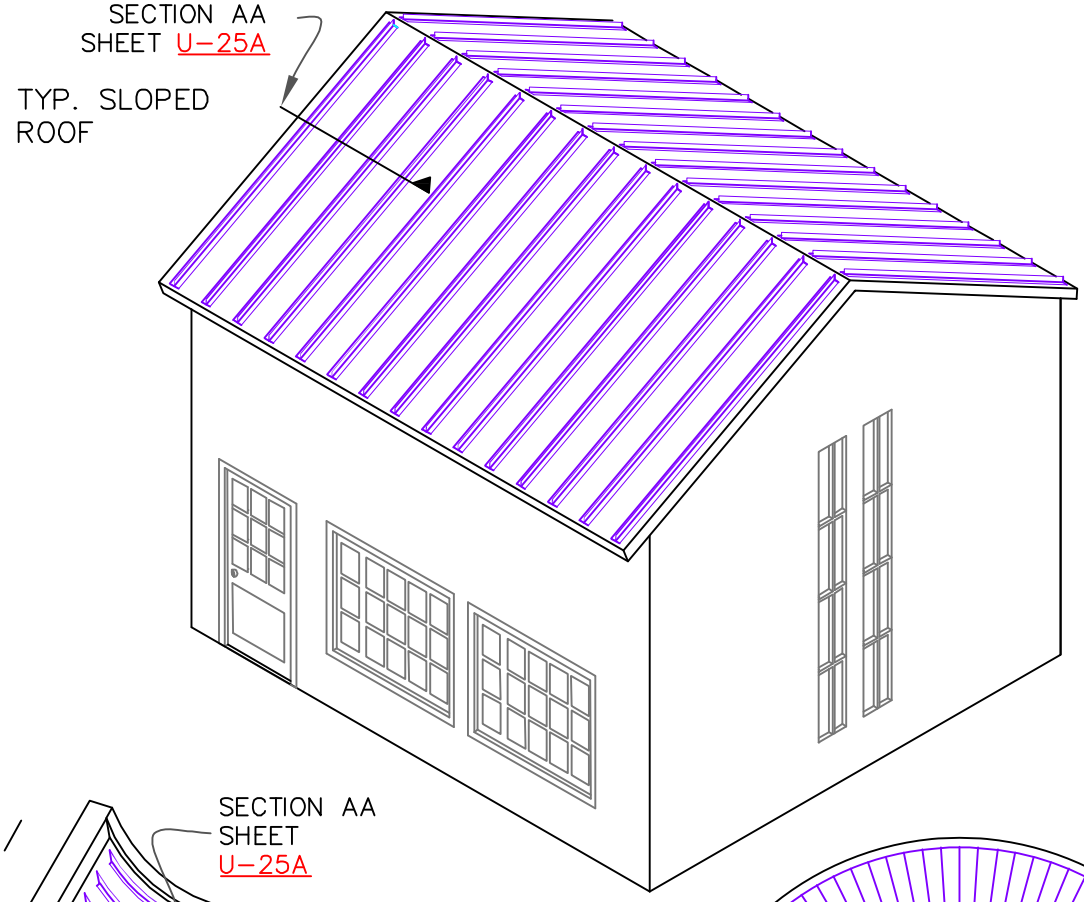
SUREFLEX PVC RIB: TYPICAL PROFILE

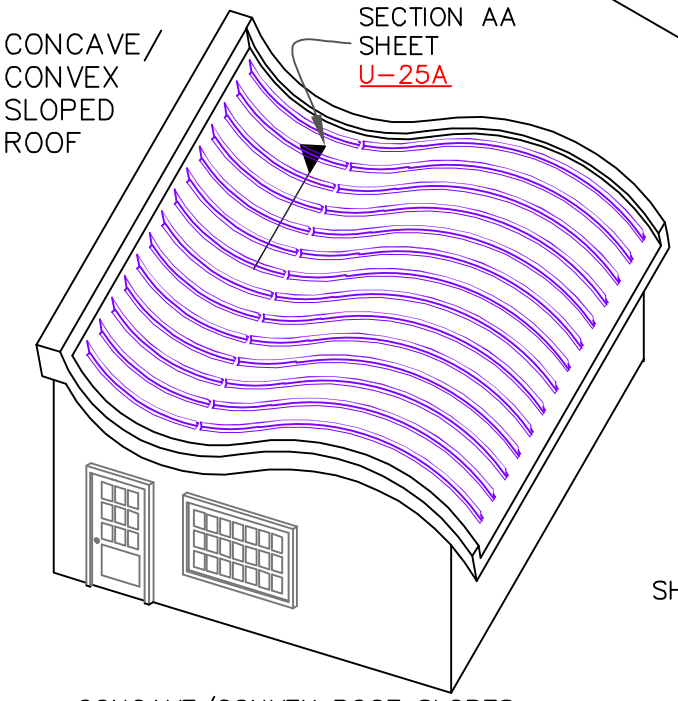
MAXIMUM WARRANTY: 30 YEARS

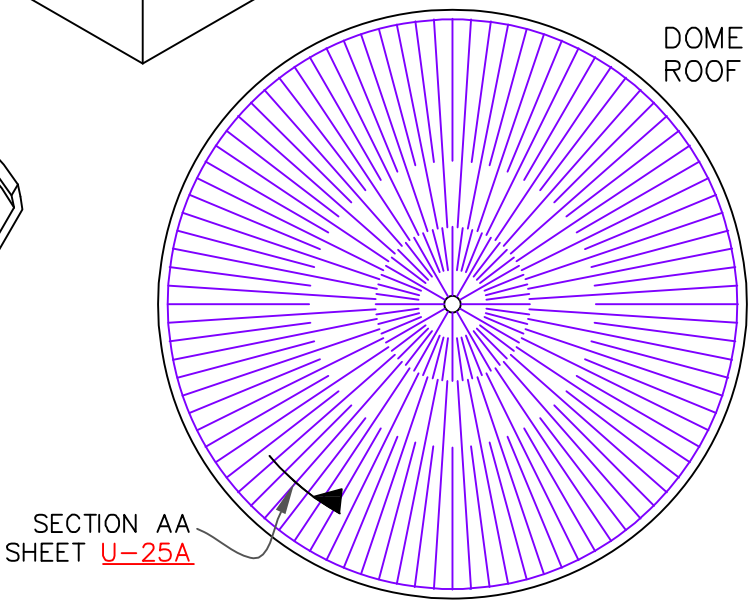
TP

DETAIL NO. U–25A

U (Universal Detail)







CONCAVE/CONVEX ROOF SLOPES

AT COMPLEX GEOMETRIC SHAPES, WITH MULTI-DIRECTIONAL SLOPES, THE SHEET METAL ROOF IS NOT ONLY DIFFICULT TO INSTALL, BUT THE WATER-SHEDDING ABILITY OF METAL ROOF IS SERIOUSLY HAMPERED WITHIN THE CONCAVE (NEGATIVE) SLOPES. THE WATERPROOFED ROOF MEMBRANE WITH THE CONTOUR RIB IS A PRACTICAL SOLUTION.

TYPICAL PLAN OF DOME ROOF

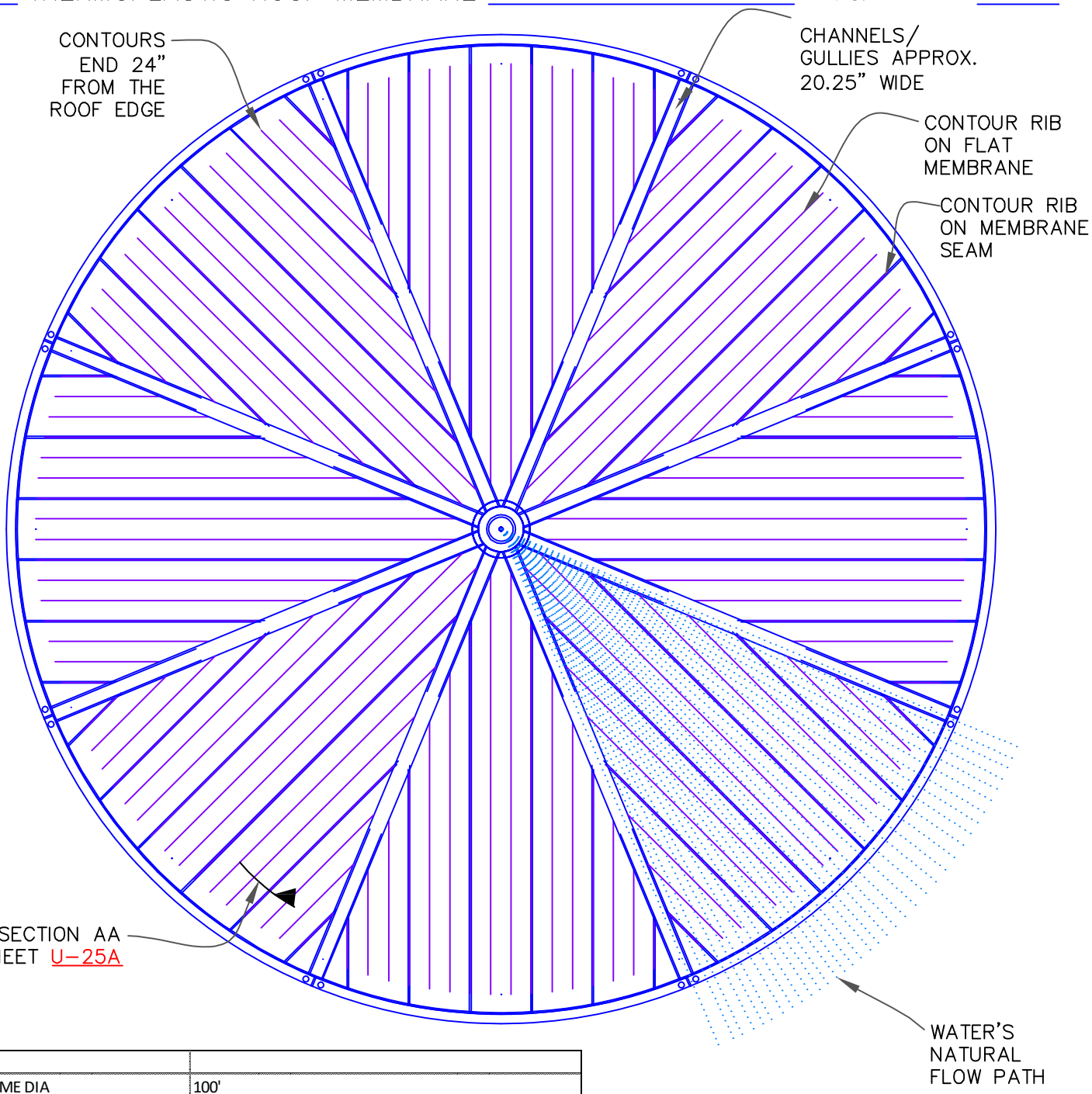
WHERE CONCENTRATION OF STANDING SEAMS NEAR CENTER IN METAL SYSTEM IS EXTREMELY HARD TO FABRICATE & INSTALL, THE CONTOUR RIB INSTALLATION IS EXTREMELY SIMPLE & EASY TO INSTALL.

CARLISLE SYNTEC SYSTEMS

SUREFLEX PVC RIB: VARIOUS APPLICATIONS

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
U-25B
U (Universal Detail)



DOME	
TYP. DOME DIA	100'
DOME AREA	8,550 S.F.
MEMBRANE	
ROLL WIDTH	81"
MEMBRANE SEAM WIDTH	2"
WELDED PORTION	1.5"
CHANNELS/GULLIES	PERFECTLY CUT 1/4TH WIDTH OF 81" ROLL (20.25")
APEX POINT	PERFECTLY CUT CIRCULAR SHAPE AS DESIGNED, APPRX. 37" DIA SHOWN
CONTOUR RIBS	
CONTOUR RIBS O.C.	26.333"
TOTAL LENGTH OF CONTOUR RIBS ON ENTIRE 100 DIA DOME	3256 LINEAR FEET (ADD % FOR DOME CURVE)

TYPICAL EXAMPLE OF 100' DIAMETER DOME ROOF PLAN SHOWS 81" WIDE ROLLS SHOWING CONTOUR RIBS @ 26" O.C.

NOTE: APEX MAY BE DESIGNED WITH SELF-CLEANSING ZINC STRIPS TO CUT DOWN STAINING AROUND LIGHTNING ROD ARRESTOR

CARLISLE SYNTEC SYSTEMS

SUREFLEX PVC RIB: EXAMPLE OF DOME WITH RIBS ALIGNED OVER MEMBRANE SEAMS

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. U-25C

U (Universal Detail)

FleeceBACK®
Roofing Systems

Adhered and Mechanically Fastened Roofing System
Sure-Seal®/Sure-White™/Sure-Weld®/Sure-Flex™

Table of Contents
July 2024

Note: In addition to information listed in this section Specifiers and Authorized applicators should reference Spec Supplement and Design Reference Sections for other pertinent information.

FleeceBACK® Adhered Roofing System
Sure-Seal®/Sure-White™/Sure-Weld®/Sure-Flex™

July 2024

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 Adhered FleeceBACK Membrane Roofing Systems. 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.

Various Warranty Tables have been included in Paragraph 1.05 citing various requirements by which specific warranty coverage can be obtained. Appropriate Warranty Table should be referenced to ensure proper warranty coverage.

PART I GENERAL

1.01 Description

Carlisle's FleeceBACK Adhered Roofing Systems utilize a Sure-Seal / Sure-White EPDM (thermoset) membrane OR a Sure-Weld TPO / Sure-Flex PVC or KEE HP PVC (thermoplastic) membrane.

A. **Thermoset Membranes**: Sure-Seal/Sure-White FleeceBACK Adhered Roofing System incorporates 10' wide, 45, 60 or 90-mil thick Sure-Seal (black) or Sure-White (white-on-black) non-reinforced EPDM membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 100, 115 or 145-mils. The membrane is fully adhered to an acceptable substrate with a spray, extrusion or splatter applied, two component, low rise, Flexible FAST™ Adhesive. Adjoining sheets of membrane are spliced together using 3" or 6" wide Factory-Applied SecurTAPE™ in conjunction with EPDM Primer.

B. **Thermoplastic Membranes**:

1. **FleeceBACK TPO Adhered Roofing System** incorporates 45-, 60- or 80-mil thick, 12' or 6' wide, scrim-reinforced, white, gray, tan or Special Color TPO (60-mil only) 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.

2. **FleeceBACK PVC FRS Adhered Roofing System** 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.

3. **FleeceBACK PVC Adhered Roofing System** 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.

4. **FleeceBACK KEE HP Adhered Roofing System** 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)

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.

NOTE: The membrane is fully adhered to an acceptable substrate with a spray, extrusion or splatter 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.

NOTE: FleeceBACK TPO is available with APEEL Protective Film, refer to PART II – PRODUCTS.

NOTE: FleeceBACK FR TPO membrane is also available for mechanically fastened systems over combustible decks – see 'Attachment III – FleeceBACK FR TPO Mechanically-Fastened Membrane Option' at the end of this specification.

NOTE: FleeceBACK RL (RapidLock) EPDM/TPO/PVC membrane is also available in a non-adhesive system utilizing Velcro® Brand Securable Solutions - see 'Attachment IV – FleeceBACK RL EPDM/TPO/PVC Membrane Option' at the end of this specification.

1.02 General Design Considerations

A. Projects with extended wind speed warranty coverage greater than 90 mph, projects requiring a 20-year or greater Total System Warranty and projects which have building control and/or expansion joints will require additional enhancements. Refer to Warranty Tables in Paragraph 1.05.

B. There are no maximum slope restrictions for the application of this roofing system.

C. Chemical compatibility will depend on type of membrane used. Carlisle should be contacted for verification of compatibility with specific products, chemicals or waste products that may come in contact with the roof membrane.

D. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

E. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.

F. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent possible damage to the membrane roofing system and insulation facer.

G. Concentrated loads from rooftop equipment may cause deformation of insulation/underlayment and possible damage to the membrane if protection is not provided. At protection course or sleepers must be specified.

H. Drainage

1. Drainage must be evaluated by the Specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.

   Carlisle specifically disclaims responsibility for design of and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or owner's design professional.

2. Small incidental areas of ponded water will not impact the performance of this roofing system; however in accordance with industry standards, the roofing assembly **should be designed to prevent ponding** of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live loads and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

3. For roofing systems utilizing white membranes, a slope greater than 1/8" per horizontal foot is recommended to serve the long-term aesthetics.

4. Tapered edge strips, crickets or saddles are recommended where periodic ponding of water may occur.

I. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. **[Refer to Design Reference DR-01 "Construction Generated Moisture" included in the Carlisle Technical Manual.]**

J. On structural concrete decks, when a vapor retarder is not used, **gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels**, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

CAUTION: If left unaddressed, collected moisture could weaken insulation boards and facers resulting in a blow-off or increase the probability of mold growth.

K. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

2. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.

3. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

L. Retrofit – Recover Projects (When the existing roofing material is left in place)

1. The removal of existing wet insulation and membrane must be specified. The specifier shall select an appropriate and compatible material as a filler for voids created by removal of old insulation or membrane.

2. On existing built-up roof where partial removal is specified to remove wet or damaged insulation, priming the structural deck, with a Carlisle primer, is required where residual asphalt is present to ensure adequate adhesion of the new insulation. In lieu of priming and the use of insulation adhesion, insulation used to fill voids or to replace wet sections may be mechanically fastened.

3. Entrapment of water between old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. If a vapor retarder or air barrier is not specified, Carlisle recommends existing membrane be perforated to avoid potential moisture accumulation to allow for detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding PVC membrane).

4. Existing non-reinforced PVC membrane must be totally removed. If not removed it must be cut into

maximum 10’ by 10’ sections and the new membrane underlayment must be mechanically fastened. Flashing must be totally removed.

5. When specifying this roofing system over existing gravel surfaced built-up roof, loose gravel must be removed to avoid the entrapment of moisture. In all cases, a membrane underlayment is required. Refer to Paragraph 3.02G, Insulation/Substrate Requirements, for minimum thickness of acceptable underlayment.

6. Existing Phenolic Foam insulation must be removed prior to the installation of this roofing system.

7. Refer to Section 3.02 for more information about securement of existing roof.

1.03 Quality Assurance

Building codes are above and beyond the intended purpose of this specification. The building **owner, owner’s representative** or **Specifier** should verify 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 FleeceBACK Roofing Systems, refer to the Carlisle FleeceBACK Code Approval Guide, DORA (Directory of Roof Assemblies), Factory Mutual (FM) Approval Guide or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

A. When recovering or retrofitting an existing roof system, the addition of new insulation (type and thickness) may alter the fire performance characteristics of the assembly. Building owners or their designated representatives shall consult the local code enforcement agency to avoid potential code violation.

B. Carlisle recommends the use of Carlisle supplied products for use with this Carlisle Roofing System. 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.

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

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

E. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative of Carlisle 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.

F. 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.

G. Solar reflectance of this roofing product may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure maximum solar reflectance.

H. 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. Air pressurized buildings, 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). Refer to Attachment IV at the end of this section for perimeter considerations, when a Mechanically Fastened System is Specified.

2. Cold storage buildings and freezer facilities.

3. Adhered Roofing System projects over 100' in height.

4. Mechanically Fastened Roofing System projects over 50’ in height.

5. Projects where the EPDM is expected to come in direct contact with petroleum-based products, waste products (i.e., grease, oil, animal fats, etc.) and other chemicals.

6. Projects where hot asphalt is specified for insulation attachment.

7. If a Mechanically Fastened membrane securement option is selected in lieu of the use of adhesive, projects specified with a fastener length exceeding 12 inches.

B. 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.
Shop drawings must include:

1. Outline of roof and size
2. Deck type (for multiple deck types)
3. Location and type of **all** penetrations
4. Perimeter and penetration details
5. Key plan (on multiple roof areas) with roof heights indicated

C. When field conditions necessitate modifications to the originally approved drawings, a copy of the shop drawing outlining all modifications must be submitted to Carlisle for revision and approval prior to inspection and warranty issuance.

D. **As Built Projects** (roofing systems installed prior to project approval by Carlisle)

The Carlisle Authorized Applicator may supply Carlisle with an As-Built drawing for projects completed prior to Carlisle's approval. The As-Built drawings:

1. Must conform to Carlisle’s most current published specification and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.
3. Must include the items identified in Paragraph 1.04B.

NOTE: As-Built projects are not recommended for those projects referenced in Paragraph 1.04A in order to ensure Carlisle Warranty requirements have been met.

E. **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 and acceptance 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 2 “Products” Section in this Specification and **Spec Supplement “Related Products” P-01.**

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

1. **TABLE I – Minimum Membrane Thickness for Various Warranty Options** Identifies minimum membrane thickness for membranes used in adhered roofing systems**.**

2. **TABLE II - Underlayment and Fastening Density for Assemblies with Warranties Up to 20 YR** Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density, adhesive bead spacing and required edge terminations.

3. **TABLE III – Underlayment and Fastening Density for Assemblies with Warranties - 25 to 30 YR** Identifies required underlayments for adhered roofing systems with Warranties from 25 to 30 year based on the various wind speed coverages available. The Table also identifies fastening density, adhesive bead spacing and required edge terminations.

4. **TABLE IV – Bead Spacing for FleeceBACK Membrane Adhesion** Identifies required bead spacing for field and perimeter sheets for available warranty duration and warranty wind speed coverages.

5. **TABLE V – Minimum Perimeter Width** Identifies required minimum perimeter sheet widths for various building heights.

Table I FleeceBACK Adhered Systems Warranty Options

Years	Minimum Membrane Thickness	Warranty Wind Speed			Additional Hail Coverage(4)				Accidental Puncture (6) (man hours per year)
		55, 72 or 80 mph	90 or 100 mph	110 or 120 mph	1" Dia. Hail	2" Dia. Hail	3" Dia. Hail	4" Dia. Hail	
5,10, or 15 year	FleeceBACK EPDM 100-mil or FleeceBACK TPO 100-mil	√	√	√	√	√ (1)	N/A	N/A	8
	FleeceBACK PVC 115-mil (3)	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK KEE HP 105-mil	√	√	√	√	√ (1)	N/A	N/A	8
20 year	FleeceBACK EPDM 115-mil or FleeceBACK TPO 115-mil	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK PVC 115-mil (3)(5)	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK KEE HP 105-mil	√	√	√	√	√ (1)	N/A	N/A	8
25 year	FleeceBACK EPDM 115-mil	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK PVC 135-mil (3)(5)	√	√	√	√	√	√	N/A	32
	FleeceBACK TPO 135-mil	√	√	√	√	√	√	N/A	32
	FleeceBACK KEE HP 115-mil	√	√	√	√	√	√ (1)	N/A	16
30 year	FleeceBACK EPDM 145-mil	√	√	√	√	√	√	√ (2)	32
	FleeceBACK TPO 135-mil	√	√	√	√	√	√	N/A	32
	FleeceBACK KEE HP 135-mil	√	√	√	√	√	√	N/A	32

Notes: N/A = Not Acceptable √= Acceptable

General: Mechanical Fastening limited to 72 mph, refer to Attachment II, for number of fastening sheets and fasteners.

(1) Requires Flexible FAST in full coverage or beads spaced at 4” o.c.
(2) Require Flexible FAST in full coverage or beads spaced at 4” o.c. Contact Carlisle for underlayment requirements.
(3) FleeceBACK PVC with Polyester or Fiberglass Reinforced Scrim (FRS).
(4) Flexible FAST Splatter application (50% coverage or 1/2 gallon per 100 square feet) does not qualify for additional puncture or hail warranties.
(5) FleeceBACK PVC 115- or 135-mil membranes in Slate Gray are limited to Warranties Up to 20 Year.
(6) Flexible FAST in full coverage or beads spread @ 4” o.c. can receive an additional 4 hours accidental puncture coverage.

Table II Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties with lesser speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment (Carlisle Supplied Only)	Insulation/Underlayment Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' and 4' x 8' size board (11)		
			Field	Perimeter	
55 or 72 MPH	1" (20 psi) Polyisocyanurate	16 (9)	12" (4)	6" (4)	Carlisle Drip Edge, SecurEdge™ 200 or 300
	1-1/2" (20-psi) Polyisocyanurate	10			
	2" (20 -psi) Polyisocyanurate	8			
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)	12			
	1/4" DensDeck or 1/4" Securock	12			
80 MPH	1/2" SecurShield HD Plus (2)	8	12" (4)(6)	6" (4)(6)	Carlisle Drip Edge, SecurEdge 200 or 300 (10)
	1/2" HP Recovery Board (2)	16			
	2" SecurShield HD Composite	6			
	1/2" DensDeck Prime or 1/2" Securock (2)	8			
	1-1/2" (25-psi) Polyisocyanurate	10			
	2" (25-psi) Polyisocyanurate	8			
90 MPH	1/2" DensDeck or 1/2" Securock (2)	12	6" (8)	6" (6)(7)	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
	1/2" SecurShield HD or 1/2" SecurShield HD Eco, 1-1/2" (20-psi) SecurShield Polyiso or 1-1/2" (20-psi) SecurShield Eco (2)	16			
	1/2" SecurShield HD Plus (2)	12			
	2" (20-psi) SecurShield Polyiso or 2" (20-psi) SecurShield Eco	8			
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	8			
	2" SecurShield HD Composite	8	6" (4)(6)	6" (4)(6)	
	1-1/2" Insulfoam HD Composite	16			
100 MPH	2" (25-psi) SecurShield Polyiso or 2" (25-psi) SecurShield Eco (1)	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
110 MPH	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	16	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (2)				
120 MPH	5/8" DensDeck or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) (1) or 1/2" EcoStorm VSH (2)	17			
	1/2" SecurShield HD Plus (2)	24			
	2" SecurShield HD Composite	16			

FS = Full Spray, Equipment (Rig) Splatter or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(2) Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C
(5) Steel Decks - Field & Perimeter @ 6" O.C.
(6) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(7) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Gravel Surface BUR – FS
(9) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40'.
(10) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X™ Fasteners may also be used fastened 12" on center.
(11) Maximum 4' x 4' insulation boards when the adhesive is extruded at 12" o.c. or when boards exceed 4" thickness. 4' x 8' insulation boards may be used when the adhesive is applied at Full-Spray, Equipment (Rig) Splatter, 4", or 6" beads)

Table II - Additional Design Considerations (Up to 20 YR Warranty)
(Required in conjunction with Table II)

1 - Building height shall not exceed 100 foot*
2 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
3 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
4 - All "T-joints" must be overlaid with appropriate flashing material
5 - Membrane Attachment: 15 YR Warranty - Adhesive Bead Spacing 12" o.c. field, 6" o.c. perimeter up to 55 MPH; 6" o.c. field, 6" perimeter 72 MPH ; 4" o.c. Splatter, or Full Spray field and perimeter 80 MPH
6 - Membrane Attachment: 20 YR Warranty - Adhesive Bead Spacing 6" o.c. field and perimeter up to 55 MPH; 6" o.c. field, 4" o.c perimeter 72 MPH ; 4" o.c. Splatter, or Full Spray field and perimeter 80 MPH.
7 - See DR-05 for insulation fastening patterns.

* For projects where building height exceeds 100' or wind speed exceeds 130 mph, please submit to Carlisle for review.

Table III Underlayment/Insulation & Required Attachment Assemblies 25 YR or 30 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' and 4' x 8' size board (10)		
			Field	Perimeter	
55 or 72 MPH	1" to 2" (25 psi) Polyisocyanurate	16	6" (3)(5)	6" (5)	Carlisle Drip Edge, SecurEdge 200 or 300 (8)
	1/2" HP Recovery Board (1)(9)				
	1/4" DensDeck Prime or 1/4" Securock				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)(7)				
80 MPH	1-1/2" to 2" (25-psi) SecurShield Polyisocyanurate or SecurShield Eco	20	6" (3)(5)(6)	6" (5)(6)	Carlisle Drip Edge (4), SecurEdge 200 or 300(4)(5) or SecurEdge 2000 or 3000.
	1/2" DensDeck Prime or 1/2" Securock (2)	16			
	1/2" SecurShield HD Plus (2)				
	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)(7)	20			
90 MPH	1/2" SecurShield HD or 1/2" SecurShield HD Eco (2)(7)	24	FS	FS	
	1/2" SecurShield HD Plus (2)	20			
	1/2" DensDeck Prime or 1/2" Securock (2)				
100 MPH	5/8" DensDeck Prime or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)				
	2" SecurShield HD Composite (2)				
	1/2" SecurShield HD Plus (2)	24			

FS = Full Spray, Equipment (Rig) Splatter or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(2) Hail coverage offered with substrate.
(3) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.

(4) 80-mph over structural concrete - Field & Perimeter @ 6" O.C.
(5) Cementitious Wood Fiber & Wood - FS
(6) 80-mph over Gypsum Decks - FS
(7) 1/2" SecurShield HD or 1/2" SecurShield HD Eco limited to 90 mph.
(8) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(9) 1/2" Recovery Board limited to 55 mph.
(10) Maximum 4' x 4' insulation boards when the adhesive is extruded at 12" o.c. or when boards exceed 4" thickness. 4' x 8' insulation boards may be used when the adhesive is applied at Full-Spray, Equipment (Rig) Splatter, 4", or 6" beads)

Table III - Additional Design Considerations (25 YR or 30 YR Warranty)

1 - Minimum membrane thickness of 145-mil FleeceBACK EPDM, 135-mil FleeceBACK TPO, PVC or KEE HP PVC
2 - Building height shall not exceed 100 foot *
3 - 1/4" per horizontal foot slope is preferred; however, 1/8" slope with sufficient number of drains and crickets / saddles may be accepted.
4 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
5 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood. Other decks should be submitted for Carlisle review.
6 - All "T-joints" must be overlaid with appropriate flashing material.
7 - Two layers of insulation with staggered joints, bottom layer must be a minimum 1-1/2" (20-psi) Polyisocyanurate.
8 - New construction or complete tear-off of existing roofing material.
9 - Membrane Attachment: 25/30 YR Warranty - Adhesive Bead Spacing 4" o.c., Splatter or Full Spray field and perimeter up to 100 MPH.
10 - See DR-05 for insulation fastening patterns.
* For projects where building height exceeds 100' or wind speed exceeds 100 mph, please submit to Carlisle for review.

Table IV Flexible FAST Application for FleeceBACK Membrane Adhesion Coverage

Peak Gust Wind Speed Warranty	Warranty Length in Years					
	5 to 15 years		20 years		25 years	
	Field	Perimeter*	Field	Perimeter*	Field	Perimeter*
55 MPH	12″	6″	6″	6″	FS	FS
72 MPH	6″	6″	6″	FS	FS	FS
80 to 120 MPH	FS	FS	FS	FS	FS	FS

FS = Full Spray, Equipment (Rig) Splatter, Dual Tank Splatter or Ribbons @ 4" O.C.
Note: Dual Tank Splatter is only approved for FleeceBACK Membrane Attachment
*Refer to Table V

Table V Minimum Perimeter Width For Insulation Attachment For All Warranties

Width of Perimeter	Building Height
4 feet	25 feet
8 feet	26 to 50 feet
12 feet	51 to 75 feet
16 feet	76 to 100 feet
24 feet	Greater than 100 feet

Note: This Table is for reference for Carlisle System Warranties and does not replace FM requirements for FM insured projects.

C. A warranty covering leaks caused by hail can be issued, refer to Table I – "FleeceBACK Adhered Systems Warranty Options" in this specification for further information. Contact Carlisle for additional information.

D. On projects utilizing FleeceBACK 115 membrane, a 5, 10, 15, or 20-year warranty with limited coverage for accidental punctures (up to 16 man-hours per year) is available. An additional 4 man-hours per year can be obtained when using Flexible FAST Adhesive in full coverage spray or extrusions at 4" on center.

E. On projects utilizing FleeceBACK 135 or 145 membrane, a 5, 10, 15, 20, 25 or 30-year warranty with limited coverage for accidental punctures (up to 32 man-hours per year) is available for an additional charge. An additional 4 man-hours per year can be obtained when using Flexible FAST Adhesive in full coverage spray or extrusions at 4" on center.

F. Upon review by Carlisle, projects incorporating white TPO FleeceBACK Membrane may be eligible for a 10- year Reflectivity Warranty Amendment. These projects must be submitted to Carlisle prior to installation and preferably prior to bid.

G. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

H. **Access for Warranty Service**

It shall be the owner's responsibility to expose the membrane in the event that warranty service is required when access is impaired. Such impairment includes, but is not limited to:

1. Design features, such as window washing systems, which require the installation of traffic surface units in excess of 80 pounds per unit.

2. Any equipment, ornamentation, building service units and other top surfacing materials which are not defined as part of this specification.

3. Photovoltaic and Mounting Systems or other Rooftop equipment that does not provide Carlisle with

reasonable access to the membrane system for purposes of warranty investigation and related repairs.

4. Severely ponding conditions.

CAUTION: Applications such as walking decks, terraces, patios or areas subjected to conditions not typically found on roofing systems are **not** covered by this specification and not eligible for system warranties as stated herein. The FleeceBACK Plaza Waterproofing specification (published separately) may be referenced for applicable installation procedures and system warranties available.

1.06 Job Conditions

A. On phased roofing, temporary closures should be provided to prevent moisture infiltration. When a temporary roof is specified, Carlisle 725TR in conjunction with CCW-702, CCW-702LV or CAV-GRIP III Low-VOC Adhesive/Primer may be used. Refer to Product Section Part II for additional product information and **Specification Supplement G-08**.

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

C. On projects at high altitudes (6,000' and above) rapid flash-off (drying) of Bonding Adhesive and Primers will occur due to low atmospheric pressure.

D. Sprayed polyurethane foam application shall not proceed during periods of inclement weather. Follow Carlisle requirements for application temperatures and humidity levels.

E. Wind barriers shall be used if conditions could affect the quality of the sprayed polyurethane adhesive and to prevent possible over spray.

F. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

   a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

   c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.

2. When a vapor retarder is specified, Carlisle 725TR Air and Vapor Barrier may be used. Refer to Part II “Products” for necessary information and **Spec Supplement G-08 “Application Procedures for 725TR Air and Vapor Barrier”** for product Installation.

G. 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 Factory Mutual’s Property Loss Prevention Data Sheet 1-49. Refer to **Design Reference DR-08 “Wood Nailer Securement Criteria**” in Carlisle Technical Manual shall be referenced.

H. Do not apply Flexible FAST Adhesive when surface and/or ambient temperatures are below 25° F, unless, heated spray equipment is being utilized. Heated spray equipment may include blankets, preheater and/or heated hoses.

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 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., Flexible FAST Adhesive - Parts A and B, uncured flashing, cleaners, sealants, primers, SecurTAPE, SPF-245 Sprayed Polyurethane Foam and Pourable Sealer.)

D. Prolonged exposure of Pressure-Sensitive Flashing and SecurTAPE to temperatures below 40°F (5°C) will cause the pre-applied adhesive to lose tack and in extreme cases, not bond to the membrane. Refer to Product Data Sheets for individual products for temperature restrictions.

E. Flexible FAST Adhesive must be a minimum of 70°F (21°C) at the time of use. Use blanket heaters and hot boxes when necessary.

F. FleeceBACK Membrane should be stored in its original plastic wrap and be covered to protect from moisture. Moisture absorbed by the fleece-backing must be removed by using a wet-vac system and allowed to dry completely, prior to membrane adhesion.

G. PVC or KEE HP PVC Membrane that has been exposed to the elements for approximately 7 days must be prepared with PVC and KEE HP Membrane Cleaner prior to hot air welding. Refer to Section 3.06, Paragraph B.2., Exposed Membrane Seam Preparation, for requirements.

H. Do not store adhesive, primer, Weathered Membrane Cleaner, PVC and KEE HP Membrane Cleaner, etc., containers with opened lids due to the loss of solvent, which will occur from flash-off.

I. 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. Adhesive and sealant containers should be rotated to maintain their temperature above 40°F (5°C).

PART II PRODUCTS

2.01 General

The components of this Carlisle 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 as compatible by Carlisle**, is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty.

2.02 Membranes

A. **Sure-Seal/Sure-White FleeceBACK Membrane**

Sure-Seal FleeceBACK 100, 115 or 145 membrane incorporates 45-, 60-, or 90-mil thick Sure-Seal (black) or Sure-White non-reinforced EPDM laminated to a 55-mil non-woven polyester fleece-backing resulting in a total finished sheet thickness of 100, 115 or 145-mil. A selvage edge with 3” or 6” wide Factory-Applied SecurTAPE is provided along the length of the membrane for splicing. The 100 and 115-mil membranes are

available in widths of 5’ or 10' and lengths of 40’, 50’ (black only) or 100’ depending on the product. The 145-mil membrane is available in width of 10’ and lengths of 50’ or 100’ depending on the specific product. Conforms to ASTM Standard D 4637-96, Type III (Fabric-Backed membrane) with the following physical properties:

Physical Property	Test Method	SPEC. (Pass)	Sure-Seal Typical	Sure-White Typical
Tolerance on Nominal Thickness, %	ASTM D 751	±10	±10	±10
Thickness over Fleece, min, in. (mm) 100 mil (2.54 mm) 115 mil (2.92 mm) 145 mil (3.68 mm)	ASTM D4637 Annex	 .030 (.762) .045 (1.14) .080 (2.03)	 .045 (1.143) .060 (1.524) .090 (2.28)	 .045(1.143) .060 (1.524) .090 (2.28)
Weight 1b/ft□ (kg/m□) 100 mil 115 mil 145 mil			 0.29 (1.4) 0.38 (1.9) 0.59 (2.4)	 0.33 (1.6) 0.42 (2.1) 0.63 (3.1)
Breaking Strength, min, lbf (N) 100 and 115 mil 145 mil	ASTM D751 Grab Method	90 (400)	 210 (934) 250 (1,112)	 210 (934) 210 (934)
Elongation, Ultimate, min, %	ASTM D 412	300 **	480 **	500 **
Tearing Strength, min, lbf (N) 100 and 115 mil 145 mil	ASTM D 751 B Tongue Tear	10 (45)	 45 (200) 60 (266)	 45 (200) 45 (200)
Puncture Resistance, Joules 100 mil 115 mil 145 mil	ASTM D5635		 20 27.5 35	 25 25 42.5
Puncture Resistance, lbf 100 mil 115 mil 145 mil	FTM 101C Method 2031		 328 338 355	 316 325 307
Puncture Resistance, lbf 100 mil 115 mil 145 mil	ASTM D120		 18 22 28	 17 19 22
Hail Resistance 100 mil 115 mil 145 mil	UL 2218 Over Iso HP Rec. Bd. Gypsum Bd.	Class 4 Rating 2” steel Ball at 20’	 Pass Pass Pass	 Pass Pass Pass
Brittleness point, max, °F (°C)	ASTM D 2137	-49 (-45)	-67 (-55)	-67 (-55)
Resistance to Heat Aging * Properties after 4 weeks @ 240°F (116°C) for Sure-Seal Properties after 1 week @ 240° F for Sure-White Breaking Strength, min, lbf (N) Elongation, Ultimate, min, % Linear Dimensional Change, max, %	ASTM D 573 ASTM D 751 ASTM D 412 ASTM D 1204	 80 (355) 200 ** ±1.0	 200 (890) 225 ** -0.7	 200 (890) 250 ** -0.7
Ozone Resistance * Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen wrapped around 3 inch (7.5 cm) mandrel	ASTM D 1149	No Cracks	No Cracks	No Cracks
Resistance to Water Absorption * After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D 471	+8, -2**	2.0 **	3.6 **
Resistance to Outdoor (Ultraviolet) Weathering * Xenon-Arc, total radiant exposure at 0.70 W/m^2 irradiance 176° F (80°C) black panel temperature	ASTM G 155	No Cracks No Crazing @ 7560 kJ/m^2	No Cracks No Crazing @ 41580 kJ/m^2	No Cracks No Crazing @ 25200 kJ/m^2

* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting

** Specimens prepared from coating rubber compound.

B. **Sure-Weld FleeceBACK Membrane**

Sure-Weld FleeceBACK 100, 115 or 135 membrane incorporates 45, 60 or 80-mil thick Thermoplastic Polyolefin (TPO) membrane laminated to a 55-mil non-woven fleece backing resulting in a total finished sheet thickness of 100, 115 or 135- mils. Membrane sheets are available in rolls 12' or 6' wide by 50', 75' or 100' long. Sure-Weld FleeceBACK Membrane is available in white, gray or tan in the 100-, 115- and 135-mil thicknesses and conforms to the table below:

OPTION: 115-mil Sure-Weld FleeceBACK TPO is available in 5 Special Colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) in 12' x 100' long rolls as a limited stock item, depending on stock levels product may require a lead time. Contact Carlisle for availability.

OPTION: 115-mil (white) and 135-mil (white or gray) Sure-Weld FleeceBACK TPO reinforced membrane is available with an optional APEEL Protective Film. APEEL Protective Film can be left in place for up to 90 days without affecting the integrity of the film, guarding the TPO membrane's surface from scuffs and dirt accumulation during installation. Durable and easy to remove, APEEL Protective Film improves aesthetics and long-term reflectivity. Available 6' and 12' widths by 100' long rolls for 115-mil membrane and 6' and 12' widths by 75' long rolls for 135-mil membranes. Sure-Weld 135-mil FleeceBACK APEEL TPO requires a minimum order of 200 squares and 2-3 week lead time. Also available, APEEL 6" Cover Tape, allowing 100% coverage of the TPO surface. APEEL Cover Tape rolls are 1,640 feet long.

Property	Test Method	SPEC. (min.)	Sure-Weld FB (typical)
Thickness of reinforced sheet over fleece, in. (mm) tolerance is ±10	ASTM D 751	-	0.045 (1.14) – FB 100 0.060 (1.52) – FB 115 0.080 (2.03) – FB 135
Weight, lb/sq.ft.	-	-	0.27 - FB 100 0.34 - FB 115 0.44 - FB 135
Breaking Strength, min, lbf (kN)	ASTM D 751 Grab Method	220 (1)	375 (1.6) min. FB 100 450 (2) min. FB 115 500 (2.2) min. FB 135
Elongation at break of internal fabric,%	ASTM D 751	15	25 typical
Tearing Strength, min, lbf (N) 8" by 8" specimen	ASTM D 751 B Tongue Tear	55 (245)	100 (445) typical
Puncture resistance, Joules	ASTM D5635	-	20 FB 100 25 FB 115 32.5 FB 135
Puncture resistance, lbf (N)	FTM 101C Method 2031	350(1.6) min. FB 100 400 (1.8) min. FB 115 425 (1.9) min. FB 135	450 (2.0) typical FB 100 525 (2.3) typical FB 115 600 (2.6) typical FB 135
Brittleness Point, °F (°C)	ASTM D 2137	-40 (-40) min.	-50 (-46) typical
Linear Dimensional Change (shrinkage), %	ASTM D 1204	+/- 1.0 max.	-0.2 typical
Field seam strength, lbf/in. (kN/m) Seam tested in peel	ASTM D1876	25 (4.4) FB 100 25 (4.4) FB 115 40 (7.0) FB 135	50 (8.8) typical FB 100 60 (10.5) typical FB 115 70 (12.3) typical FB 135
Water vapor permeance, Perms	ASTM E 96	-	0.10 max. 0.05 typical
Resistance to microbial surface growth, rating (1 is very poor, 10 is no growth)	ASTM D 3274	-	9 – 10 typical
Ozone Resistance, 100 pphm, 168 hours	ASTM D 1149	No Cracks	No Cracks
Resistance to Water Absorption After 7 days immersion @ 158°F (70°C) Change in mass, % (one side)	ASTM D 471	+/- 3.0	0.90
Resistance to Outdoor (Ultraviolet) Weathering Xenon-Arc, total radiant exposure at 0.70 W/m^2 irradiance, 80ºC black panel temp.	ASTM G 155	No Cracks No loss of breaking or tearing strength	No Cracks No loss of breaking or tearing strength
FB 100 FB 115 FB 135			17,640 kJ/m^2 20,160 kJ/m^2 27,720 kJ/m^2

C. **FleeceBACK PVC Membranes**

1. **FleeceBACK PVC FRS membrane** incorporates 60- or 80-mil thick, fiberglass reinforced scrim, Polyvinyl Chloride (PVC) membrane laminated to a 55-mil non-woven fleece backing resulting in a total finished sheet thickness of 115, or 135- mils. Membrane sheets are available in rolls 10' wide by 100' long for 115-mil membrane and 10' wide by 75' log for 135-mil membranes. FleeceBACK PVC FRS Membrane is available in white, gray, light gray and tan and conforms to the following:

Property	Test Method	Requirement	FleeceBACK FRS PVC 115-mil	FleeceBACK FRS PVC 135-mil
Thickness of reinforced sheet over fleece, in. (mm)	ASTM D 4434	0.016 min. (0.40)	0.025 typ. (0.635)	0.030 typ. (0.762)
Breaking Strength (MD x CD), lbf (N)	ASTM D 751	200 min. (0.022)	450 x 400 (0.05 x 0.045)	500 x 450 (0.056 x 0.045)
Elongation break of reinforcement (MD X CD), %	ASTM D 751	15 min.	70 x 100	70 x 100
Seam Strength, min. (% of breaking strength)	ASTM D 751	>75	PASS	PASS
Tearing Strength (CD), lbf (N)	ASTM D 751	45 (200)	60	60
Low Temperature Bend	ASTM D 2136	No Cracks - 5x	PASS (-40º C)	PASS (-40º C)
Linear Dimensional Change, % (MD x CD)	ASTM D 1204	± 0.5 max.	0.36 x 0.00 typ.	0.36 x 0.00 typ.
Ozone Resistance	ASTM D 1149	No Cracks – 7x	PASS	PASS
Water Absorption Resistance, mass %	ASTM D 570	± 3.0 max.	2.0 typ.	2.0 typ.
Field Seam Strength, lbf/in. (kN/m)	ASTM D1876	No Requirement	25 (4.4) min. 60 (10.5) typ.	25 (4.4) min. 60 (10.5) typ.
Water Vapor Permeance, Perms	ASTM E 96	No Requirement	0.10 max. 0.05 typ.	0.10 max. 0.05 typ.
Puncture Resistance, Dynamic, J (ft-lbf)	ASTM D 5635	20 (14.7)	PASS	PASS
Puncture Resistance, Static, lbf (N)	ASTM D 5602	33 (145)	PASS	PASS
Xenon-Arc Resistance 12,600 kJ/m^2 total radiant exposure 10,000 hrs	ASTM G 155	No Cracks or Crazing – 10x	PASS	PASS
Properties After Heat Aging, Breaking Strength, % retained	ASTM D 3045	90 min.	90 min.	90 min.
Properties After Heat Aging, Elongation Reinf., % retained	ASTM D 3045	90 min.	90 min.	90 in.

2. **FleeceBACK PVC membrane** incorporates 60- or 80-mil thick, polyester reinforced scrim, Polyvinyl Chloride (PVC) membrane laminated to a 55-mil non-woven fleece backing resulting in a total finished sheet thickness of 115, or 135- mils. Membrane sheets are available in rolls 10' wide by 100’ long for 115-mil membranes and 10’ wide by 75’ long for 135-mil membranes. FleeceBACK PVC Membrane is available in white, gray, light gray, slate gray and tan and conforms to the following:

Property	Test Method	Requirement	FleeceBACK PVC 115-mil	FleeceBACK PVC 135-mil
Thickness of reinforced sheet over fleece, in. (mm)	ASTM D 4434	No requirement	0.060 typ. (0.152)	0.080 typ. (0.203)
Membrane Thickness over scrim, in. (mm)	ASTM D 4434	0.016 min. (0.40)	0.027 typ. (0.686)	0.037 typ. (0.940)
Breaking Strength (MD x CD), lbf (N)	ASTM D 751	200 min. (890)	420 x 380 (73 x 66)	450 x 410 (79 x 72)
Elongation break of reinforcement (MD X CD), %	ASTM D 751	15 min.	30 x 30	30 x 30
Tearing Strength (MD x CD), lbf (N)	ASTM D 751	45 (200)	197 x 165 (876 x 734)	173 x 191 (769 x 849)
Low Temperature Bend	ASTM D 2135	No Cracks - 5x	PASS (-40º C)	PASS (-40º C)
Linear Dimensional Change, %	ASTM D 1204	± 0.5 max.	0.4 typ.	0.4 typ.
Water Absorption Resistance, mass %	ASTM D 570	± 3.0 max.	2.0	2.0
Puncture Resistance, Dynamic, J (ft-lbf)	ASTM D 5635	20 (14.7)	40 (29.5)	42.5 (31.3)
Puncture Resistance, Static, lbf (N)	ASTM D 5602	33 (145)	63.99 (284.6)	63.99 (284.6)
Federal Puncture (Max. Load in lbf)	FTM-101C	No Requirement	380	460
Xenon-Arc Resistance 12,600 kJ/m^2 total radiant exposure 10,000 hrs	ASTM G 155	No Cracks or Crazing – 10x	PASS	PASS
Properties After Heat Aging, Breaking Strength, % retained	ASTM D 3045	90 min.	90 min.	90 min.
Properties After Heat Aging, Elongation Reinf., % retained	ASTM D 3045	90 min.	90 min.	90 min.

3. **FleeceBACK KEE HP membrane** incorporates 50-, 60- or 80-mil thick Polyester Reinforced Elvaloy KEE HP PVC membrane laminated to a 55-mil non-woven fleece backing resulting in a total finished sheet thickness of 105-, 115, or 135- mils. Membrane sheets are available in rolls 10' wide by 100' long for 105- and 115-mil and 10’ wide by 75’ long for 135-mil. Sure-Flex FleeceBACK KEE HP Membrane is available in white, gray, light gray and tan and conforms to the following:

Property	Test Method	FleeceBACK KEE HP PVC 105-mil	FleeceBACK KEE HP PVC 115-mil	FleeceBACK KEE HP PVC 135-mil
Thickness of reinforced sheet over fleece, in. (mm)	ASTM D 4434	0.050 min. (1.27)	0.060 typ. (1.52)	0.080 typ. (2.03)
Thickness over scrim, in. (mm)	ASTM D 4434	0.024 min. (0.61)	0.029 typ. (0.74)	0.036 typ. (0.91)
Breaking Strength (MD x CD), lbf (kN/m)	ASTM D 751	410 x 360 (72 x 63)	450 x 410 (79 x 72)	500 x 490 (87 x 86)
Elongation break of reinforcement (MD x CD), %	ASTM D 751	35 x 30	35 x 30	35 x 30
Tearing Strength (MD x CD), lbf (N)	ASTM D 751	178 x 162 (791 x 720)	147 x 174 (653 x 774)	152 x 183 (676 x 814)
Low Temperature Bend	ASTM D 2135	PASS (-40º C)	PASS (-40º C)	PASS (-40º C)
Linear Dimensional Change, %	ASTM D 1204	0.4 typ.	0.4 typ.	0.4 typ.
Water Absorption Resistance, mass %	ASTM D 570	1.25	0.87	0.89
Puncture Resistance, Dynamic, J (ft-lbf)	ASTM D 5635	PASS	PASS	PASS
Puncture Resistance, Static, lbf (N)	ASTM D 5602	63.99 (284.6)	63.99 (284.6)	63.99 (284.6)
Federal Puncture (Max. Load in lbf)	FTM-101C	332	384	482
Xenon-Arc Resistance 12,600 kJ/m^2 total radiant exposure 10,000 hrs	ASTM G 155	PASS	PASS	PASS
Properties After Heat Aging, Breaking Strength, % retained	ASTM D 3045	90 min.	90 min.	90 min.
Properties After Heat Aging, Elongation Reinf., % retained	ASTM D 3045	90 min.	90 min.	90 min.

2.03 Insulation / Underlayments

A. General

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.

2. Multiple layers of insulation are recommended with all joints staggered between layers.

3. For minimum recommended R-Values, previously published by American Society of Heating and Air-Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.

4. For Insulation fastening pattern and densities refer to Carlisle Applicable Details and **Design Reference DR-05 "Insulation Fastening Patterns".**

5. Carlisle Insulation/underlayment must be specified for all Total System Warranty projects or when the insulation is to be covered by the Carlisle Warranty. Any of the Carlisle Insulation/Underlayment may be specified subject to design restrictions included with each table.

B. Carlisle Polyisocyanurate

Table B1 **Polyisocyanurate** (See below for product descriptions)

Insulations*	Minimum Thickness	ASTM	Roofing System Acceptability	
			Adhered	Mechanically Fastened
Carlisle InsulBase Polyisocyanurate, Carlisle InsulBase Eco, Carlisle InsulBase HD Eco	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√
Carlisle InsulBase NH Polyisocyanurate	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√
Carlisle SecurShield Polyisocyanurate, Carlisle SecurShield Eco	*1.5"	C1289, Type II Class 2, Grade 2 or 3	√	√
Carlisle SecurShield NH Polyisocyanurate	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√
Carlisle SecurShield HD Composite (SS HD)	2"	C1289, Type IV, Grade 2 or 3	√	√
Carlisle StormBase Composite (OSB)	1.5"	C1289, Type V, Grade 2 or 3	√	√

Design Restrictions

- Extended Warranty, those with longer duration, higher wind speed, or puncture coverage, may require the use of a cover board over Polyiso Insulation, refer to Warranty Tables in Paragraph 1.04 for applicable requirements.
- Maximum Flute Spanability shall be limited to 2-5/8" when 1" Minimum Polyiso Insulation is to be used.
- Minimum thickness of insulation board may be restricted by wind speed coverage and warranty duration, refer to Tables II and III in Paragraph 1.05.

*1.5" minimum for adhered systems. Subject to Warranty Limitation, 1" minimum may be acceptable for adhered system, Carlisle must be contacted for fastening density.

Notes: N/A = Not Acceptable √ = Acceptable * SecurShield HD is listed in Paragraph E2 below

1. **Carlisle InsulBase Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.

2. **Carlisle InsulBase Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to glass-reinforced felt (GRF) facers, meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. UL and FM approved for direct application over steel decks, polyiso provides the highest R-value per inch of any commercially available insulation product.

3. **Carlisle InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2" thick, 4' x 4' and 4' x 8' panels with an R-value of 2.5. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

4. **Carlisle InsulBase NH Polyisocyanurate -** A foam core insulation board covered on both sides with a glass-reinforced felt meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 4' and 4' x 8' standard size with a thickness from ½" to 4 inches. InsulBase NH Polyisocyanurate contains zero halogenated flame retardants.

5. **Carlisle SecurShield Polyisocyanurate–** A foam core insulation board covered on both sides with a coasted glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

6. **Carlisle SecurShield Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to high performance coated glass facers (CGF). ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi), available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available. Ideal for use in adhered membrane systems. Achieves a UL Class A fire rating direct to combustible deck.

7. **Carlisle SecurShield NH Polyisocyanurate -** A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4' x 4' and 4' x 8' standard size with a thickness from ½ inch to 4 inches. SecurShield NH contains zero halogenated flame retardants.

8. **Carlisle SecurShield HD Composite** – Composite insulation panel comprised of 1/2-inch high-density (109 psi max) Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type IV, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 2" to 4.5". 4' x 4' panels are also available.

9. **Carlisle StormBase Polyiso Composite (OSB)** – Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt face and laminated with a top surface of 7/16" or 5/8" thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4' x 8' boards with thickness from 1-1/2" to 4".

C. **EPS: Expanded Polystyrene**

Table C1	**EPS: Expanded Polystyrene** (See below for product descriptions)			
Insulations*	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
Insulfoam I (1 lb density)	1”	C578 Type I	N/A	N/A
Insulfoam VIII (1.25 lb density)	.75”	C578 Type VIII	N/A	N/A
Insulfoam II (1.5 lb density)	.75"	C578 Type II	N/A	N/A
Insulfoam HD Composite (SecurShield HD)	1.5”	C578 Type (I, VIII, II, or IX)	√	√
InsulLam (Various Cover Boards)	1.5"	C578 Type (I, VIII, II, or IX)	√	N/A
InsulFoam SP	1"	C578 Type VIII	√	Sure-Weld/Sure-Flex
Design Restrictions				
- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer. - Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2” SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used. - Other Insulations in other densities are available – Contact Carlisle.				
Notes: N/A = Not Acceptable √ = Acceptable * R-Tech Fanfold Recover Board is listed in Paragraph E4 below				

a. **Insulfoam I –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type I. Nominal density of 1.0 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

b. **Insulfoam VIII –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type VIII. Nominal density of 1.25 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

c. **Insulfoam II –** A closed-cell lightweight expanded polystyrene (EPS) that meets ASTM C578, Type II. Nominal density of 1.5 lbs/cubic ft (pcf) available in 4’ x 4’ or 4’ x 8’ sizes with thickness from 1/4” to 40”. Custom lengths, widths and tapered boards are available. May be specified beneath Sure-Seal HP Recovery Board, DensDeck Prime, DensDeck StormX Prime or Securock.

d. **Insulfoam HD Composite** – A composite insulation consisting of a closed-cell, lightweight and resilient expanded polystyrene (EPS) bonded to high-density Polyisocyanurate cover board. Available in 4’ x 8’ boards with overall thickness from 1-1/2” to 7”.

e. **InsulLam –** Insulfoam expanded polystyrene (EPS) insulation laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB) or 5/8” plywood. Available in 4’ x 8’ boards with thickness from 1-1/2” to 7”.

f. **Insulfoam SP** – A closed-cell, lightweight and resilient expanded polystyrene (EPS) with a durable and stable, factory-laminated fiber glass facer. Available in 4’ x 8’ boards with overall thickness from 1” to 7”.

D. **XPS: Extruded Polystyrene –** Available through Carlisle is dimensionally stable with high thermal and low water absorption performance capability. XPS is available in varying compressive strengths thicknesses and sizes and can be specified as a base layer beneath an acceptable cover board. Refer to specific product data sheets for physical properties and additional technical information.

E. **Carlisle Vacuum Insulated Panel (VIP)**

Table E1 **Vacuum Insulated Panel (VIP)** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
Carlisle Optim-R VIP	*1.6"	C1484	√	N/A
Design Restrictions				
*2.6” minimum for total installed system including an additional 2 layers of 1/2” SecurShield HD panels; 1 layer on top and 1 layer on bottom of Optim-R. For adhered systems only. Note: Optim-R VIP cannot be cut or punctured.				
Notes: N/A = Not Acceptable √ = Acceptable				

1. **Optim-R Vacuum Insulated Panel (VIP) –** a high R-Value vacuum insulated panel (VIP) used to provide a low-profile solution when height restrictions exist, such as windows, doors, equipment curbs, etc. Provides an R-38 insulating value in a 2.6” system thickness with up to 35% infill (non-VIP material). Available in 23.6” x 23.6” and 23.6” x 47.2” board sizes.

F. **Cover Boards**

Table F1	**Cover Boards** (See below for product descriptions)			
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Fastened**
SecurShield HD, SecurShield HD Eco	.5"	C1289, Type II, Class 4 (109 psi max)	√	√
SecurShield HD Plus	.5"	C1289, Type II, Class 4 (109 psi max)	√	√
InsulBase HD, InsulBase HD Eco	.5"	C1289, Type II, Class 1, Grade 3	N/A	√
EcoStorm VSH	.5”	Refer to Product Data Sheet	√	√
Securock Cover Board	.25"	Refer to Product Data Sheet	√	Sure-Weld/Sure-Flex Only
HP Recovery Board	.5"	C208 Grade 2	√	√
DensDeck StormX Prime	.625"	C1177	√	√ (1)
DensDeck Prime	.25"	C1177	√	√ (1)
DensDeck	.25"	C1177	√	√ (1)
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√
Design Restrictions				
- HP Recovery Board and R-Tech Fanfold not recommended for direct use over Type B and F steel decks. - Securock Cover Board, HP Recovery Board, DensDeck StormX Prime, DensDeck Prime or DensDeck may not be used directly over New or Existing Lightweight Insulating Concrete Decks existing or Structural Concrete. - Due to some warranty restrictions, DensDeck, DensDeck Prime and DensDeck StormX Prime not recommended for use directly over existing roofing membrane without prior written approval from Carlisle. Contact Carlisle for specific requirements. - R-Tech Fanfold primarily for use in existing roof re-covers applications or directly over structural or lightweight insulating concrete. (1) Permitted with roofs with slopes greater than 2” per foot for compliance with external fire codes, refer to UL listings or contact Carlisle.				
Notes: N/A = Not Acceptable √ = Acceptable				

1. **SecurShield HD** – a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer meeting ASTM C1289, Type II, Class 4, Grade 1, for use as a cover board or recover board. Available 1/2” thick 4’ x 4’ (5.5 lbs) and 4’ x 8’ panel weight 11 lbs with an R-value of 2.5.

   Features Ready Flash, a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

2. **SecurShield HD Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of ½" high-density, closed-cell polyisocyanurate foam core bonded to a premium performance coated glass facer (CGF) specifically designed for use as a cover board, meeting ASTM C1289, Type II, Class 4, Grade 1. Provides 5 times the R-value at one-fifth the weight of traditional gypsum cover boards. Achieves a UL Class A fire rating direct to combustible deck. Available in 1/2” thick, 4’ x 4’ (5.5 lbs) and 4’ x 8’ (11 lbs) panels with an R-value of 2.5.

3. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer, meeting ASTM C1289, Type II, Class 4, Grade 1. for use as a cover board or recover board. Available 1/2” thick 4’ x 8’ panel weight 11 lbs with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4’ x 8’ board.

4. **InsulBase HD** – a closed-cell polyisocyanurate foam core insulation board covered on both sides with glass-reinforced felt (GRF) facer meeting ASTM C 1289, Type II, Class 1, Grade 3. The product is available in 4’ x 4’ and 4’ x 8’ standard sizes with a thickness of one half inch with an R-value of 2.5. ASTM C1289, Type II, Class 1, Grade 3.

5. **InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2" thick, 4' x 4' and 4' x 8' panels with an R-value of 2.5.. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

6. **Securock Cover Board** – A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier. Available in 1/4" to 5/8" thick and 4' x 4' or 4' x 8' size boards. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

7. **EcoStorm VSH Cover Board** – an engineered composite building material made from a proprietary blend of plastic and cellulose fiber sourced from post-industrial and post-consumer waste streams. EcoStorm VSH is a durable, extremely moisture and mold resistant building material with a core that does not disintegrate or delaminate in the presence of water. Available in 1/2" thick and 4' x 8' size board.

8. **Sure-Seal HP Recovery Board** - A 1/2" or 1" thick high-density wood fiberboard with an asphalt coated facer for use as a cover board or recover board. Available 1/2" or 1" thick and 4' x 4' or 4' x 8' size boards. When used in reroof / no tear-off projects, warranty is limited to 15-year projects.

9. **DensDeck StormX Prime** – a reinforced gypsum cover board with an enhanced, moisture-resistant core and coated glass mat facers on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. DensDeck StormX Prime is extremely durable and is approved for use in assemblies meeting FM's Very Severe Hail (VSH) Classification. Available in 5/8" thickness and 4' x 4' or 4' x 8' size boards.

10. **DensDeck Prime** – gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

11. **DensDeck Cover Board** – gypsum core that incorporates glass-mat facings on the top and bottom side for use as a cover board. Available in 1/4" to 5/8" and 4' x 4' or 4' x 8' size boards.

G. For projects specified in conjunction with new sprayed-in-place polyurethane foam insulation, FleeceBACK membrane can be adhered directly to the new urethane foam surface with Carlisle Flexible FAST Adhesive. Refer to Carlisle's SPF Adhered Roofing System Specification for specific requirements.

2.04 Related Materials

A. **Flashings**

1. **EPDM (Sure-Seal/Sure-White) Related Products**

a. **Sure-Seal and Sure-White Pressure-Sensitive Cured Cover Strip –** a cured 60-mil non-reinforced EPDM membrane laminated to a nominal 30-mil pre-applied tape used to flash metal edgings, overlay end laps and completing general repairs to cured EPDM membrane. Available in 6", 9" and 12" widths.

b. **Sure-Seal Pressure-Sensitive Overlayment Strip:** a nominal 40-mil black, semi-cured EPDM membrane laminated to a nominal 30-mil cured, pre-applied tape. Available in 6", 9" and 12" widths and used to flash metal edgings and to overlay end laps of FleeceBACK membrane.

c. **Sure-Seal/Sure-White Uncured EPDM Elastoform® Flashing:** an easily formed uncured EPDM

membrane used mainly to flash inside/outside corners, pipes, scuppers and field fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

d. **Sure-Seal/Sure-White Pressure-Sensitive Uncured Elastoform Flashing:** A 6", 9" or 12" wide, 40-mil thick **uncured** EPDM Flashing laminated to a 30-mil pre-applied adhesive tape used in conjunction with Sure-Seal Primer as an alternative to Elastoform Flashing.

e. **Sure-Seal/Sure-White Pressure-Sensitive T-Joint Covers**: A factory cut 40-mil thick uncured EPDM flashing laminated to a nominal 30-mil cured pre-applied tape, used to overlay field splice intersections and to cover field splices at angle changes. Sure-Seal available in 6" and 12". Sure-White is 7" x 9".

f. **Pre-Fabricated Accessories:**

1) **Sure-Seal/Sure-White Pressure-Sensitive Pipe Flashings** with pressure-sensitive tape pre-applied to the deck flange. Fits pipes from 1" to 6" in diameter.

2) **Sure-Seal/Sure-White Pourable Sealer Pocket:** a prefabricated pourable sealer pocket which consists of a 2" wide plastic support strip with Pressure-Sensitive Uncured Elastoform Flashing. Sure-Seal available in 4", 6" and 8" diameters. Sure-White available in 6" diameter.

3) **Sure-Seal/Sure-White Inside/Outside Corner:** a 7" by 9" precut 60-mil thick Elastoform Flashing with a 30 mil pre-applied tape.

4) **Sure-Seal/Sure-White Pressure-Sensitive Curb Flashing**: a 20" wide by 50' long cured 60-mil membrane with pre-applied 6" SecurTAPE.

5) **Sure-Seal/Sure-White 20-inch Pressure-Sensitive Cured Flashing**: a 20" wide by 50' long cured flashing with pre-applied adhesive for both the vertical and deck flange surfaces.

6) **Sure-Seal/Sure-White Pressure-Sensitive Walkway Pads**: 30" x 30" pads designed to protect the EPDM membrane in those areas exposed to repetitive foot traffic or other hazards.

2. **TPO (Sure-Weld) Related Products**

a. **Sure-Weld Flashing:** Sure-Weld **non-reinforced flashing** is available in rolls **12" and 24" wide by 50' long**. Flashing is used for inside/outside corners and field fabricated pipe flashings when the use of pre-molded or pre-fabricated accessories is not feasible. In addition, **0.045 by 6" wide by 100' long**, **0.060 by 9" wide by 50' long and 0.080 by 9" wide by 50' long** Sure-Weld **reinforced membrane** is available for overlaying fasteners and fastening plates.

b. **Sure-Weld Pressure-Sensitive Cover Strip:** A nominal 40-mil thick non-reinforced TPO membrane laminated to nominal 35-mil thick cured synthetic rubber pressure-sensitive adhesive used in conjunction with TPO Primer or Low-VOC TPO Primer to strip in flat metal flanges (i.e., drip edges or rows of fasteners and plates). Available in rolls 6" wide by 100' long in colors of white, gray or tan. Not for use on 25-year or 30-year Warranty projects.

c. **Sure-Weld TPO Reinforced Overlayment Strip:** A heat-weldable, reinforced thermoplastic polyolefin membrane. It is available in 45-mil 6" x 100' and 60-mil 6" x 100' and 9" x 50' rolls in colors of white, gray or tan. It can be used to cover end laps on FleeceBACK and SAT TPO systems and to strip in flat metal flanges on details such as TPO coated drip edges, gravel stops, and scuppers.

d. **Sure-Weld TPO APEEL Cover Tape:** A 6"-wide, 1,640' long roll of APEEL Protective Film used to protect areas of Sure-Weld TPO membrane where APEEL Protective Film has been removed (around details) or was not factory applied (seams). APEEL Cover Tape allows contractors to keep

100 percent of the TPO surface clean during installation and is applied using the APEEL Cover Tape Applicator.

e. **Sure-Weld TPO T-Joint Covers:** A 60-mil thick injection molded TPO flashing formed into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60, 72, and 80-mil TPO systems and on 45-mil systems where step-offs have not been properly sealed. Packaged in boxes of 100. Available in white, tan or gray.

f. **Yellow Pressure-Sensitive (PS) Warning Strip:** A nominal 30-mil-thick non-reinforced TPO flashing laminated to a nominal 30-mil-thick, fully cured synthetic rubber Pressure-Sensitive adhesive and is available in 6" wide by 100' long rolls. Yellow Pressure-Sensitive Warning Strip can be applied to EPDM, TPO or Hypalon roofing systems to provide a visual warning of an impending hazard (i.e. roof edge, deep drain sump, skylight).

g. **Sure-Weld TPO Contour Rib Profile:** Used to obtain the appearance of standing seam metal roofing with the performance of a TPO single-ply membrane. The Contour Rib Profile measures 1-1/4” tall and 2-1/8” wide, including the welding flanges, while the vertical profile is a substantial 3/8” thick. The profile has a continuous 1/8” diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8” fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray and tan, 10’ lengths and packaged 20 per carton.

h. **Pre-Molded Accessories:**

1) **Inside Corners**: A pre-molded corner flashing for inside corners. Available in white, gray or tan; 60-mil thick.

2) **Outside Corners**: A one-piece injection molded corner flashing used for flashing outside corners. Available in white, gray or tan; 60-mil thick.

3) **TPO Curb Wrap Corners**: Fabricated flashings are made of 60-mil thick reinforced Sure-Weld Detail membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height. Four sizes are available to fit curbs up to 6' by 6' in size. One curb requires 4 corners for a complete installation. TPO Curb Corners are packaged in boxes containing twelve corners. Custom sizes are available as a special order product requiring lead time.

4) **TPO Universal Corners:** a pre-molded flashing for use in a variety of corner details, including inside and outside corners. Available in white, gray and tan and are 60-mil thick.

5) **Pipe Flashings**: A pre-molded white, gray or tan pipe flashing used for pipe penetrations. Available for 3/4” –8” diameter pipes with clamping rings included.

6) **Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Weld Detail Membrane for pipes 1" – 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Custom sizes are available as a special order product requiring lead time.

7) **TPO Square Tubing Wraps**: Fabricated flashings made of 60-mil thick reinforced Sure-Weld Detail Membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration. Available for 3", 4", 5" and 6" square tubing.

8) **Molded TPO Sealant Pocket**: A pre-fabricated, interlocking, 2-piece, injection molded, flexible pocket with a rigid polypropylene vertical wall and pre-formed deck flanges. Pockets can be adjusted from 11.5” to 7.5” in length by 6” in width by following the cutting lines molded into the

pocket. Used in conjunction with White One-Part Pourable Sealer for waterproofing pipe clusters or other odd shaped penetrations. Available in white, gray or tan.

9) **Pre-fabricated Sealant Pocket**: A two-piece, pre-fabricated sealant pocket that utilizes reinforced 60-mil TPO membrane and coated metal to form a rigid, oversized sealant pocket with a weldable horizontal deck flange. Available in 12" (total volume of 1.87 gallons). Packaged 2 per carton and available in white only. Refer to the applicable Product Data Sheets for dimensions and installation instructions. Custom sizes are available as special order product.

10) **Sealant Pocket Extension Legs**: Designed for use with the TPO Molded Sealant Pocket and the Pre-Fabricated Sealant Pocket to extend the length in increments of 10". Fabricated from 60-mil thick reinforced TPO membrane and TPO coated metal. Can be used full length, cut to size for customized lengths or welded to each other for extra long applications. Packaged 10 legs per carton and available in white only.

3. **PVC/KEE HP PVC (Sure-Flex) Related Products**

a. **Sure-Flex PVC non-reinforced Flashing** is 60-mil thick (white, gray, light gray, slate gray or tan) and available in rolls **12" and 24" wide by 50' long**. Flashing is used for inside/outside corners and field fabricated pipe flashings when use of pre-molded accessories is not feasible.

b. **Sure-Flex Reinforced Cover Strip:** A 8” wide, nominal 60-mil and 80-mil thick, polyester reinforced PVC membrane. Used for stripping in rows of fasteners and plates and covering the butt joints of Sure-Flex PVC membranes. Available in rolls 8" wide by 75' long in colors of white, gray or tan. Also available in 60-mil in rolls of 8" wide by 100' long in white only.

c. **Sure-Flex KEE HP Reinforced Cover Strip:** A 8” wide, nominal 60-mil and 80-mil thick, polyester reinforced KEE HP PVC membrane. Used for stripping in rows of fasteners and plates and covering the butt joints of Sure-Flex KEE HP PVC membranes. Available in rolls 8" wide by 75' long in colors of white, gray or tan, also available in 60-mil in rolls of 8” wide by 100’ long in white only.

d. **Sure-Flex PVC Pressure-Sensitive Cover Strip:** A 6” wide, nominal 35-mil thick non-reinforced KEE HP flashing laminated to a nominal 35-mil, fully cured, pressure-sensitive, synthetic rubber adhesive. Used for stripping in flat metal edgings (i.e. drip edge) of Sure-Flex PVC and KEE HP PVC membranes. Available in rolls 6" wide by 100' long in colors of white, gray or tan. Used in conjunction with PVC Step 1 Activator and PVC Step 2 Primer.

e. **Sure-Flex PVC “T” Joint Cover:** A 4-1/2" diameter, 60-mil thick (white) or 40-mil (gray or tan), pre-cut non-reinforced PVC flashing used to overlay “T” joints at field splices when 80-mil Sure-Flex PVC membrane is used.

f. **Sure-Flex PVC Yellow Pressure-Sensitive Warning Strip:** a nominal 30-mil-thick, non-reinforced membrane flashing laminated to a nominal 30-mil-thick, fully cured, synthetic rubber, pressure-sensitive adhesive and is available in 6"-wide by 100'-long rolls. Pressure-Sensitive Warning Strip can be applied to Sure-Flex PVC or KEE HP systems to provide a visual warning of an impending hazard (e.g., roof edge, deep drain sump, skylight, etc.).

g. **Sure-Flex PVC Contour Rib Profile:** Used to obtain the appearance of standing seam metal roofing with the performance of a PVC single-ply membrane. The Contour Rib Profile measures 1-1/4” tall and 2-1/8” wide, including the welding flanges, while the vertical profile is a substantial 3/8” thick. The profile has a continuous 1/8” diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8” fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray, light gray, slate gray and tan, 10’ lengths and packaged 20 per carton.

h. **Pre-Molded Accessories:**

1) **Sure-Flex PVC Inside Corners:** A pre-molded flashing for inside corners. Available in white, gray or tan; 60-mil thick.

2) **Sure-Flex PVC Outside Corners:** A pre-molded flashing for outside corners. Available in white, gray or tan; 60-mil thick.

3) **Sure-Flex PVC Curb Wrap Corners**: Fabricated flashings are made of 60-mil thick reinforced Sure-Flex KEE HP PVC Detail membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height. Three sizes are available to fit curbs up to 3' by 3' in size. One curb requires 4 corners for a complete installation. PVC Curb Wrap Corners are packaged in boxes containing twelve corners. Custom sizes are available as a special order product requiring lead time.

4) **PVC Universal Corners:** a pre-molded flashing for use in a variety of corner details, including inside and outside corners. Available in white tan, gray, and light gray; 60-mil thick.

5) **Sure-Flex PVC Pipe Flashings:** A pre-molded (white, gray, tan and light gray) pipe flashing used for pipe penetrations. Available for 3/4" – 8" diameter pipes with clamping rings included.

6) **Sure-Flex PVC Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Flex Membrane for pipes 1" – 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Available in white, gray or tan.

7) **Sure-Flex PVC Square Tubing Wraps:** Fabricated flashings made of 60-mil thick reinforced Sure-Flex membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration. Available for 3", 4" and 6" diameter square tubing. Available in white and gray.

8) **Sure-Flex PVC Molded Sealant Pockets:** A pre-fabricated, interlocking, 2-piece, injection molded, flexible pocket with a rigid PVC vertical wall and pre-formed deck flanges. Pockets can be adjusted from 11.5” to 7.5” in length by 6” in width by following the cutting lines molded into the pocket. Used in conjunction with White One-Part Pourable Sealer for waterproofing pipe clusters or other odd shaped penetrations. Available in white only.

B. **Primers, Adhesives, Sealants And Cleaners**

Refer to Product Data Sheets for material coverage rates and proper usage. Prior to the use of any of the products listed below, consult the Safety Data Sheets (SDS) for applicable cautions and warnings.

1. **General Adhesives and Sealants (For all Membranes)**

   a. **Flexible FAST Adhesive:** A two-component (Part A and B), low-rise polyurethane adhesive designed for bonding FleeceBACK membrane and/or insulation to various substrates. Coverage rates can be found in Paragraph 3.05 ‘Membrane Placement and Securement’. Flexible FAST Adhesive is packaged in 50- and 15-gallon drums, as well as, 5-gallon Jug that can be applied in full spray, extrusion, or splatter application depending on dispensing type.

   b. **Carlisle Flexible FAST Dual Tank Adhesive:** A two-component (Part A and B), low rise adhesive for bonding FleeceBACK membrane and/or insulation to various surfaces. Flexible FAST Dual Tanks utilize an HFO blowing agent. HFO (hydrofluoroolefin) blowing agents are widely recognized as the next-generation environmentally friendly blowing agent, replacing their HFC (hydrofluorocarbon) predecessor. Flexible FAST Dual Tank Adhesive can be applied in bead or spatter application. Coverage rates can be found in Paragraph 3.05 ‘Membrane Placement and Securement’.

c. **Flexible FAST Dual Cartridge:** A two component (Part A and B), extrusion applied, low rise adhesive for bonding insulation to various surfaces. Flexible FAST Dual Cartridge Adhesive can be applied in bead application. Coverage rates can be found in Paragraph 3.05 'Membrane Placement and Securement'.

d. **Aqua Base 120 Bonding Adhesive**: A semi-pressure-sensitive, water based adhesive used as a one-sided wet lay-in adhesive for FleeceBACK (Sure-Seal, Sure-White and Sure-Weld). Coverage rate is 100-120 square feet per gallon finished surface. Refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for further information.

e. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding Sure-Weld membrane to various surfaces, priming unexposed asphalt prior to applying Flexible FAST Adhesive and for adhering Sure-Seal/Sure-Weld/Sure-Flex FleeceBACK and Sure-Seal EPDM or Sure-Weld TPO membrane to vertical walls. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application; 750 sq. ft. per 40 lb cylinder and 1,500 sq. ft. per 85 lb cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per 40 lb cylinder and 2,000 sq. ft. per 85 lb cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.

f. **HydroBond Water-based Adhesive:** A wet lay-in, one sided dispersion adhesive. Compatible with all FleeceBACK membranes, this product is ideal for bonding to various porous and non-porous substrates. (The use of Hydrobond with FleeceBACK EPDM is not approved for use with Coated Glass Faced products). Coverage rates vary between 100-133 sq. ft. per gallon using roller or spray applications.

g. **Water Cut-Off Mastic:** A one-component, low viscosity, self wetting, butyl blend mastic used to prevent moisture migration at drains, compression terminations and beneath certain metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon

h. **Universal Single-Ply Sealant:** A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counterflashing, coping, and scupper details. Packaged 24 per carton in 10.3 ounce tubs with a coverage rate of approximately 10' per tube.

2. **Sure-Seal/Sure-White Adhesives, Sealants and Cleaners**

a. **90-8-30A or Low-VOC Bonding Adhesive**: Yellow colored synthetic rubber adhesive that can be used for bonding FleeceBACK membrane or EPDM membrane to walls, curbs, etc.

b. **Sure-Seal/Sure-White Lap Sealant:** A heavy-bodied material (trowel or gun consistency) used to seal the top of termination bars and exposed edges of an adhesive membrane splice (if applicable). A preformed Lap Sealant tool is included in each carton of Lap Sealant.

c. **Sure-Seal/Sure-White SecurTAPE:** A 3" or 6" wide by 100' long splice tape used to splice adjoining sheets together. Complies with the South Coast Air Quality Management District Rule 1168.

d. **HP-250 EPDM Primer:** A solvent-based primer used to prepare the surface of the membrane for the application of SecurTAPE, Splicing Cement (if applicable) or Pressure-Sensitive products. Available in 1 and 3 gallon pails.

e. **Low-VOC EPDM and TPO Primer:** A Low-VOC (volatile organic compound) primer (less than 250 grams/liter) for priming of EPDM or TPO surfaces prior to application of FAT, Cover strip, SecurTAPE and all other pressure-sensitive products. Available in 1 gallon pails.

f. **Weathered Membrane Cleaner:** A clear, solvent-based cleaner used to loosen and remove dirt and other contaminants from the surface of exposed EPDM membrane (for repairs, etc.) prior to applying

Sure-Seal Splice Cleaner or Primer. Available in 1 gallon can and 5 gallon pails.

g. **One-Part Pourable Sealer**: A black or white, single-component, moisture curing elastomeric, polyether sealant used to seal around hard-to-flash membrane penetrating objects such as clusters of pipes.

h. **Pourable Sealer**: A black, two-component, solvent-free, polyurethane based product used for certain tie-ins.

3. **Sure-Weld Adhesives, Sealants and Cleaners**

a. **Sure-Weld Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Weld non-fleece-backed membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Sure-Weld Low-VOC Bonding Adhesive:** An alternate, high-strength, adhesive using a blend of VOC exempt and non-exempt solvent which complies with the State of California Clean Air Act of 1988 (updated in 1997).

c. **Cut-Edge Sealant:** A clear sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8"diameter bead is applied.

d. **White One-Part Pourable Sealer**: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 122 cubic inches of volume within a sealant pocket.

e. **Weathered Membrane Cleaner:** Used to prepare membrane that has been exposed to the elements for approximately 7 days prior to hot air welding at an approximate coverage rate of 600 linear feet per gallon on a 4" wide surface.

f. **TPO and Low-VOC TPO Primer:** A primer used to prepare the surface of the membrane for the application of the Pressure-Sensitive Cover Strip.

4. **Sure-Flex Adhesives, Sealants and Cleaners**

a. **Sure-Flex Low-VOC Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Flex membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Hydrobond Water-Based Adhesive:** A wet lay-in, one-sided dispersion adhesive. Compatible with only Sure-Flex PVC smooth-backed and FleeceBACK membranes, this product is ideal for bonding only PVC membranes to various porous and non-porous substrates (cannot be used with any KEE or KEE HP PVC bareback membranes). Coverage rates vary between 100-133 square foot per gallon using roller or spray applications.

c. **CAV-GRIP PVC Aerosol Contact Adhesive:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: adhering PVC bareback membranes to a variety of horizontal substrates and vertical walls (cannot be used with any KEE or KEE HP bareback membranes), as well as adhering FleeceBACK membranes to vertical walls. Coverage rate is approximately 400 sq. ft. per #40 cylinder and 800 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided applications.

d. **Sure-Flex Cut-Edge Sealant:** A clear sealant used to seal cut edges of reinforced Sure-Flex membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8"diameter bead is applied. The use of cut edge sealant to seal cut edges of Sure-Flex membrane is not required.

e. **White One-Part Pourable Sealer:** A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Sealant Pockets. Packaged in four 1/2 gallon pouches per plastic bucket. One pouch will fill 122 cubic inches of volume within a molded sealant pocket.

f. **PVC and KEE HP Membrane Cleaner:** Used to prepare PVC and KEE HP PVC membrane that has been exposed to the elements for approximately 7 days prior to hot air welding or to remove general construction dirt. Approximate coverage rate of 400 square feet per gallon (one surface).

g. **Sure-Flex Low-VOC PVC Step 1 Activator:** A high-strength, solvent-based activator that allows PVC Pressure-Sensitive (PS) Cover Strip to be bonded to Sure-Flex PVC or KEE HP membranes. Low-VOC PVC Step 1 Activator meets the < 250 gpl VOC content requirements of the OTC Model Rule. It is specially formulated using a blend of VOC-exempt and non-exempt solvents and follows the state of California Clean Air Act of 1988 (updated in 1997) as further regulated by California's Air Quality Control Districts listing VOC limitations.

h. **Sure-Flex Low-VOC PVC Step 2 Primer:** A high-solids-content, polymer based splice primer. This product is applied to KEE HP and PVC membranes to improve the adhesion of PVC Pressure-Sensitive Cover Strip. Low-VOC PVC Step 2 Primer meets the < 250 gpl VOC content requirements of the OTC Model Rule.

i. **Sure-Flex PVC Step 2 Primer:** A high-solids-content, clear (translucent color), polymer-based splice primer used to prepare KEE HP and PVC membranes to be bonded to PVC Pressure-Sensitive Cover Strip.

2.05 Fastening Components

A. **Fasteners**

The following Table illustrates criteria for fastening of Carlisle Insulation with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Insulation Fastening Criteria

Deck Type	Carlisle Fasteners (1)	Min. Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel or Lightweight Insulating Concrete over Steel	ASAP or InsulFast™	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10	1"	Note (2)	7/32"
	HD 14-10	1"	Note (2)	3/16"
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP, ASAP or InsulFast	Min. 1" (3)	N/A	N/A
Cementitious Wood Fiber	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (4)	N/A
Gypsum	Polymer Gyptec or Lite-Deck Fastener	1-1/2"	Note (2)	7/16", 1/2" or 9/16" (5)

Notes: N/A = Not Applicable

(1) Only 3" diameter insulation fastening plates can be used for insulation attachment.
(2) The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most cementitious wood fiber decks do not require pre-drilling; however, Carlisle should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.

(5) Pilot hole size may be varied to maximize pullout resistance.

All Fasteners listed below can be used with Sure-Seal, Sure-Weld or Sure-Flex Roofing Systems. Refer to the applicable specification for specific requirements.

1. **HP Fastener:** A threaded E-coat square head fastener **for insulation attachment only**. Used into steel, wood plank, minimum 15/32" thick plywood or minimum 7/16" thick oriented strand board (OSB).

2. **InsulFast Fastener**: A threaded Phillips drive fastener used with Carlisle Insulation Plates for **insulation attachment** to steel or wood decks.

3. **Pre-Assembled ASAP Fasteners:** Carlisle's InsulFast Fastener pre-assembled with a 3" diameter plastic plate used for **insulation attachment only** on Adhered and Mechanically Fastened Roofing Systems. Installed using Olympic Fasteners' Fastening Tool.

4. **CD-10 Fasteners**: A hammer-driven, non-threaded E-Coat fastener for use with structural concrete decks rated 3,000 psi or greater.

5. **HD 14-10 Concrete Fasteners**: A #14 threaded fastener with a #3 Phillips drive used for minimum 3,000 psi concrete decks.

6. **Polymer Gyptec Fastener:** A non-penetrating, plastic fastener and corresponding plate used with lightweight deck substrates such as fibrous cement and gypsum.

7. **Lite-Deck Fastener**: A oversized diameter fastener and associated 3" Lite-Deck Metal Plate for use on Adhered Roofing Systems to attach insulation to gypsum decks.

8. **HP Term Bar Nail-In**: A 1-1/4" long expansion anchor with threaded drive pin used for fastening Sure-Seal Termination Bar or Seam Fastening Plates to concrete, brick or block walls. The fastener is set by hammering the drive pin into place.

B. **Insulation Fastening Plates**

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

2.06 Vapor /Air Barrier and Primers

A. **General**

If insulation is to be adhered to the vapor retarder with Flexible FAST Adhesive, the vapor retarder must be compatible and shall be fully adhered to the substrate. Available products include Carlisle's VapAir Seal 725TR and VapAir Seal MD Air and Vapor Barrier and spray or roller applied butyl coatings. Installation requirements for Carlisle's VapAir Seal 725TR Air and Vapor Barrier are identified in **Spec Supplement G-08 "Application Procedures for Carlisle's VapAir Seal 725TR Air and Vapor Barrier/Temporary Roof"** and Carlisle's VapAir Seal MD Air and Vapor Barrier are identified in **Spec Supplement G-12 "Application Procedures for Carlisle's VapAir Seal MD Air and Vapor Barrier"** in the Carlisle Technical Manual.

B. **Carlisle VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to a 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with Flexible FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

C. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23' long (460 square feet).

D. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application.

E. **CCW-702 Primer and 702LV Primer (Low-VOC) -** A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., DensDeck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

F. **CCW-702WB –** a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, DensDeck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

2.07 Edgings And Terminations

A. **General**

Products listed below can be used with any of the available Carlisle Roofing Systems. Refer to the applicable Carlisle details and installation instruction manuals for specific installation criteria.

B. **Products**

1. **SecurEdge 200 Fascia**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI ES-1 certified. Meets FM 1-90 approval, refer to Product Data sheet for applicable requirements.

2. **SecurEdge 300 Fascia System**: A snap-on edge system consisting of a 24 gauge galvanized metal springclip water dam and 50 or 63-mil thick aluminum Kynar 500, colored anodized finish or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 10". Custom fascias and colors are available upon request. ANSI/SPRI ES-1 certified. Meets Up to FM 1-180 approval, refer to Product Data sheet for applicable requirements.

3. **SecurEdge 2000 Standard Fascia:** An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI ES-1 certified. Also available in **SecurEdge 2000 Extended Fascia** (Up to 13” Face Height) and **SecurEdge 2000 Canted Fascia**. Meets Up to FM 1-645 approval, refer to Product Data sheet for applicable requirements.

4. **SecurEdge 3000 Roof Edge System**: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 32, 40, 50 or 63-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI ES-1 certified. Also available in **SecurEdge 3000XT Roof Edge System** (Up to 13” Face Height). Meets Up to FM 1-465 approval, refer to Product Data sheet for applicable requirements

5. **SecurEdge One Fascia (MF/FA Single Ply):** A snap-on edge system consisting of an extruded aluminum retainer bar, corrosion resistant fasteners and a 24 gauge or 0.040 Kynar finished aluminum fascia cover. Available with a 3” fascia height 12’ long. ANSI/SPRI ES-1 certified.

6. **SecurEdge One Edge (MF/FA Single Ply):** A snap-on edge system consisting of a 24 gauge retainer bar, corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished fascia cover. A spring clip holds the fascia cover in place. Available in sizes up to 8” fascia height 12’ long. ANSI/SPRI ES-1 certified.

7. **SecurSeal Drip Edge:** Designed for use on Adhered and Mechanically Fastened Roofing Systems. Includes a 22 gauge continuous 12' pre-punched 90-degree angle cleat and 12' long fascia sections. Incorporates concealed joint covers and strong 1-1/4" ring shank nails to provide long-term holding power. A selection of colors in 24 gauge steel, Kynar® 500 and 32-mil aluminum finish or Kynar 500 is available.

8. **SecurWeld® 200/300 Drip Edge:** Pre-fabricated with TPO or PVC-coated metal edging. Heat-weld membrane directly to edge. Available in sizes up to 8” fascia height and in colors: white, gray or tan.

9. **SecurEdge 200 Coping:** Incorporates an anchor cleat with pre-slotted holes, a concealed joint cover and 10' or 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also

available. ANSI/SPRI ES-1 certified. Meets FM 1-90 approval, refer to Product Data sheet for applicable requirements.

10. **SecurEdge 300 Parapet Wall Coping:** Incorporates an anchor cleat with pre-slotted holes, a concealed joint cover and 10' or 12' continuous sections of coping cap consisting of 50 or 63-mil thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI ES-1 certified. Meets Up to FM 1-180 approval, refer to Product Data sheet for applicable requirements

11. **SecurEdge One Coping:** A snap-on coping edge system consisting of a 24 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Available for wall thicknesses up to 30". ANSI/SPRI ES-1 Certified.

12. **Termination Bar:** A 1" wide and 98-mil thick extruded aluminum bar pre-punched 6" on center which incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

13. **SecurEdge Term Bar Fascia:** A 1.75" wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040" aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12' lengths for fewer joints/seams, fewer sections to handle and faster installation.

14. **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. Coated metal is available in sheets 4' x 10' and comes packaged 25 sheets per pallet (also available packaged 10 sheets per pallet on a direct ship basis). Available in white, gray or tan.

15. **Sure-Flex PVC Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 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, light gray, slate gray and tan.

2.08 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment.

A. **Walkway Types**

1. **Sure-Seal/Sure-White Pressure-Sensitive Walkway Pads**: Sure-Seal (black) or Sure-White (white) molded walkway pads with Factory-Applied TAPE used to provide protection for areas of EPDM membrane that are exposed to regular rooftop maintenance.

2. **Sure-Weld Heat Weldable Walkway Rolls:** Designed to protect Sure-Weld membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Weld membrane using an automated heat welder or hand held heat welder. The diamond plate tread pattern offers superior slip resistance. The walk edges are trimmed in safety yellow to better define the designated traffic flow. Walkway Rolls are 34" wide by 50' long and are nominal 180 mils thick. Available in white, tan or gray.

   NOTE: As an option, Sure-Weld walkway pads may be adhered to the membrane surface with SecurTAPE/TPO Primer

3. **Sure-Flex PVC Heat Weldable Walkway Rolls:** Manufactured from specially compounded PVC, offering superior tear, puncture and weather resistance. Designed to protect Sure-Flex (PVC/KEE HP) membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Flex (PVC/KEE HP) membrane using an automated heat welder or hand held heat welder. Walkway Rolls are 36" wide by 60' long and are nominal 80-mils and 110-mils thick. Available in gray only.

4. **Sure-Weld TPO Crossgrip Walkway Rolls:** Manufactured from TPO and may be used in lieu of standard Sure-Weld TPO Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip TPO Walkway Rolls are effective for winds up to 55 mph. Rolls are 36” wide by 33’ long, available in white, gray and yellow.

5. **Sure-Flex PVC Crossgrip Walkway Rolls:** Manufactured from PVC and may be used in lieu of standard Sure-Flex PVC Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip PVC Walkway Rolls are effective for winds up to 55 mph. Rolls are 36” wide by 33’ long, available in white, gray and yellow.

6. **Other Walkways (For use with all membranes)**

    a. **Carlisle’s Interlocking™ Rubber Pavers:** 24" X 24" X 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in black and terra cotta.

    b. **Smooth concrete pavers**, when specified in conjunction with insulation that is mechanically fastened, must be loose laid over a slip sheet of membrane or 2 layers of HP Protective Mat. When insulation is attached with Flexible FAST Adhesive, concrete pavers may be placed over one layer of HP Protective Mat. Pavers cannot weigh more than 80 pounds per paver for ease of removal.

    c. **Hanover Pedestal Paver** – Used for light traffic areas associated with rooftop or garden roof applications. 23-1/2” x 23-1/2” x 2” thick precast concrete pavers weighing 25 psf with an elevated clearance of 1/2” from incorporated footing. Available in 8 standard colors, with special order colors available. The pedestal paver can either be installed in conjunction with a separation layer of HP Protective Mat or using Hanover Pedestal and shims.

    d. **Hanover Ballast and Lightweight Ballast Pavers:** The standard, 24” x 24” x 1-13/16” thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2” x 23-1/2” x 1-1/4” thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

2.09 Other Carlisle Accessories

Refer to **Spec Supplement P-01 “Related Products”** for additional accessories.

PART III EXECUTION

Prior to commencing with the installation of any of the FleeceBACK Membrane Systems refer to Paragraph 1.05 "Warranty Tables" for applicable components and proper securement method suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are considered to be beyond the scope of this specification.

3.01 General

A. Safety Data Sheets (SDS) must be on location at all times during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

B. To ensure most current installation requirements are met and techniques are followed, Product Data Sheets should be available on site.

C. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

D. A proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.

E. Protect areas of high construction traffic using plywood sheets.

3.02 Roof Deck/Substrate Criteria

A. Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system as well as construction and live loads in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

B. When insulation/membrane underlayments are to be mechanically fastened, withdrawal resistance tests are strongly suggested to determine the suitability of a roof deck. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria" in** the Carlisle Technical Manual proper procedures for conducting pullout tests.

C. Defects in the substrate must be reported and documented to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Applicator shall not proceed with installation unless defects are corrected

D. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

E. **For all projects** (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.

F. **Substrate Preparation**

1. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

2. For direct application over an acceptable roof deck/substrate, the substrate must be smooth, steel trowel finished (structural concrete), free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material.

3. **On retrofit - recover projects**, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation of type specified so it is relatively flush (+/- 1/4") with the existing surface.

    a. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action.

    b. **For existing PVC membranes**, when insulation/membrane underlayment are to be mechanically fastened, in lieu of total removal, the membrane may be cut into maximum 10' by 10' sections. All PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

    c. When installing this roofing system over existing **gravel surfaced built-up roof**, **loose gravel must be removed**. Power Brooming or Hydro Vacuuming is recommended by Carlisle to remove the loose gravel or dirt, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent new insulation from bridging.

    d. When installing this roofing system over existing TPO Membranes less than 2 years old or EPDM Membrane, use X-Tenda Coat Membrane Cleaner or X-Tenda Coat EPDM Activator. Dilute the product per the instruction label., Spray the surface and let stand for 15 minutes, prior to power washing.

        1) On retrofit projects, all existing phenolic insulation must be removed.
        2) Refer to table below for other Recover/Retro-fit considerations.

    NOTE: When FleeceBACK membrane is installed directly over an existing single-ply roof, the existing single-ply roof must be secured with HP or HP-X Fasteners and 2” diameter Seam Plates at 12” O.C. at all deck to wall junctions, angle changes greater than 2:12 and around curbs/skylights, regardless of warranty duration or warranty wind speed. Fasten directly through FleeceBACK membrane and existing single-ply roof to the deck OR fasten through the existing single-ply roof to the deck, prior to application of FleeceBACK. Additional fastening of the existing roof may be utilized to enhance the wind uplift resistance of the existing roof, Contact Carlisle for further information.

G. The following table identifies the acceptable roof decks/substrates and the minimum underlayment requirements:

Roof Deck & Substrate Criteria for Adhered Roofing Systems

Acceptable Roof Deck/Substrate	FleeceBACK EPDM Membrane	FleeceBACK TPO Membrane	FleeceBACK PVC / KEE HP PVC Membrane
NEW CONSTRUCTION			
Steel (min. 22 gauge) (1)(2)	Insulation	Insulation	Insulation
Structural Concrete (min. 3000 psi) or Gypsum	Direct Application	Direct Application	Direct Application
Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application	Direct Application	Direct Application
Wood Planks (minimum 3/4" thick)	Direct Application	Direct Application	Direct Application
Fibrous Cement	Insulation	Insulation	Insulation
Lightweight Insulating Concrete	Direct Application (3)	Direct Application (3)	Direct Application (3)
RETROFIT / NO TEAR-OFF			
Existing Smooth Surface BUR (9) or Mineral Surface Cap Sheet	Direct Application (4)(10)	Direct Application (10)	Direct Application (10)
Gravel Surfaced Asphaltic BUR (5)	Insulation	Insulation	Insulation
Coal Tar Pitch (5)(6)	Insulation	Insulation	Insulation
Modified Bitumen	Direct Application (8)(10)	Direct Application (8)(10)	Direct Application (8)(10)
Existing Single-Ply	Direct Application (7)	Direct Application (7)	Direct Application (7)
Existing SPF	Direct Application (11)	Insulation	Insulation
RETROFIT / TEAR-OFF			
Existing roof material removed (regardless of deck type)	Insulation	Insulation	Insulation

Notes:

(1) Local codes must be consulted regarding thermal barrier requirements.

(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge (Refer to attachment 2).

(3) FleeceBACK Adhered Roofing System may be specified directly over a new approved cellular or perlite lightweight insulating concrete substrate, refer to Attachment I for additional information.

(4) FleeceBACK EPDM Adhered Systems (Sure-Seal black membrane) may be applied directly to the substrate providing asphalt on existing smooth surfaced built-up roof has a softening point above 185°F (85°C).

(5) Loose gravel must be removed to avoid moisture entrapment.

(6) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.

(7) An approved mechanically fastened insulation/underlayment is required over existing ballasted single-ply systems and PVC roofing systems of any type. For Direct Application Carlisle may be contacted for required substrate preparation.

(8) Direct application permitted over smooth or granular surfaced modified bitumen. Membrane shall be positioned with length of sheets parallel to modified bitumen field seams. Effort should be made to ensure seams of the FleeceBACK system are parallel to existing seams, when new splices run perpendicular the field seam must be carefully inspected especially at intersections.

(9) Existing Type III or IV smooth asphalt BUR Only

(10) Possible staining/discoloration of the white membrane may result when installing this system directly over existing smooth surfaced BUR or modified bitumen, especially along the selvage edge where fleece backing is not present. If aesthetics are critical, an approved insulation should be specified beneath the membrane

(11) Silicone-coated substrates must be scarified (coating removed) prior to the application of Flexible FAST Adhesive.

3.03 Insulation/Underlayment

A. General

1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the dew point.

2. On projects where coal tar pitch is used, sufficient insulation must be used to prevent softening of the coal tar and possible dripping into the building, especially when the insulation is mechanically fastened.

4. Multiple layers of insulation are recommended with all joints staggered between layers.

5. Do not install more insulation/underlayment than can be covered by membrane in the same day.

6. All insulation boards must be butted together with no gaps greater than 1/4". Gaps greater than 1/4" are not acceptable.

7. Insulation should be protected from repetitive foot or construction traffic during or after installation of the roofing system.

8. Adhered or “Peel and Stick” Vapor Retarders, when used, may pull away from angle changes due to inadequate adhesion or poor substrate preparation. When insulation is to be adhered to the Vapor Retarder, mechanical securement is required along the perimeter. Insulation shall be mechanically fastened with plates and fasteners at 12” o.c. (within 6” of the angle change).

   NOTE: Projects utilizing Carlisle’s “Peel and Stick” Vapor Barrier must comply with Carlisle’s installation requirement outlined in Spec Supplement G-08 “Application Procedures for Carlisle 725TR Air and Vapor Barrier”. Applicable Details should also be referenced for Vapor Retarder terminations along angle changes.

9. Restrictions:

   a. Carlisle Roofing Systems cannot be specified in conjunction with existing or new Phenolic Insulation.

   b. Fiberglass insulation cannot be specified even if overlaid with additional insulation or membrane underlayment.

c. The direct application of Sure-Flex Membrane over expanded or extruded polystyrene insulation is not permitted.

3.04 Insulation Attachment

A. **General**

1. Prior to proceeding with insulation securement refer to Warranty Tables, Paragraph 1.05, for attachment method and appropriate fastening density required for the specific Carlisle Warranty.

B. **Adhered Roofing Systems**

1. **Mechanical Attachment**, insulation fastening density will vary based on insulation type, thickness, and required warranty. Warranty Tables in Paragraph 1.05 should be referenced for fastening density and the appropriate Carlisle detail may be consulted to identify acceptable fastening pattern.

   a. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Refer to **Design Reference DR-05 "Insulation Fastening Patterns"** for fastening pattern reference.

   b. When insulation securement is to comply with Factory Mutual (FM) approvals, follow the requirements of the specifier concerning additional securement at the roof perimeter and corners. Also refer to **Design Reference DR-05 "Insulation Fastening Patterns"** for various fastening patterns.

   c. On Reroof/No Tear off projects with a maximum roof height of 40', any Carlisle Insulation (i.e., 1/2" SecurShield HD, HP Recovery Board, Polyisocyanurate less than 1-1/2" thick) may be secured at the minimum rate of 11 Fasteners per 4' x 8' board (5 Fasteners per 4' x 4' board).

   d. Oriented strand board (OSB) when specified as the membrane underlayment, must be mechanically fastened to the deck at the rate 17 fasteners for 4 x 8 board in accordance with Carlisle Details. If OSB is to be used in conjunction with Carlisle urethane based adhesive, an OSB/Polyisocyanurate composite board is recommended. When positioning OSB it shall not be butted allow 1/8" gaps between boards to prevent cupping.

2. **Adhesive attachment**, Carlisle Urethane Adhesive Full Spray (Flexible FAST), Bead (Flexible FAST or Olybond) or Equipment (Rig) Splatter (Flexible FAST) may be used. When bead adhesive is specified, bead spacing will vary based on Warranty coverage, refer to Warranty Tables, Paragraph 1.05 and appropriate Carlisle Details.

   a. **CAUTION:** Ensure the bead of adhesive is 2" from edge of board for 4" o.c. bead spacing and 3" from edge of board for 6" and 12" o.c. bead spacing. Refer to **Detail A-27G** in **Spec Supplement G-09**.

   b. **CAUTION:** For application of urethane adhesives directly to un-weathered asphalt, (new or residual), refer to **Spec Supplement G-03 "FleeceBACK and Insulation Attachment and Coverage Rates with Flexible FAST Adhesive".**

   c. **CAUTION:** Gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.

   d. Flexible FAST may be used in an Equipment (Rig) splatter application method, in lieu of, full spray or bead attachment for adhering Insulation or FleeceBACK Membranes to a smooth, flat surface. Flexible FAST may be dispensed by using a HULK Spray Rig with a HULK Dispensing Gun or Patriot Spray Rig with a VEE-AIR Spray Gun to achieve 50% coverage of the substrate at a rate of 1/2 gallon per 100 square feet. To achieve proper coverage, spray in a horizontal, sweeping motion, from a minimum of 24" height, overlapping each new pass with the previous pass by 50%.

e. Refer to **Spec Supplement G-02 "Flexible FAST Adhesive Equipment and Set-Up Requirements for Full Spray, Bead and Splatter Applications"** and **G-03-20 "FleeceBACK and Insulation Attachment and Coverage Rates with Flexible FAST Adhesive"** for equipment settings, application procedures and coverage rates.

f. On FM Global insured projects, consult FM Global's local representative concerning the use of adhesive to attach insulation to steel decks.

g. Check to ensure the substrate is dry. Adhesive cannot be applied to a wet or damp surface.

h. Allow the adhesive to rise up approximately 1/8" to 3/4", depending on dispensing method, and develop strings prior to setting insulation boards into adhesive.

Note: String-time is measured by touching the adhesive with a splice wipe and looking for development of "strings" of adhesive as you pull the splice wipe out of the adhesive. With Flexible FAST Adhesive, string time is generally around 1-1/2 – 2 minutes after application at room temperature.

i. **Walk the boards into the adhesive and roll using a 30" wide, 150 pound segmented steel roller** to ensure full embedment. Optimal set up time should be approximately 5 to 7 minutes.

CAUTION: Walking on the boards immediately after placement in adhesive can cause slippage/movement until the adhesive has started to set up.

CAUTION: If the boards easily slide, string time has not been achieved.

On roofs with a slope greater than 1/2" in 12", begin adhering insulation at the low point and work upward to avoid slippage.

One person should be designated to walk and roll in all boards. Relief cuts may be necessary to allow lifted board to lay flat, or constant weight (a minimum 10 lbs for 5-15 minutes per lifted area) may be necessary to achieve adequate adhesion.

j. **NOTE: Projects utilizing Carlisle's "Peel and Stick" Vapor Barrier must comply with Carlisle's installation requirement outlined in Spec Supplement G-08 "Application Procedures for Carlisle 725 Air and Vapor Barrier". Applicable Details should also be referenced for Vapor Retarder terminations along angle changes.**

3.05 Membrane Placement and Securement

A. **General**

1. Do not apply Flexible FAST Adhesive when surface and/or ambient temperatures are below 25°F (-4°C). The temperature of Flexible FAST Adhesive must be between 70°F (21°C) and 90°F (32°C), at the time of use. Use blanket heaters and/or hot boxes when necessary.

2. Flexible FAST Adhesive may be applied when surface and/or ambient temperatures are below 25°F (-4°C) when heated equipment is used that includes the following: heated blankets, preheater, and heated hose.

3. When using Flexible FAST Adhesive in non-heated spray equipment, substrate and/or ambient temperatures must be between 25° F (-4° C) and 120° F (49° C).

4. The coverage rate of Flexible FAST Adhesive below:

Flexible FAST Adhesive Coverage Rates					
Approximate Coverage Rate (Sq. Ft.)					
Package Type	**Full Spray**	**Splatter**	**4” o.c.**	**6” o.c.**	**12” o.c.**
Dual Cartridges	N/A	N/A	100-200	200-300	400-600
Dual Tanks	N/A	2,600-2,800	1,100-1,300	1,700-1,900	3,500-3,700
5-Gallon Jugs	600-1,000	1,800-2,000	670-900	1,000-1,250	2,000-2,500
15-Gallon Drums	1,800-3,000	5,400-6,000	2,110-2,700	3,000-3,750	6,000-7,500
50-Gallon Drums	5,000-10,000	18,000-20,000	6,700-9,000	10,000-12,500	20,000-25,000

5. **Sweep** all loose debris from the substrate.

6. **Verify** all sections are dry prior to proceeding with the application of Flexible FAST Adhesive/FleeceBACK membrane.

CAUTION: Ensure that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each work day.

7. At angle changes along walls, curbs, skylights, etc., for warranties up to 20 years, FleeceBACK membrane must be adhered in Flexible FAST Adhesive beads placed directly at the angle change and an additional bead spaced a maximum of 3” away from the first bead (at the angle change). For warranties over 20 years, mechanical securement of the membrane is required.

B. **EPDM Membrane Installation - Option #1**

1. Position and unroll successive sheets and align to provide the minimum 3" or 6” wide splice. At end laps (along the width of the sheet), membrane shall be butted together.

2. Fold adjacent sheets in half lengthwise (end to end) to expose approximately 10' wide (width of the sheet) by half the length of the sheet substrate area.

   Notes: Fold selvage sheet edges (along the length of the sheets), if pre-applied tape is not present, under the membrane to prevent overspray onto the splice area.

   Membrane which has the adjacent sheet spliced over it should be adhered to the substrate first. This will prevent the selvage edge splice area from being contaminated by setting splice edge into urethane adhesive.

3. Apply Flexible FAST Adhesive onto the substrate and allow to rise approximately 1/8" to 3/4" and develop **strings when touched with an HP Splice Wipe**. Roll the membrane with a 30" wide, 150 lb weighted segmented steel roller, to set the membrane into the adhesive. **For Non-Dual Tank extruded applications, apply adhesive at 4", 6" or 12" on center with a minimum 1/2" wide, wet bead**. **For Dual Tank extruded applications apply adhesive with a minimum of 1.5" wide, wet bead.**

4. Apply Flexible FAST Adhesive to the substrate and continue the process described above until all sheets are fully adhered, allowing for the necessary splice overlaps at selvage edges. At end laps (along the width of the sheet), membrane shall be butted together and overlay with 6" wide Pressure-Sensitive Cured Cover Strip or Pressure-Sensitive Overlayment Strip. See Paragraph 3.05-F for additional splicing requirements.

C. **TPO/PVC Membrane Installation –Option #1**

1. Position and unroll successive sheets and align to provide a minimum 2" overlap (use pre-marked overlap line) along the selvage edge. At end laps (along the width of the sheet), membrane shall be butted together.

2. Fold adjacent sheets in half lengthwise (end to end) to expose approximately 10' wide (width of the sheet) by half the length of the sheet substrate area.

   Notes: Fold selvage sheet edges (along the length of the sheets) under the membrane to prevent overspray onto the splice area.

   Membrane which has the adjacent sheet spliced over it should be adhered to the substrate first. This will prevent the selvage edge splice area from being contaminated by setting splice edge into urethane adhesive.

3. Apply Flexible FAST Adhesive onto the substrate and allow to rise approximately 1/8" to 3/4"and develop strings when touched with an HP Splice Wipe. Roll the membrane with a 30" wide, 150 lb weighted segmented steel roller, to set the membrane into the adhesive. **For Non-Dual Tank extruded applications, apply adhesive at 4", 6" or 12" on center with a minimum 1/2" wide, wet bead**. **For Dual Tank extruded applications apply adhesive with a minimum of 1.5" wide, wet bead.**

   Note: Exercise care to prevent overspray onto membrane. If Flexible FAST Adhesive should contaminate the splice area, immediately (while adhesive is still in liquid form) clean with TPO, PVC and KEE HP Membrane Cleaner or allow Flexible FAST Adhesive to cure and remove with a paint remover as referenced in Paragraph 3.05-E.

4. Apply Flexible FAST Adhesive to the substrate and continue process described above until all sheets are fully bonded, allowing for the necessary splice overlaps. At end laps (along the width of the sheet), membrane shall be butted together and to be overlaid with minimum 6" wide Sure-Weld/Sure-Flex Reinforced Membrane hot air welded on all edges.

D. **EPDM, TPO and PVC Membrane Installation – Option #2**

1. **Position** first roll of FleeceBACK membrane at the designated starting point on the roof.

2. **Chalk** a line to ensure proper positioning of the FleeceBACK membrane.

3. **Unroll** 10' to 15' of membrane to ensure it is properly aligned and fold unrolled section back over roll.

4. **Apply** Flexible FAST Adhesive over the substrate area to be covered by the membrane that is folded back. **For Non-Dual Tank extruded applications, apply adhesive at 4", 6" or 12" on center with a minimum 1/2" wide, wet bead**. **For Dual Tank extruded applications apply adhesive with a minimum of 1.5" wide, wet bead.**

5. Once the Flexible FAST Adhesive is applied in place and has begun to rise approximately 1/8" in height and **develop strings when touched with an HP Splice Wipe**, slide the membrane back into the adhesive.

6. **Roll** the membrane using a 30” wide, 150 lb weighted segmented steel roller, to set the membrane into the adhesive.

7. Proceed to the front of the roll and continue to apply Flexible FAST Adhesive and roll the FleeceBACK membrane into the adhesive.

8. Once the first sheet is positioned, measure to allow for a minimum (Refer to Option #1) overlap along the length of the sheet.

9. Position the next roll and repeat the process as described above.

10. At end laps, membrane shall be butted together and overlaid with 6" wide Pressure-Sensitive Cured Cover Strip or Pressure-Sensitive Overlayment Strip with EPDM Primer, for EPDM, and overlaid with a minimum 6” wide Sure-Weld/Sure-Flex Reinforced Membrane hot air welded on all edges. (Cut edges of Sure-Weld membrane shall be sealed with Cut Edge Sealant.)

E. **Do not apply Flexible FAST Adhesive to splice areas.** If Flexible FAST Adhesive should contaminate the splice area, immediately (while the adhesive is still in liquid form) clean with Weathered Membrane Cleaner (EPDM or TPO) or PVC and KEE HP Membrane Cleaner (PVC or KEE HP PVC Only). Cured Adhesive which has dried may be removed with paint remover as referenced in Paragraph 3.06 B.3.

F. **EPDM MEMBRANE SPLICING (Sure-Seal/Sure-White)**

FleeceBACK membrane has selvage edges (fleece-backing is discontinued) and **Factory-Applied SecurTAPE** along the length of the sheet for membrane splicing in accordance with the following procedures.

Selvage edges are not provided along the width of the membrane (roll ends); adjoining membrane sheets shall be butted together and overlaid with 6” wide Pressure-Sensitive Cured Cover Strip in accordance with appropriate Carlisle Detail. As an option, sheets can be rotated 90° to form a cap sheet to eliminate flashing overlay. For additional installation procedures, refer to **Spec Supplement E-02 “EPDM Membrane Splicing and Splice Repairs”.**

1. **General**

a. **Projects with 10, 15 and 20 year Warranties – Detail FB-2A**

Side Laps: Tape splices must be a minimum of 2-1/2" wide using **3" wide field-applied Pressure Sensitive SecurTAPE OR 3” Factory-Applied TAPE (FAT)**. (**Detail FB-2A**).

End Laps: A minimum of 6” wide Pressure-Sensitive Cured Cover strip or Pressure-Sensitive Overlayment Strip shall be used at all end laps and shall be centered over the leading edge (butt edge) of the splice. (**Detail FB-2A**).

Splice Intersections: All intersections between the Pressure-Sensitive Cover strip and side laps shall be overlaid by a 6”x6” minimum (black) or 7”x9” (white) Pressure-Sensitive ‘T’-Joint cover with a bead of Lap Sealant. (**Detail FB-2A**).

Note: In lieu of the 7”x9” Sure-White Pressure Sensitive ‘T’-Joint cover, a 6”x6” section of white Pressure-Sensitive Elastoform flashing may be used. White Pressure-Sensitive Elastoform flashing is available in rolls of 6”, 9” and 12”.

b. **Projects with 25 and 30 year Warranties - Detail FB-2A.1**

Side Laps: Must be a minimum of 5-1/2” wide using **6” wide Field-Applied or Factory-Applied Tape (FAT)** OR if **3” wide Factory-Applied Tape (FAT)** SecurTAPE is used, the 3” Tape must be overlaid with **6” Pressure-Sensitive Cured Cover Strip**. (**Detail FB-2A.1**).

End Laps: Use two layers of Pressure-Sensitive Flashing as an overlay for the end laps. The first layer shall be 6” wide Pressure-Sensitive Overlayment Strip or Pressure-Sensitive Cured Cover Strip and the top layer shall be 12” wide Pressure-Sensitive Elastoform Flashing. Both layers shall be centered over the butt edges of the sheet.

Splice Intersections: ’T’-Joints are to be flashed with a bead of lap sealant and 6”x6” (black) or 7”x9” (white) Pressure-Sensitive ‘T’-Joint Cover. Apply a second layer of 12”x12” Pressure-Sensitive ‘T’-Joint Cover centered over 6” x 6” ‘T’-Joint Cover. (**Detail FB-2A.1**).

Note: In lieu of the 7”x9” Sure-White Pressure-Sensitive ‘T’-Joint cover, a 6”x6” section of white Pressure-Sensitive uncured Elastoform flashing may be used. White Pressure-Sensitive Elastoform flashing is available in rolls of 6”, 9” and 12”.

c. Field splices located in areas where ponding water occurs or those that resist water flow, must be overlaid with 6" wide Pressure-Sensitive Overlayment Strip or 6" wide Pressure-Sensitive Cured Cover Strip.

d. Tape shall extend 1/8" minimum to 1/2" maximum beyond the splice edge. Factory-Applied tape can be flush with sheet edge.

e. **Prior to SecurTAPE application, the splice area must be primed with Sure-Seal EPDM or Low-VOC EPDM Primer.**

f. Field splices at roof drains must be located outside the drain sump.

2. If the splice area is contaminated with field dirt, adhesive or other residue, scrub with Sure-Seal Weathered Membrane Cleaner prior to application of Sure-Seal Primer.

3. Position membrane sheets to allow for an appropriate overlaps depending on SecurTAPE width. Where Factory-Applied tape is not present, mark the bottom sheets with an indelible marker approximately 1/4" from the top sheet edge. The pre-marked line on the membrane edge can also be used as a guide for positioning splice tape.

4. **Apply EPDM or Low-VOC EPDM Primer** with a 1/2” medium nap roller to achieve a **thin, even coat** on both membrane surfaces. Splice area must be uniform in color, streak free and free of globs or puddles.

   Note: Permeation-resistant gloves (that meet ANSI/ISEA 105-2005) are recommended when cleaners or primers are being used.

5. **Allow** Primer to dry until tacky but does not transfer to a dry finger touch.

   Note: Due to solvent flash-off, condensation may form on freshly applied EPDM Primer when the ambient temperature is near the dew point. If condensation develops, the application of Primer and SecurTAPE must be discontinued since proper adhesion will not be achieved. Allow the primer surface to dry and apply a thin freshener coat of EPDM Primer to the previously coated surface and apply SecurTAPE when conditions allow.

6. Where Factory-Applied SecurTAPE is not present (i.e., base flashing details, cap sheet locations, etc.) unroll approximately 3' of SecurTAPE. Align release film with marked line and press tape down to bottom sheet using firm even hand pressure. Continue for the length of the splice. Tape roll ends must be overlapped 1". Allow top sheet to rest on release film on back side of the tape.

7. **Pull** release film from SecurTAPE beneath top sheet and allow top sheet to fall freely onto exposed tape.

8. **Press** the top sheet onto the tape using firm even hand pressure across the splice towards the splice edge.

9. **Immediately roll** the splice using positive pressure. When using a 2" wide steel roller, roll across the splice edge, not parallel to it. When using Carlisle's Stand-Up Seam Roller, splices may be rolled lengthwise along the splice.

   Note: When temperatures are below 40°F (4°C), prior to rolling the splice, apply heat to the top side of the splice area with a hot air gun.

10. **Install** a "T" Joint Covers as required. Refer to **Spec Supplement E-02 "EPDM Membrane Splicing and Splice Repair"** for specific requirements dictated by membrane thickness and warranty duration

11. **Cold Weather Restrictions** - When temperatures are below 40°F (4°C)

    1) Splice tape must be stored in a warm, dry area. Hot boxes must be provided for temporary storage to maintain the temperature of the tape above 40°F (4°C).

    2) After Primer has been applied and allowed to properly dry, **heat the primed area of the bottom membrane sheet** with a hot air gun as the tape is applied and pressed into place.

    3) When temperatures fall below 40°F (4°C), use a steel roller to apply pressure to the tape prior to removing the release film.

    4) Position the top sheet and remove the release film. Prior to rolling the splice with the 2" steel roller, apply heat to the top side of the splice area with a hot air gun. The heated surface should be very hot to the touch of bare skin (approximately the temperature of hot tap water). Take care not to burn or blister the membrane.

G. Lap Sealant Application

1. **General**

   a. The use of Lap Sealant with tape splices is optional except at tape overlaps, where Lap Sealant must be utilized.

   b. Lap Sealant is optional on straight runs of Pressure-Sensitive Flashing and around Pressure-Sensitive Pipe Flashings.

   c. Lap Sealant is required at the following locations:

      a. Splices between adjoining sections of uncured and semi-cured Pressure-Sensitive Flashing.

      b. Intersections between Pressure-Sensitive Flashing and joints in metal edgings.

2. Where applicable, additional cleaning of the splice edge prior to applying Lap Sealant is not required unless contaminated with dirt or other contaminants.

3. Apply a **5/16" (minimum 1/4") diameter bead** of Lap Sealant to completely cover the splice edge. When a 5/16" diameter bead of Lap Sealant is applied, approximately 22 linear feet of coverage per tube can be achieved.

4. **Feather** the Lap Sealant with the specially preformed tool or nozzle (included in the Lap Sealant cartons) so the high point or the crown of the Lap Sealant is located over the edge of the splice.

   Clean the feathering tool occasionally for consistent crowning of the Lap Sealant.

5. **APPLICATION OF LAP SEALANT SHOULD BE COMPLETED BY THE END OF THE DAY.** Delayed Lap Sealant application (not within the same day) will require scrubbing of accumulated dirt and dust along the splice edge, rinsing with clean water and cleaning with Weathered Membrane Cleaner or Primer.

3.06 Heat Welding Procedures (Sure-Weld/Sure-Flex)

A. **General**

1. Hot air weld the Sure-Weld or Sure-Flex FleeceBACK membrane sheets using the Automatic Hot Air Welding Machine or Hot Air Hand Welder and silicone roller. For description of heat welding equipment and generator/electrical requirements, refer to **Spec Supplement T-01 "Heat Welding Equipment".**

2. When roof slope exceeds 5 inches per horizontal foot, use of the Automatic Hot Air Welding Machine may become more difficult working parallel with the slope it may be necessary to run the sheets perpendicular to avoid the use of Hand Held Hot Air Welder.

3. Membrane has a selvage edge (fleece-backing is discontinued) along the length of the sheet for membrane welding.

   Selvage edges are not provided along the width of the membrane. Adjoining membrane sheets shall be butted together, overlaid with a minimum 6" wide Sure-Weld/ Sure-Flex Reinforced Membrane and hot air welded on all edges. Seal all Sure-Weld membrane edges (where scrim reinforcement is exposed) with Cut-Edge Sealant. Cut-Edge Sealant not required for Sure-Flex Membrane, however it is recommended.

   Note: When using Sure-Weld FleeceBACK 115- or 135-mil membrane or Sure-Flex FleeceBACK 135-mil membrane, a surface splice of non-reinforced flashing or "T-Joint" Cover must be applied over all "T" joint splice intersections.

B. Check the surfaces of the membrane to be hot air welded to ensure they are properly prepared as outlined below:

1. Membrane Cleaning - The surfaces to be hot air welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned with Weathered Membrane Cleaner (Sure-Weld) or PVC and KEE HP Membrane Cleaner (Sure-Flex) and wiped dry with a clean HP Splice Wipe. No residual dirt or contaminants should be evident.

2. Exposed Membrane Seam Preparation - Surface oxidation of membrane will occur upon exposure to heat and sunlight. After exposure to the elements, membrane must be cleaned with Weathered or PVC and KEE HP Membrane Cleaner prior to hot air welding as follows:

   a. Apply Weathered Membrane Cleaner (Sure-Weld) or PVC and KEE HP Membrane Cleaner (Sure-Flex) to the surface of the membrane which has been exposed using a clean HP Splice Wipe or other white natural fiber (cotton) rag or "Scotch Brite" type pad and wipe along the direction of the seam.

      If natural fiber rags are used, they must be white to prevent fabric dye from discoloring the membrane.

      Prior to hot air welding, wipe the surface where Weathered Membrane Cleaner (Sure-Weld) or PVC or KEE HP Membrane Cleaner (Sure-Flex) has been applied with a clean, dry HP Splice Wipe or other white rag to remove cleaner residue.

   b. Weathered Membrane Cleaner (Sure-Weld) will achieve approximately 600 linear feet (one surface) of coverage per gallon for a standard hot air welded splice area. PVC or KEE HP Membrane Cleaner (Sure-Flex) will achieve approximately 400 square feet (one surface) of coverage per gallon for a standard heat welded splice area.

   c. The membrane can typically be repaired up to 6 months to a year with the standard cleaning method referenced above. In cases where the standard cleaning method is not sufficient, additional scrubbing

and cleaning will be required. Refer to Paragraph 3.07-B.

3. Check surfaces of the FleeceBACK membrane around details (i.e., walls, curbs, vents, etc.) for evidence of Flexible FAST Adhesive overspray since proper heat welding of flashing will not be accomplished if overspray is present. Overspray shall be removed as follow:

   a. Apply a paint remover such as Tal-Strip® Extra Strength manufactured by Mar-Hyde® Corporation (can be purchased at most automotive centers) to the overspray area and allow to remain on the membrane surface approximately 5 minutes.

   b. Remove residue with a Splice Wipe or clean cloth. Wipe cleaned area with Weathered Membrane Cleaner (EPDM or TPO) or PVC and KEE HP Membrane Cleaner (PVC and KEE HP Only) prior to heat welding (Acetone may be used in lieu of PVC and KEE HP Membrane Cleaner where VOC requirements are in effect.

C. **Automatic and/or Hand Held Hot Air Welder Equipment**

1. Refer to **Spec Supplement T-01 – "Heat Welding Equipment"** for:

   a. Temperature Settings.
   b. Equipment Set-up.
   c. Additional Information.

D. **Membrane Welding**

1. Prepare the Automatic Hot Air Welding Machine and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2. Perform test trials before welding to ensure proper welding is achieved.

3. Position the Automatic Hot Air Welding Machine properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

4. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Hot Air Welding Machine between the overlap. Immediately begin moving the machine along the seam to prevent burning the membrane.

5. Weight plates provided on Automatic Welders must be utilized.

6. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

   CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

7. At all splice intersections, roll the seam with a silicone roller to ensure a continuous hot air welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Sure-Weld membrane sheets.

   Note: When using Sure-Weld FleeceBACK 115- or 135-mil membrane or Sure-Flex FleeceBACK 135-mil membrane, a surface splice of Non-Reinforced Flashing or T-Joint Cover must be applied over all "T" joint splice intersections. T-joint covers are also required along the end-lap overlays regardless of membrane thickness

8. To remove the Automatic Hot Air Welding Machine from the finished splice, stop the movement of the machine and immediately remove the nozzle from the seam area. Mark the end of the hot air welded

seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Hot Air Welding Machine is stopped and restarted.

E. **Preventing Membrane Creeping During Welding**

The operator of automatic welding equipment must apply foot pressure to the membrane, keeping the membrane tight under the welder. Refer to **Spec Supplement T-01 – "Heat Welding Equipment**" for additional information.

F. **Test Cuts**

Perform a test weld at least at the start of work each morning and afternoon. Refer to **Spec Supplement T-01 – "Heat Welding Equipment"** for additional information.

G. **Seam Probing**

A blunt or dull cotter pin puller is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Refer to **Spec Supplement T-01 – "Heat Welding Equipment"** for additional information.

3.07 Welding Problems/Repairs

A. A Hand Held Hot Air Welder and a 2 inch wide silicone roller must be used when repairing the Sure-Weld or Sure-Flex FleeceBACK membrane. When the entire hot air welded seam is to be overlaid, an Automatic Hot Air Welding Machine may be used.

B. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned and any material which has been exposed approximately 7 days must be prepared with Carlisle Weathered Membrane Cleaner (Sure-Weld) or PVC and KEE HP Membrane Cleaner (Sure-Flex) as outlined in **Spec Supplement T-01 "Heat Welding Equipment Use and Procedures Thermoplastic Membranes",** Exposed Membrane Seam Preparation. The membrane can typically be repaired up to 6 months to a year with a standard cleaning method. In cases where the standard cleaning method is not sufficient, the following procedures must be used:

1. Scrub the area to be welded with a "Scotch Brite" pad and appropriate Membrane Cleaner. The cleaner will become discolored during this procedure.

2. Clean all residue from the area to be welded with a Splice Wipe or clean rag.

3. Weld the new membrane to the cleaned area using standard welding procedures.

C. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller.

D. Position the Hand Held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

E. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test cut areas must be repaired by overlaying the damaged area with a separate piece of membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

F. Probe all edges of the overlay once cooled to ensure a proper weld has been achieved.

G. Seal all cut edges of Sure-Weld reinforced membrane with TPO Cut-Edge Sealant. PVC Cut-Edge Sealant is not required for Sure-Flex Membrane.

Note: The same overlay repair procedures may be used for punctures in the Sure-Flex membrane.

3.08 Flashings

For other requirements which must be complied with in order for Carlisle warranty to be issued, refer to Spec Supplement G-05 "Flashing Consideration/Metal Work".

A. General Considerations

1. All existing loose flashing must be removed prior to the application of new flashing. New membrane flashing must extend above all existing intact flashing but must not conceal weep holes or cover existing through wall counterflashing.

2. Deck to wall joints, vertical joints between tilt up panels, and any gaps in metal walls must be sealed to prevent any infiltration and possible condensation beneath the membrane. Refer to appropriate Carlisle Details for recommendation.

3. Install surface mounted reglets and compression bar terminations directly to the wall surface.

4. In areas where metal counterflashing is used as the vertical termination, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

5. **At roof drains and compression seal terminations** such as terminations bars and coping stones, the **fleece-backing must be removed** from the back of the membrane so Water Cut-Off Mastic can be applied directly to the membrane surface.

    a. To remove fleece-backing utilize a Hand Held Hot Air Welder and apply heat in a back and forth motion over the area of where the fleece is to be removed. Fleece will melt and the bottom of the membrane will be exposed.

6. Cut-edges of Sure-Weld FleeceBACK membrane, where scrim reinforcement is exposed, must be sealed with TPO Cut-Edge Sealant (not required on vertical surfaces). The use of PVC Cut-Edge Sealant on cut edges of Sure-Flex FleeceBACK membrane is not required.

7. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

8. All vertical EPDM field splices at the base of a wall or curb must be overlaid with a Pressure-Sensitive "T" Joint Cover, 6" wide section (with rounded corners) of Sure-Seal Pressure-Sensitive Flashing or Sure-White uncured Elastoform Flashing centered over the field splice in accordance with the applicable Carlisle Details. When 60-mil or greater Reinforced Sure-Weld or 80-mil Sure-Flex Non-Fleece Membrane is used for wall/curb flashing resulting splice intersection must be overlaid with appropriate "T"-Joint cover.

9. Terminate the edges of the installed membrane in accordance with Carlisle's applicable Termination Details.

10. On all Total System Warranty projects, Carlisle's Termination Bar, in conjunction with Water Cut-Off Mastic, must be installed under all metal counterflashings used for vertical wall terminations.

11. The height of the new wall flashing and termination must extend above the anticipated water level (due to heavy rain) or slush line (due to water under accumulated snow).

12. The Specifier must examine structural supports for rooftop equipment to determine if reasonable access to the membrane beneath the equipment is provided.

13. Bitumen based roof cement must be removed or concealed with an acceptable underlayment.

14. When sleepers are used for mounting rooftop equipment, they must be designed to provide adequate support. An appropriate detail must be selected to prevent depression of the insulation and possible damage to the membrane.

    NOTE: When sleeper mounted pipe and gas lines running perpendicular to roof slope should be elevated to reduce forces caused by melting/sliding snow. Designer may consider the utilization of a support system secured to roof structure and properly flashed.

15. **Existing Roof Tie-Ins**, depending on the type of the existing roofing system, the tie-in method will vary. Total isolation between the two roofing systems or weep holes may be required to address moisture migration from one roofing system to the other. Refer to appropriate U-13 Detail, contact Carlisle for further information. If constant compression is required, ensure fleece is removed from the bottom of the membrane.

16. **Flashing of other Penetrations**, refer to **Spec Supplement G-05 for "Flashing Considerations / Metal Work"** and the applicable Carlisle detail for specific requirements.

17. **Flashing of Difficult Penetrations,** refer to **Spec Supplement G-13 for "LIQUISEAL Liquid Flashing"** for additional information and specific requirements.

B. **Walls, Parapets, Curbs, Skylights, etc.**

1. Use continuous deck membrane where feasible as outlined in appropriate Carlisle Detail.

2. When the use of continuous deck membrane for wall flashing is not feasible, a separate piece of Non-Fleece Cured Membrane may be used in accordance with appropriate Carlisle Detail.

   When a separate piece of Non-Fleece Cured membrane is used, adhere membrane to the wall or curb with appropriate Bonding Adhesive. Terminate in accordance to the applicable Carlisle Termination Details.

3. When using a separate piece of Non-Fleece membrane for wall flashing should comply with minimum membrane thickness as outlined in Warranty Tables in the appropriate EPDM and Thermoplastic specifications.

4. As an alternative to the use of a separate piece of Non-Fleece Cured Membrane, a separate piece of FleeceBACK membrane can be used for wall/curb flashings if a selvage edge is provided.

5. At angle changes along walls, curbs, skylights, etc., for warranties up to 20 years, FleeceBACK membrane must be adhered in Flexible FAST Adhesive beads placed directly at the angle change and an additional bead spaced a maximum of 3" away from the first bead (at the angle change) see Detail FB-12A.1 and FB -12B.1. For warranties over 20 years, mechanical securement of the membrane is required.

6. Adhere **FleeceBACK** membrane to the wall with **Flexible FAST Adhesive with full spray.** Allow extra time for Flexible FAST Adhesive to gain green strength prior to setting membrane in vertical surface.

   NOTE: Splatter Application is not approved for vertical wall attachment.

   a. FleeceBACK membrane may be adhered with appropriate Bonding Adhesive, however, a coat of bonding adhesive must first be applied to the fleece backing and allowed to dry. Then apply a standard coat of Bonding Adhesive on the wall and a second layer over the dried coat of Bonding Adhesive on the fleece membrane, then and allow to properly dry.

   b. FleeceBACK membrane may be adhered to vertical surfaces with CAV-GRIP III Low-VOC aerosol adhesive. Spray wall and back of the membrane utilizing 50% overlap and 100% coverage.

7. When FleeceBACK membrane is used as wall/curb flashing, the **fleece-backing must be removed along the top edge of the membrane prior to completing compression seal terminations** so Water Cut-Off Mastic can be applied directly to the membrane surface. This can be accomplished by applying heat to the fleece until the bottom of the membrane is exposed.

8. For **corner flashing** requirements, refer to the applicable Carlisle Details included at the end of this section.

9. For re-roofing projects where residual asphalt may be present separation must be provided between the asphalt and White Membranes to avoid possible discoloration and permanent staining. Refer to applicable Carlisle Detail or Carlisle may be contacted for other recommendations.

C. **Metal Edge Terminations**

1. The width of the perimeter wood nailer to which the metal edge is to be secured must extend beyond the width of the metal edge deck flange.

2. All shop fabricated metal must incorporate a continuous cleat (min. 22 ga.) and must be secured at least 6 inches on center. Or as approved by the Specifier, whichever is greater.

3. Pre-Manufactured metal edging must be secured to the wood nailer as specified by the respective manufacturer.

4. Refer to the appropriate Carlisle Detail for flashing options and requirements and **Design Reference DR-12 "Metal Edgings"** for applicable wind uplift achieved using the various Carlisle supplied metal.

D. **Expansion Joints**

At expansion joints, a separate section of FleeceBACK membrane installed with the fleece-backing side facing up beneath the field membrane may be required. Refer to the applicable Carlisle Details for installation requirements.

E. **Roof Drains**

When the FleeceBACK membrane extends into the drain sump/clamping ring, **Fleece-backing must be removed** from the underside of the membrane so Water Cut-Off Mastic can be applied directly to the membrane surface. Apply heat to fleece material until the bottom of the membrane is exposed. As an option, a separate section of Non-Fleece Membrane can be extended into the drain sump. Refer to applicable Carlisle Details for various flashing options.

Only drain strainers that have been approved by the specifier in accordance with all applicable codes may be used.

F. **Sure-Weld/Sure-Flex Contour Rib Profiles**

1. The Contour Rib Profile is recommended for use with FleeceBACK® TPO and PVC adhered roofing systems.

2. The Sure-Weld/Sure-Flex Contour Rib Profiles should be positioned parallel to the laps of the installed TPO/PVC roofing system and parallel with the roof slope where possible.

3. Ensure that all welding surfaces are clean and dry. Inspect all seam areas for proper weld prior to installing Sure-Weld/Sure Flex Contour Rib Profile.

4. Contour Rib Profile spacing can be individually determined to achieve the desired appearance.

5. Connecting multiple ribs is achieved by using fiberglass pins. Insert a pin half-way into the end of one

profile. Connect the adjoining rib by inserting the exposed end of the pin into the alignment hole. Repeat previous steps for additional TPO/PVC Contour Rib profiles.

6. Consult the Sure-Weld or Sure Flex Contour Rib Profile installation guides for instructions on proper installation techniques.

G. **Other Penetrations**

1. Thermoplastic FleeceBACK Membrane (TPO/PVC/KEE HP PVC) with Warranties of 20 Year or greater must incorporate Carlisle supplied pre-fabricated accessories to seal pipes, corners, sealant pockets, etc.

2. Carlisle's pre-fabricated accessories are available in thickness of 60 mil. For projects with 20 year or greater Warranties only pre-fabricated accessories with minimum of 60-mil may be used.

3. For EPDM FleeceBACK installations, use Pressure-Sensitive Pipe Seals, when feasible, to flash pipes and round penetrations in accordance with appropriate Carlisle Detail.

   When Pressure-Sensitive Pipe Seals cannot be used, install field fabricated pipe seals using Pressure Sensitive uncured Elastoform Flashing around pipe, round supports and structural steel tubing with a corner radius greater than 1/4".

4. For either Thermoplastic or EPDM FleeceBACK Membrane, Flexible Penetrations (braided cables, conduits, wires, etc.) must be enclosed in a stable "goose neck".

   Apply a field fabricated pipe flashing using Sure-Weld (TPO) or Sure-Flex (PVC) non-reinforced flashing to flash the goose neck.

   For EPDM FleeceBACK Membrane systems use Sure-Seal/Sure-White Pressure-Sensitive Flashing refer to appropriate Carlisle Detail

5. For pipe clusters or unusually shaped penetrations, a Molded or Pourable Sealant Pocket must be utilized.

6. Hot pipes which exceed 140°F (60°C) (PVC/KEE HP PVC), 160°F (71°C) (TPO) or 180°F (82°C) (EPDM) must be insulated with metal collars and rain hoods and flashed in accordance with appropriate Carlisle Detail.

7. Applicable Carlisle details shall be utilized. For FleeceBACK Adhered Roofing Systems, additional membrane securement around pipes or pourable sealer pockets is not required regardless of size.

3.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to **Spec Supplement G-06 "Roof Walkway Installation".**

3.10 Daily Seal

On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration. Refer to **Spec Supplement G-07 "Daily Seal / Clean Up**".

SPECIFICATION ATTACHMENT
FLEECEBACK ROOFING SYSTEMS

Adhered Roofing System
Sure-Seal®/Sure-White™/Sure Weld®/Sure-Flex™
"Attachment I"

Direct Application Over Lightweight Insulating Concrete

July 2024

When specified, the Sure-Seal/Sure-White or Sure-Weld or Sure-Flex FleeceBACK membrane may be adhered with **Flexible FAST Adhesive** directly over a new **approved cellular or perlite lightweight insulating concrete** substrate with a **minimum compressive strength of 225 psi.**

Note: When the use of vermiculite lightweight insulating concrete is specified, Carlisle must be contacted to determine applicable requirements pertaining to priming, venting and warranty wind speed coverage. Projects where the FleeceBACK membrane has been approved over vermiculite will be limited to a wind speed coverage of 55 mph peak gust wind speed unless otherwise approved by Carlisle.

Note: Except when the lightweight insulating concrete is poured over slotted steel decks, pressure relief vents must be specified at a minimum rate of 1 every 2000 square feet and shall be installed with each completed section, to provide immediate relief and prevent pressure build-up. Direct Application is not permitted where the lightweight concrete is poured over an existing roofing material.

The Authorized Applicator must provide Carlisle with a copy of a certification letter from the lightweight insulating concrete manufacturer (on new construction projects), which references the project name and location and contains the manufacturer's brand name, minimum compressive strength, average wet and air dry densities.

The substrate must be dry, free of debris, fins, frost, loose and foreign materials. Fill any gaps in the substrate greater than 1/4" with Flexible FAST Adhesive or other appropriate material.

FleeceBACK Membrane - Adhesive Attachment – Up to 20 YR Warranty			
Warranty Duration	**Wind Speed Coverage**	**Adhesive Ribbon Spacing**	
		Field	**Perimeter**
15 YR Warranty	55 MPH	12” O.C.	6” O.C.
	72 MPH	6” O.C.	6” O.C.
	80 MPH	FS	FS
20 YR Warranty	55 MPH	6” O.C.	6” O.C.
	72 MPH	6” O.C.	4” O.C.
	80 MPH	FS	FS
FS = Full Spray, Equipment (Rig) Splatter, Dual Tank Splatter or Ribbons @ 4” O.C.			

Application Cautions

1. Do not proceed with membrane installation until the lightweight insulating concrete has cured a minimum of 48 hours. If necessary, consult with the lightweight insulating concrete manufacturer concerning additional drying time.

2. After rain or other precipitation, follow the manufacturer's requirements concerning proper visual inspection and additional drying time prior to adhering the membrane.

3. Prior to membrane installation, darker areas, especially along hairline cracks in the concrete, may serve as an indication of moisture entrapment and possible standing water beneath the surface. If this condition is found, consult with the lightweight insulating concrete manufacturer for proper corrective measures.

4. Except when lightweight insulating concrete is poured over slotted steel decks, the roofing applicator must conduct core cuts at the minimum rate of 1 every 2,000 square feet. The core cuts should be located around hairline cracks (if present) where darker areas are visible. After core cuts have been taken, the substrate must be examined for evidence of moisture above the structural deck and, if found, a wet/dry vacuum system, as recommended by the lightweight insulating concrete manufacturer, must be utilized to remove standing water from beneath the surface of the concrete.

    a. To ensure the efficient operation of the vacuum system, a tight seal must be provided between the nozzle of the vacuum and the lightweight concrete substrate.

    b. A one-way pressure relief vent, approved by Carlisle, must be installed over each core cut in accordance with applicable Carlisle Detail. Contact Carlisle for approved pressure relief vents.

END OF ATTACHMENT

SPECIFICATION ATTACHMENT
FLEECEBACK ROOFING SYSTEMS

Mechanically Fastened Roofing System
Sure-Seal®/Sure-White™/Sure Weld®/Sure-Flex™
"Attachment II"

Mechanically Fastened Membrane Option

July 2024

General Considerations

A. As an option to fully adhering the FleeceBACK Membrane with Flexible FAST Adhesive, the membrane may be loose laid and mechanically fastened over an approved substrate to an acceptable deck (minimum 22 ga. steel deck or wood decks as described in Table I (below) using Carlisle Fasteners and Plates.

1. For EPDM Membrane use HP Fasteners with HP Polymer Plates.
2. For TPO and PVC Membranes use HP-X Fasteners and Pirahna Plates.

B. **Any Carlisle approved insulation or cover board** included in the Thermoplastic or EPDM Specifications, approved for Mechanically Fastened Assemblies, may be used as part of the roofing assembly.

C. The approved insulation/cover board shall be mechanically fastened to the roof deck at the minimum rate of **1 fastener and plate per every 8 square feet** (4 fasteners in a 4 x 8 board) for warranties up to 15 year. Projects with 20 year or greater warranties require the use of 6 fasteners and plates in a 4' x 8' board (1 per 5.333 square feet).

CAUTION: Carlisle Polyisocyanurate Insulation with a thickness less than 1.5" installed over an existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation. Refer to appropriate EPDM/Thermoplastic Mechanically Fastened Specification for Specific Cautions, Warnings and other membrane/insulation fastening options.

D. Use of DensDeck, DensDeck Prime and DensDeck StormX Prime should be limited to assemblies with slopes greater than 2" per foot to ensure compliance with external fire codes, care shall be exercised to ensure polymer plates are fully seated. DensDeck, DensDeck Prime or DensDeck StormX Prime are not approved in re-roofing applications for use directly over existing roofing membranes. Not for use directly over lightweight insulating concrete substrates in either new construction or re-roofing applications/tear-off.

Submittals

A. In addition to the Submittal requirements outlined in Paragraph 1.04 of the main specification, for mechanically fastened systems shop drawings must include:

1. Sheet width and number of perimeter sheets
2. Carlisle Fastener type, length and maximum spacing (for membrane securement).

B. **Along with 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 the Table included in **Design Reference DR-06 "Withdrawal Resistance Criteria".**

Warranty

A. Projects meeting the conditions below can be eligible for a maximum 20 year System Warranty with wind speed coverage up to 72 mph peak gusts. Projects requiring extended wind speed coverage must be submitted to Carlisle for review prior to installation.

Table I **FleeceBACK Membrane Fastening Criteria for Mechanically Fastened Roofing Systems 22 GA. Steel Deck Only – Maximum 60' Building Height**

Peak Gust Wind Speed Warranty	Membrane Type	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Building Distance from Coastline					
		Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	TPO	1	2	3	12'	6'	12" O.C.
	EPDM	1	2	3	10'	5'	
	KEE HP PVC	1	2	3	10'	5'	
72 MPH	TPO	2	2	3	12'	6'	12" O.C.
	EPDM	2	2	3	10'	5'	
	KEE HP PVC	2	2	3	10'	5'	

* TPO or KEE HP PVC Using HP-X Fasteners and Piranha™ Plates. EPDM using HP Fasteners and Polymer Fastening Plates.

Table II **FleeceBACK Membrane Fastening Criteria for Mechanically Fastened Roofing Systems Wood (Plywood and OSB) Decks Maximum 60' Building Height**

Peak Gust Wind Speed Warranty	Deck Type	Projected Pull-Out Values	Membrane Type	Min. Number of Perimeter Sheets			Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field & Perimeter Sheets)
				Building Distance from Coastline					
				Greater than 7 miles	3 to 7 miles	Less than 3 miles			
55 MPH	7/16" OSB* or 15/32" 3-Ply Plywood or 5/8" OSB	210 lbs* (OSB) or 240 lbs (3-Ply) or 310lbs (OSB)	TPO	2	3	3	12'	6'	12" O.C. *
			EPDM	2	3	3	10'	5'	
			KEE HP (1) PVC	2	3	3	10'	5'	
	15/32" 5-Ply Plywood	530 lbs	TPO	1	1	1	12'	6'	12" O.C.
			EPDM	1	1	1	10'	5'	
			KEE HP (1) PVC	1	1	1	10'	5'	
72 MPH	15/32" 5-Ply Plywood	530 lbs	TPO	1	1	1	12'	6'	12" O.C.
			EPDM	1	1	1	10'	5'	
			KEE HP (1) PVC	1	1	1	10'	5'	

*Fastening Density for Field and Perimeter Sheets is 9" o.c. when fastening to 7/16" OSB with minimum pullout of 210lbs.
1. FleeceBACK PVC polyester reinforced can be used.

Roof Deck and Substrate Criteria

A. The following table identifies the acceptable roof decks/substrates and the minimum underlayment requirements:

Roof Deck & Substrate Criteria for Mechanically Fastened Roofing Systems

Acceptable Roof Deck/Substrate	FleeceBACK EPDM Membrane	FleeceBACK TPO Membrane	FleeceBACK PVC / KEE HP PVC Membrane
NEW CONSTRUCTION			
Steel (min. 22 gauge) (1)(2)	Insulation	Insulation	Insulation
Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application	Direct Application	Direct Application
Wood Planks (minimum 3/4" thick)	Direct Application	Direct Application	Direct Application
Lightweight Insulating Concrete	Direct Application	Direct Application	Direct Application
RETROFIT / NO TEAR-OFF			
Existing Smooth Surface BUR (4)(8) or Mineral Surface Cap Sheet	Direct Application (3)(8)	Direct Application (8)	Direct Application (8)(9)
Gravel Surfaced BUR (4)(5)	Insulation	Insulation	Insulation
Coal Tar Pitch (4)(5)	Insulation (5)	Insulation (5)	Insulation (5)
Modified Bitumen	Direct Application	Direct Application (7)	Direct Application (7)
Existing Single-Ply	Direct Application (6)	Direct Application (6)	Direct Application (6)
RETROFIT / TEAR-OFF			
Existing roof material removed (steel or wood decks)	Insulation	Insulation	Insulation

Notes:

(1) Local codes must be consulted regarding thermal barrier requirements.

(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge.

(3) Mechanically Fastened Systems (Sure-Seal (black)) may be applied directly to the substrate providing asphalt on existing smooth surfaced built-up roof has a softening point above 185°F (85°C).

(4) Loose gravel or granules must be removed to avoid moisture entrapment.

(5) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.

(6) An approved Insulation/underlayment is required over existing ballasted single-ply systems and PVC roofing systems of any type.

(7) Direct application permitted over smooth surfaced modified bitumen. Membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where splices intersect modified bitumen field seams. Refer to FleeceBACK specification for end laps. For side laps refer to appropriate Mechanically Fastened Specification and applicable Carlisle Details.

(8) Existing Type III or IV smooth asphalt BUR Only.

(9) Direct Application for FleeceBACK KEE HP Only. FleeceBACK PVC requires Insulation.

END OF ATTACHMENT

SPECIFICATION ATTACHMENT
FLEECEBACK ROOFING SYSTEMS

FleeceBACK FR TPO
Mechanically Fastened Roofing System

"Attachment III"

July 2024

General Considerations

A. A UL Class A roof assembly can be achieved without the use of a coverboard over combustible decks by utilizing the FleeceBACK FR TPO, 115-mil white, membrane, available in 5’ or 10’ wide by 50’ or 100’ long rolls. This roof assembly is loose laid and mechanically fastened over a combustible deck with Carlisle HP-X Fasteners and Pirahna Plates positioned along the sheets as follows:

1. Adjoining sheets of FleeceBACK FR TPO are overlapped approximately 51/2" along the length of the membrane (at the selvage edge) where fastening plates will be located.

   Note: To qualify for Carlisle’s 2" hail coverage warranty, adjoin the two FleeceBACK FR TPO sheets by overlapping approximately 9" to ensure the fastening plates are covered by the FR fleece. The fleece portion of the membrane must extend a minimum of 3/4" past the edge of the plate.

2. At end laps (along the width of the sheet), membranes shall be butted together which will be overlaid with minimum 6"-wide Sure-Weld reinforced membrane hot-air welded on all edges. Cut edges of TPO membrane shall be sealed with TPO cut edge sealant.

B. The membrane shall be secured around the building perimeter using either 5’ wide sheets of FleeceBACK FR TPO or additional rows of HP-X Fasteners and Pirahna Plates positioned along the centerline of the 10'-wide sheets as follows:

1. Sure-Weld Pressure-Sensitive Cover strip (in conjunction with TPO Primer) or a minimum 6"-wide Sure-Weld Reinforced membrane (hot-air welded) used to overlay the fasteners and plates. Cut edges of TPO membrane shall be sealed with TPO cut edge sealant.

2. **Note:** Projects, where a 20-year Warranty is specified, must utilize a minimum 6"-wide Sure-Weld Reinforced membrane (hot-air welded) used to overlay the fasteners and plates.

Submittals

A. In addition to the Submittal requirements outlined in Paragraph 1.04 of the main specification, for mechanically fastened systems shop drawings must include the number of perimeter.

B. **Along with 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 I.

Warranty

Projects meeting the conditions outlined in Table I can be eligible for a maximum 20 year System Warranty with wind speed coverage up to 72 mph peak gusts. Projects requiring extended wind speed coverage or a 20-year System warranty must be submitted to Carlisle for review prior to installation.

Table I	FleeceBACK FR TPO Membrane Fastening Criteria for Wood (Plywood / OSB) Decks							
Peak Gust Wind Speed Warranty	Deck Type	Projected Pull-Out Values	Membrane Type	Min. Number of Perimeter Sheets		Field Membrane Width	Perimeter Sheet Width	Fastening Density (Field & Perimeter Sheets)
				Building Distance form Coastline				
				Greater than 7 miles	Less than or equal to 7 miles			
55 MPH	7/16" OSB* or 15/32" 3-Ply Plywood or 5/8" OSB	210 lbs* (OSB) or 240 lbs (3-Ply) or 310lbs (OSB)	**FR TPO**	2	3	10'	5'	12" O.C. *
	15/32" 5-Ply Plywood	530 lbs	**FR TPO**	1	2	10'	5'	12" O.C.
72 MPH	15/32" 5-Ply Plywood	530 lbs	**FR TPO**	2	3	10'	5'	12" O.C.

*Fastening Density for Field and Perimeter Sheets is 9" o.c. when fastening to 7/16" OSB with minimum pullout of 210lbs.

Roof Deck and Substrate Criteria

The following table identifies the acceptable roof decks/substrates and the minimum underlayment requirements:

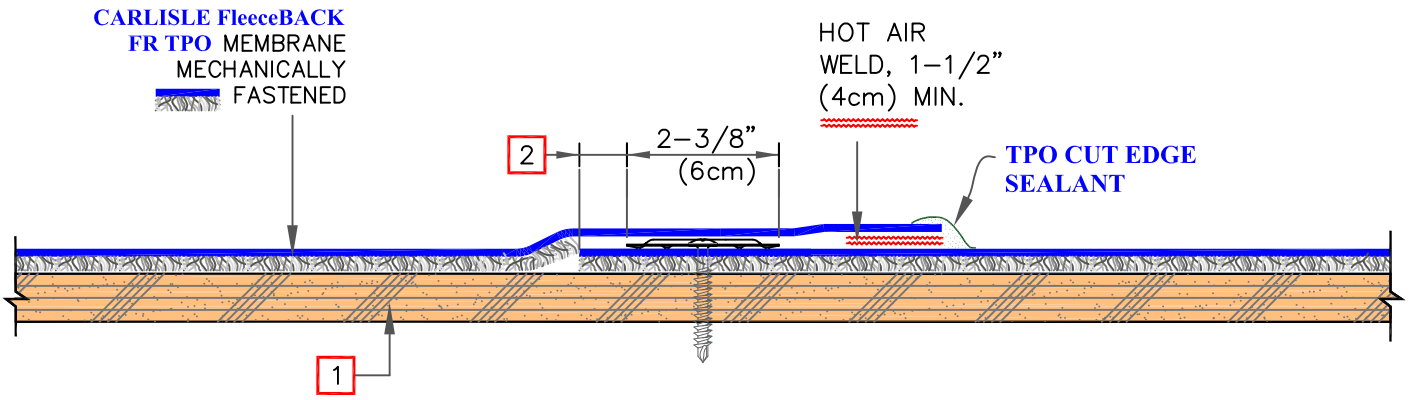
Roof Deck & Substrate Criteria for Mechanically Fastened Roofing Systems

Acceptable Roof Deck/Substrate	FleeceBACK FR TPO Membrane
NEW CONSTRUCTION	
Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application
Wood Planks (minimum 3/4" thick)	Direct Application
RETROFIT / TEAR-OFF	
Existing roof material removed (wood decks)	Direct Application with some limitations*

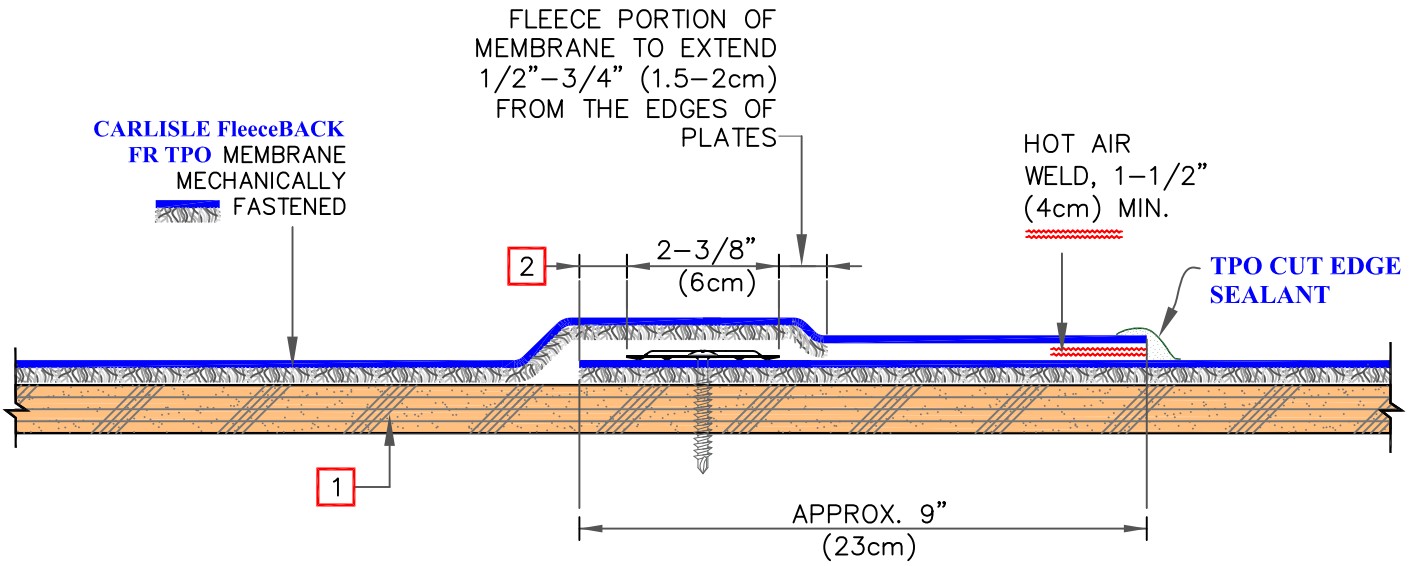
* For direct application over an acceptable roof deck/substrate, the substrate must be smooth, free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material. Protruding nails or screws shall be removed and replaced with threaded screw-type fasteners.

Associated Installation Details

END OF ATTACHMENT



DETAIL A (TYPICAL SEAM)



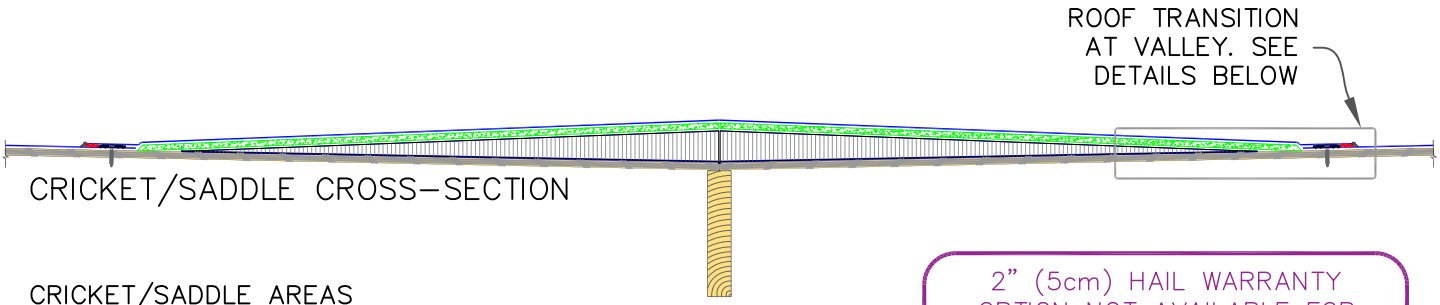
DETAIL B (SEAM FOR OBTAINING HAIL WARRANTY COVERAGE)

NOTES:

1. COMBUSTIBLE DECK, MAX. SLOPE 1/4" PER FOOT – PLYWOOD SHOWN. ON EXISTING DECKS, REMOVE PROTRUDING NAILS/FASTENERS AND REPLACE WITH NEW THREADED FASTENERS.

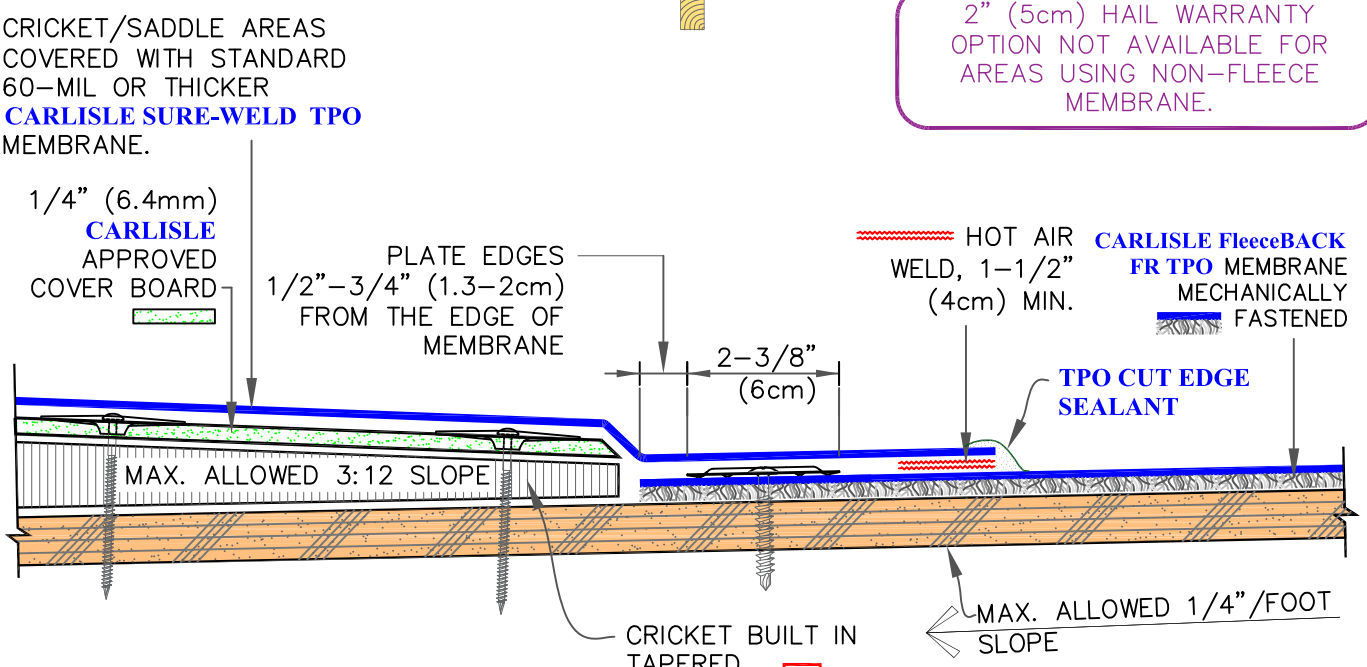
2. PLATE EDGES 1/2"–3/4" (1.5–2cm) FROM THE EDGE OF MEMBRANE.

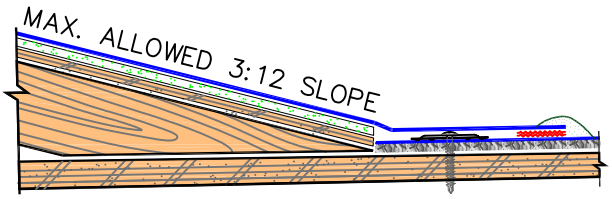
DIRECT APPLICATION OVER WOOD DECK		DETAIL NO.
For additional information, refer to Specifications		FR–2.1
		FR (FIRE RATED)



CRICKET/SADDLE CROSS-SECTION

2" (5cm) HAIL WARRANTY OPTION NOT AVAILABLE FOR AREAS USING NON-FLEECE MEMBRANE.



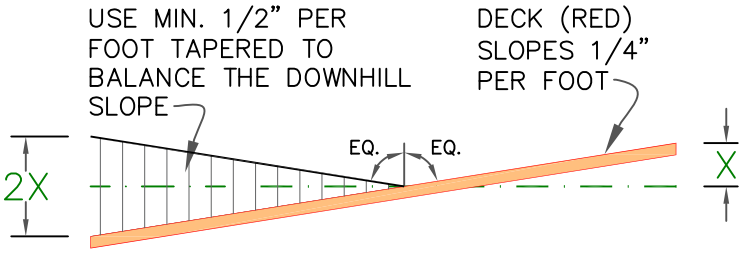


CRICKET BUILT IN WOOD CARPENTRY

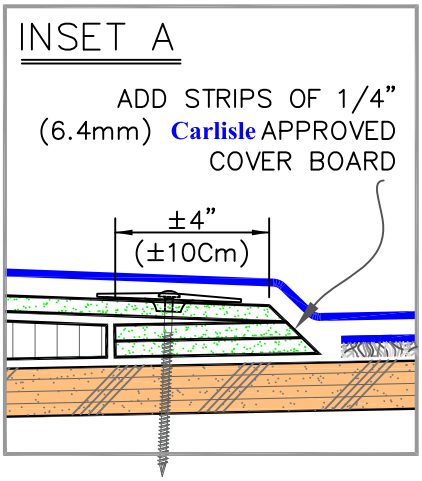
1/4"/FOOT	1.2°	1 METER : 2Cm	2%
3" : 12"	14°	1 METER : 25Cm	25%

NOTES:

1. SEE INSET A TO FURTHER ENHANCE THE FIRE PROTECTION, (OPTIONAL).
2. POLYISOCYANURATE OR EXPANDED POLYSTYRENE BOARDS. SEE GRAPHIC EXAMPLE BELOW FOR SLOPE RATIO.



INSET A

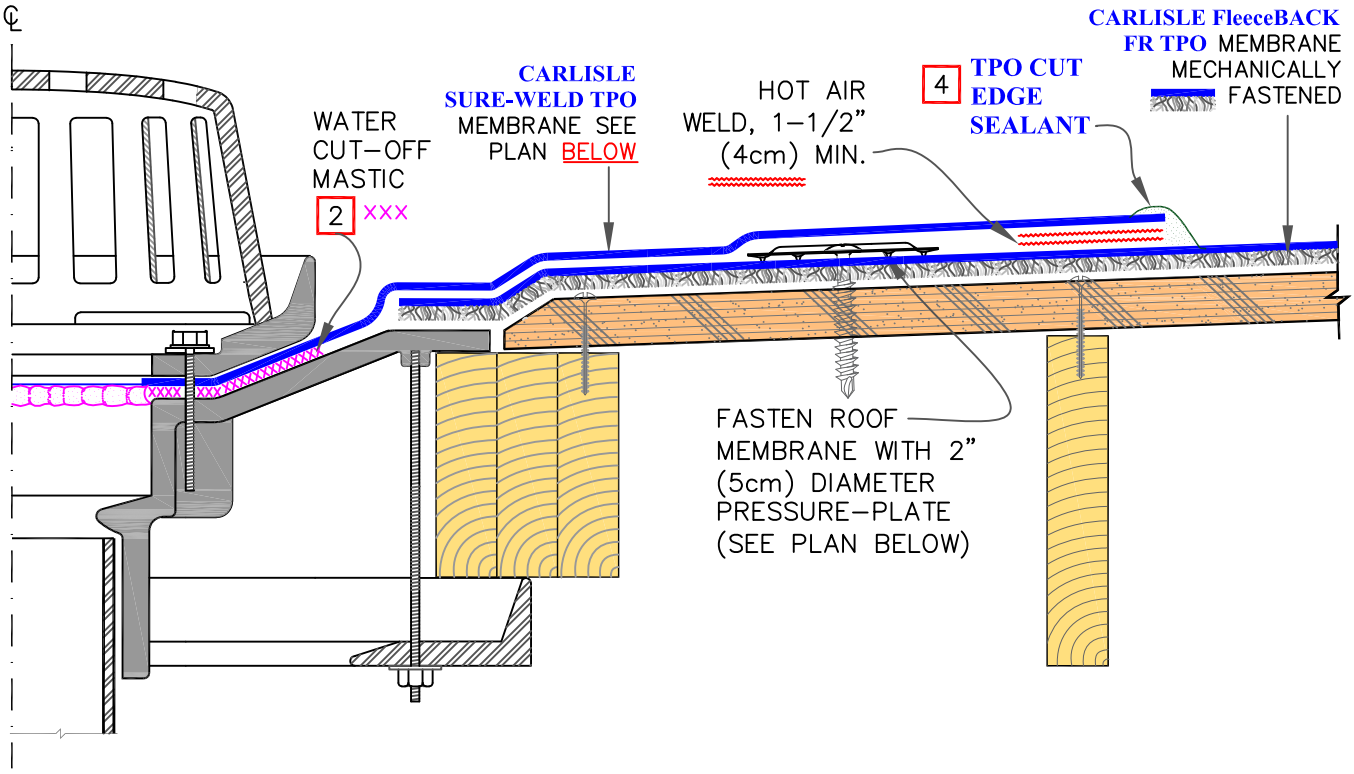


CRICKET OR SADDLE COVERED WITH STANDARD TPO MEMBRANE

DETAIL NO. FR-2.2

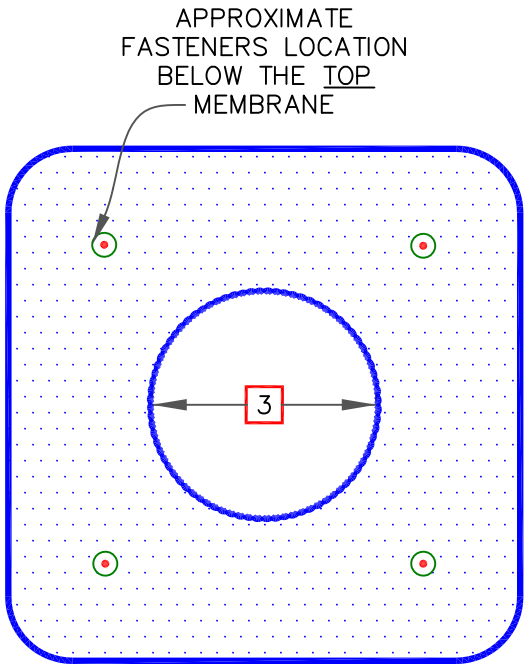
For additional information, refer to Specifications

FR (FIRE RATED)



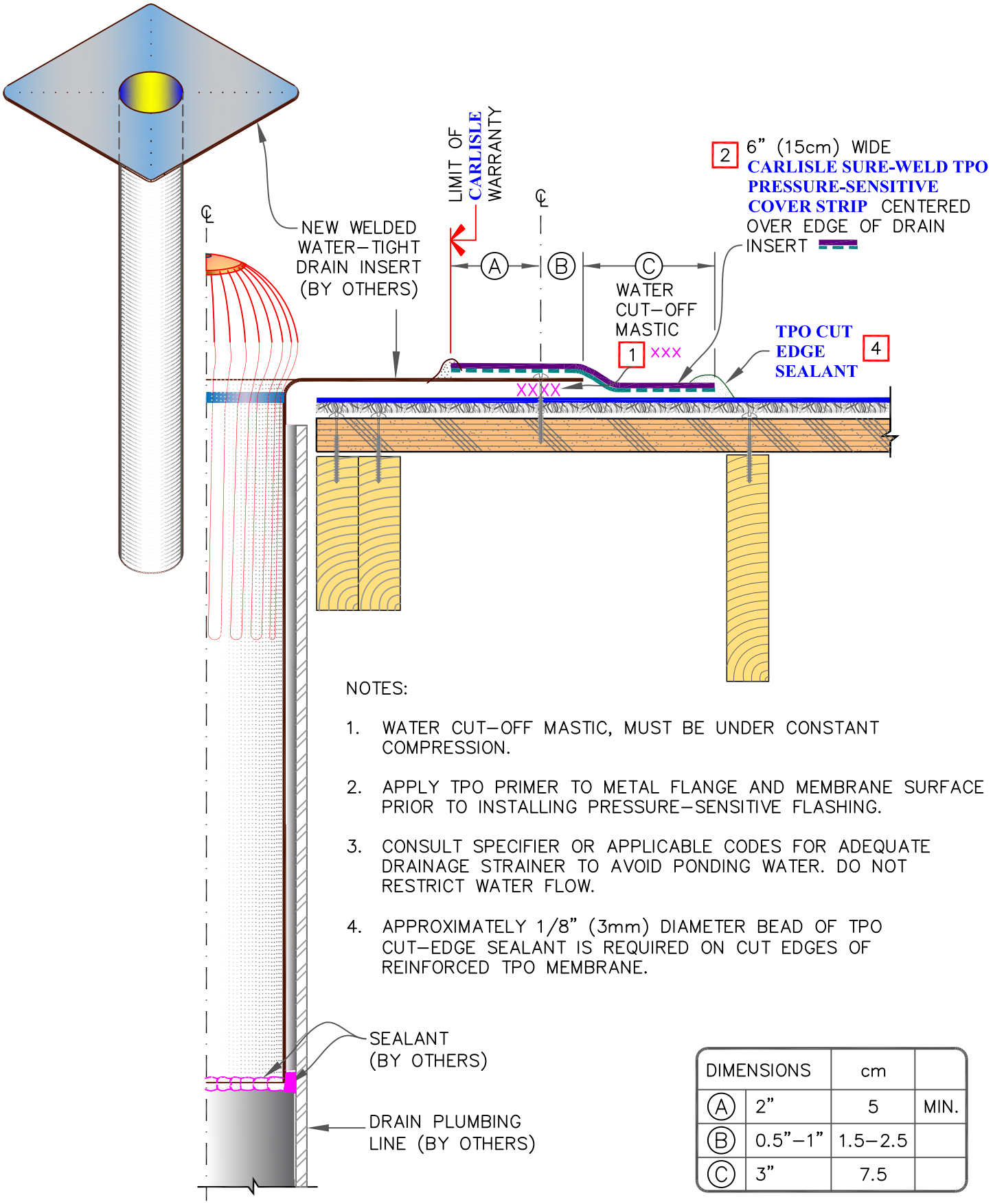
NOTES:

1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
4. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



36"X36" (91X91cm) CARLISLE SURE-WELD TPO MEMBRANE WITH ROUNDED CORNERS

ROOF DRAIN		DETAIL NO.
For additional information, refer to Specifications		FR–6.1
		FR (FIRE RATED)



NOTES:

1. WATER CUT-OFF MASTIC, MUST BE UNDER CONSTANT COMPRESSION.
2. APPLY TPO PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING PRESSURE-SENSITIVE FLASHING.
3. CONSULT SPECIFIER OR APPLICABLE CODES FOR ADEQUATE DRAINAGE STRAINER TO AVOID PONDING WATER. DO NOT RESTRICT WATER FLOW.
4. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF TPO CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

DIMENSIONS		cm	
A	2"	5	MIN.
B	0.5"–1"	1.5–2.5	
C	3"	7.5	

INSERT DRAIN THROUGH DECK

DETAIL NO. FR–6.2

FR (FIRE RATED)

For additional information, refer to Specifications

SPECIFICATION ATTACHMENT
FLEECEBACK ROOFING SYSTEMS

FleeceBACK RL EPDM/TPO/PVC/KEE HP RapidLock Roofing System

"Attachment IV"

July 2024

General Considerations

This system utilizes FleeceBACK RL EPDM, TPO or PVC membrane attached with Velcro® Brand Securable Solutions to either InsulBase RL Polyiso, SecurShield RL Polyiso or SecurShield HD RL Cover Board resulting in a fully adhered membrane without the use of adhesives.

A. Thermoset Membranes

1. Sure-Seal FleeceBACK RapidLock EPDM Roofing Systems incorporates 10' wide, 60 or 90-mil thick Sure-Seal (black) non-reinforced EPDM membrane laminated to a 55-mil thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 115 or 145-mil. The membrane is fully attached to an acceptable substrate with a hook and loop attachment method. Adjoining sheets of the membrane are spliced together using 3” (115-mil) or 6” (145-mil) wide Factory-Applied SecurTAPE™ in conjunction with EPDM Primer.

B. Thermoplastic Membranes

1. Sure-Weld FleeceBACK RL TPO Adhered Roofing System incorporates a 10’ wide, 60 or 80-mil thick, scrim-reinforced, white, gray, tan or Special Color TPO (60-mil only) 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 115 or 135-mils. The FleeceBACK RL TPO 115- or 135-mil membrane is available with APEEL Protective film in white, tan or gray and 10’ wide by 75’ long rolls.

2. Sure-Flex FleeceBACK RL PVC Adhered Roofing System incorporates a 10’ wide, 60 or 80-mil thick, 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.

Warranty

Membrane System Warranty is available for roofing systems on commercial buildings within the Unites 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. Projects requiring extended wind speed coverage warranty must be submitted to Carlisle for review prior to installation.

NOTE: See Tables Below for information regarding Warranted Systems and Design Criteria

Table I **FleeceBACK RL Adhered Systems Warranty Options**

Years	Minimum Membrane Thickness	Warranty Wind Speed			Additional Hail Coverage(4)			Accidental Puncture (man hours per year)
		55, 72 or 80 mph	90 or 100 mph	110 or 120 mph	1" Dia. Hail	2" Dia. Hail	3" Dia. Hail	
5,10, or 15 year	FleeceBACK RL EPDM 115-mil (1) or FleeceBACK RL TPO 115-mil or FleeceBACK RL PVC 115-mil	√	√	√	√	√	N/A	16
20 year	FleeceBACK RL EPDM 115-mil (1) or FleeceBACK RL TPO 115-mil or FleeceBACK RL PVC 115-mil	√	√	√	√	√	N/A	16
25 year	FleeceBACK RL EPDM 115-mil (2)	√	√	√	√	√	N/A	16
	FleeceBACK RL EPDM 145-mil (2)	√	√	√	√	√	√	32
	FleeceBACK RL TPO 135-mil	√	√	√	√	√	√	32
	FleeceBACK RL PVC 135-mil	√	√	√	√	√	√	32
30 year	FleeceBACK RL EPDM 145-mil (2)	√	√	√	√	√	√	32
	FleeceBACK RL PVC 135-mil	√	√	√	√	√	√	32
	FleeceBACK RL TPO 135-mil	√	√	√	√	√	√	32

Notes: N/A = Not Acceptable √= Acceptable

(1) Using 3” Factory-Applied Tape (FAT)
(2) Using 6” Factory-Applied Tape (FAT)

Table II Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties with lesser speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment (Carlisle Supplied Only)	Insulation/Underlayment Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' and 4' x 8' size board (9)		
			Field	Perimeter	
55 or 72 MPH	1/2 SecurShield HD RL (2)	12	6" (4)	6" (4)	Carlisle Drip Edge, SecurEdge™ 200 or 300
	2" InsulBase RL	8			
	2.6" InsulBase RL				
	2" SecurShield Polyiso RL				
	2.6" SecurShield Polyiso RL				
80 MPH	1/2 SecurShield HD RL (2)	16	6" (4)	6" (4)	Carlisle Drip Edge, SecurEdge 200 or 300 (8)
	2" SecurShield Polyiso RL	8			
	2.6" SecurShield Polyiso RL				
90 MPH	1/2" SecurShield HD RL (2)	16	6" (7)	6" (7)	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
	2" SecurShield Polyiso RL	8			
	2.6" SecurShield Polyiso RL				
100 MPH	2" SecurShield Polyiso RL	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
	2.6" SecurShield Polyiso RL				
110 or 120 MPH	1/2" SecurShield HD RL (2)	Not Acceptable	FS	FS	SecurEdge 2000 or 3000

FS = Full Spray, Equipment (Rig) Splatter or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates. Cannot exceed 24 fasteners per board.
(2) Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C
(5) Steel Decks - Field & Perimeter @ 6" O.C.
(6) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C
(7) Gravel Surface BUR – FS
(8) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X™ Fasteners may also be used fastened 12" on center.
(9) Maximum 4' x 4' insulation boards when the adhesive is extruded at 12" o.c. or when boards exceed 4" thickness. 4' x 8' insulation boards may be used when the adhesive is applied at Full-Spray, Equipment (Rig) Splatter, 4", or 6" beads).

Additional Design Considerations (Up to 20 YR Warranty)
(Required in conjunction with Table II)

A - Building height shall not exceed 100 foot*
B - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
C - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
D - All "T-joints" must be overlaid with appropriate flashing material
* For projects where building height exceeds 100' or wind speed exceeds 130 mph, please submit to Carlisle for review.

Table III Underlayment/Insulation & Required Attachment Assemblies 25 YR or 30 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for a lower speed coverage.
(i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment	Insulation Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 8' size board		
			Field	Perimeter	
55 or 72 MPH	2" SecurShield Polyiso RL	20	6" (3)	6"	Carlisle Drip Edge, SecurEdge 200 or 300 (5)
	2.6" SecurShield Polyiso RL				
	1/2" SecurShield HD RL (1) (2)(7)	16			
80 MPH	2" SecurShield Polyiso RL	20	6"	6"	Carlisle Drip Edge (4), SecurEdge 200 or 300(4) or SecurEdge 2000 or 3000.
	2.6" SecurShield Polyiso RL				
	1/2" SecurShield HD RL (2)(7)				
90 MPH	1/2" SecurShield HD RL (1) (2)(7)	24	FS	FS	SecurEdge 2000 or 3000
100, 110 or 120 MPH	1/2" SecurShield HD RL (2)	Not Acceptable	FS	FS	SecurEdge 2000 or 3000

FS = Full Spray, Equipment (Rig) Splatter or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates. Cannot exceed 24 fasteners per board.
(2) Hail coverage offered with substrate.
(3) Structural Concrete - Field @ 12" O.C. / Perimeter @ 6" O.C.
(4) 80-mph over structural concrete - Field & Perimeter @ 6" O.C.
(5) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X Fasteners may also be used fastened 12" on center.
(6) Gravel Surface BUR – Field @ 6" O.C. / Perimeter @ 4" O.C.
(7) 1/2" SecurShield HD limited to 90 mph.

Additional Design Considerations (25 YR or 30 YR Warranty)

(Required in conjunction with Table III)

A - Minimum membrane thickness of 145-mil FleeceBACK RL EPDM, 135-mil FleeceBACK RLTPO or RL PVC, Maximum 25-year warranty for FleeceBACK RL PVC
B - Building height shall not exceed 100 foot *
C - 1/4" per horizontal foot slope is preferred; however, 1/8" slope with sufficient number of drains and crickets / saddles may be accepted.
D - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
E - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.

F - All "T-joints" must be overlaid with appropriate flashing material.
G - Two layers of insulation with staggered joints, bottom layer must be a minimum 1-1/2" (20-psi) Polyisocyanurate.
H - New construction or complete tear-off of existing roofing material.
* For projects where building height exceeds 100' or wind speed exceeds 100 mph, please submit to Carlisle for review.

Table IV Minimum Perimeter Width For Adhered Insulation Attachment

Width of Perimeter	Building Height
4 feet	25 feet
8 feet	26 to 50 feet
12 feet	51 to 75 feet
16 feet	76 to 100 feet
24 feet	Greater than 100 feet

Note: This Table is for reference for Carlisle System Warranties and does not replace FM requirements for FM insured projects.

Insulation/Underlayments

A. Carlisle InsulBase RL (RapidLock) Polyisocyanurate – A foam core insulation board covered on both sides with a glass fiber-reinforced felt facer (GRF) meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi). The product is available in 4’ x 8’ standard size with a thickness of 2.0 inch and 2.6 inch. InsulBase RL has an additional “hook” facer to be used with the “loop” fleece of the FleeceBACK RL membrane.

B. Carlisle SecurShield RL (RapidLock) Polyisocyanurate – A foam core insulation board covered on both sides with a premium coated glass facer (CGF) meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi). The product is available in 4’ x 8’ standard size with a thickness of 2.0 inch and 2.6 inch. InsulBase RL has an additional “hook” facer to be used with the “loop” fleece of the FleeceBACK RL membrane.

C. Carlisle SecurShield HD RL Cover Board– a rigid insulation panel composed of a high-density, closed-cell polyisocyanurate foam core laminated to moisture resistant coated-glass fiber-mat facer for use as a cover board or recover board meeting ASTM 1289, Type II, Class 4, Grade 1 (80 psi). Available 1/2” thick 4’ x 8’ panel weight 11 lbs with an R-value of 2.5. SecurShield HD RL has an additional “hook” facer to be used with the “loop” fleece of the FleeceBACK RL membrane.

D. Carlisle SecurShield HD Composite RL Polyiso – a rigid roof insulation panel composed of a top layer of high-density, closed cell foam, and a bottom layer of 20 psi closed cell foam. Both layers are laminated to a coated glass facer. SecurShield HD Composite RL has an additional “hook” facer to be used with the “loop” fleece of the FleeceBACK RL membrane; May be used as a cover board in compliance with ASTM C1289 Type II, Class 4, Grade 1 (109 psi max.) or as base insulation meeting ASTM C1289 Type II, Class 2, Grade 2 (20 psi). The product is available in 47.5” x 95.5” (1206 mm x 2425 mm) and 47.5” x 47.5” (1206 mm x 1206 mm) in 2” to 2.5” thickness in .5” increments.

Insulation Installation

A. Insulation Attachment (Mechanically Fastened) –
RapidLock insulation is mechanically fastened to the roof deck per Paragraph 3.04 of this FleeceBACK

specification.

B. Insulation Attachment (Adhered) –
RapidLock insulation is adhered with Flexible FAST Adhesive to the roof deck. When adhering insulation with Flexible FAST, the adhesive is spray-applied, bead-applied or Equipment (Rig) Splatter, onto the substrate and allowed to rise and foam. Once the adhesive develops string/body/gel (approximately 2 minutes depending on climate), place insulation into the adhesive and walk board into place. Roll the insulation with 30” wide, 150 lb weighted segmented steel roller, to ensure full embedment.

NOTE: Assemblies with multiple layers of insulation may incorporate both methods by fastening the bottom layer(s) and adhering the top layer.

Membrane Installation

A. Membrane Attachment –
Prior to membrane placement, the surface of the RapidLock insulation must be cleaned of dust and other foreign matter using a fine push broom or a blower.

B. Option 1

1. Remove the RapidLock fleece release film on one half of the sheet starting from the split in the liner at the middle of the sheet. The liner should be removed at an angle to reduce splitting or tearing.
2. Roll the membrane onto the substrate at an angle while avoiding wrinkles. When applying the FleeceBACK RL EPDM, TPO or PVC membrane, it is recommended to maintain a large curve (radius) on the leading edge of the membrane. This will help eliminate creases and bubbles that cannot be removed after the sheet is in place.
3. Broom the sheet and then roll the membrane in place starting using a 30” wide, 150 lb weighted segmented steel roller from the middle of the 10'-0” wide sheet and working towards the outer edge.
4. Fold back the remaining half of the sheet and repeat the above process.

C. Option 2

1. Pull both release liners off simultaneously from underneath the membrane at a low angle.
2. Broom the sheet and then roll the membrane in place starting using a 30” wide, 150 lb weighted segmented steel roller from the middle of the 10'-0” wide sheet and working towards the outer edge.

D. Membrane Splicing – FleeceBACK RL EPDM

1. To complete seams between two adjoining membrane panels, apply primer to the splice area in conjunction with Carlisle’s Factory-Applied Tape.
2. Roller-apply HP-250 Primer or Low-VOC EPDM Primer to the splice area of the bottom sheet with a short-nap-length paint roller. The primed area shall be free of globs and puddles. Allow primer to dry until it does not transfer to a dry finger.
3. Allow the taped edge of the top sheet to fall freely onto the primed sheet below.
4. Pull the poly backing from the Factory-Applied Tape beneath the top sheet and allow the top sheet to fall freely onto the exposed primed surface.
5. Press top sheet onto bottom sheet using firm, even hand pressure across the splice and toward the splice edge.
6. Immediately roll the splice with a 2"-wide (50 mm) steel roller or Carlisle’s Stand-Up Seam Roller, using positive pressure. Roll across the splice edge when using a 2" roller, not parallel to it. When using the Stand-Up Seam Roller, roll parallel to direction of the splice.
7. For cold-weather splicing below 40°F (4°C), these steps must be followed:

    a. Heat the primed area of the bottom membrane with a hot-air gun as the top sheet with Factory-Applied Tape is applied and pressed into place.

    b. Prior to rolling the splice area with a 2"-wide steel hand roller, apply heat to the top side of the membrane with a hot-air gun. The heated surface should be hot to the touch. Be careful not to burn or blister the membrane.

8. Install Pressure-Sensitive Elastoform Flashing or Pressure- Sensitive T-Joint Covers over all field splice intersections. Apply Lap Sealant according to appropriate detail.
9. Strip-in end laps with 6" Pressure-Sensitive Overlayment Strip or Pressure-Sensitive Cured Cover Strip.

E. TPO Membrane Splicing using Heat-Welding – FleeceBACK RL TPO

1. Refer to the paragraph 3.06 of this FleeceBACK specification for typical heat welding procedures.
2. The membrane has an uncoated edge on one side along the length of the sheet for membrane welding. Adjoining membrane sheets are overlapped lengthwise a minimum of 2" to provide for a minimum 1-1/2" wide heat weld. It is recommended that all splices be shingled to avoid bucking of water.
3. An uncoated edge is not provided at the ends of the rolls. Adjoining membrane sheets must be butted together and overlaid with 6"- wide TPO Reinforced Membrane, hot-air welded along all edges. Seal all membrane edges (where scrim reinforcement is exposed) with TPO Cut-Edge Sealant.

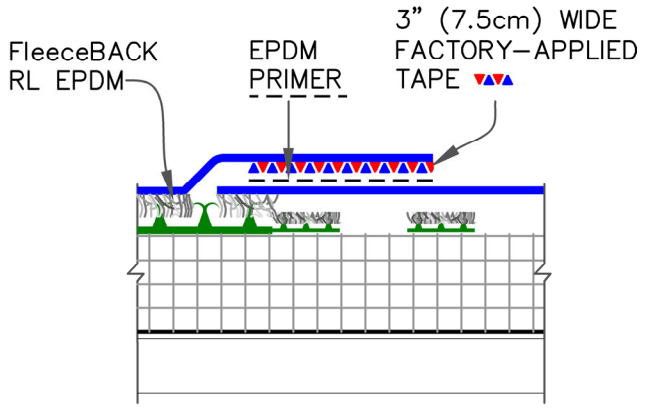
F. PVC Membrane Splicing using Heat-Welding – FleeceBACK RL PVC

1. Refer to the paragraph 3.06 of this FleeceBACK specification for typical heat welding procedures.
2. The membrane has an uncoated edge on one side along the length of the sheet for membrane welding. Adjoining membrane sheets are overlapped lengthwise a minimum of 2" to provide for a minimum 1-1/2" wide heat weld. It is recommended that all splices be shingled to avoid bucking of water.
3. An uncoated edge is not provided at the ends of the rolls. Adjoining membrane sheets must be butted together and overlaid with 6"- wide PVC Reinforced Membrane, and hot-air welded along all edges. PVC Cut-Edge Sealant is not required on cut edges of Sure-Flex membrane.

Associated Installation Details

END OF ATTACHMENT

MEMBRANE SPLICE



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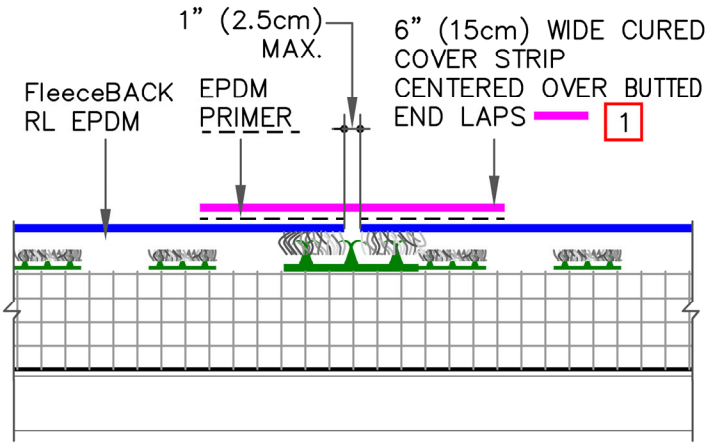
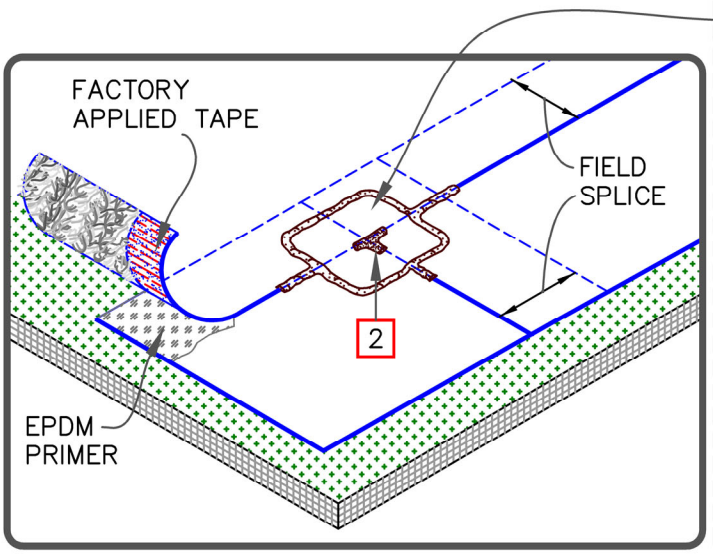
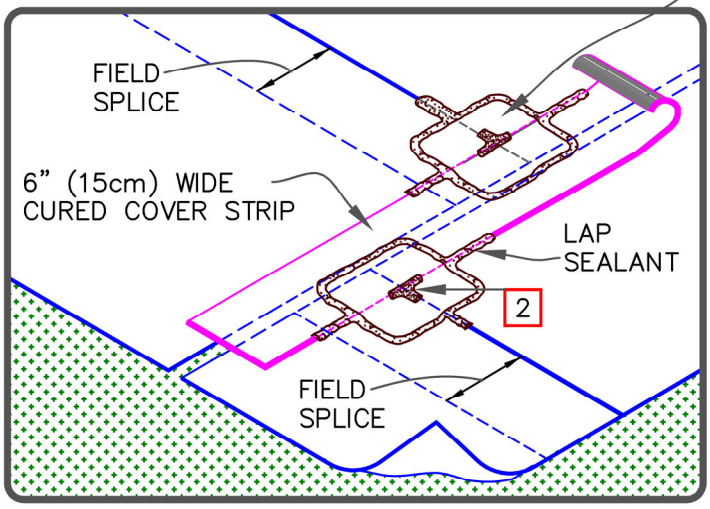






NOTES:

1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

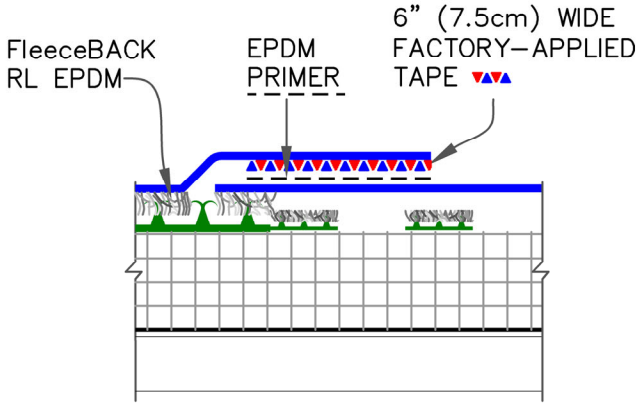
2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

3. 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING MAY ALSO BE CENTERED OVER THE FIELD SPLICE INTERSECTION.

*RAPID LOCK TECHNOLOGY IS MAGNIFIED ON SCALE

FleeceBACK RL MEMBRANE *INSULATION BOARD WITH RAPID LOCK TECHNOLOGY 0 SEE NOTE(S)	RL™ EPDM (RAPID LOCK) MEMBRANE SPLICE– PROJECTS WITH 10, 15 AND 20 YEAR WARRANTIES MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. RL – 2A RAPID LOCK

MEMBRANE SPLICE



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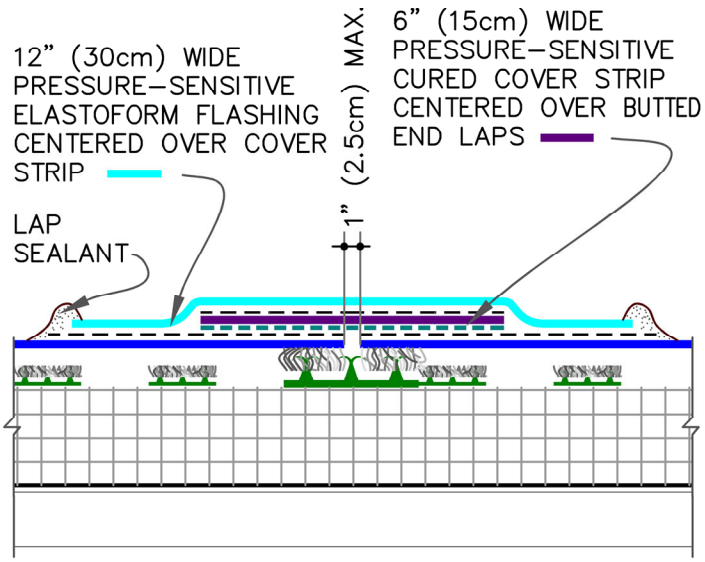
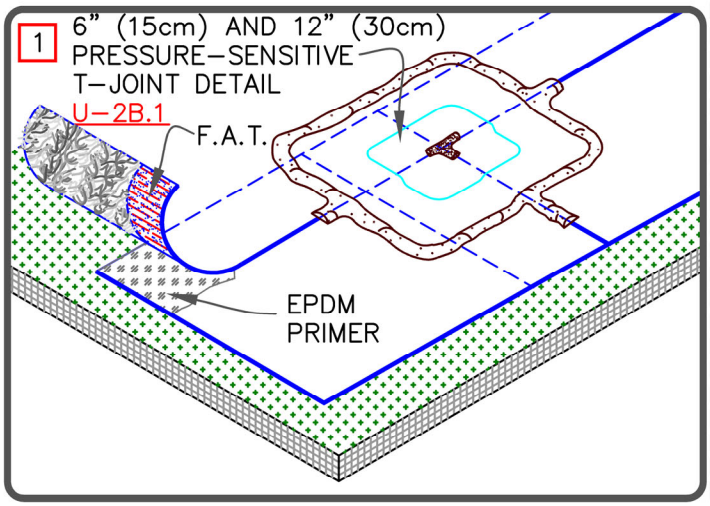
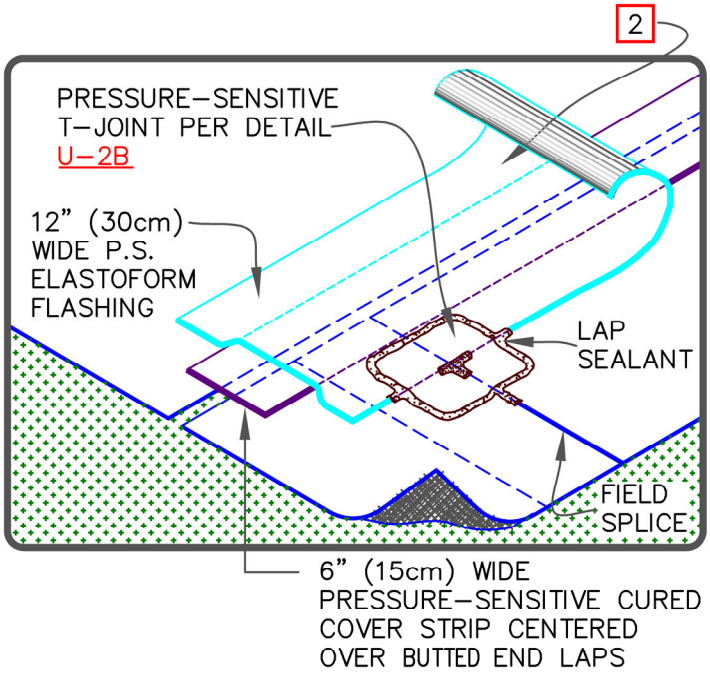






NOTES:

1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

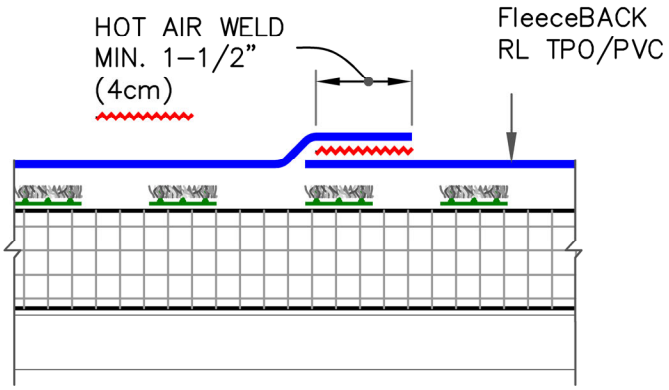
2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

3. ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" (30cm X 30cm) TOP LAYER. BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, AS SHOWN.

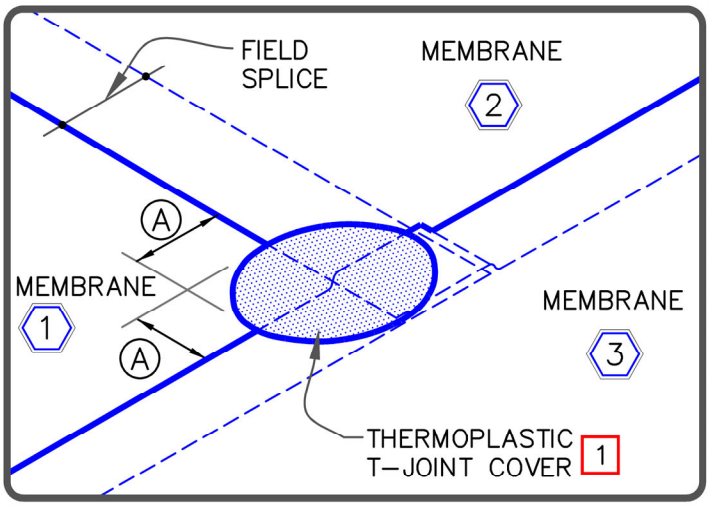
*RAPID LOCK TECHNOLOGY IS MAGNIFIED ON SCALE

FleeceBACK RL MEMBRANE *INSULATION BOARD WITH RAPID LOCK TECHNOLOGY 0 SEE NOTE(S)	RL™ EPDM (RAPID LOCK) MEMBRANE SPLICE– PROJECTS WITH 145–MIL MEMBRANE OR 25 AND 30–YEAR WARRANTIES MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. RL–2A.1 RAPID LOCK

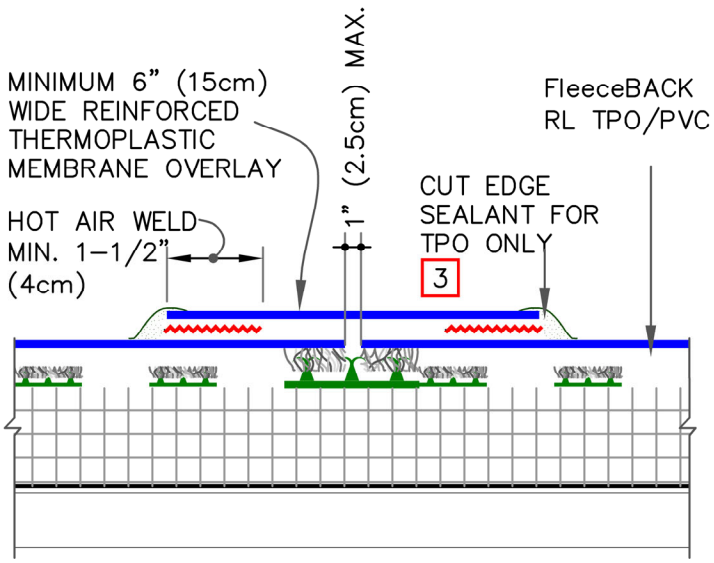
MEMBRANE SPLICE

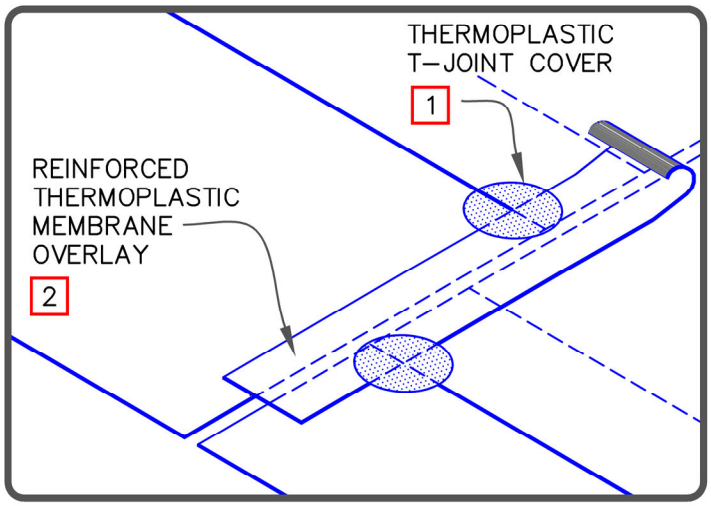


DIMENSION		cm
Ⓐ	2–1/4"	6



END LAP SPLICE



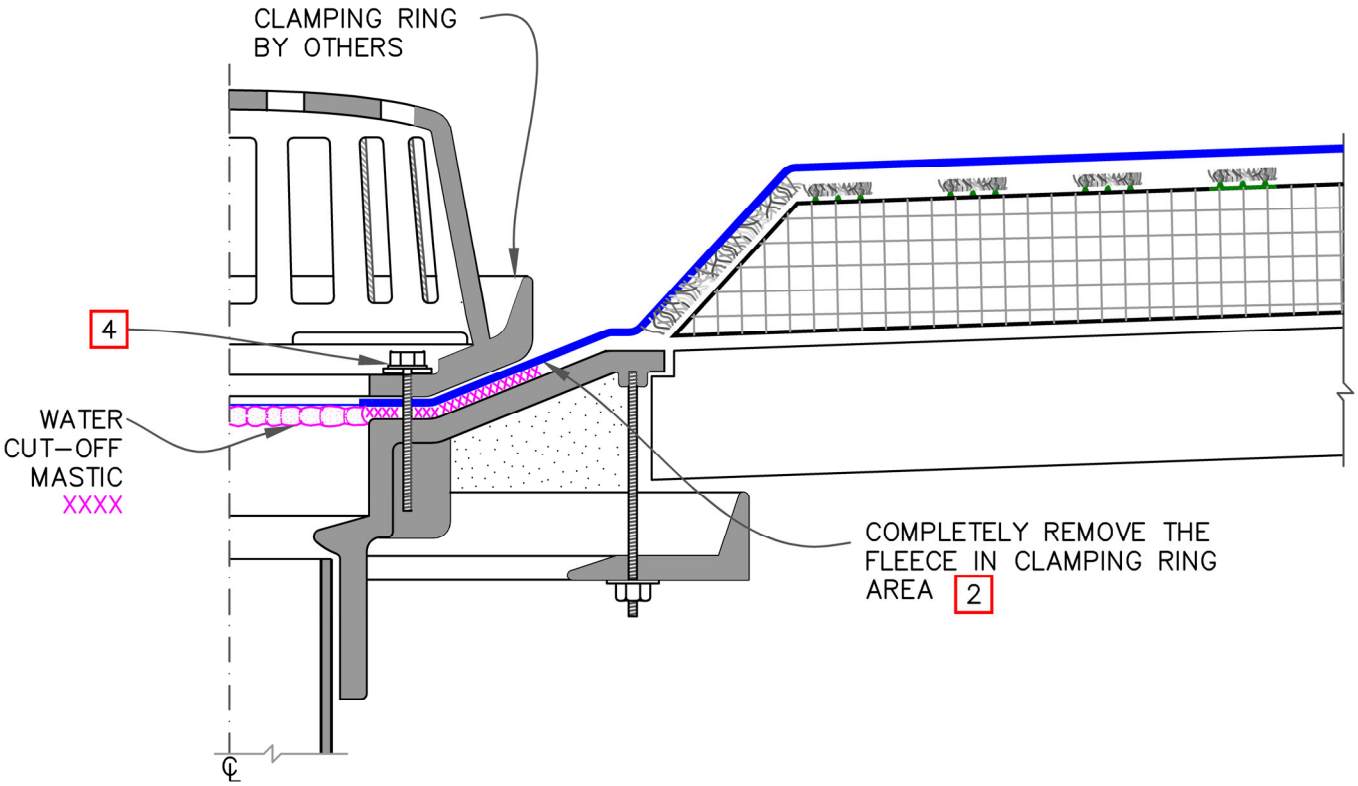


NOTES:

1. WHEN USING 115–MIL OR 135–MIL FLEECEBACK RL TPO OR PVC MEMBRANE, APPLY A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.
2. WHEN USING 60–MIL OR 80–MIL THERMOPLASTIC REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
4. WHEN USING 115–MIL FLEECEBACK RL TPO OR PVC MEMBRANES, MAXIMUM WARRANTY IS 20 YEARS.

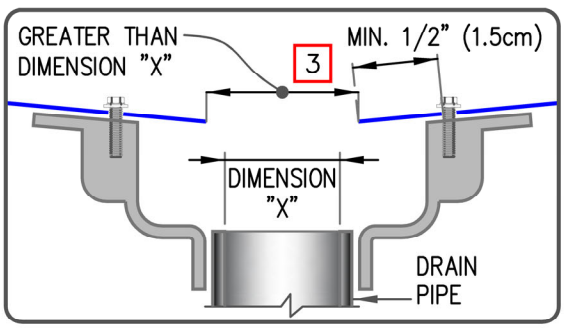
*RAPID LOCK HOOKS ARE MAGNIFIED AND THOSE ARE NOT TO SCALE

FleeceBACK RL MEMBRANE *INSULATION BOARD WITH RAPID LOCK TECHNOLOGY 0 SEE NOTE(S)	TPO/PVC RL™ (RAPID LOCK) – MEMBRANE SPLICES MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. RL–2B.1 RAPID LOCK



NOTES:

1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
2. FLEECE RL BACKING MUST BE REMOVED FROM THE MEMBRANE SO THAT WATER CUT OFF MASTIC IS IN DIRECT CONTACT.
3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
4. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
5. FIELD SPLICES MUST BE LOCATED AT LEAST 6 INCHES (15cm) OUTSIDE THE DRAIN SUMP.
6. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

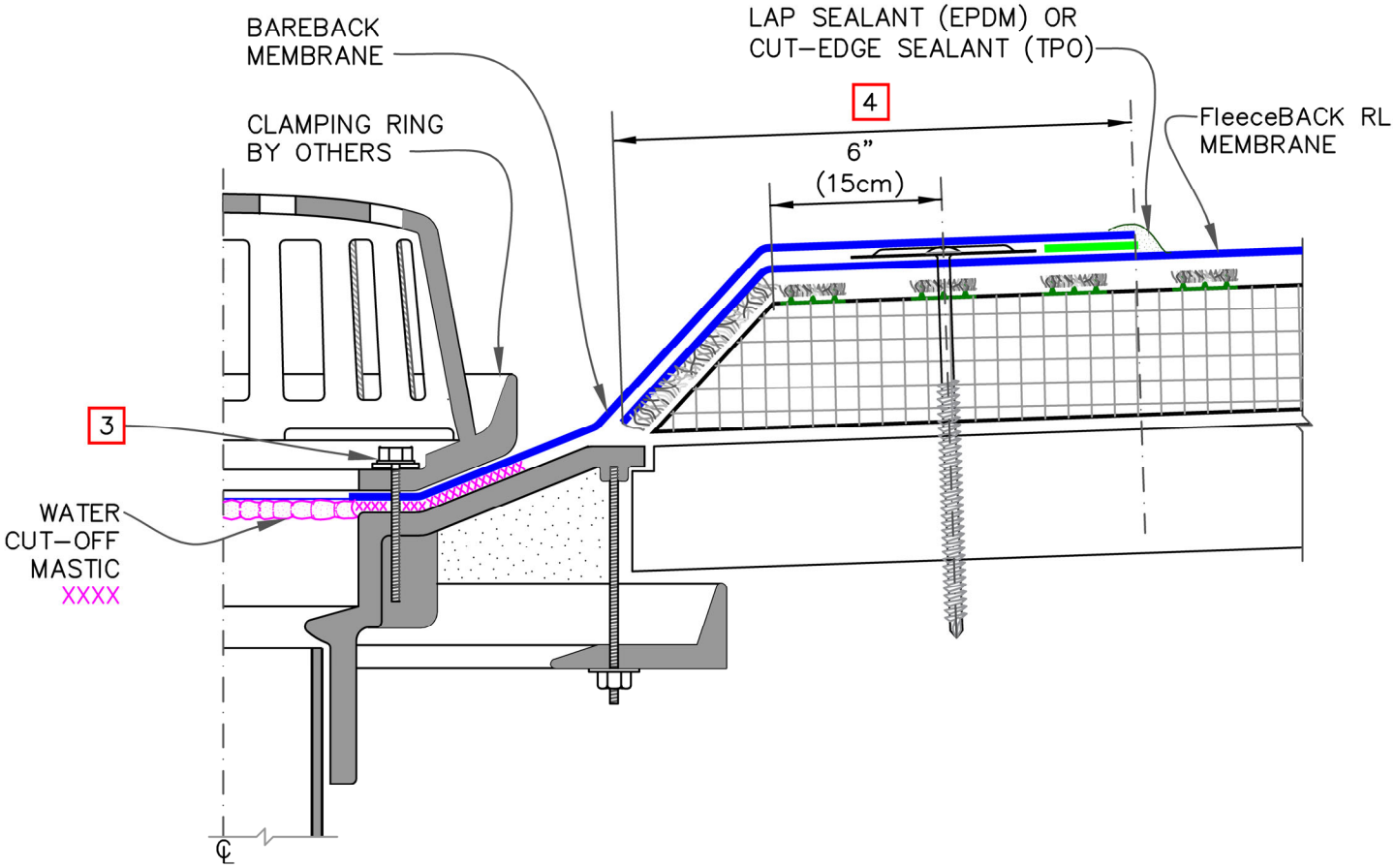


*RAPID LOCK TECHNOLOGY IS MAGNIFIED ON SCALE

FleeceBACK RL MEMBRANE *INSULATION BOARD WITH RAPID LOCK TECHNOLOGY 0 — SEE NOTE(S)	ROOF DRAIN WITH CONTINUOUS MEMBRANE MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. RL–6A.1 RAPID LOCK

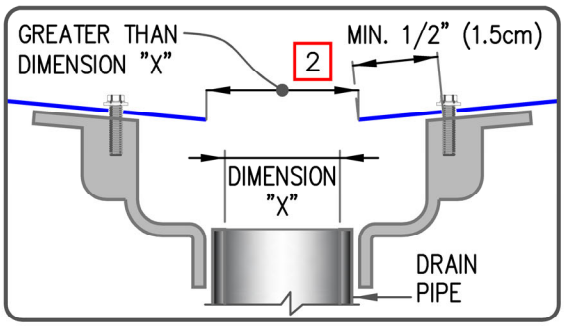
CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20, 25 & 30-YEAR WARRANTIES.

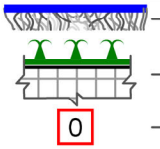


NOTES:

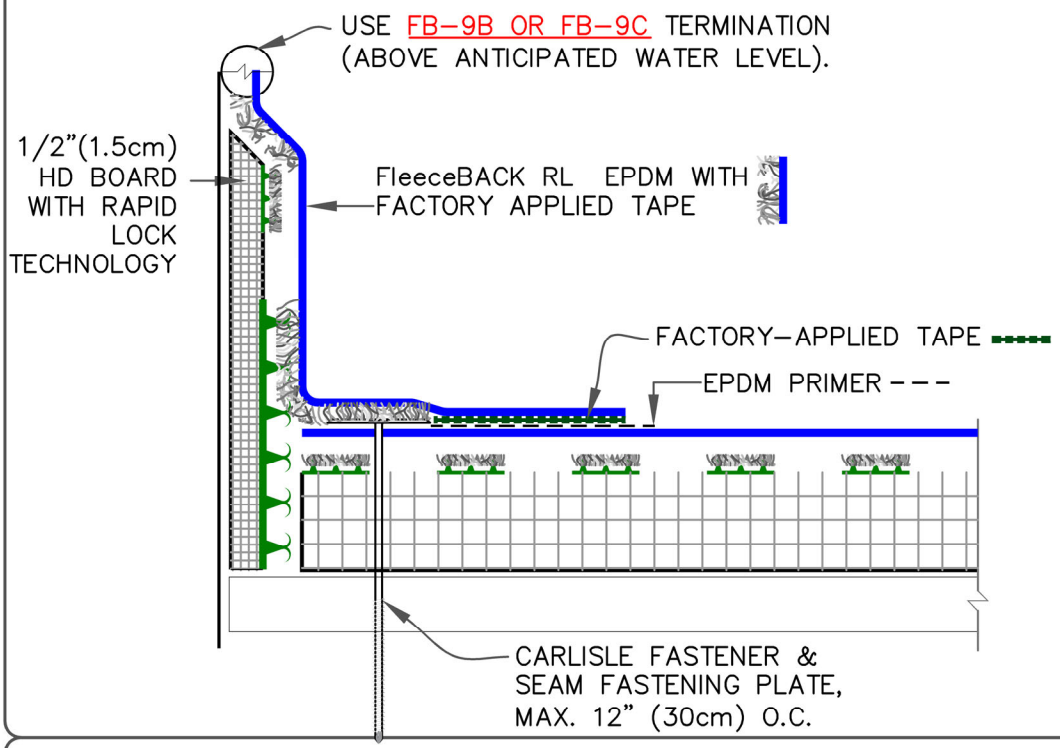
1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. SPLICES SHALL BE COMPLETED USING MIN. 3" (7.5CM) WIDE SecurTAPE/PRIMER WITH EPDM MEMBRANE AND MIN. 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC MEMBRANES
5. FIELD SPLICES MUST BE LOCATED AT LEAST 6 INCHES (15cm) OUTSIDE THE DRAIN SUMP.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
7. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



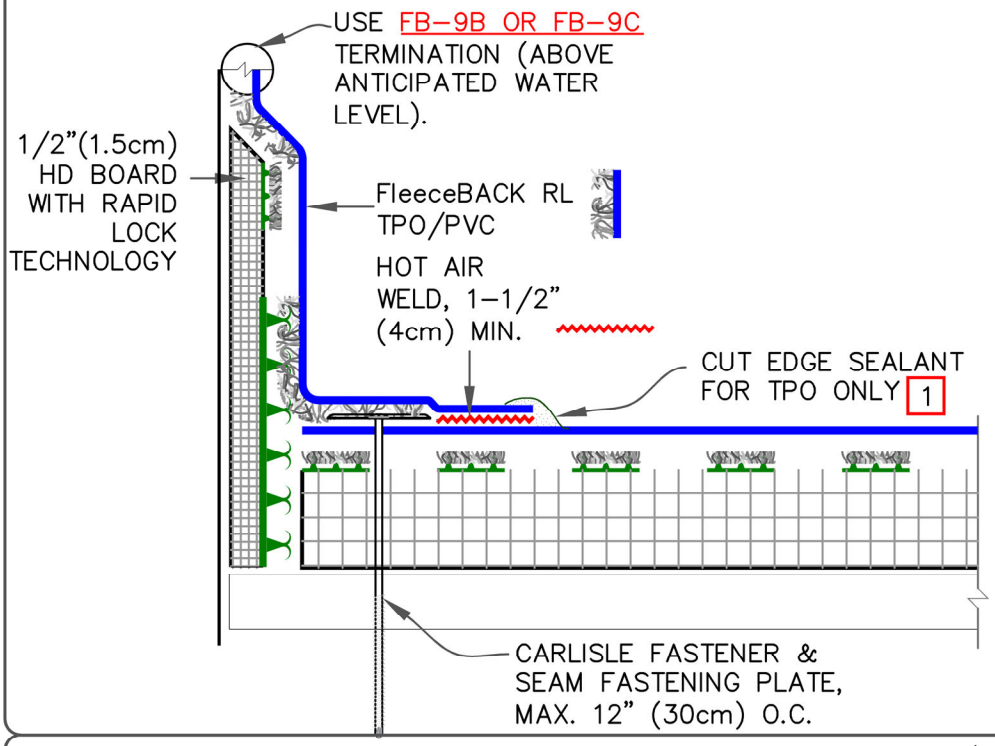
*RAPID LOCK TECHNOLOGY IS MAGNIFIED ON SCALE



ROOF DRAIN WITH SEPARATE TARGET SPLICE	DETAIL NO. RL-6B.1
MAXIMUM WARRANTY: 30 YEARS	RAPID LOCK



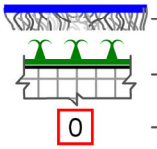
FleeceBACK RL EPDM



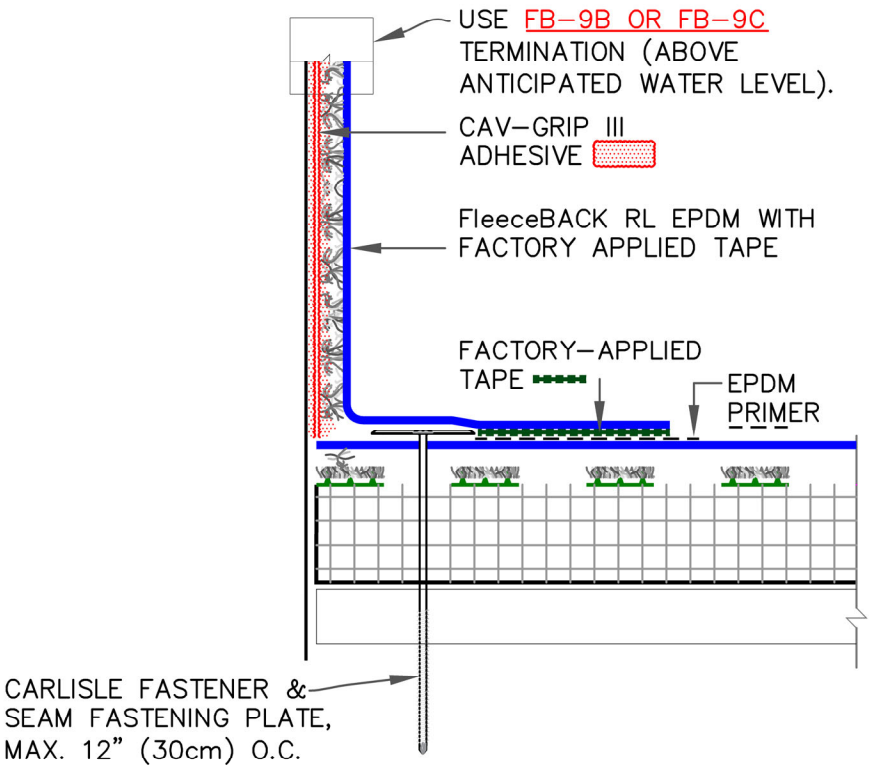
NOTE:

1. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE ONLY.

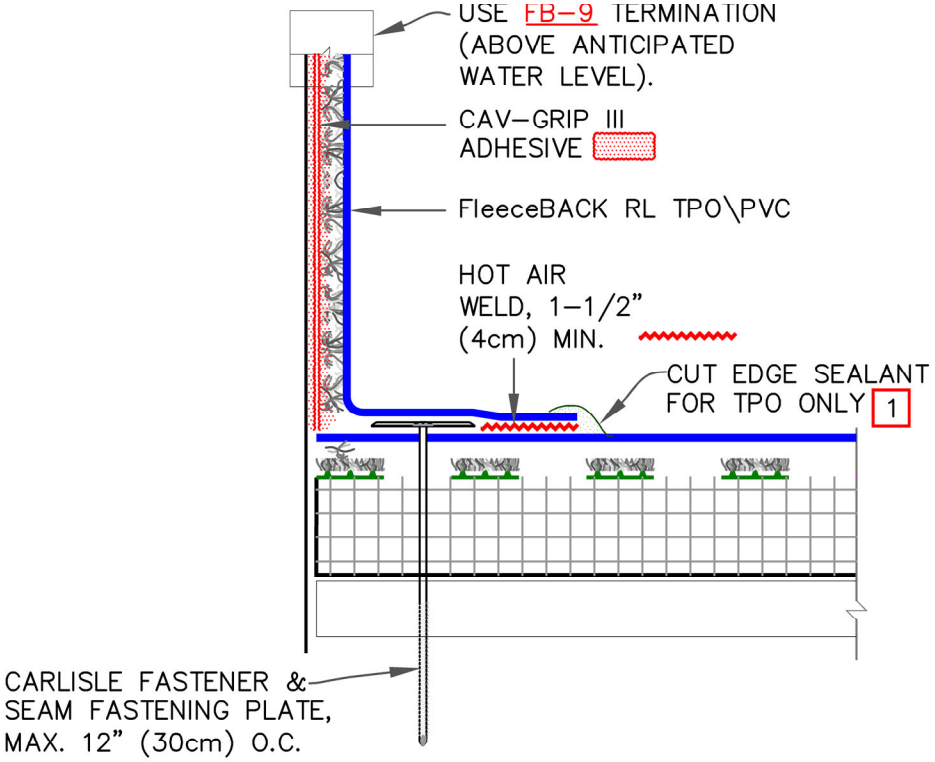
FleeceBACK RL TPO/PVC



PARAPET/CURB WITH SEPARATE MEMBRANE: NO ADHESIVE	DETAIL NO. RL–12A.1A
MAXIMUM WARRANTY: 30 YEARS	RAPID LOCK



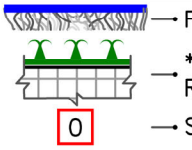
FleeceBACK RL EPDM



NOTES:

1. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE ONLY.

FleeceBACK RL TPO/PVC



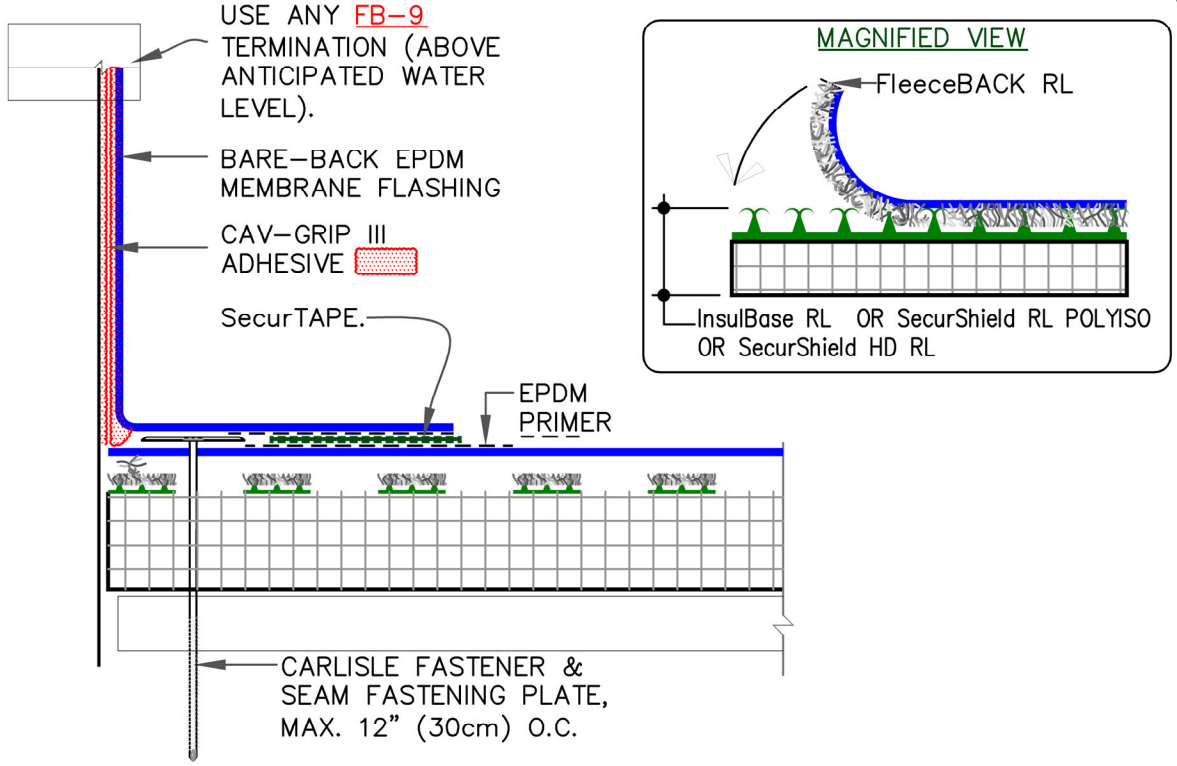
PARAPET/CURB WITH SEPARATE MEMBRANE: RL MEMBRANE ADHERED WITH CAV-GRIP III

MAXIMUM WARRANTY: 30 YEARS

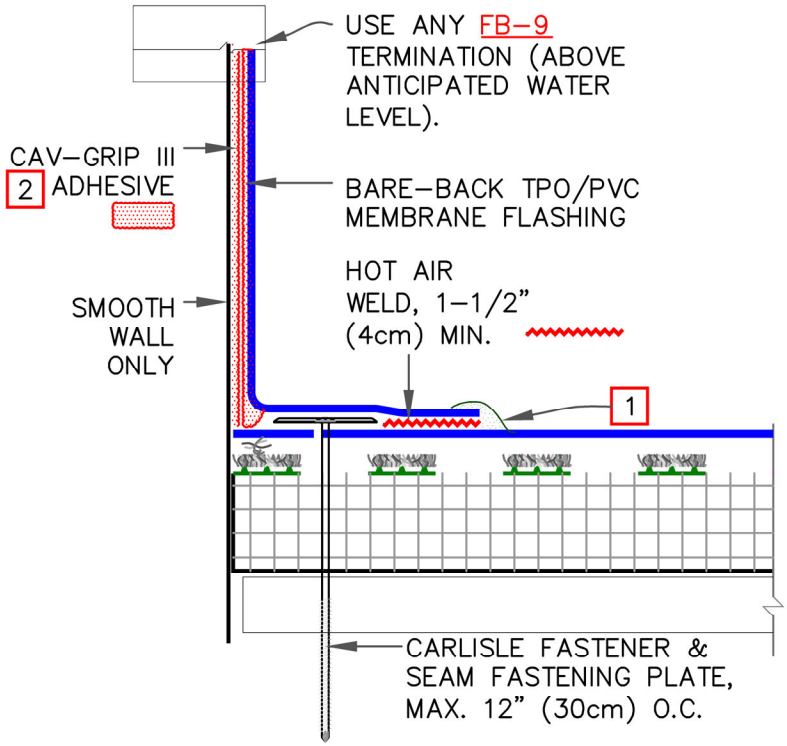
DETAIL NO.

RL-12A.1B

RAPID LOCK



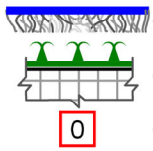
FleeceBACK RL EPDM



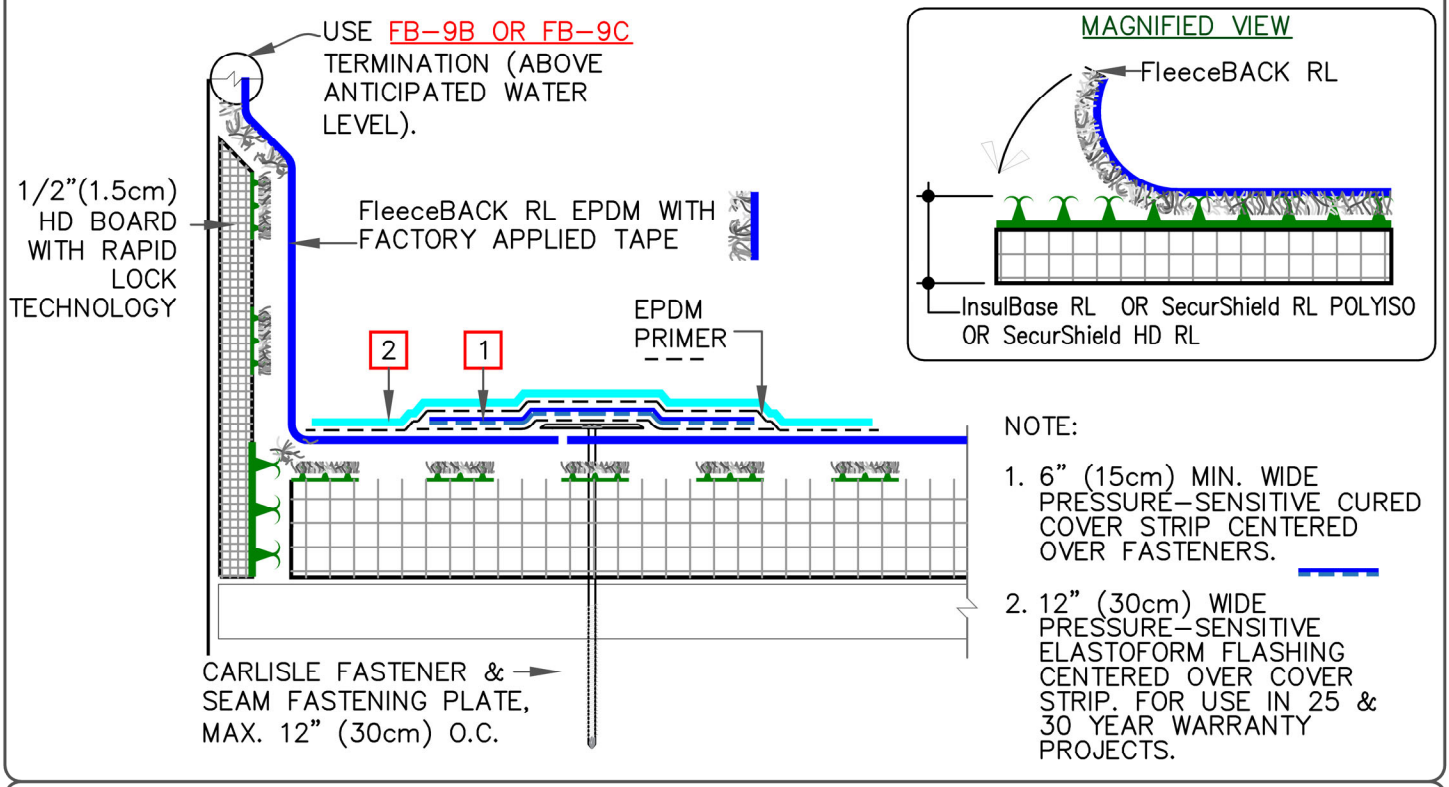
NOTES:

1. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE ONLY.
2. FOR PVC USE CAV-GRIP PVC IN PLACE OF CAV-GRIP III.

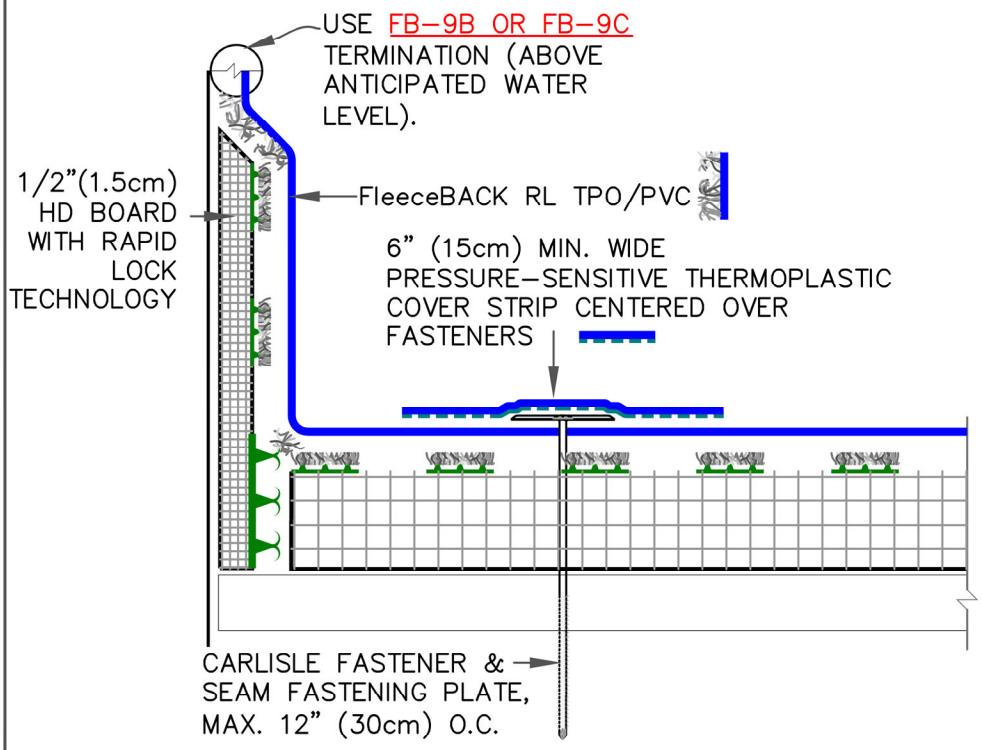
FleeceBACK RL TPO/PVC



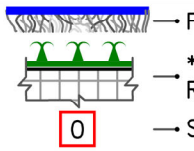
PARAPET/CURB WITH SEPARATE MEMBRANE: BARE-BACK MEMBRANE ADHERED WITH CAV-GRIP III/CAV-GRIP PVC	DETAIL NO. RL-12A.1C
MAXIMUM WARRANTY: 30 YEARS	RAPID LOCK



FleeceBACK RL EPDM – MAXIMUM 30 YEAR WARRANTY



FleeceBACK RL TPO/PVC – MAXIMUM 20 YEAR WARRANTY



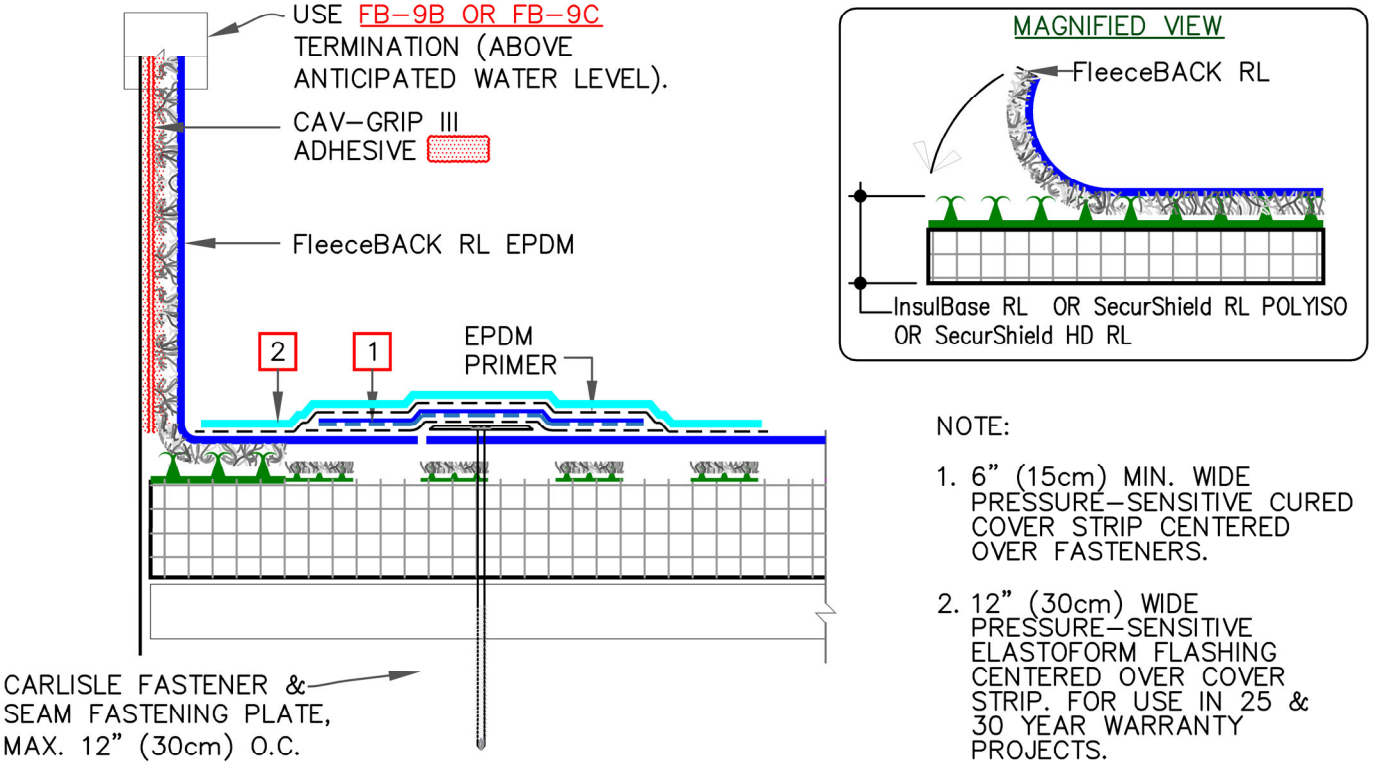
PARAPET/CURB WITH CONTINUOUS MEMBRANE–NO ADHESIVE

MAXIMUM WARRANTY: 20/30 YEARS

DETAIL NO.

RL–12B.1A

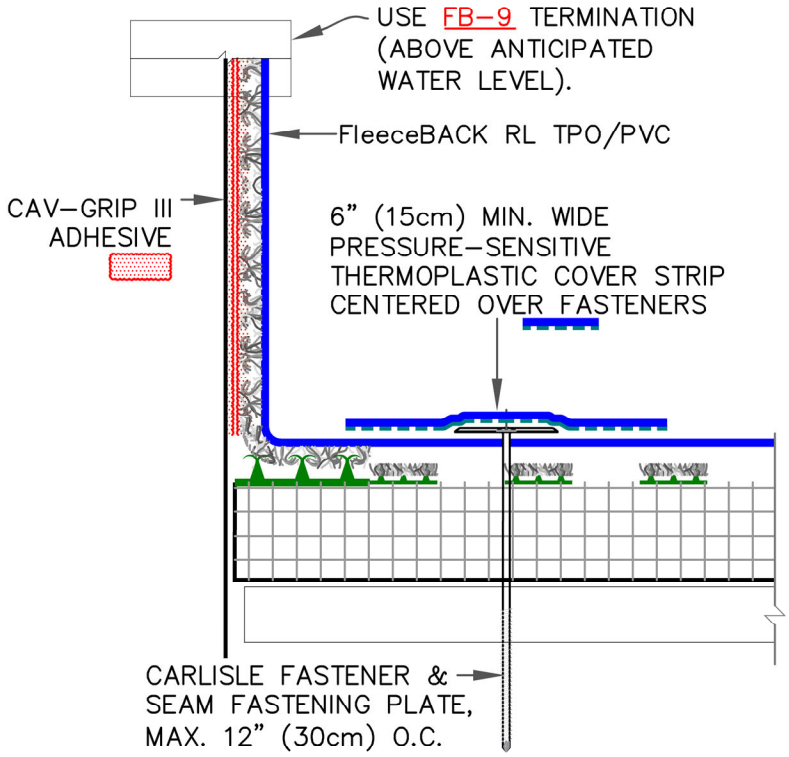
RAPID LOCK



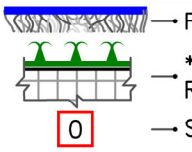
NOTE:

1. 6" (15cm) MIN. WIDE PRESSURE-SENSITIVE CURED COVER STRIP CENTERED OVER FASTENERS.
2. 12" (30cm) WIDE PRESSURE-SENSITIVE ELASTOFORM FLASHING CENTERED OVER COVER STRIP. FOR USE IN 25 & 30 YEAR WARRANTY PROJECTS.

FleeceBACK RL EPDM – MAXIMUM 30 YEAR WARRANTY



FleeceBACK RL TPO/PVC – MAXIMUM 20 YEAR WARRANTY



	PARAPET/CURB WITH CONTINUOUS MEMBRANE-RL MEMBRANE ADHERED WITH CAV-GRIP III	DETAIL NO. RL-12B.1B
	MAXIMUM WARRANTY: 20/30 YEARS	RAPID LOCK

CARLISLE'S FLEECEBACK ROOFING SYSTEMS

Adhered Roofing System
Sure-Seal®/Sure-White™/Sure Weld®/Sure-Flex™

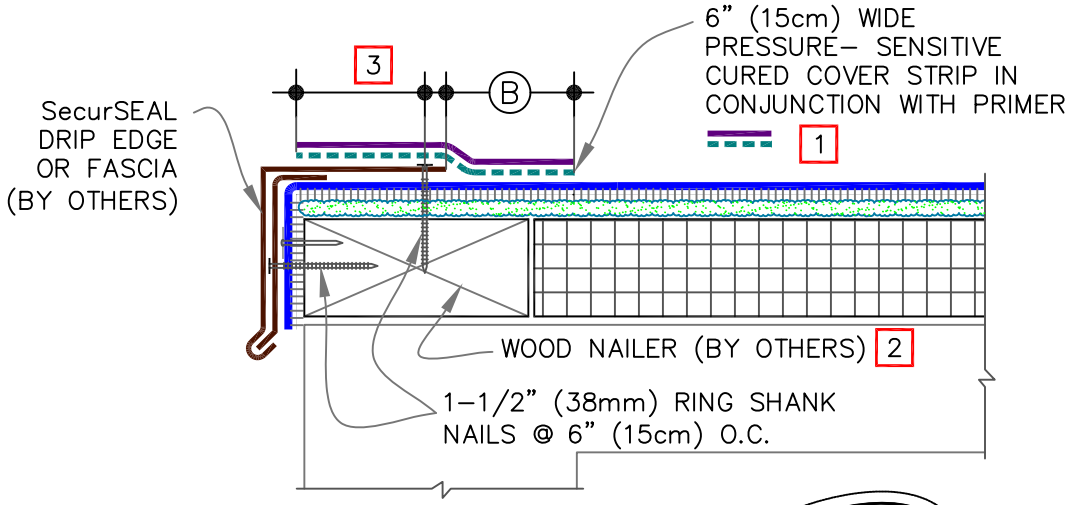
Table of Contents

July 2024

Through-Wall Scupper

Accessory

CAUTION DETAIL NOT FOR USE ON 25 & 30–YEAR WARRANTY PROJECTS. ACCEPTABLE EDGING SHALL CONFORM WITH THERMOSET DETAIL U–1A.1 WHEN USING EPDM MEMBRANE OR FB–1B WITH TPO MEMBRANE.

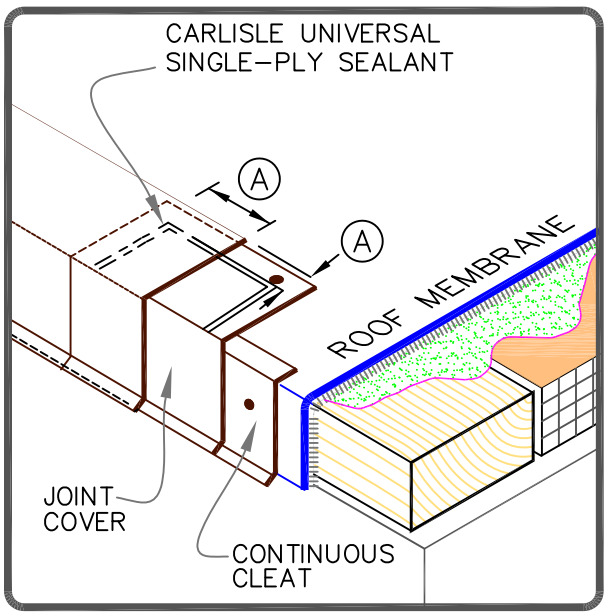


EPDM & TPO ONLY (NOT FOR PVC)

NOTES:

1. USE APPROPRIATE COVER STRIP & PRIMER BASED UPON MEMBRANE TYPE. FOR EPDM, REFER TO THERMOSET U–1A. FOR TPO, REFER TO THERMOPLASTIC U–1A.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
3. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY PRESSURE–SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
4. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.
5. APPLY PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING.
6. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.

DIMENSIONS		cm	
A	1/2"	1.5	TO
	1"	2.5	
B	2"	5	MIN.

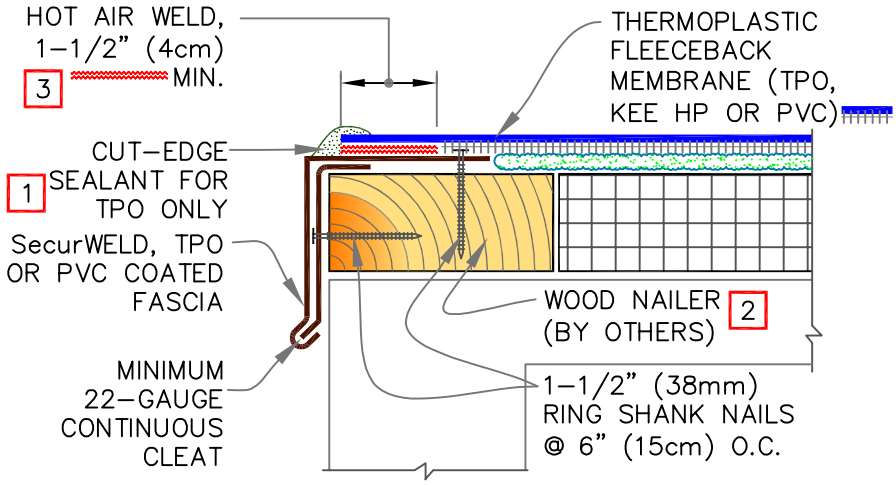


FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

SecurSEAL DRIP EDGE FASCIA

MAXIMUM WARRANTY: 20 YEARS

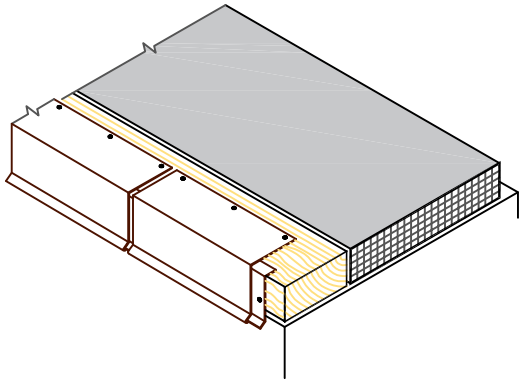
DETAIL NO.
FB–1A
FLEECEBACK ADHERED



NOTES:

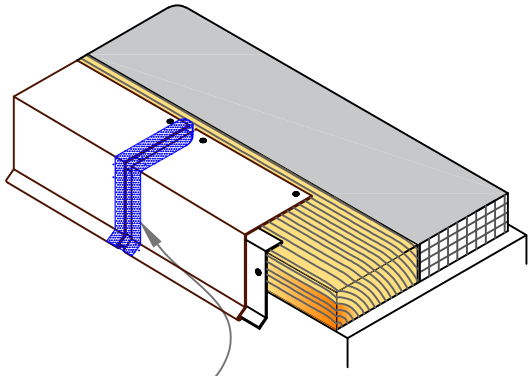
1. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
3. POSITION MEMBRANE WITH SELVAGE EDGE TO AVOID REMOVAL OF FLEECE BACKING.

1



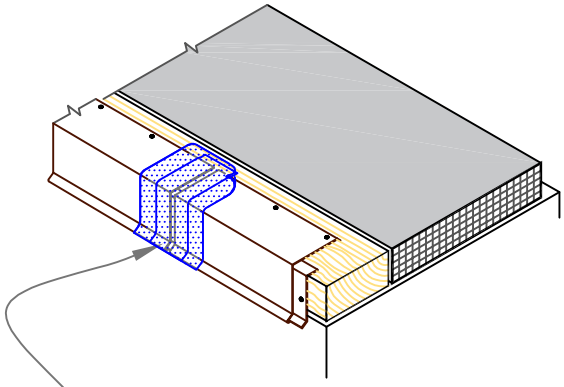
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"–1/4" (0.5–1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



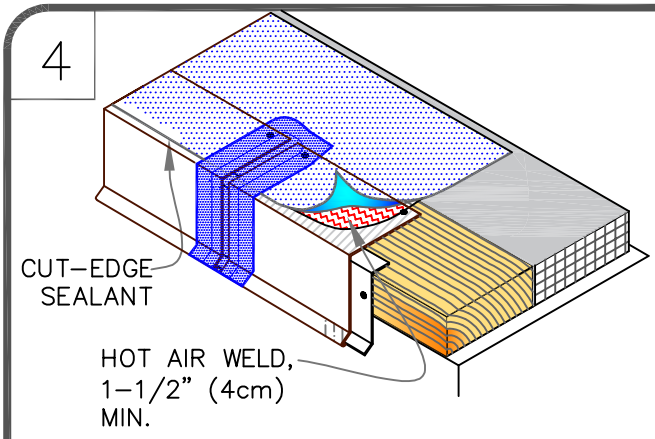
HEAT WELD 3" (7.5cm) WIDE PIECE OF NON–REINFORCED THERMOPLASTIC MEMBRANE OVER JOINT

3



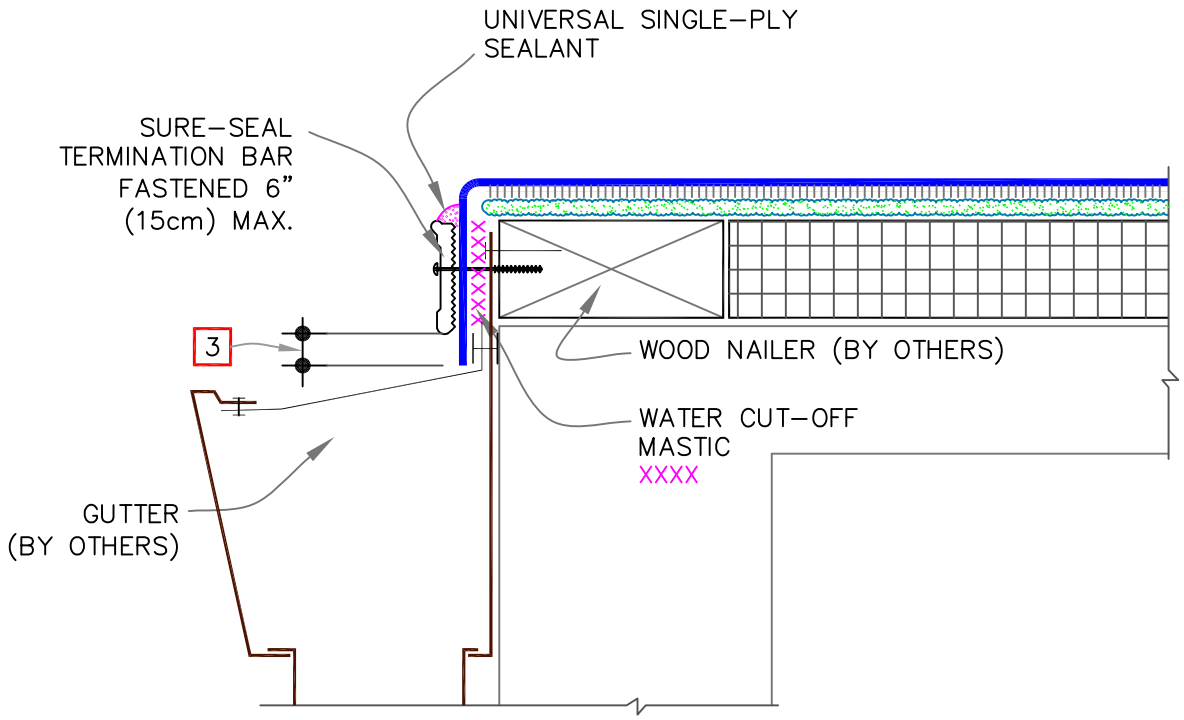
HEAT WELD 6" (15cm) WIDE PIECE OF NON–REINFORCED THERMOPLASTIC MEMBRANE OVER JOINT

4



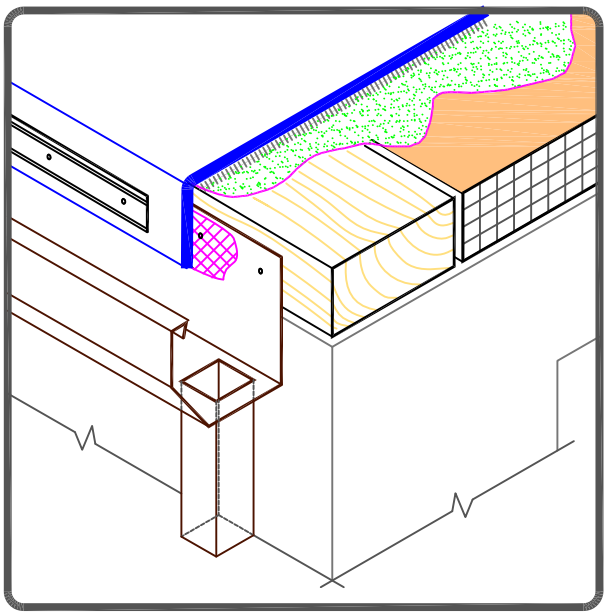
POSITION FIELD MEMBRANE AND HEAT WELD TO COATED METAL A MINIMUM OF 1–1/2" (4cm) AS SHOWN.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	COATED DRIP EDGE FASCIA – TPO, PVC OR KEE HP MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB–1B.1 FLEECEBACK ADHERED



NOTES:

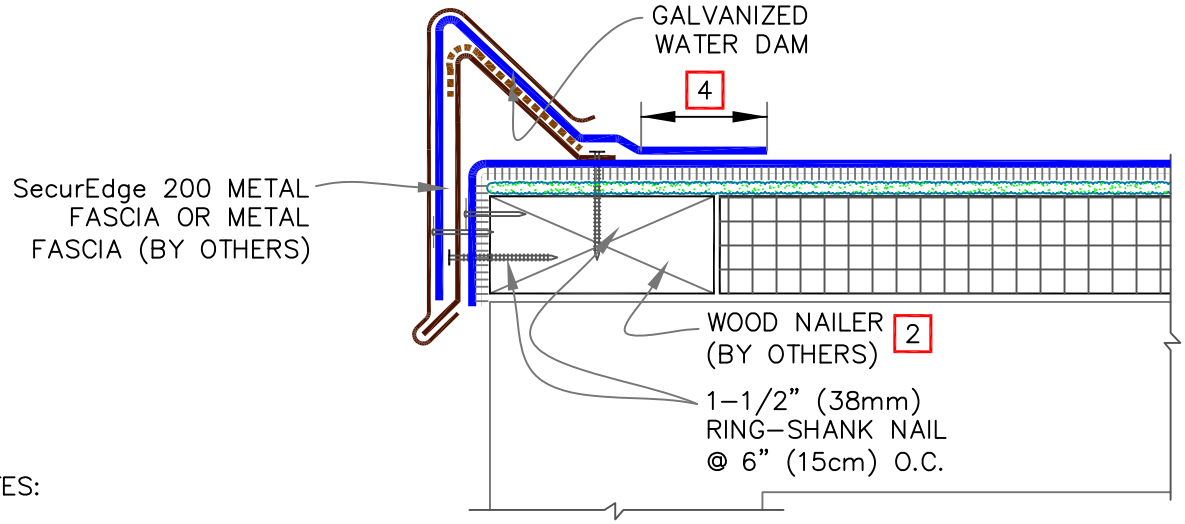
1. POSITION MEMBRANE WITH SELVAGE EDGE AT TERMINATION BAR LOCATION TO AVOID REMOVAL OF FLEECE BACKING.
2. FASTENING OF METAL TERMINATION BAR MUST PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
3. ALLOW MEMBRANE SHEET TO EXTEND 1/2" (1.5cm) MINIMUM BELOW THE METAL TERMINATION BAR.



FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	METAL BAR EDGE TERMINATION MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB–1C.1 FLEECEBACK ADHERED

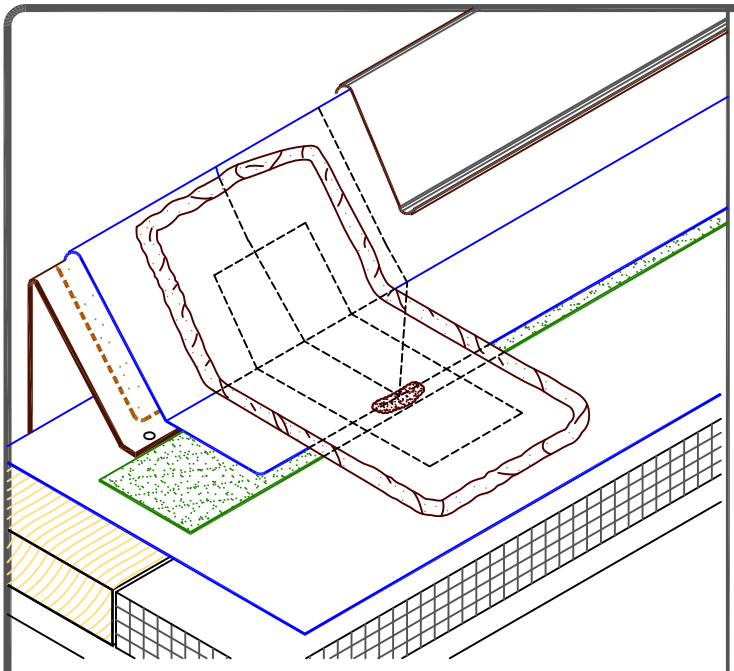
CAUTION

FOR PROJECTS WITH 25 & 30–YEAR WARRANTIES, ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT.



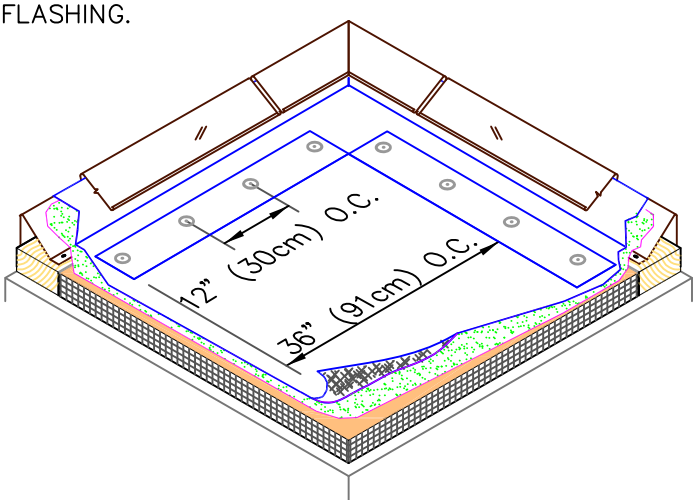
NOTES:

1. REFER TO SecurEdge 200 INSTALLATION INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF GRAVEL STOP DECK FLANGE.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
4. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1–1/2" (4cm) HOT AIR WELD WITH TPO/PVC.



EPDM SPLICE

AT CORNERS, SEAM FASTENING PLATES MUST BE INSTALLED 12" (30cm) MAX. FROM THE BASE OF THE WATER–DAM AND SHALL EXTEND 36" (91cm) MINIMUM IN EACH DIRECTION. STRIP IN WITH CURED MEMBRANE FLASHING.

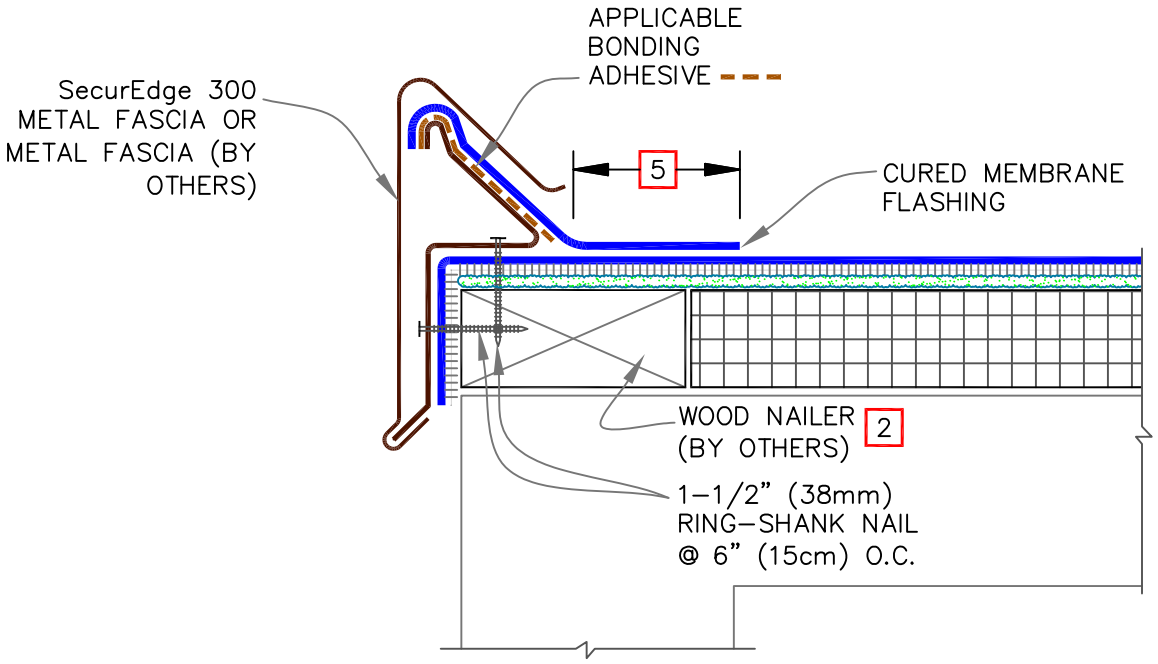


CORNER REINFORCEMENT

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	CARLISLE SecurEdge 200 MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB–1D.1 FLEECEBACK ADHERED

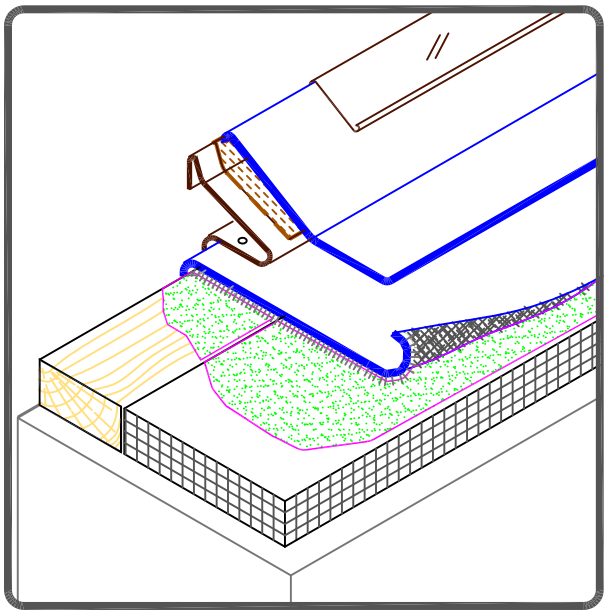
CAUTION

FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES OR WHEN USING 145-MIL FLEECEBACK MEMBRANE, REFER TO DETAIL FB-2A.1.



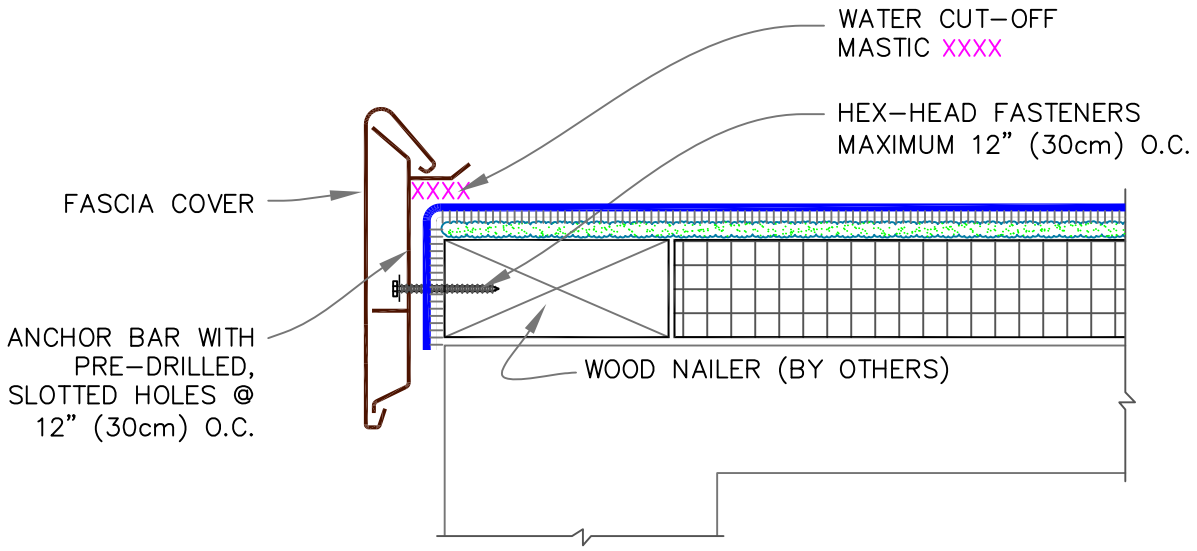
NOTES:

1. REFER TO SecurEdge 300 INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF GRAVEL STOP DECK FLANGE.
3. PRESSURE-SENSITIVE T-JOINT COVER OR 6" (15cm) WIDE PRESSURE-SENSITIVE FLASHING, IN CONJUNCTION WITH EPDM PRIMER, MUST BE CENTERED OVER EPDM FIELD SPLICES AT THE ANGLE CHANGE. PROJECTS WITH 25 OR 30-YEAR WARRANTIES OR WHEN USING 145-MIL MEMBRANE, FIELD SPLICES SHALL BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6" (15cm) WIDE COVERED WITH A 12" WIDE TOP LAYER (30cm). BOTH LAYERS SHALL BE CENTERED AND SEALED WITH CONTINUOUS LAP SEALANT.
4. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



5. MEMBRANE SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/EPDM PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	CARLISLE SecurEdge 300 MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-1E.1 FLEECEBACK ADHERED



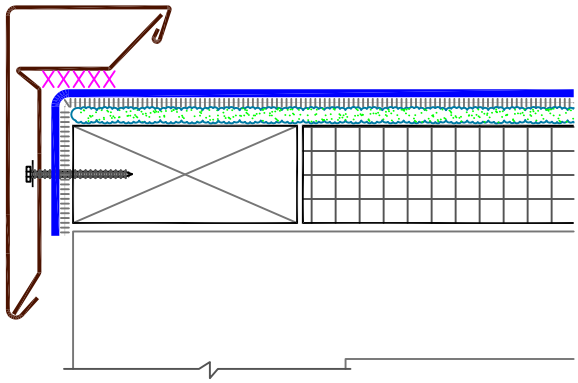
SecurEdge 2000

NOTES:

1. REFER TO SecurEdge 2000 OR 3000 INSTRUCTION MANUALS FOR THE STEP BY STEP INSTALLATION PROCEDURES.

2. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SecurEdge MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.

3. ENSURE ROOF SLOPES AWAY FROM SecurEdge.



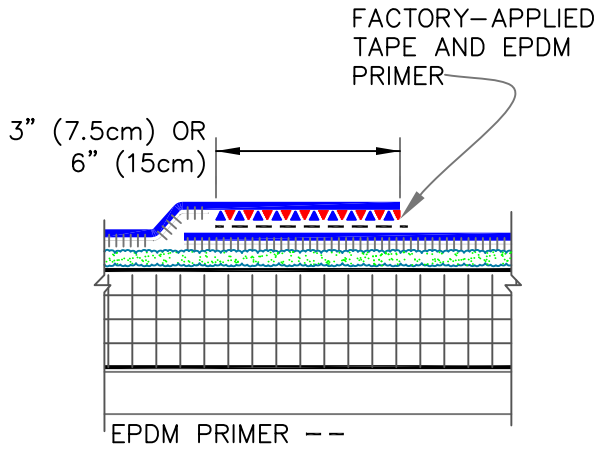
SecurEdge 3000

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	CARLISLE SecurEdge 2000, & 3000 MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-1F.1 FLEECEBACK ADHERED

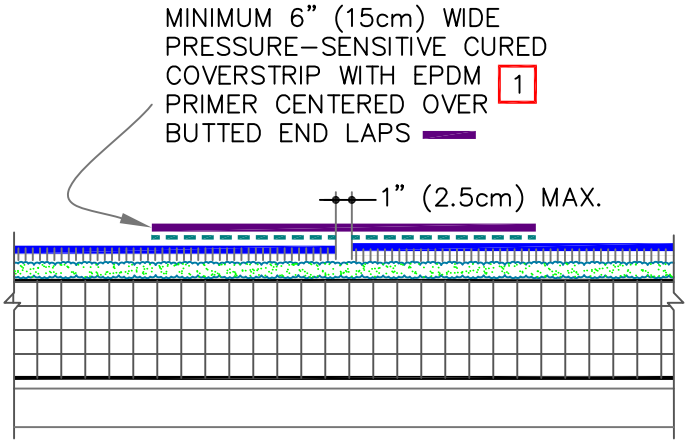
CAUTION

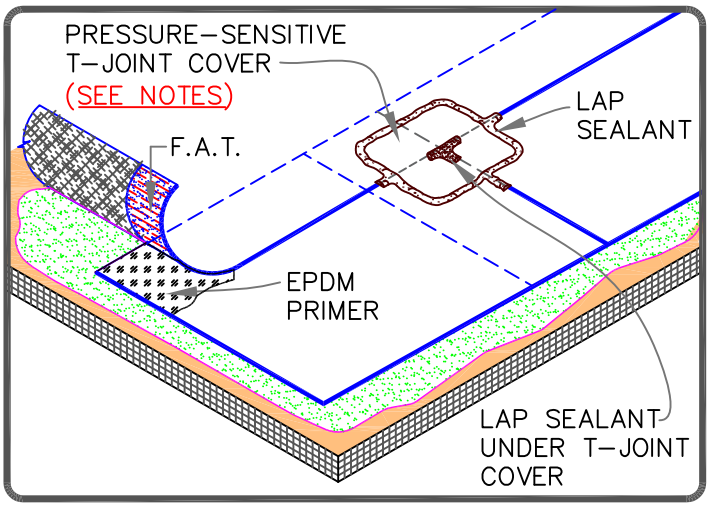
EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20, 25 & 30-YEAR WARRANTIES.

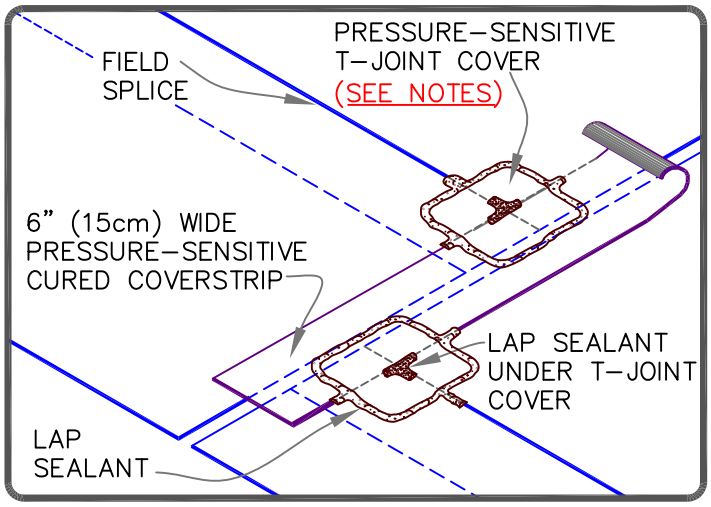
MEMBRANE SPLICE



END LAP SPLICE





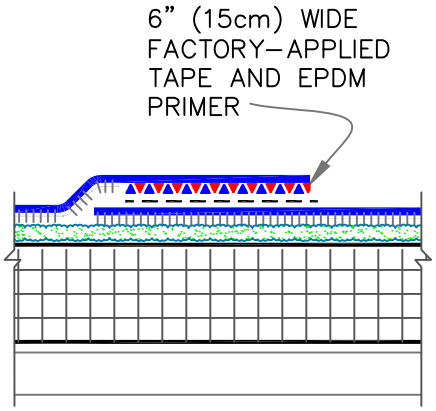


NOTES:

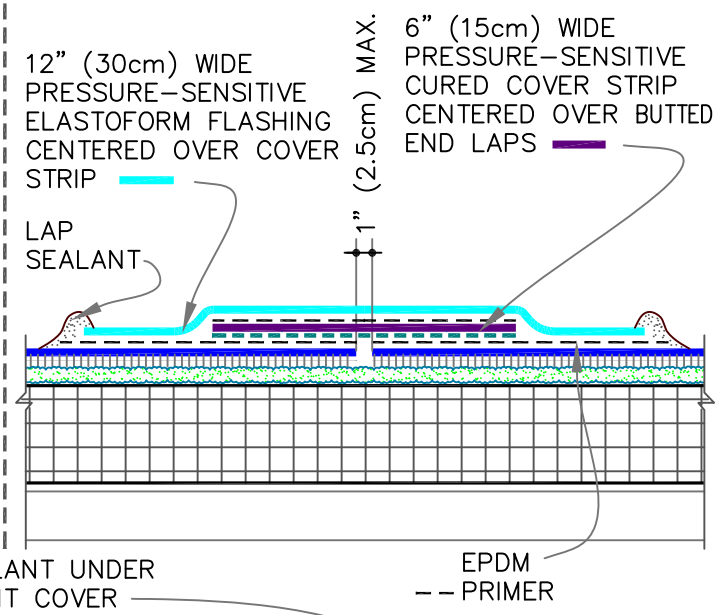
1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE-SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.
2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm x15cm)T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.
3. 6" (15cm) WIDE PRESSURE-SENSITIVE ELASTOFORM FLASHING MAY ALSO BE CENTERED OVER THE FIELD SPLICE INTERSECTION.

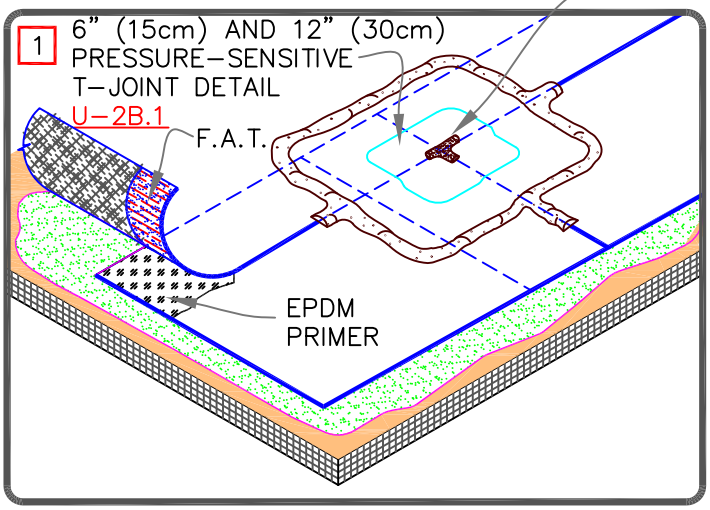
FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	EPDM MEMBRANE SPLICES – PROJECTS WITH 10, 15 AND 20 YEAR WARRANTIES MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. FB-2A FLEECEBACK ADHERED

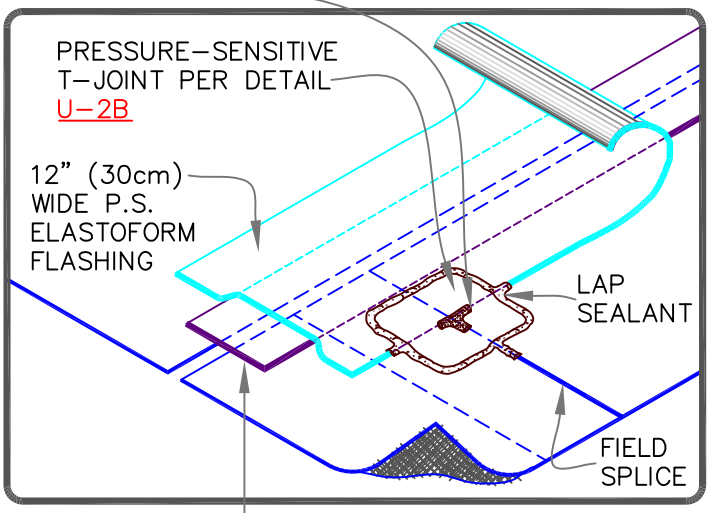
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

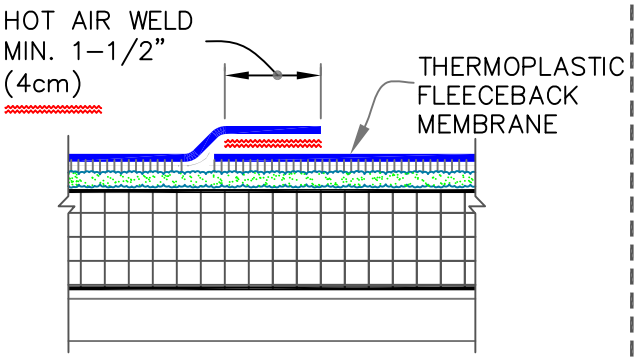
1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE-SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15cm) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

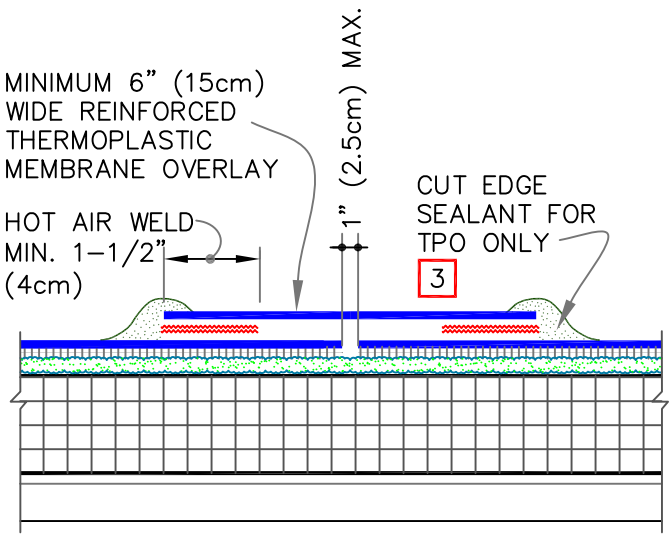
3. ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" (30cm X 30cm) TOP LAYER. BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, AS SHOWN.

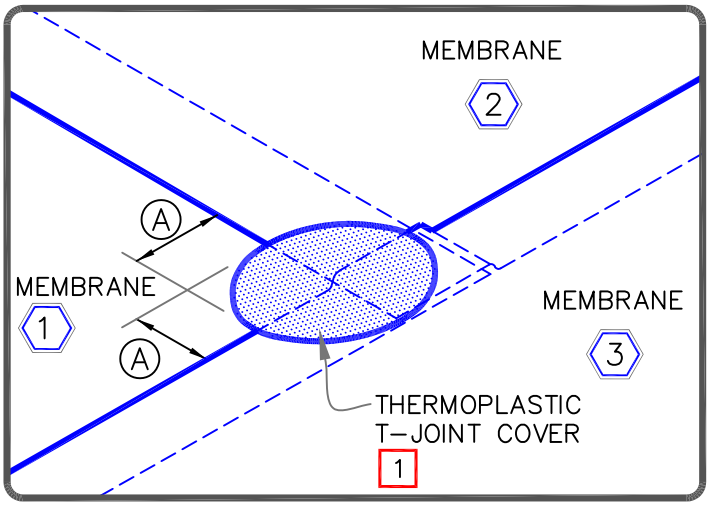
FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	EPDM MEMBRANE SPLICES- PROJECTS WITH 145-MIL MEMBRANE OR 25 and 30-YEAR WARRANTIES MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-2A.1 FLEECEBACK ADHERED

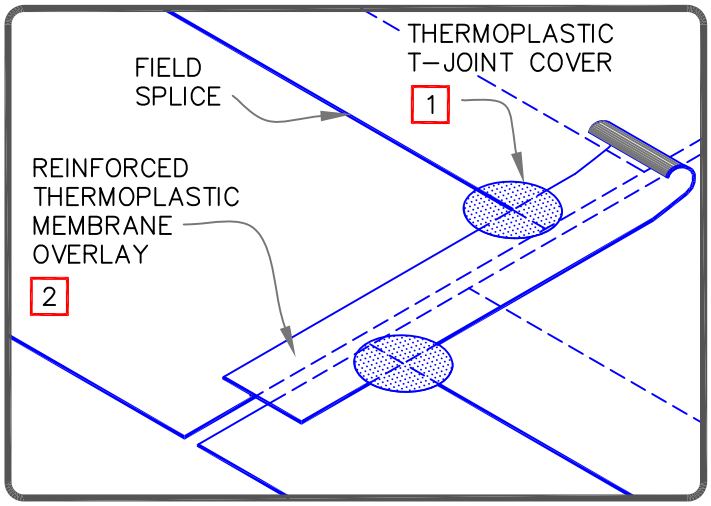
MEMBRANE SPLICE



END LAP SPLICE







DIMENSION		cm
A	2–1/4"	6

NOTES:

1. WHEN USING 115–MIL TPO OR 135–MIL TPO, 135–MIL PVC OR KEE HP FLEECEBACK MEMBRANE, APPLY A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

2. WHEN USING 60 OR 80 MIL THERMOPLASTIC REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

4. WHEN USING 115–MIL FLEECEBACK TPO, MAXIMUM WARRANTY IS 20 YEARS

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

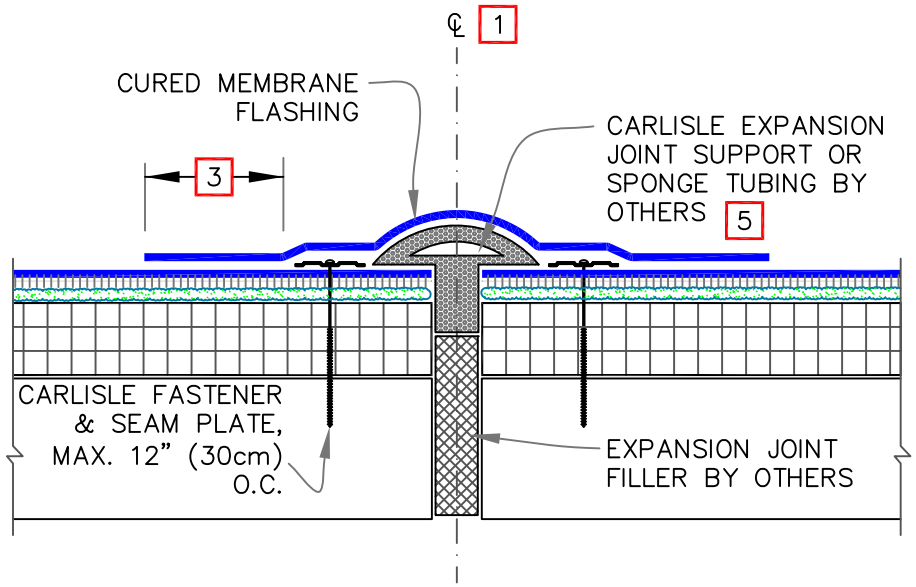
THERMOPLASTIC MEMBRANE SPLICES

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB–2B.1
FLEECEBACK ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20, 25 & 30-YEAR WARRANTIES.



NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (2cm) AND SHALL NOT EXCEED 3" (7.5cm).

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

3. MEMBRANE SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE & PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC.

4. WHEN USING 60 OR 80-MIL TPO AND 80-MIL PVC/KEE HP REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4-1/2" (11cm) DIAMETER THERMOPLASTIC "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

5. ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH A PRESSURE-SENSITIVE T-JOINT COVER. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15CM) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION. PROJECTS WITH 25 & 30-YEAR WARRANTIES OR WHEN USING 145-MIL MEMBRANE, INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, REFER TO FB-2 DETAILS.

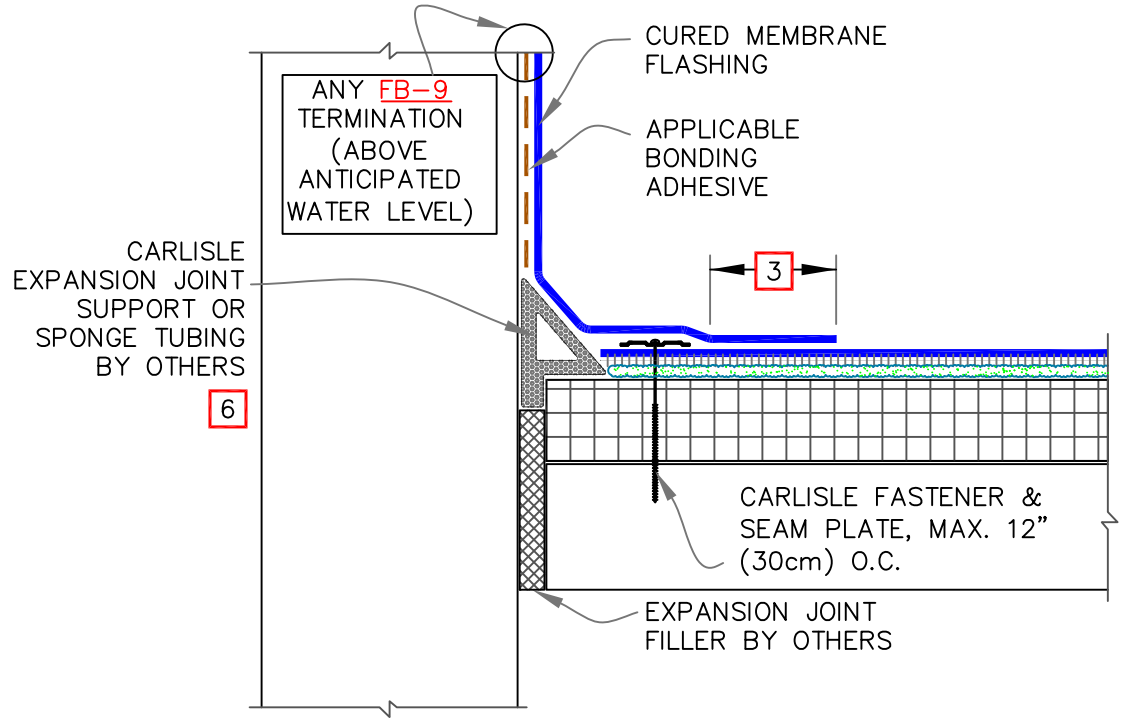
6. ROOF MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

7. FOR EPDM APPLICATIONS, USE TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING WITH EACH LAYER 3" (7.5cm) LARGER THAN THE PREVIOUS LAYER IN ALL DIRECTIONS FOR EXPANSION JOINT INTERSECTIONS BETWEEN EXPANSION JOINTS TO WALL OR EDGING.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	DECK-TO-DECK EXPANSION JOINT MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-3A.1 FLEECEBACK ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20, 25 & 30-YEAR WARRANTIES.



NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (2cm) AND SHALL NOT EXCEED 2" (5cm).

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

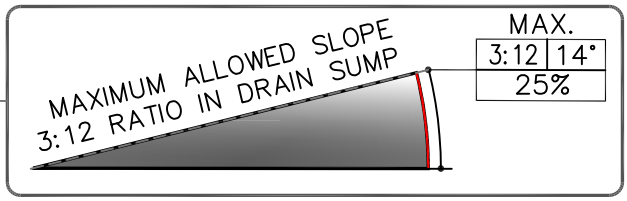
3. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC.

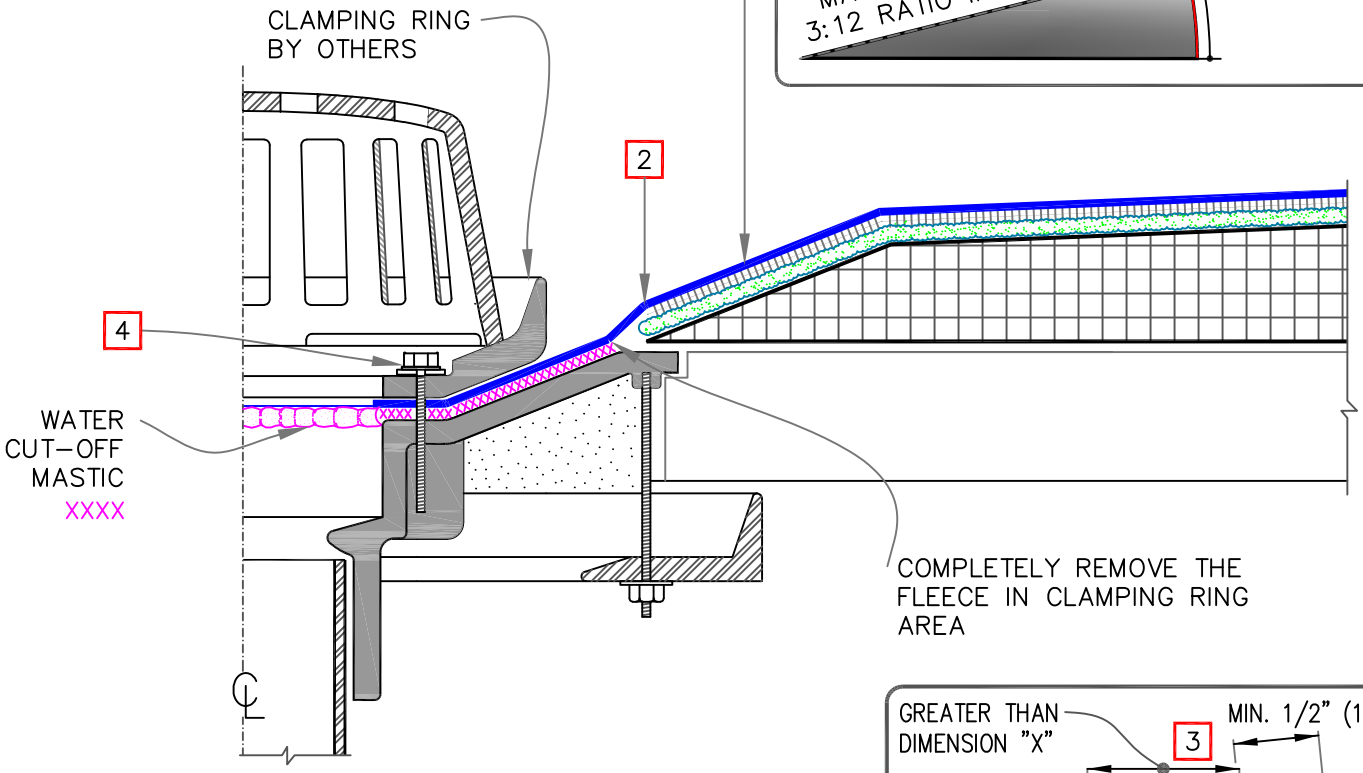
4. WHEN USING 60 OR 80-MIL TPO AND 80-MIL PVC/KEE HP REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4-1/2" (11cm) DIAMETER THERMOPLASTIC "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

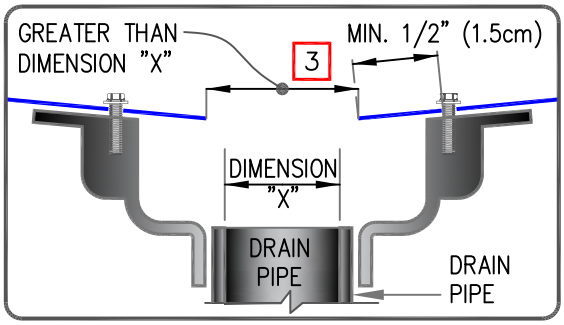
5. ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH A PRESSURE-SENSITIVE T-JOINT COVER. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15cm)T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION. PROJECTS WITH 25 & 30-YEAR WARRANTIES OR WHEN USING 90-MIL EPDM FLASHING, INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, REFER TO FB-2 DETAILS.

6. ROOF MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	DECK-TO-WALL EXPANSION JOINT MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-3B.1 FLEECEBACK ADHERED







NOTES:

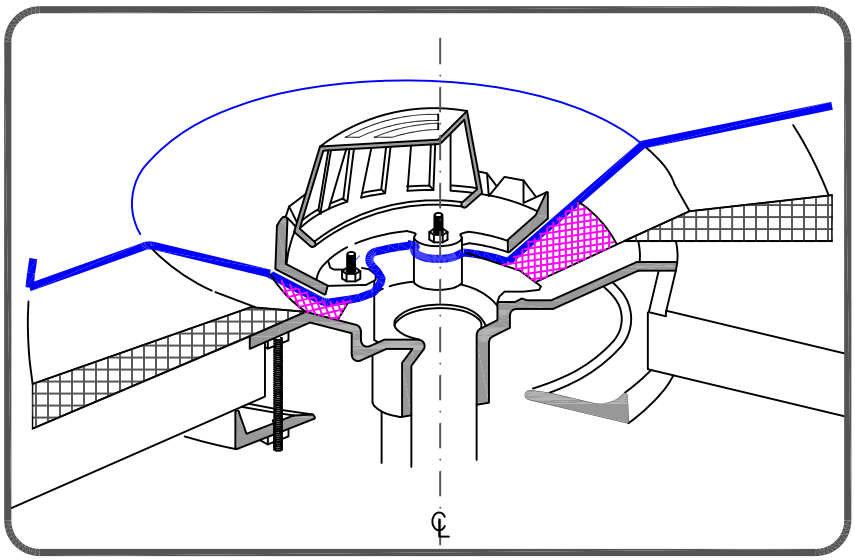
1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.

2. FLEECE–BACKING MUST BE REMOVED FROM THE MEMBRANE SO THAT WATER CUT–OFF MASTIC IS IN DIRECT CONTACT.

3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.

4. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.

5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

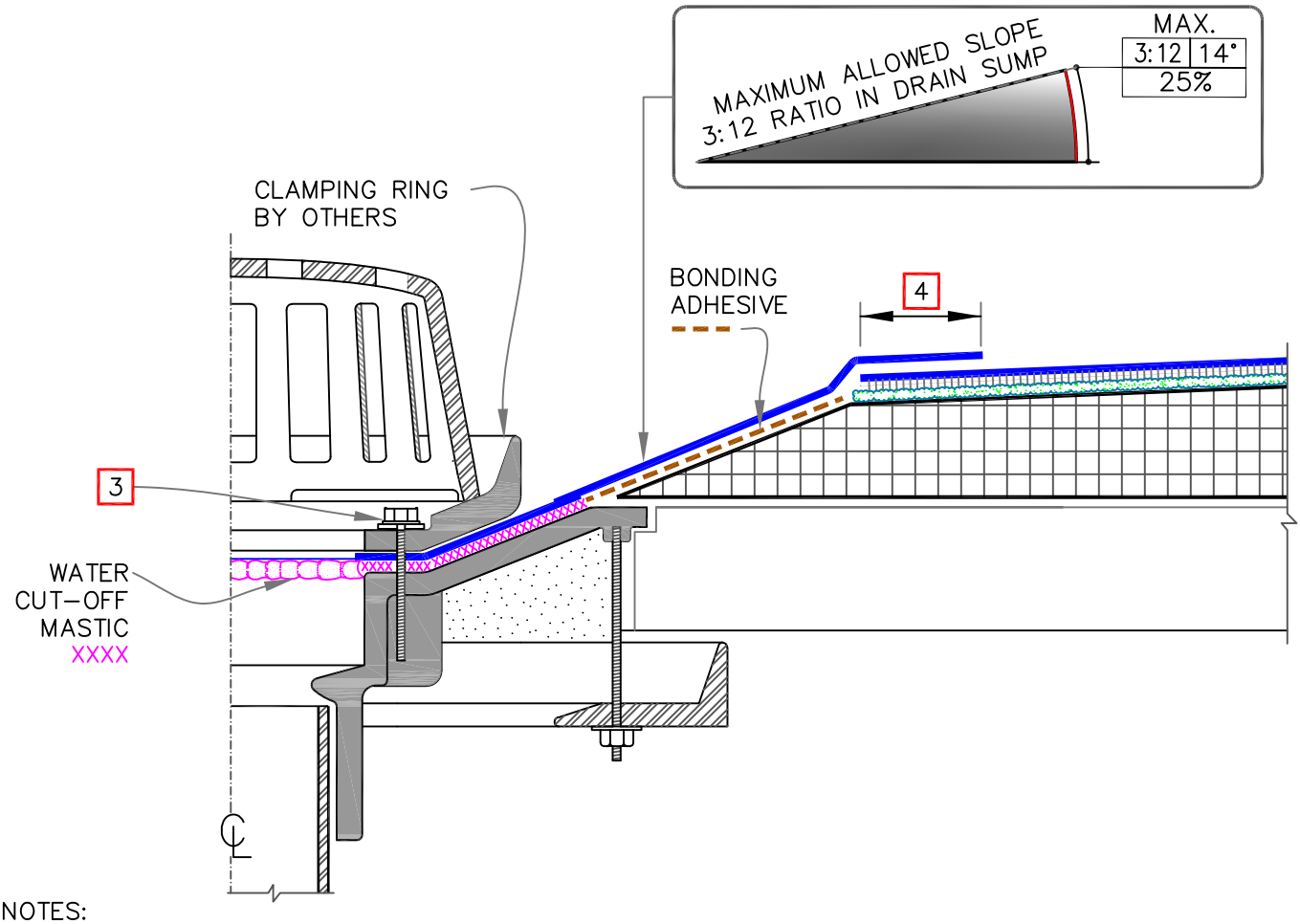
ROOF DRAIN WITH CONTINUOUS MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB–6A.1
FLEECEBACK ADHERED

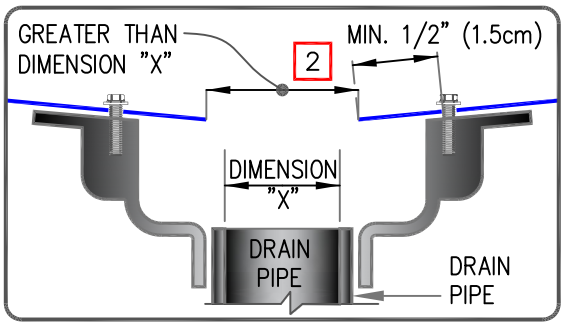
CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20, 25 & 30-YEAR WARRANTIES.



NOTES:

1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. SPLICES SHALL BE COMPLETED USING MIN. 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC/KEE HP.
5. FIELD SPLICES MUST BE LOCATED AT LEAST 6 INCHES (15cm) OUTSIDE THE DRAIN SUMP.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
7. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



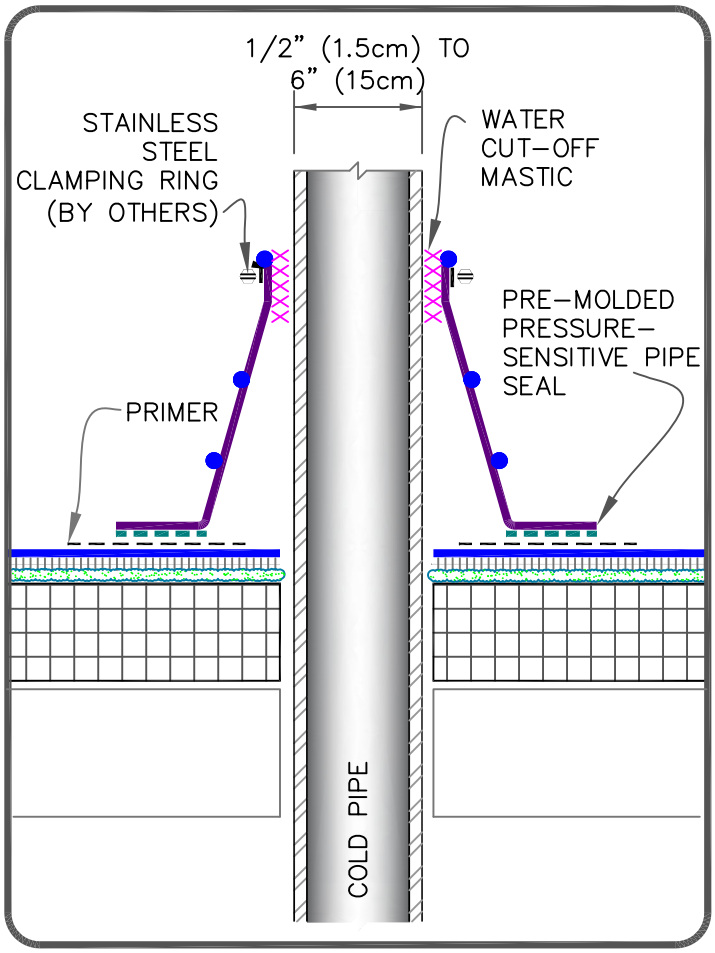
FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ROOF DRAIN WITH SEPARATE TARGET SPLICE

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB-6B.1
FLEECEBACK ADHERED

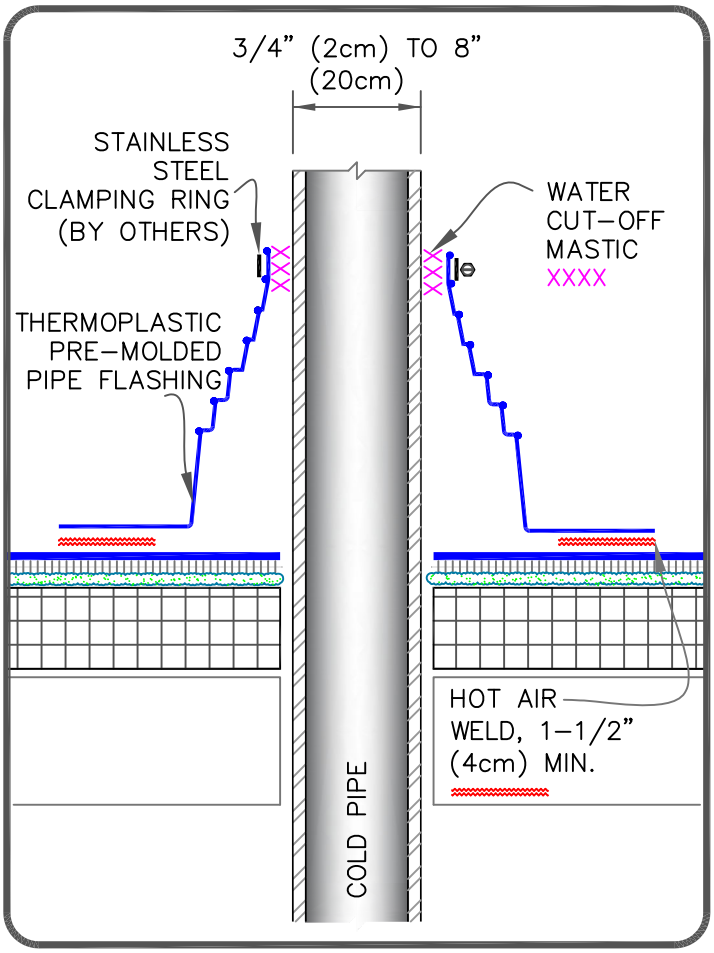
EPDM



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. APPLY EPDM PRIMER TO SPLICE AREA.
4. PRE–MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
5. DECK FLANGES OF THE PRE–MOLDED PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
6. WHEN A FIELD SPLICE INTERSECTS A PIPE SEAL, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION & OVERLAY WITH A 6"X6" (15 X 15cm) T–JOINT COVER.

TPO/PVC/KEE HP



NOTES:

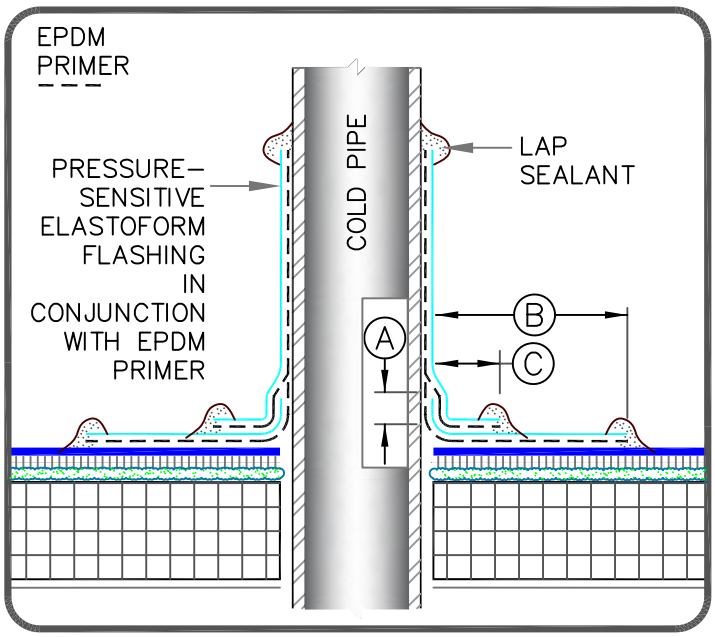
1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C) WHEN USING PVC OR KEE HP AND 160°F (71°C) WHEN USING TPO FLASHING.
3. PRE–MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE PRE–MOLDED PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PRE–MOLDED PIPE SEALS MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB–8A.1 FLEECEBACK ADHERED

CAUTION

DETAIL NOT FOR USE ON 25 & 30–YEAR WARRANTY PROJECTS. ACCEPTABLE PIPE FLASHINGS SHALL CONFORM WITH FB–8A DETAIL OR REFER TO THERMOSET/THERMOPLASTIC UNIVERSAL DETAILS.

EPDM

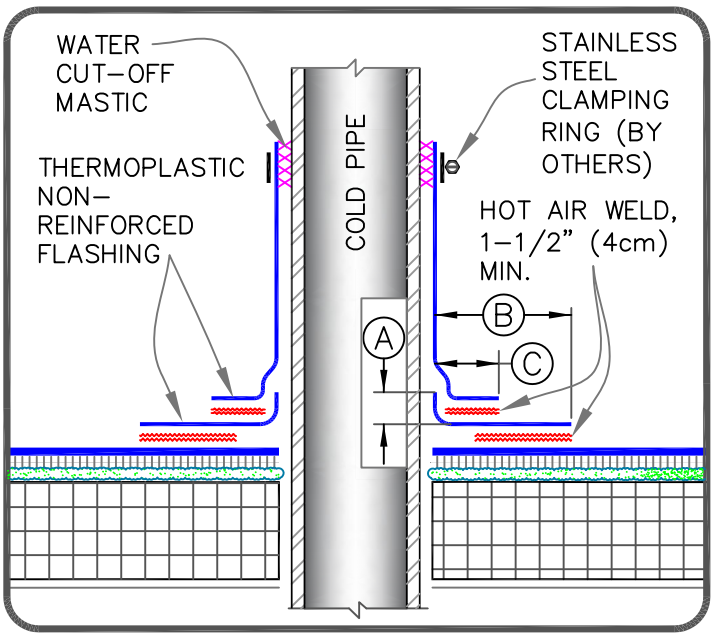


DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	3"	7.5	MIN.
C	1"	2.5	MIN.

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD–FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. PRIOR TO APPLYING PRESSURE–SENSITIVE ELASTOFORM FLASHING, APPLY EPDM PRIMER TO SPLICE AREAS.
4. MECHANICAL SECUREMENT IS REQUIRED AROUND ALL PIPES GREATER THAN 18" (46cm) IN DIAMETER.
5. IN COLDER TEMPERATURES A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE ELASTOFORM FLASHING.
6. REFER TO EPDM UNIVERSAL DETAILS FOR HOT STACK, STEEL TUBING & FLEXIBLE PIPE PENETRATIONS.

TPO/PVC/KEE HP



DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	1–1/2"	4	TO
	2"	5	
C	1"	2.5	MIN.

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C) WHEN USING PVC OR KEE HP AND 160°F (71°C) WHEN USING TPO FLASHING.
3. APPLY HEAT TO FLASHING AND FORM BY HAND PRIOR TO HOT AIR WELDING
4. MECHANICAL SECUREMENT IS REQUIRED AROUND ALL PIPES GREATER THAN 18" (46cm) IN DIAMETER.
5. REFER TO THERMOPLASTIC UNIVERSAL DETAILS FOR HOT STACK, STEEL TUBING & FLEXIBLE PENETRATIONS.

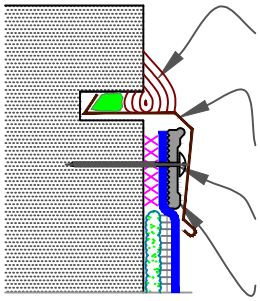
FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

FIELD FABRICATED PIPE FLASHING

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
FB–8B
FLEECEBACK ADHERED

9A MECHANICAL TERMINATION WITH COUNTER FLASHING



CARLISLE UNIVERSAL SINGLE-PLY SEALANT OR SEALANT (BY OTHERS)

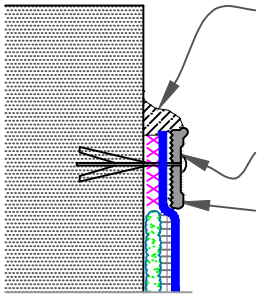
METAL COUNTER-FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

THREADED FASTENERS OR CARLISLE HP TERM BAR NAIL-IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 30 YEARS | **SEE INSET A**

9B MECHANICAL TERMINATION



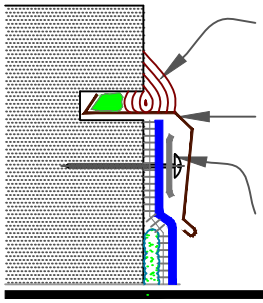
CARLISLE UNIVERSAL SINGLE-PLY SEALANT OR SEALANT (BY OTHERS)

CARLISLE HP TERM BAR NAIL-IN

CARLISLE TERMINATION BAR

WARRANTY UP TO 20 YEARS | **SEE INSET A**

9C COUNTER FLASHING TERMINATION



CARLISLE UNIVERSAL SINGLE-PLY SEALANT OR SEALANT (BY OTHERS)

METAL COUNTER-FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

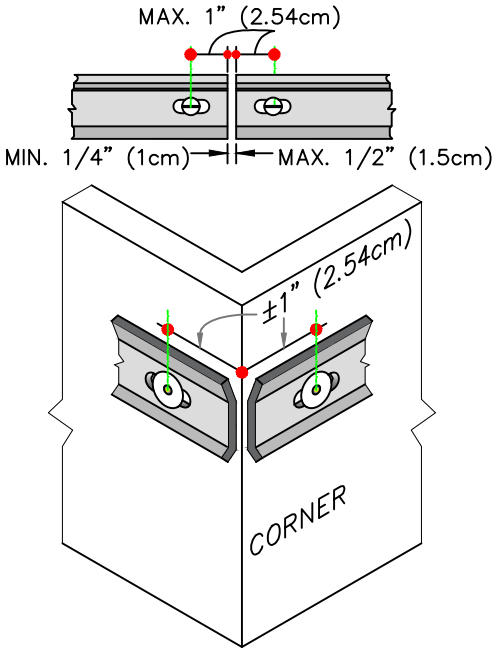
FASTEN MEMBRANE @ 12" (30cm) O.C. MAX. USE GALVANIZED WASHERS, MIN. 1", (2.54cm) DIAMETER

NOTE:

1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING OR CAULK THE FASTENER HEADS.

WARRANTY UP TO 10 YEARS

INSET A



NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. DETAIL 9D ON PAGE 2 OF 3 MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

xxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

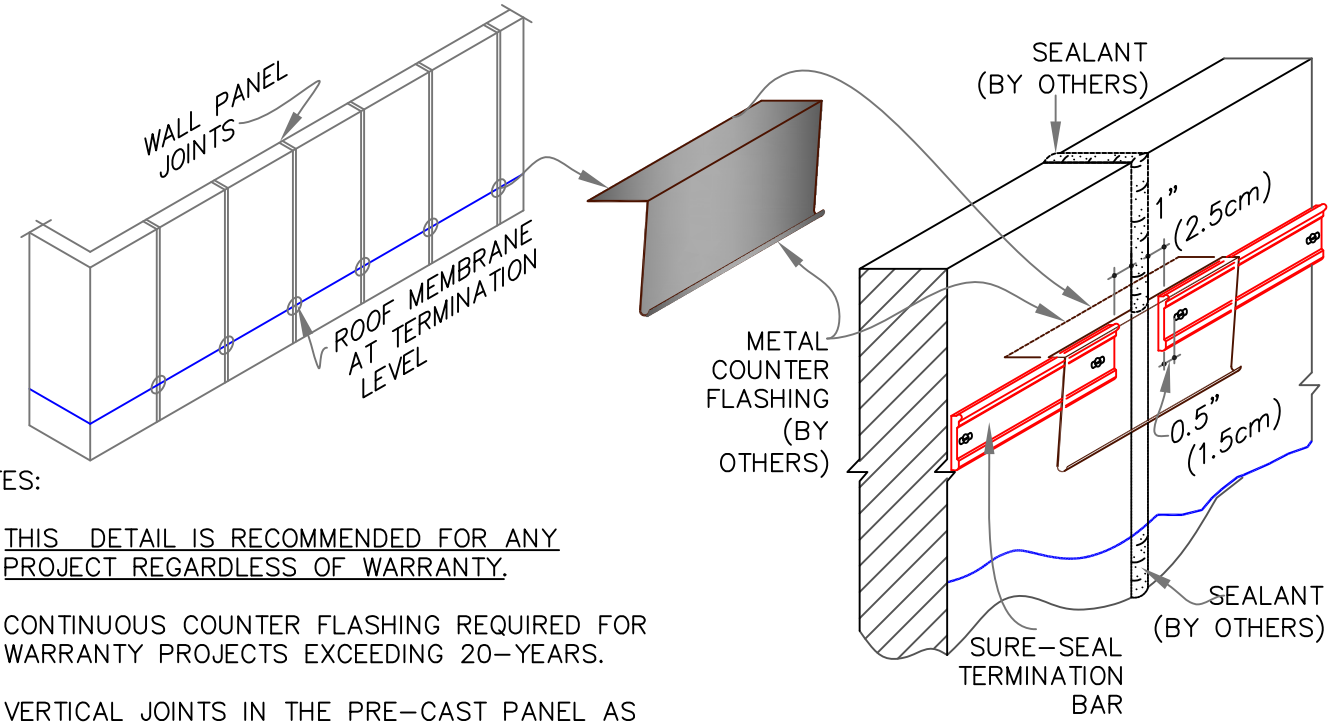
MEMBRANE TERMINATIONS (PAGE 1 OF 3)

WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. FB-9

FLEECEBACK ADHERED

9D MECHANICAL TERMINATION AT VERTICAL JOINTS



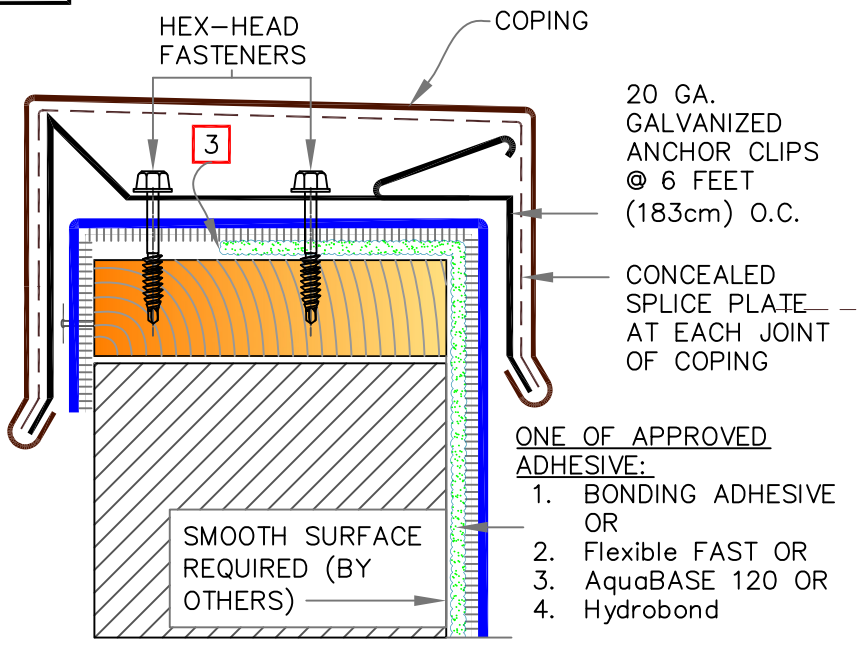
NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.

9E SecurEdge 200 & 300 COPINGS

NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. SEE 3D DETAIL 9F ON PAGE 3 OF 3.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.
3. STOP ADHESIVE AT APPROPRIATE DISTANCE TO AVOID STAINING ON EXTERIOR FACE OF WALL. EXTEND THE MEMBRANE DOWN & TEMPORARILY SECURE WITH CAPPED NAILS AT 12" (30.5cm) O.C. ENSURE SEAMS ARE SEALED.



FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

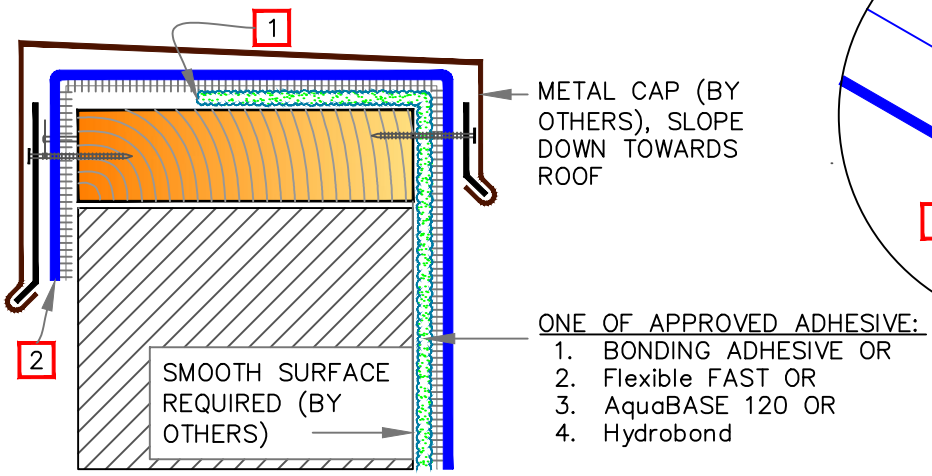
MEMBRANE TERMINATIONS (PAGE 2 OF 3)

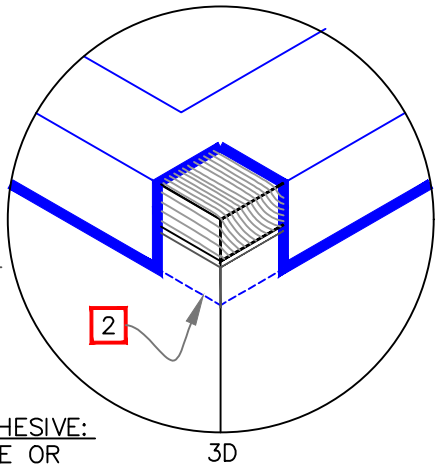
WARRANTY AS NOTES FOR EACH DETAIL

DETAIL NO. FB-9

FLEECEBACK ADHERED

9F | SHEET METAL COPING (BY OTHERS)



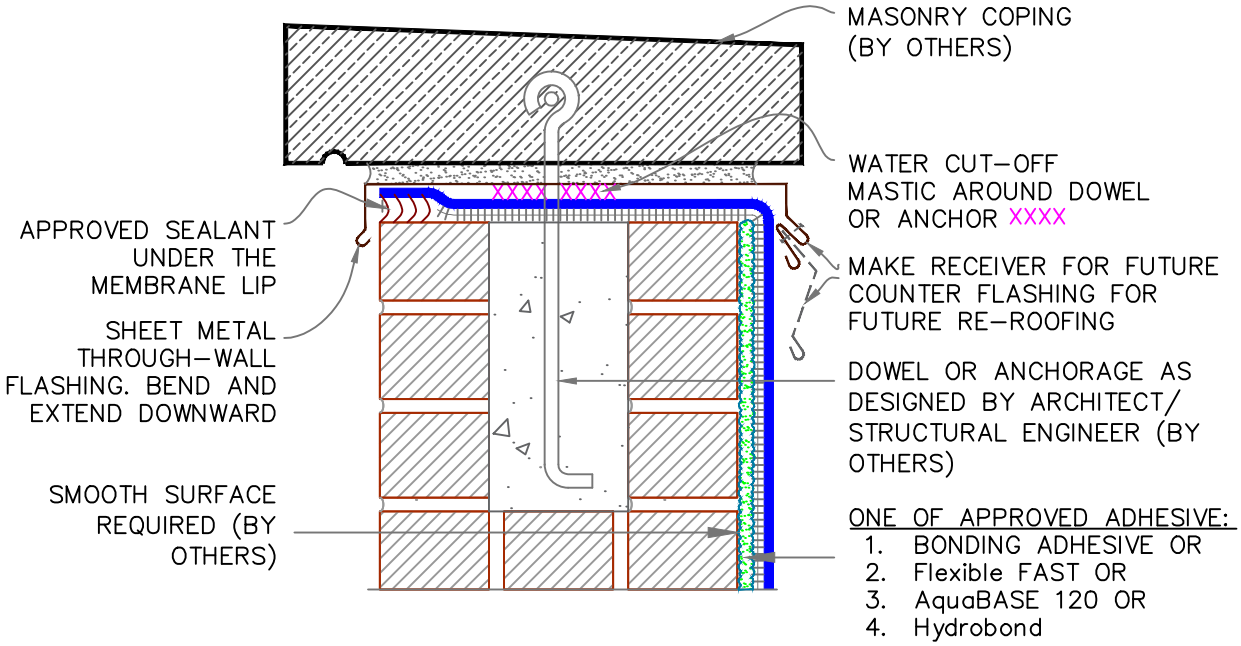


NOTES:

1. STOP ADHESIVE AT APPROPRIATE DISTANCE TO AVOID STAINING ON EXTERIOR FACE OF WALL. EXTEND THE MEMBRANE DOWN & SECURE WITH CAPPED NAILS AT 12" (30.5cm) O.C. ENSURE SEAMS ARE SEALED.

2. EXTEND THE MEMBRANE BELOW THE JOINT. AT CORNERS, MEMBRANE MUST BE EXTENDED TO PROVIDE COMPLETE COVERAGE OF WALL SURFACE.

9G | MASONRY COPINGS (BY OTHERS)

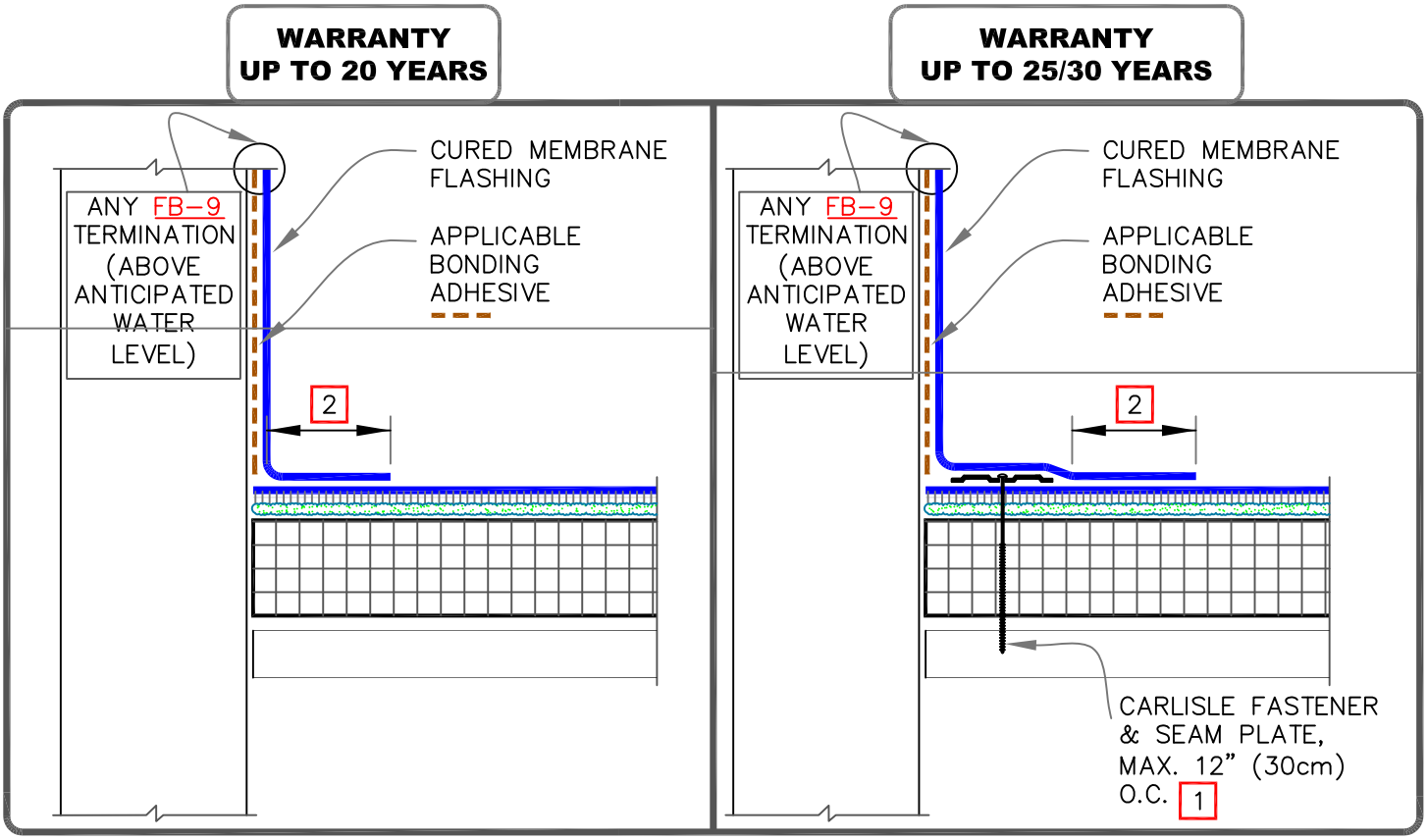


XXX WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	MEMBRANE TERMINATIONS (PAGE 3 OF 3) MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-9 FLEECEBACK ADHERED

CAUTION

REFER TO DETAIL FB–12C WHEN USING AQUA BASE 120 ADHESIVE OR HYDROBOND.



NOTES:

1. MECHANICALLY FASTENED BASE SECUREMENT IS REQUIRED WHEN ANY ONE OF THE FOLLOWING MAY OCCUR:
   - 1.1. SPECIFIED WARRANTIES GREATER THAN 20–YEARS.
   - 1.2. WARRANTY WIND SPEEDS GREATER THAN 90MPH.
   - 1.3. PROJECTS WITH CONTROL OR EXPANSION JOINTS OR ANTICIPATED BUILDING MOVEMENT.
   - 1.4. WHEN FLEECEBACK MEMBRANE IS INSTALLED DIRECTLY OVER AN EXISTING SINGLE–PLY ROOF.

2. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1–1/2" (4cm) HOT AIR WELD WITH TPO/PVC/KEE HP. EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE SECURTAPE FOR PROJECTS WITH 25 AND 30–YEAR WARRANTIES.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

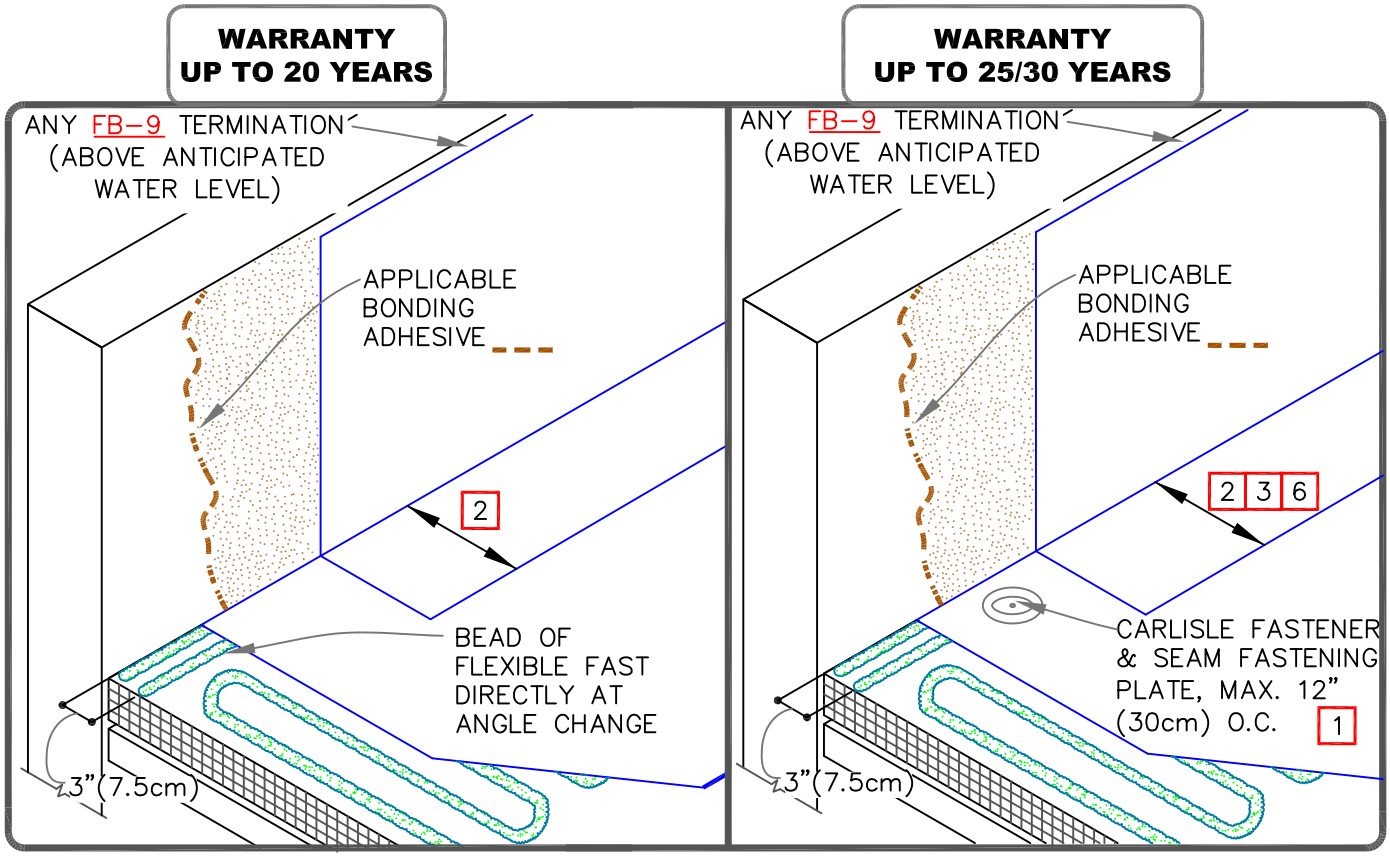
4. WHEN USING 60 OR 80–MIL REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

5. ALL EPDM SPLICE INTERSECTIONS REFER TO FB–2 DETAILS.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB WITH SEPARATE MEMBRANE – FULL COVERAGE / SPLATTER MAXIMUM WARRANTY: SEE EACH DETAIL	DETAIL NO. FB–12A.1A FLEECEBACK ADHERED

CAUTION

REFER TO DETAIL FB–12C WHEN USING AQUA BASE 120 ADHESIVE OR HYDROBOND.



NOTES:

1. MECHANICALLY FASTENED BASE SECUREMENT IS REQUIRED WHEN ANY ONE OF THE FOLLOWING MAY OCCUR:
   - 1.1. SPECIFIED WARRANTIES GREATER THAN 20–YEARS.
   - 1.2. WARRANTY WIND SPEEDS GREATER THAN 90MPH.
   - 1.3. PROJECTS WITH CONTROL OR EXPANSION JOINTS OR ANTICIPATED BUILDING MOVEMENT.
   - 1.4. WHEN FLEECEBACK MEMBRANE IS INSTALLED DIRECTLY OVER AN EXISTING SINGLE–PLY ROOF.

2. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1–1/2" (4cm) HOT AIR WELD WITH TPO/PVC/KEE HP.

3. EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE SECURTAPE FOR PROJECTS WITH 25 AND 30–YEAR WARRANTIES.

4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

5. WHEN USING 60 OR 80–MIL REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

6. 3" AND 6" FIELD APPLIED TAPE MUST BE OUTSIDE PLATES.

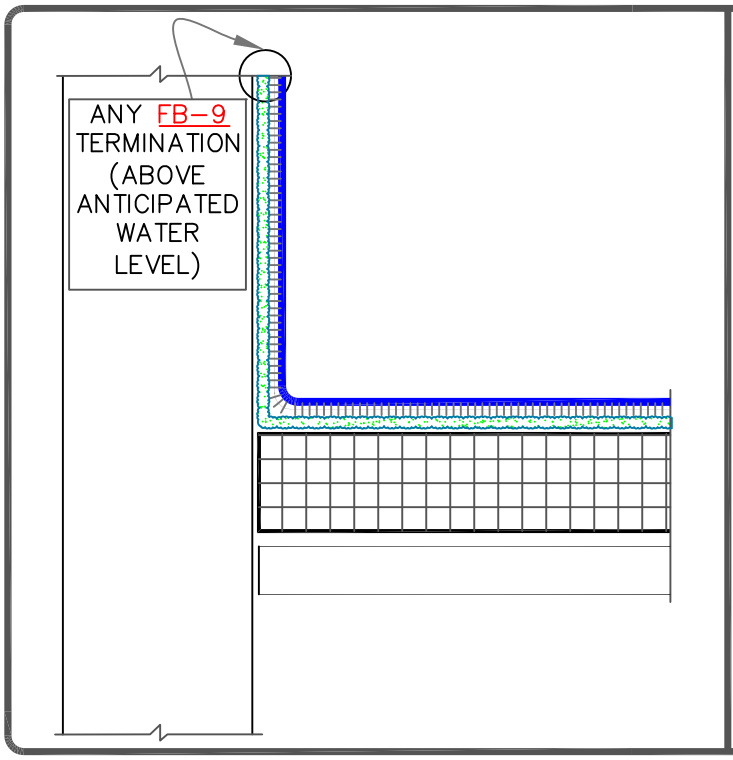
7. ALL EPDM SPLICE INTERSECTIONS REFER TO FB–2 DETAILS.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB WITH SEPARATE MEMBRANE – BEAD APPLIED MAXIMUM WARRANTY: SEE EACH DETAIL	DETAIL NO. FB–12A.1B FLEECEBACK ADHERED

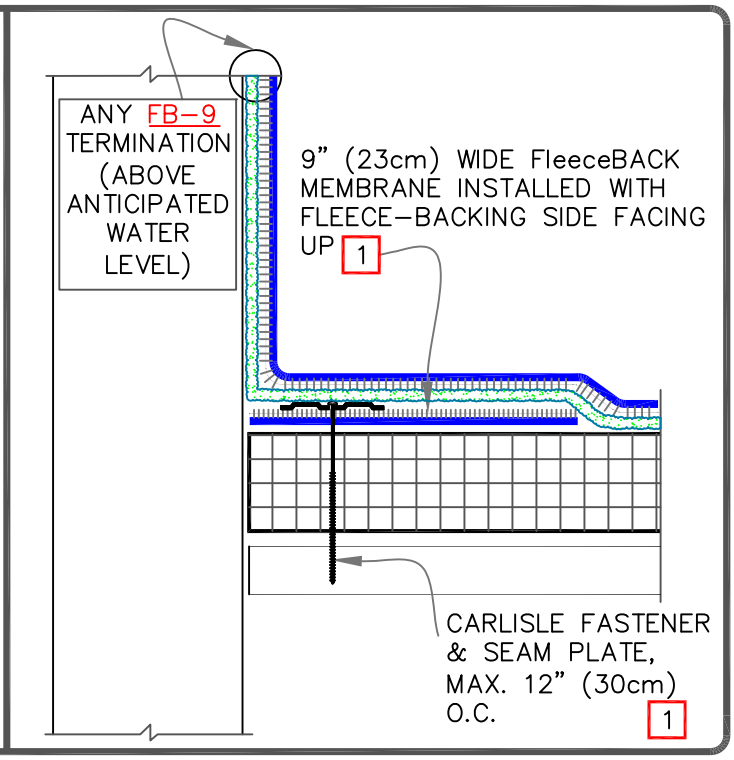
CAUTION

REFER TO DETAIL FB–12C WHEN USING AQUA BASE 120 ADHESIVE OR HYDROBOND.

WARRANTY UP TO 20 YEARS



WARRANTY UP TO 25/30 YEARS



NOTES:

1. MECHANICALLY FASTENED BASE SECUREMENT IS REQUIRED WHEN ANY ONE OF THE FOLLOWING MAY OCCUR:
   - 1.1. SPECIFIED WARRANTIES GREATER THAN 20–YEARS.
   - 1.2. WARRANTY WIND SPEEDS GREATER THAN 90MPH.
   - 1.3. PROJECTS WITH CONTROL OR EXPANSION JOINTS OR ANTICIPATED BUILDING MOVEMENT.
   - 1.4. WHEN FLEECEBACK MEMBRANE IS INSTALLED DIRECTLY OVER AN EXISTING SINGLE–PLY ROOF.

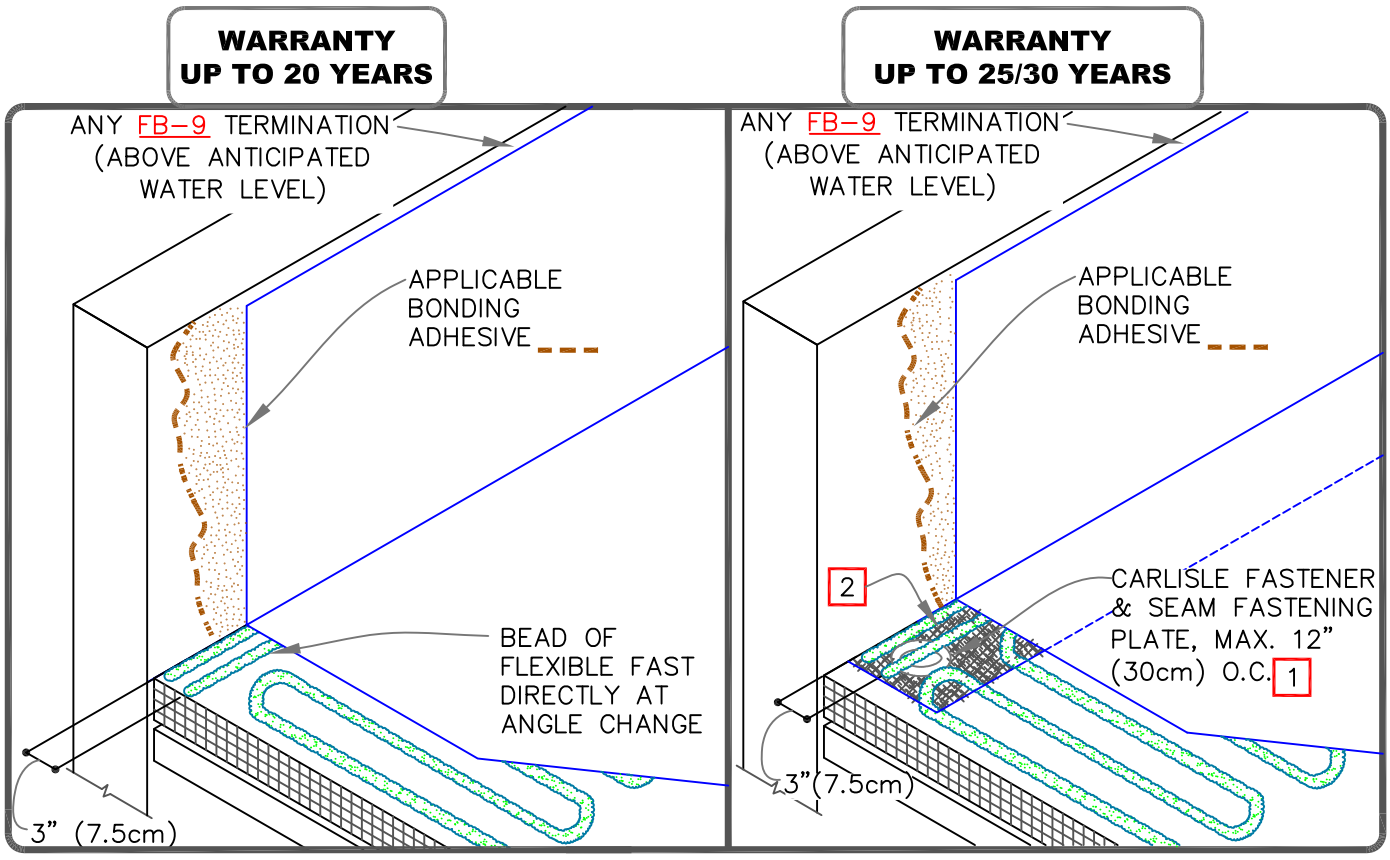
2. PRESSURE–SENSITIVE EPDM T–JOINT COVER OR 6" (15cm) WIDE PRESSURE–SENSITIVE FLASHING, IN CONJUNCTION WITH EPDM PRIMER, MUST BE CENTERED OVER EPDM FIELD SPLICES AT THE ANGLE CHANGE. PROJECTS WITH 25 OR 30–YEAR WARRANTIES OR WHEN USING 145–MIL MEMBRANE, FIELD SPLICES SHALL BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6" (15cm) WIDE COVERED WITH A 12" WIDE TOP LAYER (30cm). BOTH LAYERS SHALL BE CENTERED AND TOP LAYER SEALED WITH CONTINUOUS LAP SEALANT.

3. WHEN THE USE OF FLEXIBLE FAST ADHESIVE (FULL SPRAY) IS NOT FEASIBLE ON THE VERTICAL SUBSTRATE. SEE APPROPRIATE PDS FOR INSTALLATION INSTRUCTIONS FOR BONDING ADHESIVE.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB WITH CONTINUOUS MEMBRANE – FULL COVERAGE / SPLATTER MAXIMUM WARRANTY: SEE EACH DETAIL	DETAIL NO. FB–12B.1A FLEECEBACK ADHERED

CAUTION

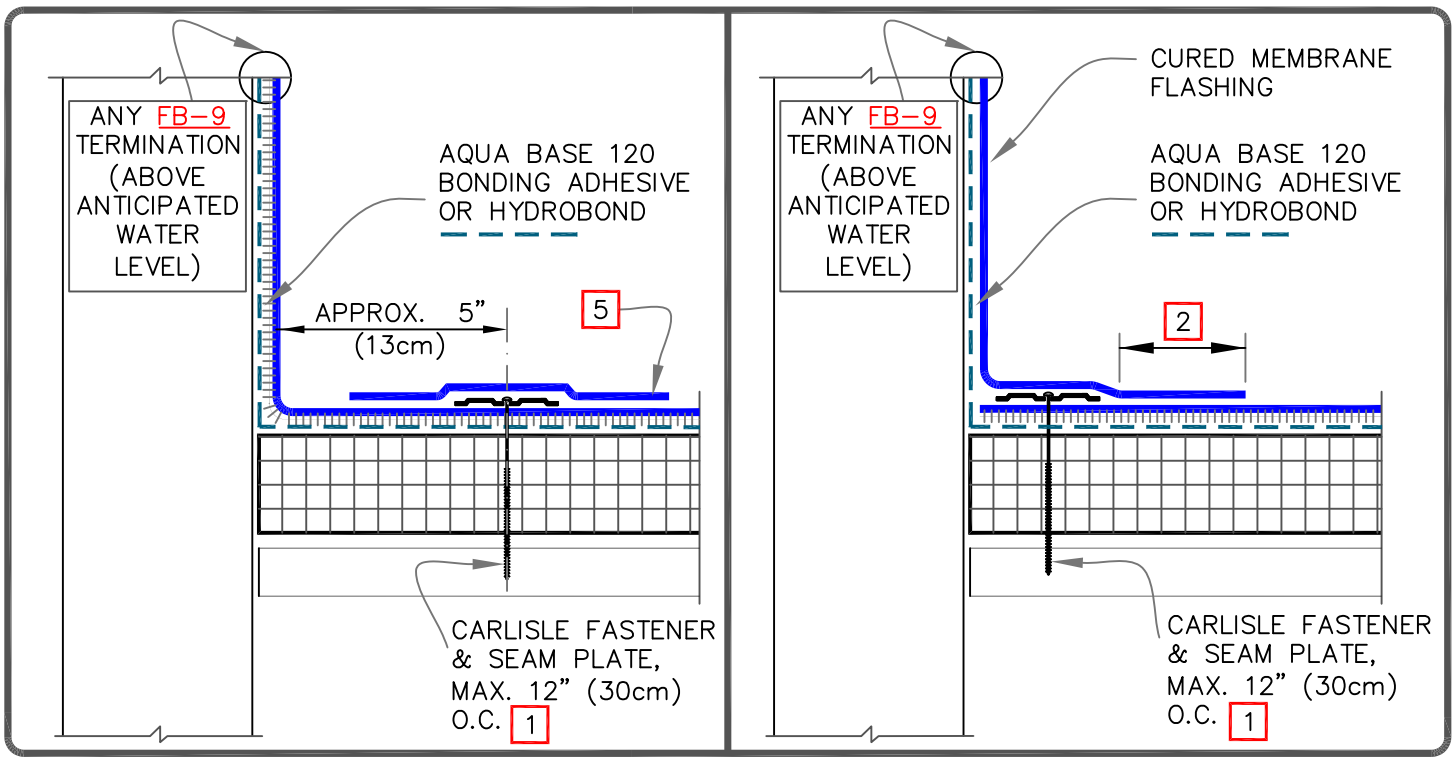
REFER TO DETAIL FB–12C WHEN USING AQUA BASE 120 ADHESIVE OR HYDROBOND.



NOTES:

1. MECHANICALLY FASTENED BASE SECUREMENT IS REQUIRED WHEN ANY ONE OF THE FOLLOWING MAY OCCUR:
   - 1.1. SPECIFIED WARRANTIES GREATER THAN 20–YEARS.
   - 1.2. WARRANTY WIND SPEEDS GREATER THAN 90MPH.
   - 1.3. PROJECTS WITH CONTROL OR EXPANSION JOINTS OR ANTICIPATED BUILDING MOVEMENT.
   - 1.4. WHEN FLEECEBACK MEMBRANE IS INSTALLED DIRECTLY OVER AN EXISTING SINGLE–PLY ROOF.
2. 9" (23cm) WIDE FleeceBACK MEMBRANE INSTALLED WITH FLEECE–BACKING SIDE FACING UP.
3. WHEN USING 60 OR 80–MIL REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4–1/2" (11cm) DIAMETER THERMOPLASTIC "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.
4. ALL EPDM SPLICE INTERSECTIONS REFER TO FB–2 DETAILS.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB WITH CONTINUOUS MEMBRANE – BEAD APPLIED MAXIMUM WARRANTY: SEE EACH DETAIL	DETAIL NO. FB–12B.1B FLEECEBACK ADHERED



NOTES:

1. REGARDLESS OF WARRANTY/ WARRANTY WIND SPEEDS, MECHANICAL 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.

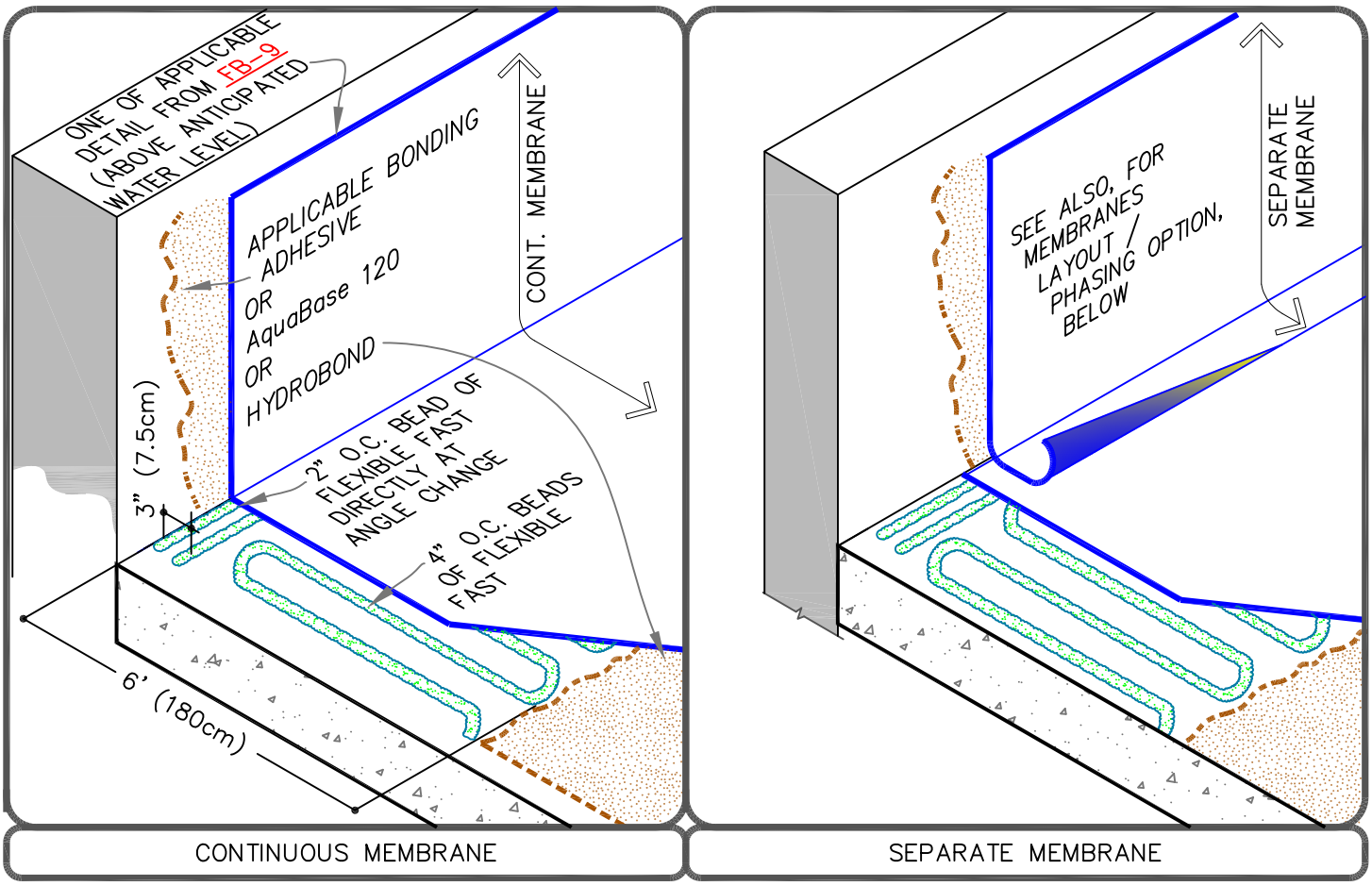
2. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/PVC.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

4. WHEN APPLYING AQUA BASE 120 BONDING ADHESIVE TO FLEECEBACK MEMBRANE ON THE VERTICAL WALL SUBSTRATE, APPLY A COAT OF AQUA BASE 120 ADHESIVE OR HYDROBOND TO THE FLEECE SIDE OF THE MEMBRANE AND ALLOW TO DRY. ONCE THE ADHESIVE ON THE FLEECE IS DRY, APPLY BONDING ADHESIVE AT THE COVERAGE RATE OF 60 S.F./GALLON FOR AQUA BASE 120 AND 100 S.F./GALLON FOR HYDROBOND TO THE WALL SUBSTRATE AND A SECOND COAT TO THE FLEECEBACK MEMBRANE.

5. WHEN USING EPDM FB MEMBRANE, MINIMUM 6" (15cm) WIDE PRESSURE-SENSITIVE CURED COVER STRIP MUST BE CENTERED OVER THE MECHANICAL FASTENERS AND PLATES. WHEN USING TPO OR PVC FLEECEBACK MEMBRANE, MINIMUM 6" (15cm) WIDE REINFORCED THERMOPLASTIC MEMBRANE FLASHING SHALL BE CENTERED OVER THE MECHANICAL FASTENERS AND PLATES AND HEAT WELDED ON ALL SIDES AND TPO CAN USE PRESSURE-SENSITIVE SUREWHITE.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB WITH WATER BASED ADHESIVE MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. FB-12C FLEECEBACK ADHERED



NOTES:

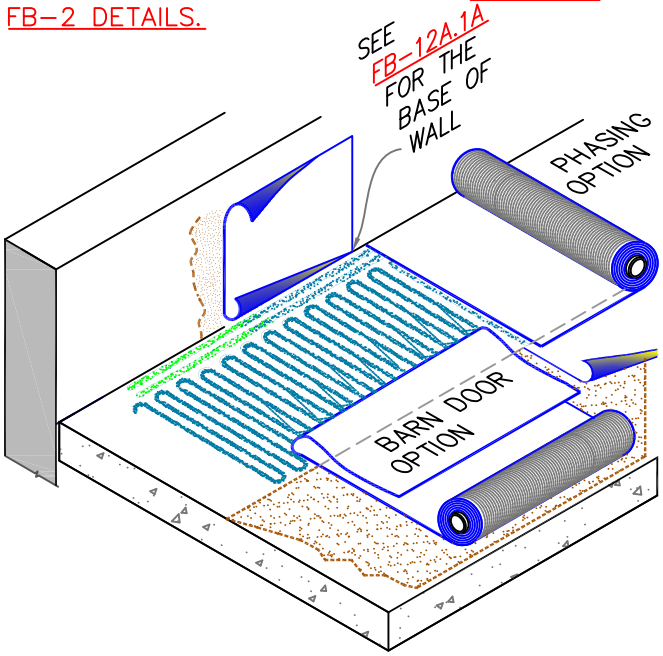
1. REGARDLESS OF WARRANTY/ WARRANTY WIND SPEEDS, SECUREMENT MUST BE PROVIDED AT THE PERIMETER OF EACH ROOF LEVEL, ROOF SECTION, EXPANSION JOINT, CURB FLASHING, SKYLIGHT, INTERIOR WALL, PENTHOUSE, ETC., AT ANY INSIDE ANGLE CHANGE WHERE SLOPE EXCEEDS 2" IN ONE HORIZONTAL FOOT.

2. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1–1/2" (4cm) HOT AIR WELD WITH TPO/PVC.

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

4. WHEN APPLYING AQUA BASE 120 BONDING ADHESIVE TO FLEECEBACK MEMBRANE ON THE VERTICAL WALL SUBSTRATE, APPLY A COAT OF AQUA BASE 120 ADHESIVE OR HYDROBOND TO THE FLEECE SIDE OF THE MEMBRANE AND ALLOW TO DRY. ONCE THE ADHESIVE ON THE FLEECE IS DRY, APPLY BONDING ADHESIVE AT THE COVERAGE RATE OF 60 S.F./GALLON FOR AQUA BASE 120 AND 100 S.F./GALLON FOR HYDROBOND TO THE WALL SUBSTRATE AND A SECOND COAT TO THE FLEECEBACK MEMBRANE.

5. ALL EPDM SPLICE INTERSECTIONS REFER TO FB–2 DETAILS.



FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

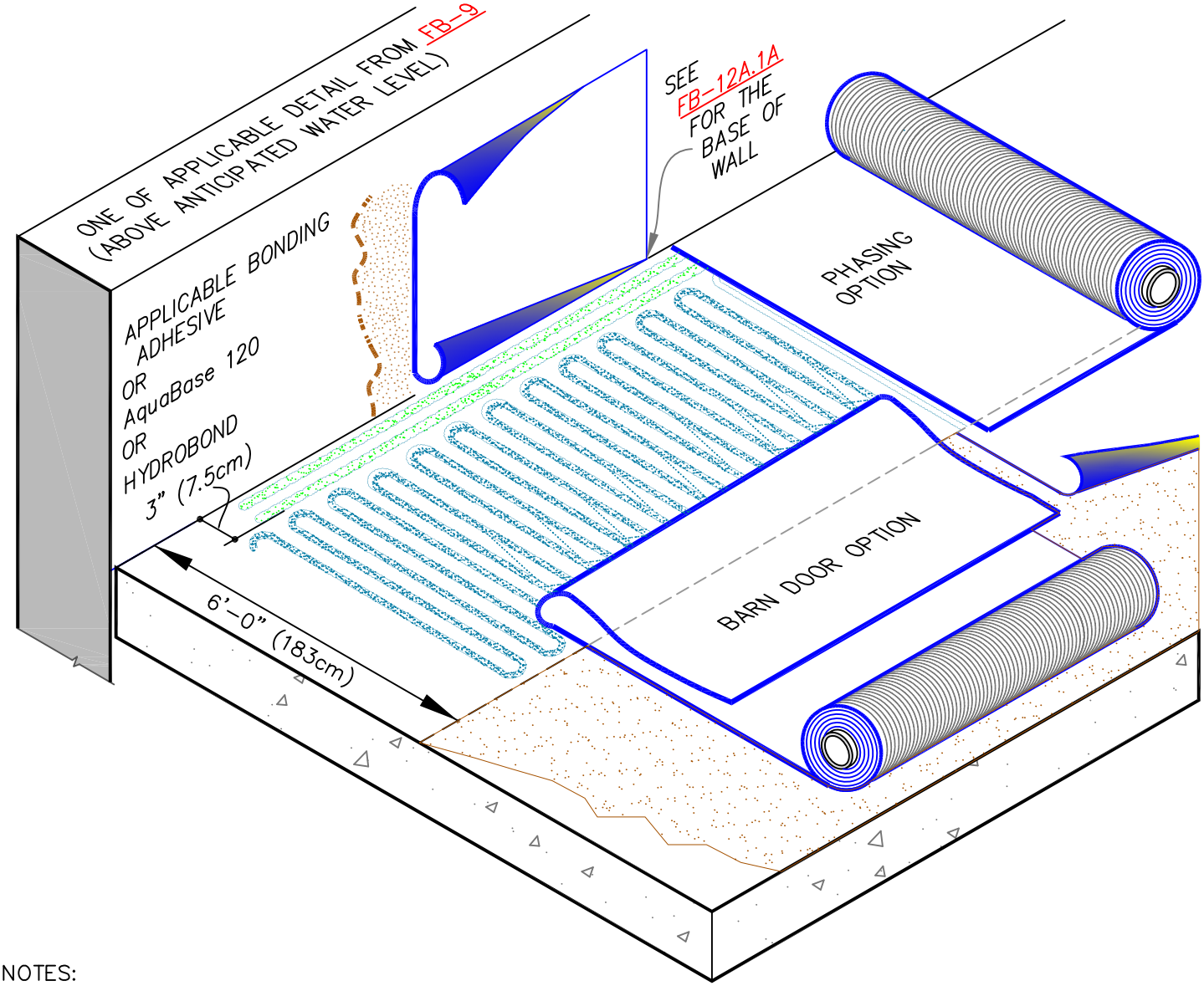
PARAPET/CURB–WATER BASED ADHESIVES W/ BEAD APPLIED FLEXIBLE FAST AT PERIMETERS– OVER CONCRETE. PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB–12C.1
FLEECEBACK ADHERED

CAUTION

REFER TO DETAIL FB–12C WHEN USING AQUA BASE 120 ADHESIVE OR HYDROBOND.

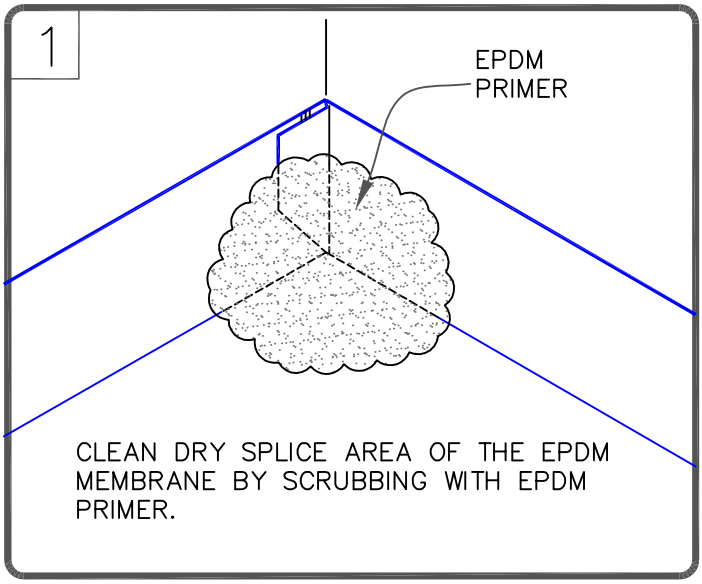


NOTES:

1. ADDITIONAL SECUREMENT IS REQUIRED FOR ANY ISNIDE ANGLE CHANGE WHEN SLOPE EXCEEDS 2" IN ONE HORIZONTAL FOOT.
2. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1–1/2" (4cm) HOT AIR WELD WITH TPO/PVC.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
4. WHEN APPLYING AQUA BASE 120 BONDING ADHESIVE TO FLEECEBACK MEMBRANE ON THE VERTICAL WALL SUBSTRATE, APPLY A COAT OF AQUA BASE 120 ADHESIVE OR HYDROBOND TO THE FLEECE SIDE OF THE MEMBRANE AND ALLOW TO DRY. ONCE THE ADHESIVE ON THE FLEECE IS DRY, APPLY BONDING ADHESIVE AT THE COVERAGE RATE OF 60 S.F./GALLON FOR AQUA BASE 120 AND 100 S.F./GALLON FOR HYDROBOND TO THE WALL SUBSTRATE AND A SECOND COAT TO THE FLEECEBACK MEMBRANE.
5. FOR ALL EPDM SPLICE INTERSECTIONS, REFER TO FB–2 DETAILS.

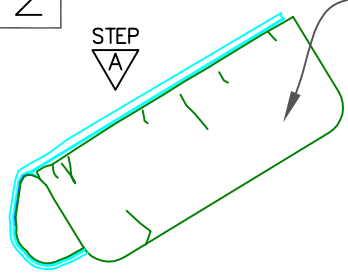
FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	PARAPET/CURB–WATER BASED ADHESIVES W/ BEAD APPLIED FLEXIBLE FAST AT PERIMETERS– OVER CONCRETE. PAGE 2 OF 2 MAXIMUM WARRANTY: 20 YEARS (90MPH)	DETAIL NO. FB–12C.1 FLEECEBACK ADHERED

1



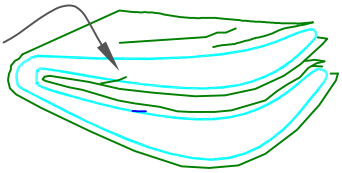
CLEAN DRY SPLICE AREA OF THE EPDM MEMBRANE BY SCRUBBING WITH EPDM PRIMER.

2



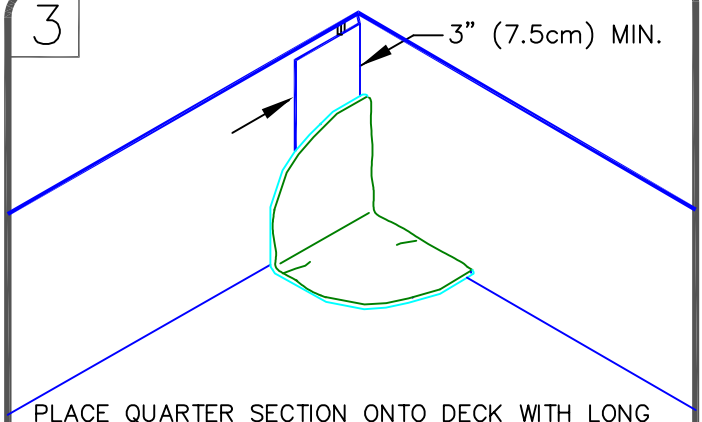
CLEAR POLY RELEASE FILM REMOVE POLY RELEASE FILM AND PLACE ON FLASHING SIDE TO PREVENT STOCKING

STEP
B



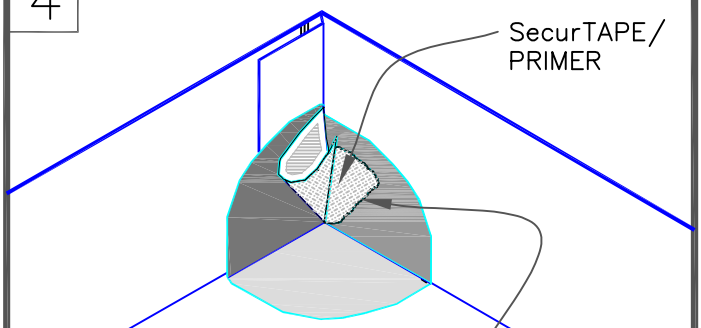
FOLD PRESSURE-SENSITIVE CORNER LENGTHWISE AND PROCEED TO FOLD QUARTERLY AS SHOWN IN STEP B

3



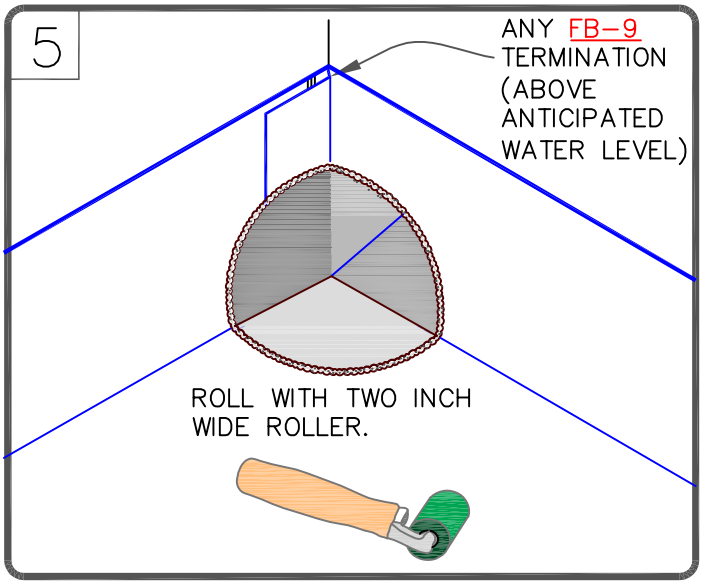
PLACE QUARTER SECTION ONTO DECK WITH LONG FOLDED SIDE FACING THE WALL. REMOVE REMAINING RELEASE PAPER. PRESS FIRMLY AND PROCEED WITH SECOND QUARTER GOING UP THE VERTICAL WALL BY PRESSING FIRMLY INTO CORNER.

4



FORM A PIG EAR. APPLY PRIMER/SecurTAPE TO THE PIG EAR AND ADHERE TO THE WALL.

5



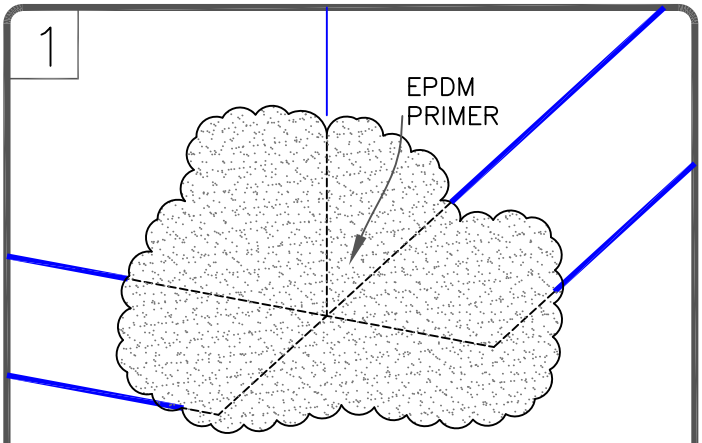
ROLL WITH TWO INCH WIDE ROLLER.

NOTES:

1. FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES OR WHEN USING 145-MIL MEMBRANE, ALL INSIDE CORNERS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE FLASHING. THE BOTTOM LAYER SHALL BE A 7"X9" (17.5cm X 23cm) PRESSURE-SENSITIVE PRE-CUT INSIDE/OUTSIDE CORNER OR A 6'X6" (15cm X 15cm) PRESSURE-SENSITIVE ELASTOFORM FLASHING PIECE COVERED WITH A 12"X12" (30cm X 30cm) TOP LAYER OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. BOTH LAYERS SHALL BE CENTERED AND SEALED WITH CONTINUOUS LAP SEALANT.
2. EPDM PRIMER MUST BE APPLIED TO ALL SPLICE AREAS AND FOR EACH LAYER OF PRESSURE-SENSITIVE FLASHING.
3. IF USING FLEECE MEMBRANE ON THE VERTICAL, STRIP-IN SPLICE WITH ELASTOFORM PRIOR TO INSTALLING OUTSIDE CORNER.

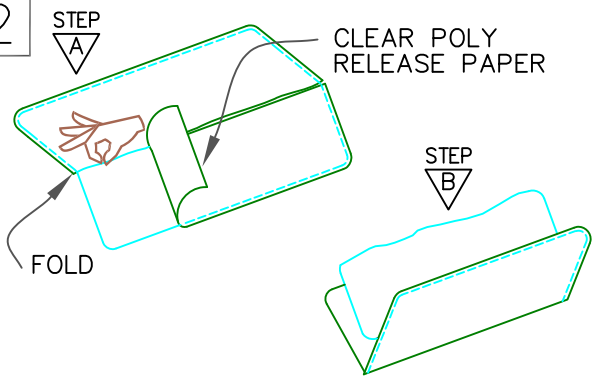
FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	EPDM PRESSURE-SENSITIVE INSIDE CORNER MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-15A.1 FLEECEBACK ADHERED

1



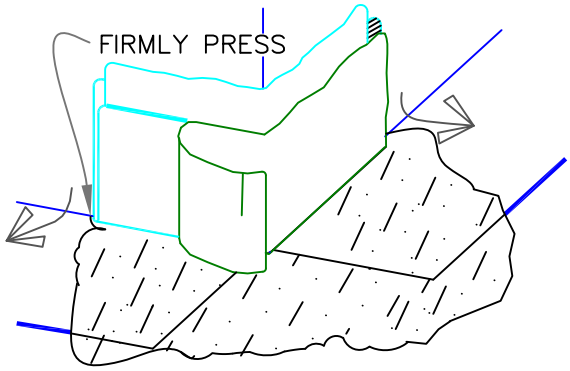
CLEAN THE DRY SPLICE AREA OF THE EPDM MEMBRANE BY SCRUBBING WITH EPDM PRIMER.

2



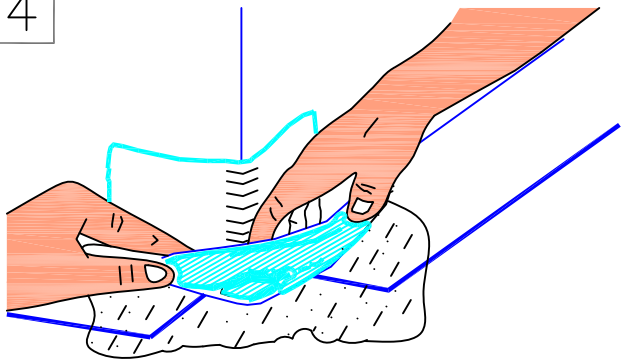
PRIOR TO PLACEMENT OF SURE-SEAL CORNER, PEEL OFF THE BLUE POLY RELEASE FILM AND HEAT THE FLASHING SIDE WITH A HEAT GUN. RE-APPLY THE POLY LOOSELY. FOLD THE FLASHING IN HALF.

3



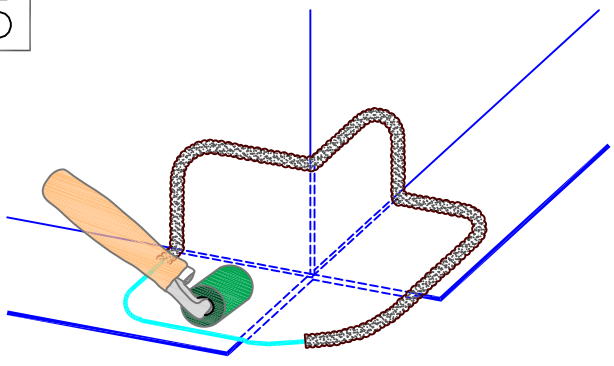
PLACE SURE-SEAL INSIDE/OUTSIDE CORNER AS SHOWN AND REMOVE RELEASE PAPER. PRESS FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING AGAINST THE VERTICAL SURFACE.

4



PLACE FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING ONTO THE DECK FLANGE BY PRESSING THE FLASHING AGAINST THE HORIZONTAL SURFACE.

5



ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGE.

NOTE:

FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES OR WHEN USING 145-MIL MEMBRANE, REFER TO THERMOSET DETAIL U-15H FOR REQUIRED FLASHING ENHANCEMENTS.

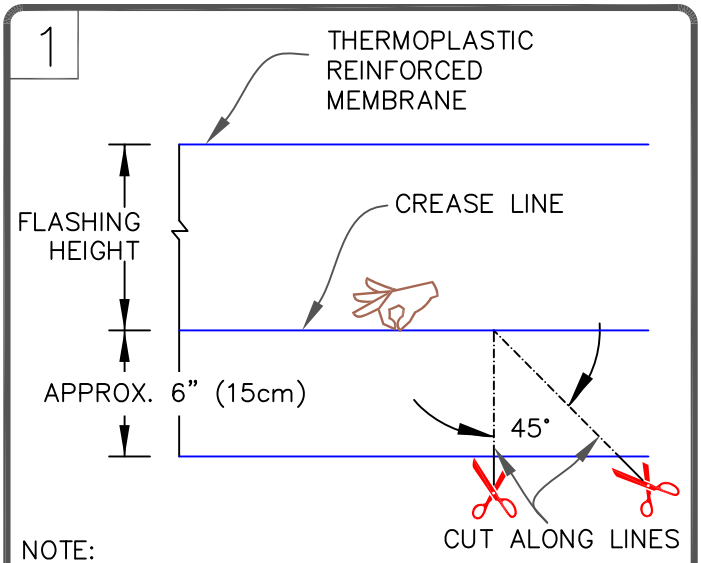
FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

EPDM PRESSURE-SENSITIVE OUTSIDE CORNER

MAXIMUM WARRANTY: 30 YEARS

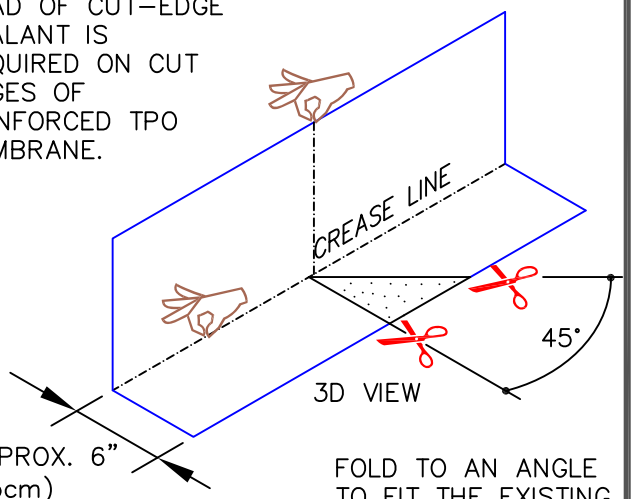
DETAIL NO.
FB-15B.1
FLEECEBACK ADHERED

1

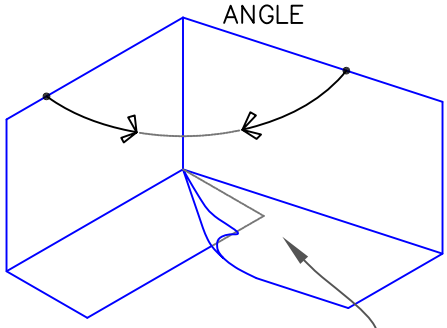


NOTE:

APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



FOLD TO AN ANGLE TO FIT THE EXISTING INSIDE CORNER ANGLE

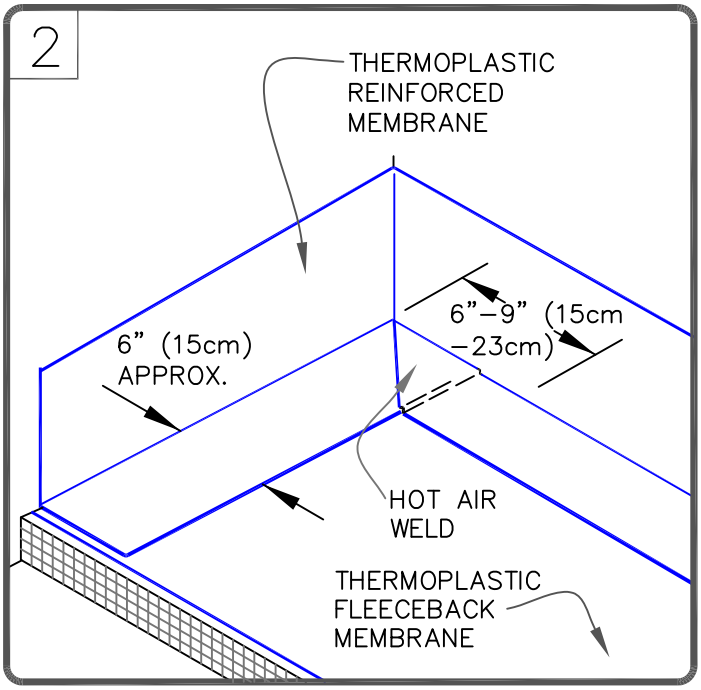


NOTE: THE 45° CUT SIDE GOES ABOVE THE 90° CUT SIDE.

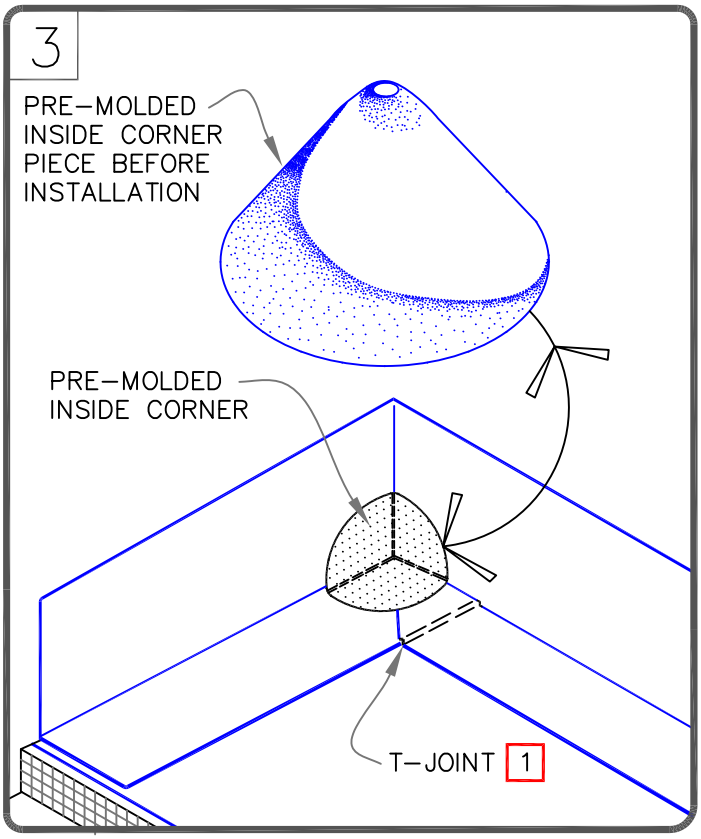
MAKE CREASE

CUT MEMBRANE

2



3



NOTES:

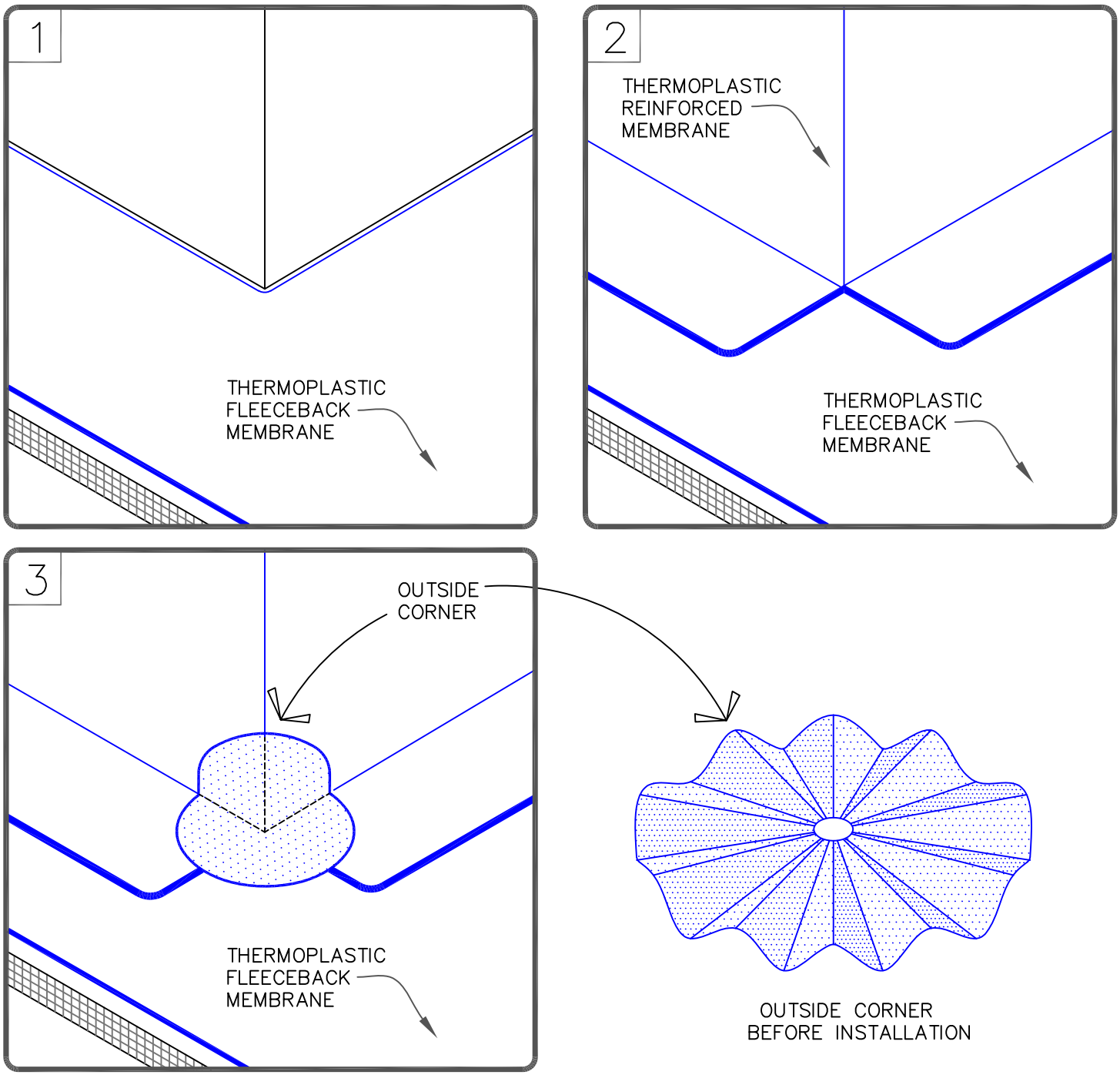
1. WHEN USING 115 OR 135-MIL FLEECEBACK TPO OR 135-MIL FLEECEBACK PVC/KEE HP MEMBRANE, APPLY A 4-1/2" (11cm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.
2. WHEN USING 115-MIL FLEECEBACK TPO, MAXIMUM WARRANTY IS 20 YEARS

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

THERMOPLASTIC PRE-MOLDED INSIDE CORNER

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB-15C.1
FLEECEBACK ADHERED



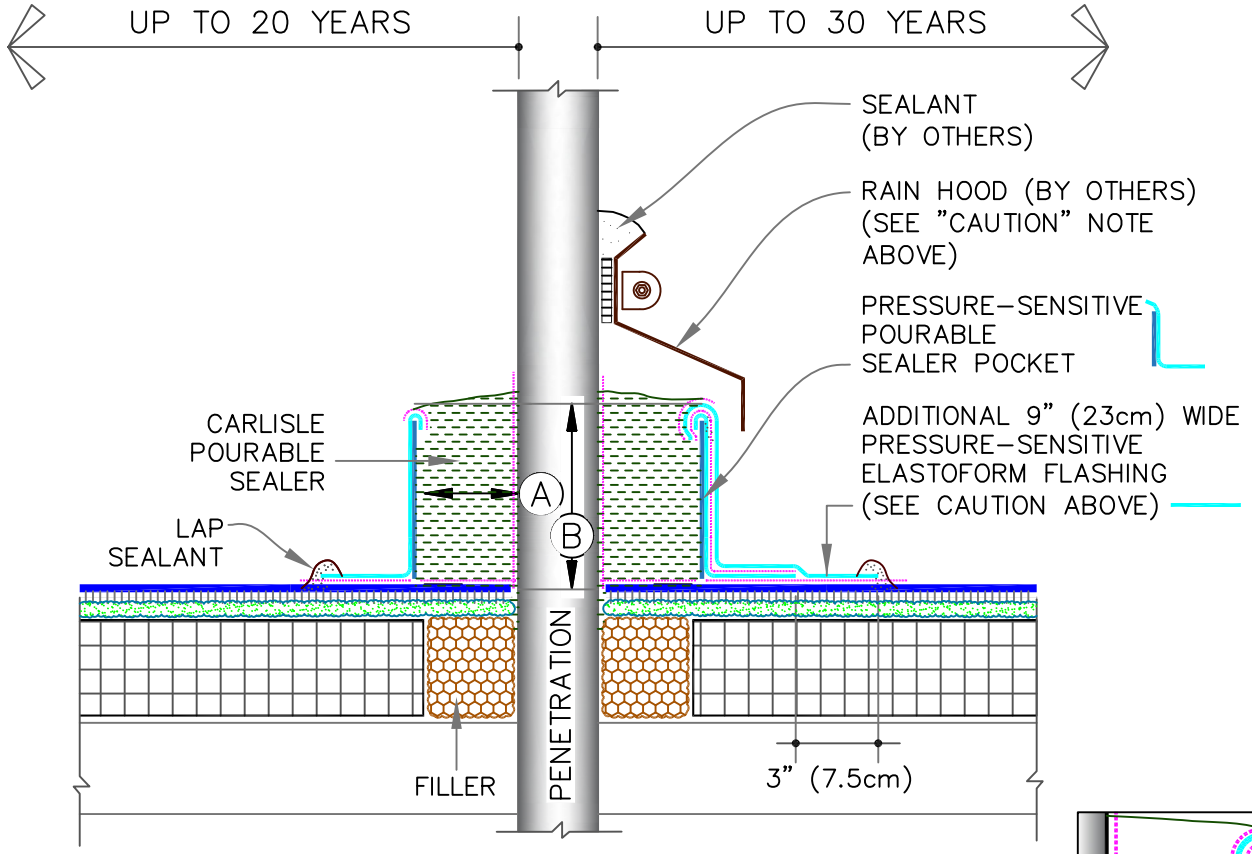
NOTE:

APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

FleeceBACK MEMBRANE APPROVED ADHESIVE APPROVED SUBSTRATE 0 SEE NOTE(S)	THERMOPLASTIC PRE-MOLDED OUTSIDE CORNER MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. FB-15D.1 FLEECEBACK ADHERED

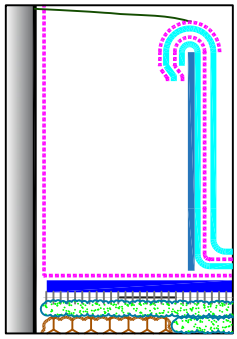
CAUTION

POURABLE SEALER POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS AND AN EXTRA LAYER OF PRESSURE SENSITIVE ELASTOFORM FLASHING [EXTENDING 3" (7.5cm) BEYOND THE BASE LAYER OF FLASHING] FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES.



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. PENETRATIONS, MEMBRANE, FLASHING AND METAL (INSIDE POCKET) MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO DETAIL MF-8A) REGARDLESS OF SIZE OR DIAMETER.
8. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER EXCEPT BLUE PLASTIC SUPPORT STRIP

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

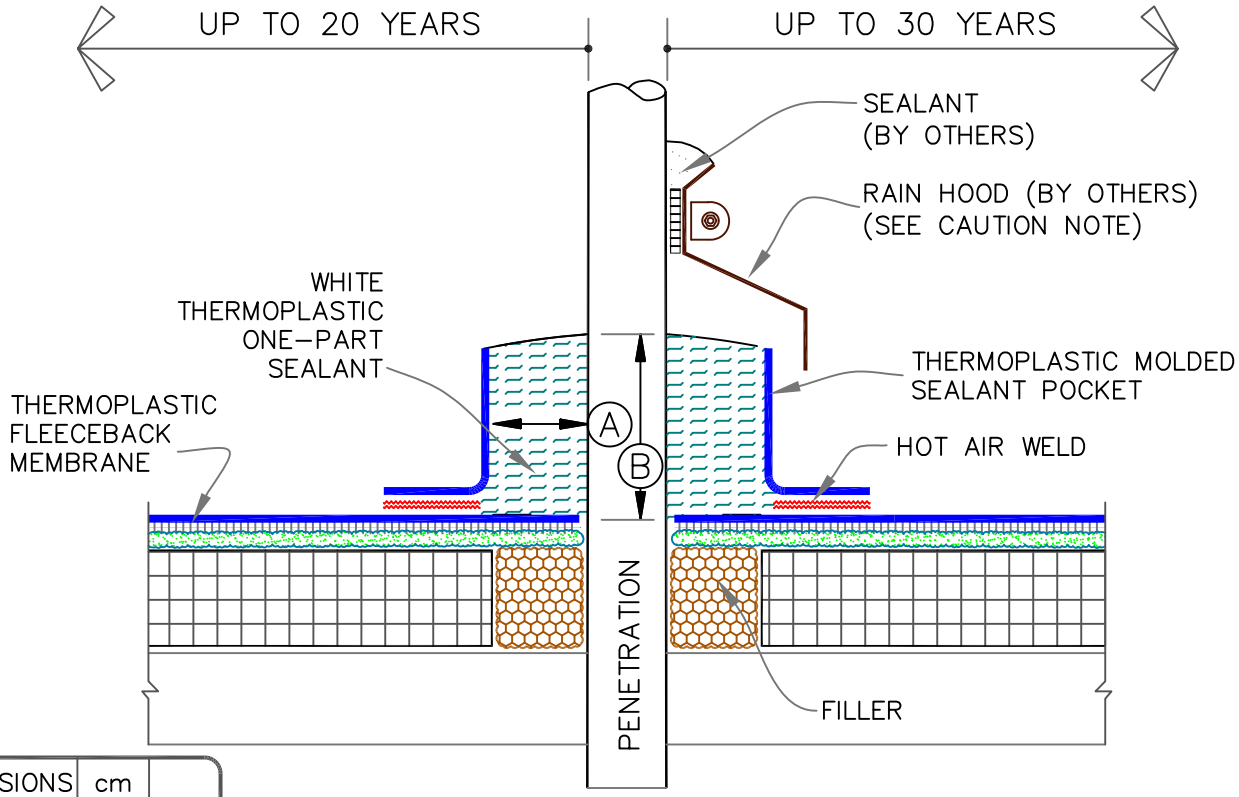
EPDM PRESSURE-SENSITIVE POURABLE SEALER POCKET

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB-16A.1
FLEECEBACK ADHERED

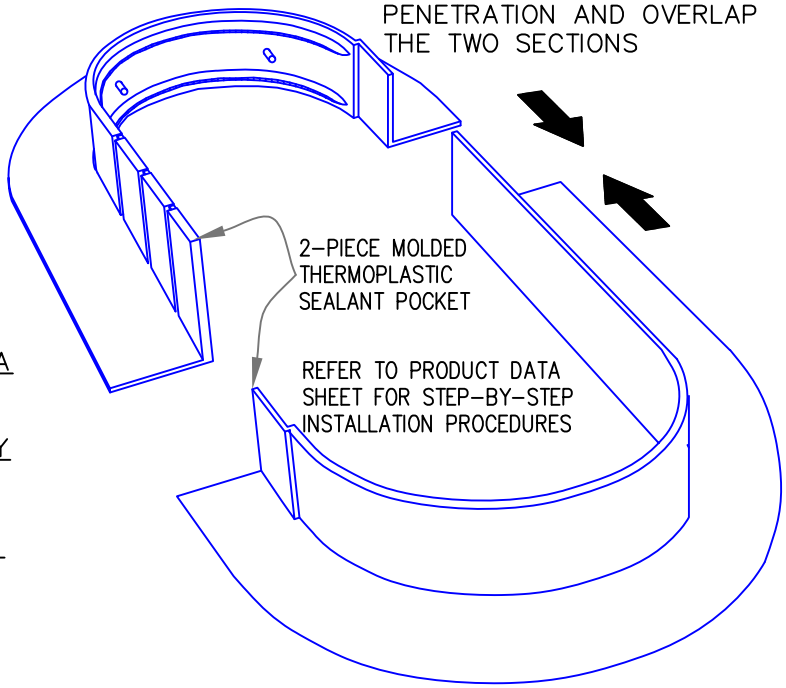
CAUTION

MOLDED SEALANT POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30 YEAR WARRANTIES.



DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

PLACE MOLDED THERMOPLASTIC SEALANT POCKET AROUND PENETRATION AND OVERLAP THE TWO SECTIONS



NOTES:

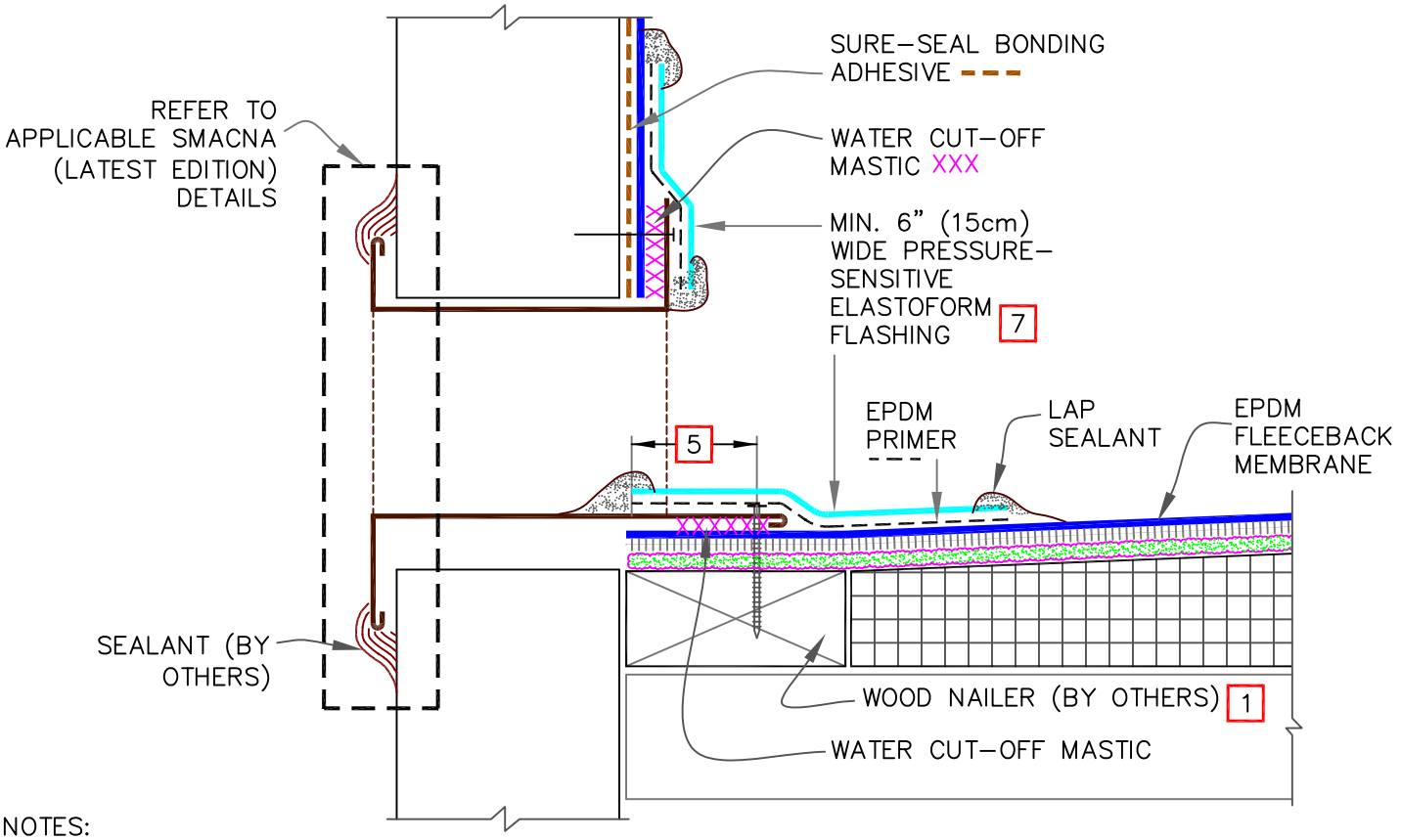
1. TEMPERATURE OF PIPE MUST NOT EXCEED 160°F (71°C).
2. WHEN USING TPO MEMBRANE/MOLDED SEALANT POCKET, APPLY A THIN COAT OF TPO PRIMER TO THE INSIDE AND AROUND THE TOP RIM OF THE POCKET, TO THE DECK MEMBRANE ENCLOSED BY THE POCKET AND TO THE PENETRATION USING A SMALL PAINT BRUSH. WHEN USING PVC MOLDED SEALANT POCKET, CLEAN THE POCKET WITH PVC KEE HP CLEANER, APPLY TPO CLEANER TO PENETRATION(S) ONLY.
3. ONE-PART SEALANT MUST COMPLETELY FILL MOLDED SEALANT POCKET TO PREVENT PONDING OF WATER.
4. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

THERMOPLASTIC MOLDED SEALANT POCKET

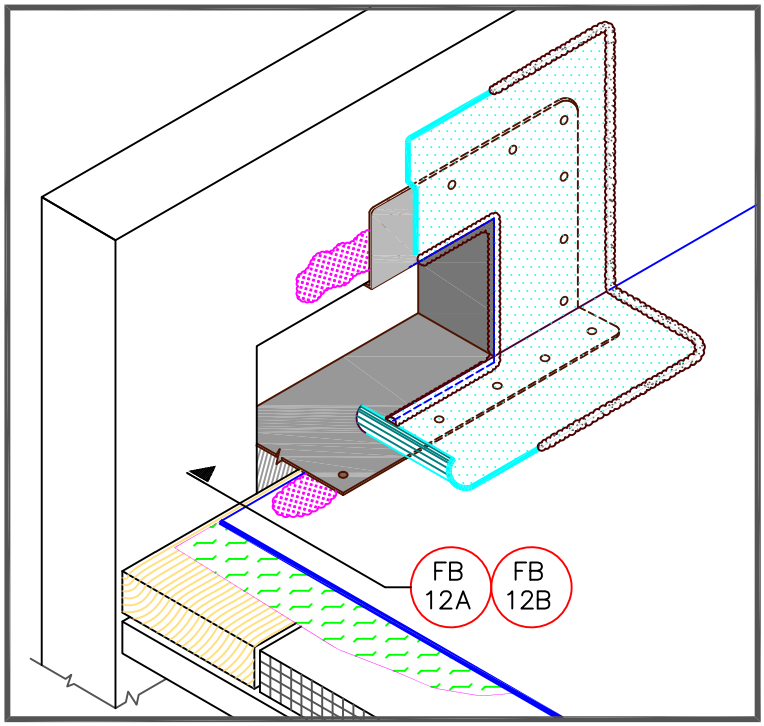
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB-16B.1
FLEECEBACK ADHERED



NOTES:

1. WOOD NAILERS ARE INSTALLED ONLY AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. INSTALL WALL FLASHING PRIOR TO SCUPPER INSTALLATION.
3. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS. SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
4. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
5. SCUPPER FLANGES MUST BE TOTALLY COVERED BY PRESSURE-SENSITIVE ELASTOFORM FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
6. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING EPDM PRIMER.
7. APPLY EPDM PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING PRESSURE-SENSITIVE ELASTOFORM FLASHING.

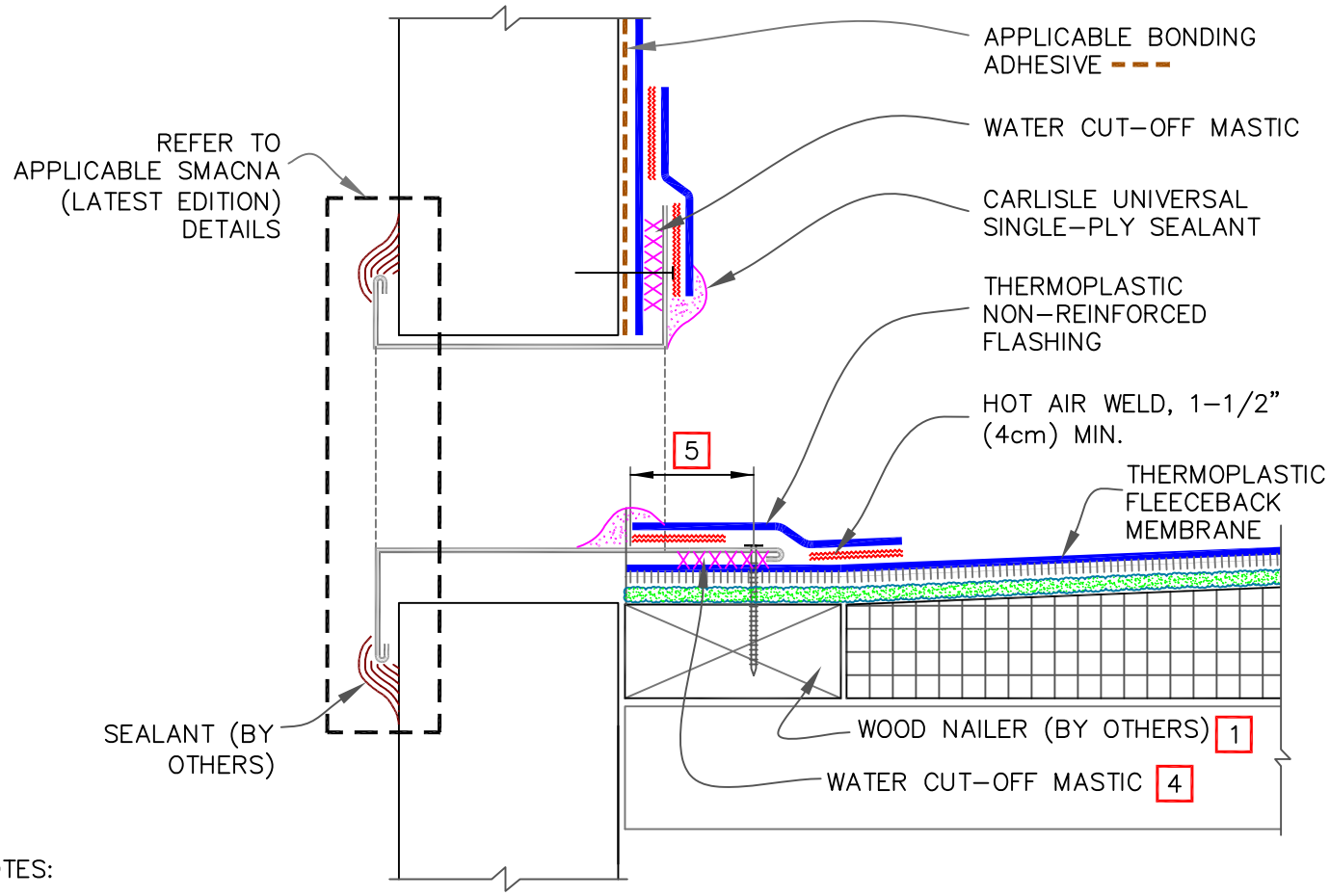


FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

THROUGH-WALL SCUPPER WITH PRESSURE-SENSITIVE EPDM FLASHING

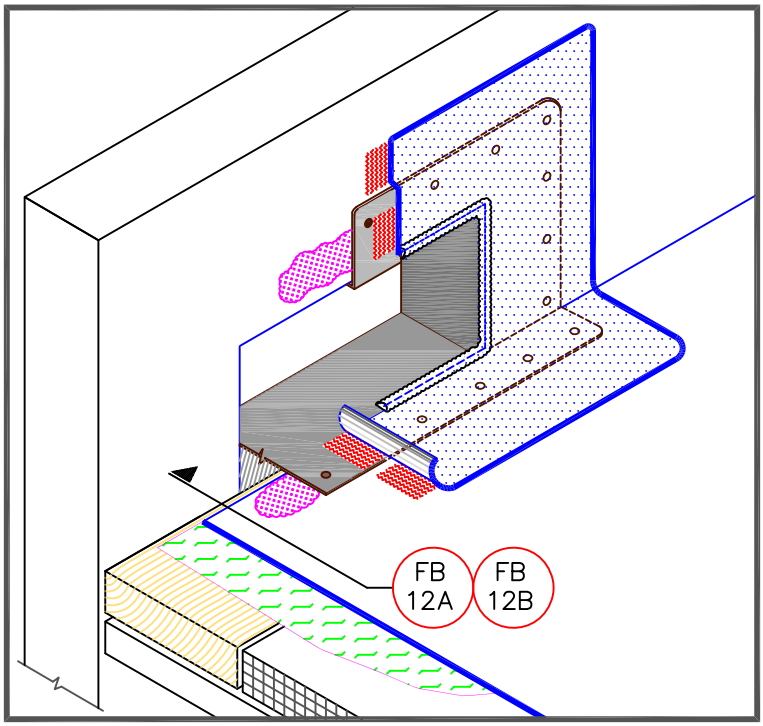
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB-18A.1
FLEECEBACK ADHERED



NOTES:

1. WOOD NAILERS ARE INSTALLED ONLY AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. INSTALL WALL FLASHING PRIOR TO SCUPPER INSTALLATION.
3. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS. SOLDER ALL SCUPPER SEAMS WATER–TIGHT.
4. WATER CUT–OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
5. SCUPPER FLANGES MUST BE TOTALLY COVERED BY THERMOPLASTIC NON–REINFORCED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
6. UNIVERSAL SINGLE–PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. WHEN USING TPO MEMBRANE, TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.

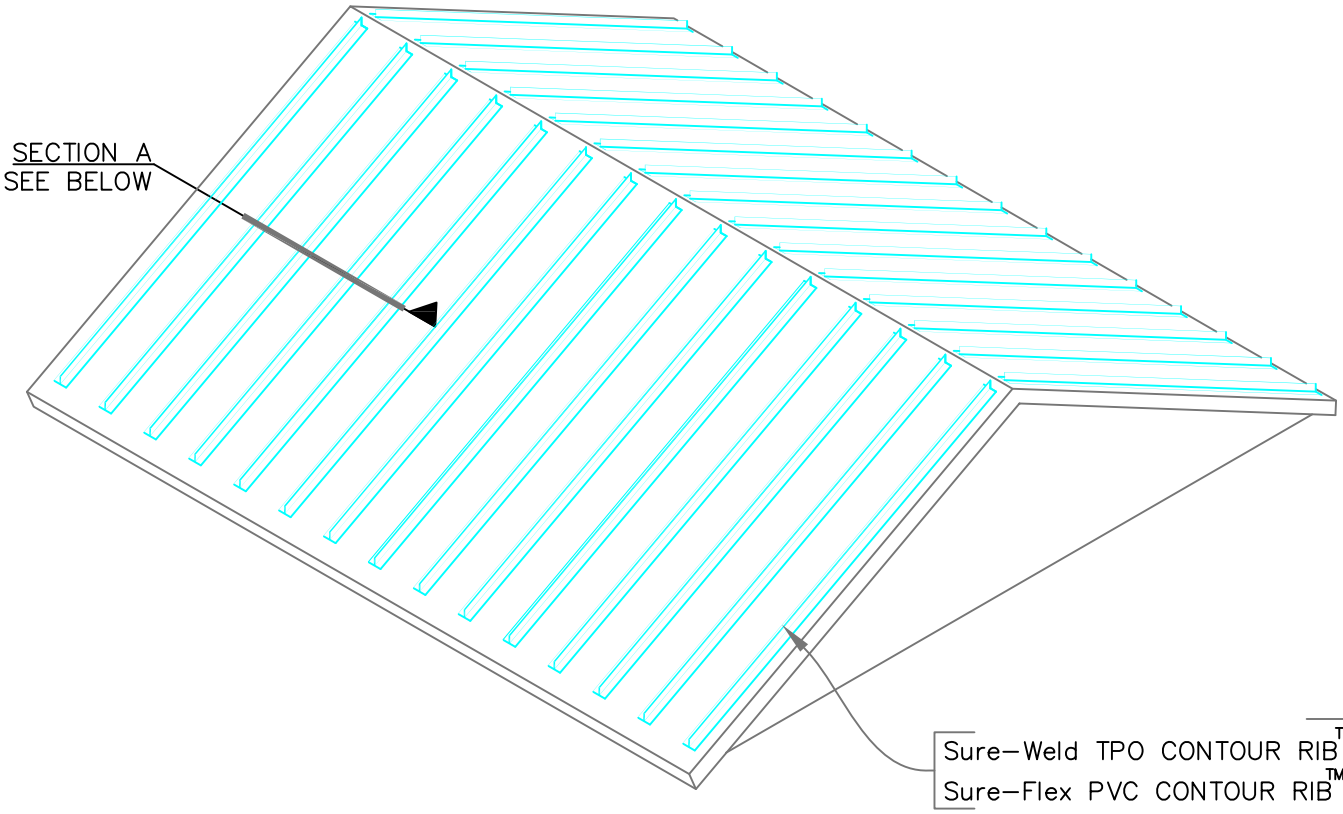


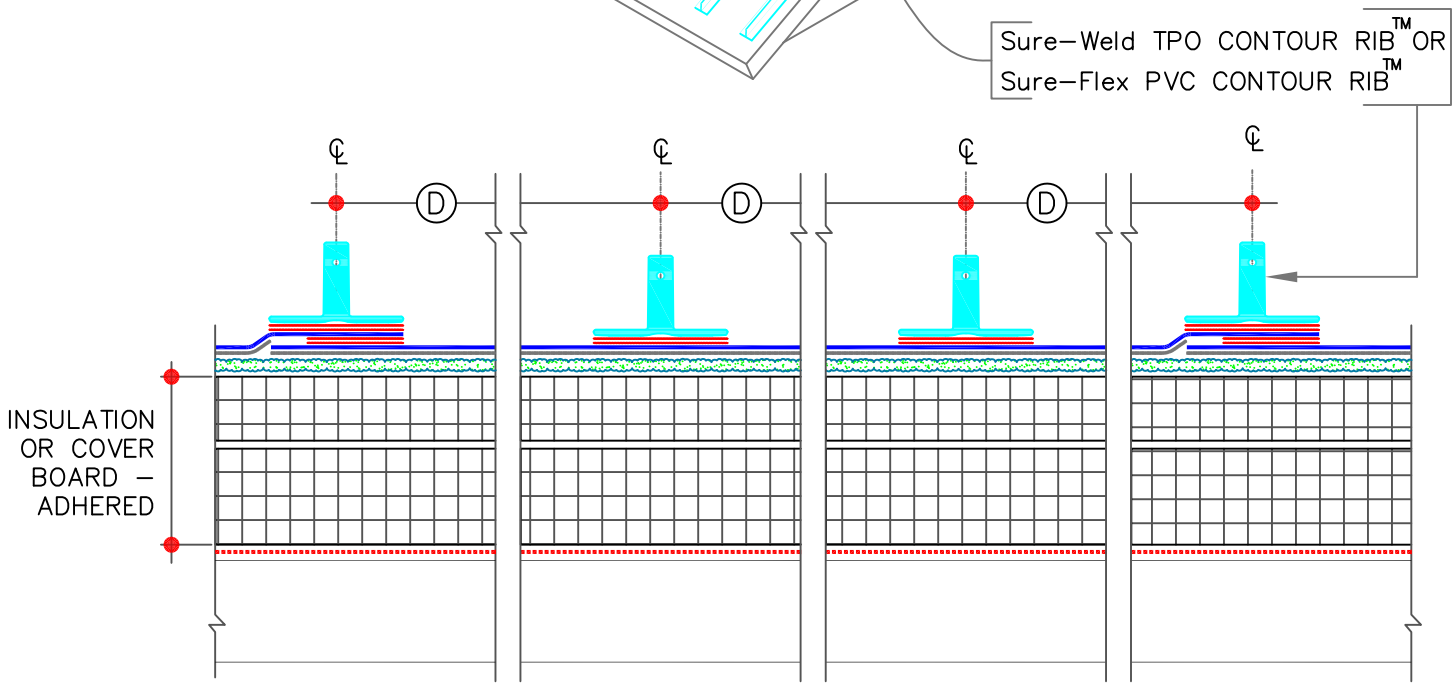
FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

THROUGH–WALL SCUPPER WITH SecurWELD OR SURE–FLEX METAL

MAXIMUM WARRANTY: 30 YEARS

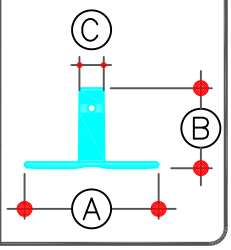
DETAIL NO.
FB–18B.1
FLEECEBACK ADHERED





SECTION A: PVC/TPO CONTOUR RIB PROFILE

RIB PROFILE DIMENSIONS		
	INCH	cm
Ⓐ	1–3/4"	4.5
Ⓑ	1–1/4"	3
Ⓒ	1/2"	1
Ⓓ	VARIES	



HOT AIR WELD (REFER TO SPECS)

AIR/VAPOR BARRIER (WHERE REQUIRED)

FleeceBACK MEMBRANE
APPROVED ADHESIVE
APPROVED SUBSTRATE
0 SEE NOTE(S)

SIMULATION OF METAL ROOF IN THERMOPLASTIC MEMBRANES

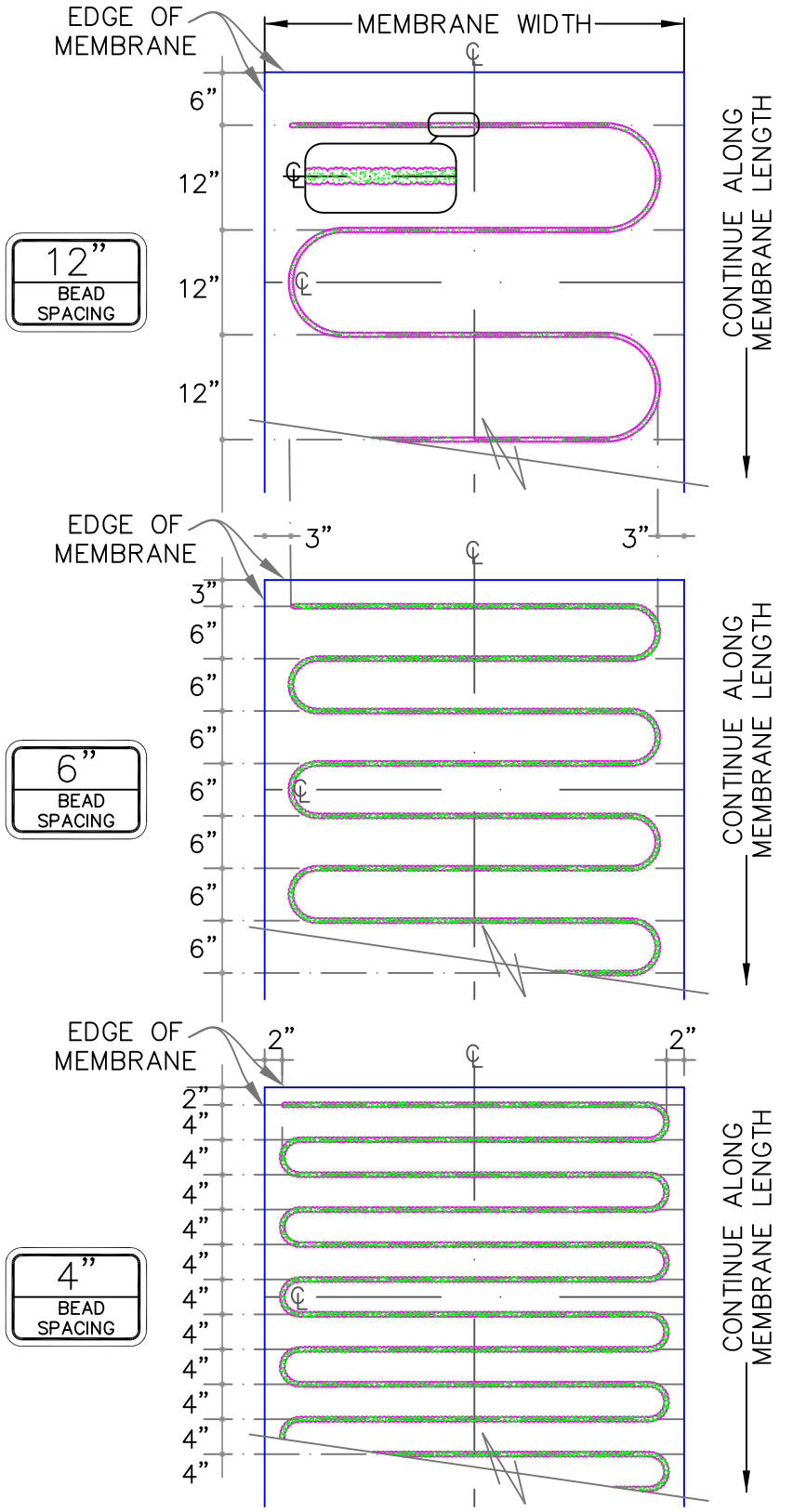
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
FB–25.1
FLEECEBACK ADHERED

FLEXIBLE FAST ADHESIVE BEADS ATTACHMENT

NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR PRODUCT DATA SHEETS FOR APPROPRIATE BEAD SPACING BASED UPON THE BUILDING HEIGHT, WARRANTY TERM AND ACCEPTABLE SUBSTRATE.
2. THE SURFACE TO WHICH ADHESIVE IS TO BE APPLIED SHALL BE DRY, FREE OF FINS, PROTRUSIONS, SHARP EDGES, LOOSE AND FOREIGN MATERIALS, OIL AND GREASE. AREA SHOULD BE CLEANED WITH AN AIR BLOWER.
3. PREVIOUSLY UNEXPOSED ASPHALT OR RESIDUE MUST BE PRIMED WITH CARLISLE CAVGRIP III, 702 OR 702LV PRIMER.
4. SEAL ALL GAPS IN THE CONCRETE DECK WITH CARLISLE 725TR OR OTHER SUITABLE MATERIAL TO AVOID CONDENSATION ISSUES OR FILL WITH CARLISLE INSULATION ADHESIVE.
5. UNROLL 10' TO 15' OF MEMBRANE TO ENSURE IT IS PROPERLY ALIGNED AND FOLD UNROLLED SECTION BACK OVER ROLL.
6. APPLY FLEXIBLE FAST ADHESIVE OVER THE SUBSTRATE AREA TO BE COVERED BY THE MEMBRANE THAT IS FOLDED BACK.
7. ALLOW FLEXIBLE FAST ADHESIVE TO RISE AND DEVELOP "STRING / BODY" (APPROX. 1–1/2 TO 2 MINUTES). STRING TIME WILL VARY BASED ON ENVIRONMENTAL CONDITIONS LIKE TEMPERATURE AND HUMIDITY. DO NOT ALLOW THE ADHESIVE TO OVER–CURE PRIOR TO SETTING INSULATION BOARDS.
8. ROLL THE MEMBRANE USING A 30" WIDE, 150 POUND WEIGHTED SEGMENTED STEEL ROLLER, TO SET THE MEMBRANE BACK INTO THE ADHESIVE.



FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

℄ CENTER LINE
GUIDE LINE
FOAM ADHESIVE

FLEECEBACK MEMBRANE ATTACHMENT USING BEAD ADHESIVE

For additional information, refer to Specifications

DETAIL NO.
FB–27
ADHERED SYSTEM

NOTES:

1. Flexible FAST ADHESIVE SHOULD BE DISPENSED IN LARGE DROPLETS, NOT A FINE MIST. AIR PRESSURE/FLOW IS TOO HIGH IF THE Flexible FAST ADHESIVE IS DISPENSING IN A FINE MIST.

2. REFER TO CARLISLE DOCUMENT, SPEC SUPPLEMENT, SECTION G-02-22.3a FOR EQUIPMENT INFORMATION.

3. THE SURFACE TO WHICH ADHESIVE IS TO BE APPLIED SHALL BE DRY, FREE OF FINS, PROTRUSIONS, SHARP EDGES, LOOSE AND FOREIGN MATERIALS, OIL AND GREASE. AREA SHOULD BE CLEANED WITH AN AIR BLOWER.

4. PREVIOUSLY UNEXPOSED ASPHALT OR RESIDUAL MUST BE PRIMED WITH CARLISLE CAVGRIP III, 702 OR 702LV PRIMER.

5. SEAL ALL GAPS IN THE CONCRETE DECK WITH CARLISLE 725TR OR OTHER SUITABLE MATERIAL TO AVOID CONDENSATION ISSUES OR FILL WITH CARLISLE INSULATION ADHESIVE.

6. UNROLL 10' TO 15' (305-457cm) OF MEMBRANE TO ENSURE IT IS PROPERLY ALIGNED AND FOLD UNROLLED SECTION BACK OVER ROLL.

7. APPLY Flexible FAST ADHESIVE OVER THE SUBSTRATE AREA TO BE COVERED BY THE MEMBRANE THAT IS FOLDED BACK.

8. ALLOW Flexible FAST ADHESIVE TO RISE AND DEVELOP "STRING/BODY" (APPROX. 1-1/2 TO 2 MINUTES). STRING TIME WILL VARY BASED ON ENVIRONMENTAL CONDITIONS LIKE TEMPERATURE AND HUMIDITY. DO NOT ALL THE ADHESIVE TO OVER-CURE PRIOR TO SETTING INSULATION BOARDS.

9. ROLL THE MEMBRANE USING A 30" (76cm) WIDE, 150 POUND (68 KILOGRAM) WEIGHTED SEGMENTED STEEL ROLLER, TO SET THE MEMBRANE BACK INTO THE ADHESIVE. REFER TO CARLISLE DOCUMENT G-03-22.4.

FIG 1. CORRECT COVERAGE – SPLATTER APPLICATION

FIG 2. LIGHT COVERAGE – SPLATTER APPLICATION

	FLEECEBACK MEMBRANE ATTACHMENT USING SPLATTER For additional information, refer to Specifications	FB	DETAIL NO. FB-27.1 ADHERED SYSTEM

FleeceBACK® AFX Roofing Systems

AFX EPDM / AFX Sure-Weld® / FleeceBACK Sure-Flex KEE HP Hot Mopped / Cold Applied Adhered Roofing System

Table of Contents

July 2024

FleeceBACK® AFX Roofing Systems

AFX EPDM / AFX Sure-Weld® / FleeceBACK Sure-Flex KEE HP Hot Mopped / Cold Applied Adhered Roofing System

July 2024

The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing system 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.

PART I GENERAL

1.01 Description

The Hot Mopped / Cold Applied FleeceBACK AFX or FleeceBACK KEE HP Membrane System incorporates the use of hot mopped (Type III or IV Asphalt, or SEBS Modified Asphalt) or cold applied (Cold Applied Adhesive, an asphalt-modified polyether VOC free adhesive) FleeceBACK AFX (EPDM/TPO) membrane or FleeceBACK KEE HP membrane to recover various existing roof systems. The membrane assembly can also be used for new construction or when existing roofing material is to be removed.

1. FleeceBACK AFX EPDM membranes:
   a. Sure-Seal AFX EPDM combines 45- or 60-mil Sure-Seal® non-reinforced EPDM membrane with 7.5 ounce per square yard (45-mil thick), non-woven polyester polypropylene blended fleece-backing resulting in a total thickness of 90-mil or 105-mil thick.

   b. Sure-White (white) AFX EPDM membrane combines 60-mil Sure-White® non-reinforced EPDM membrane with 7.5 ounce per square yard (45-mil thick), non-woven polyester polypropylene blended fleece-backing resulting in a total thickness of 105-mil thick.

2. FleeceBACK AFX Sure-Weld TPO membrane combines 45-, 60- or 80-mil Sure-Weld TPO polyester reinforced membrane with 10 ounce per square yard (75-mil thick), non-woven polyester polypropylene blended fleece-backing resulting in a total thickness of 120-, 135- or 155-mil thick.

3. FleeceBACK Sure-Flex KEE HP membrane combines 50-, 60- or 80-mil Sure-Flex KEE HP polyester reinforced membrane with 7.5 ounce per square yard (55-mil thick), non-woven polyester polypropylene blended fleece-backing resulting in a total thickness of 105-, 115- or 135-mil thick.

Adjoining EPDM sheets are spliced together with Factory-Applied SecurTAPE™ and Primer. Sheet end laps are butted and overlaid with Sure-Seal or Sure-White Cured Cover Strip or Pressure-Sensitive Overlayment Strip.

When TPO or KEE HP membrane is used, adjoining sheets are overlapped and joined with a minimum 1-1/2 inch wide hot air weld. Sheet end laps are butted together and overlaid with Sure-Weld Reinforced Membrane and hot air welded.

Note: As an alternate to the adhered method, the membrane can be mechanically fastened over existing roofing membrane as a recover option with or without insulation. Refer Attachment I at the end of this section.

1.02 Assembly Options

A. **Projects with Smooth BUR (Type III or IV Asphalt), Mineral Cap Sheet or SBS Modified Bitumen**

FleeceBACK AFX or FleeceBACK KEE HP Membrane adhered with Type III or IV Asphalt, SEBS Modified Asphalt, or Carlisle Cold Applied Adhesive after priming the existing roofing membrane with CCW-550 Cut Back Asphalt. When Cold Applied Adhesive is to be used, power washing the existing membrane is an acceptable alternative to Cut Back Asphalt.

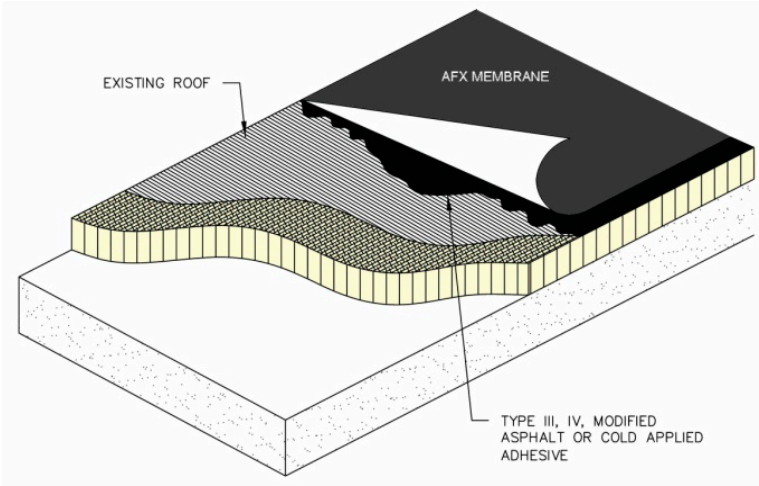


Figure 1

B. **Projects with Wood, Gypsum, Lightweight Insulating Concrete, Fibrous Cement (No Insulation)**

When FleeceBACK AFX or FleeceBACK KEE HP Membrane is installed over Cellular or perlite based lightweight insulated concrete, one-way vents are required and must be installed at the rate of 1 vent every 2000 square feet.

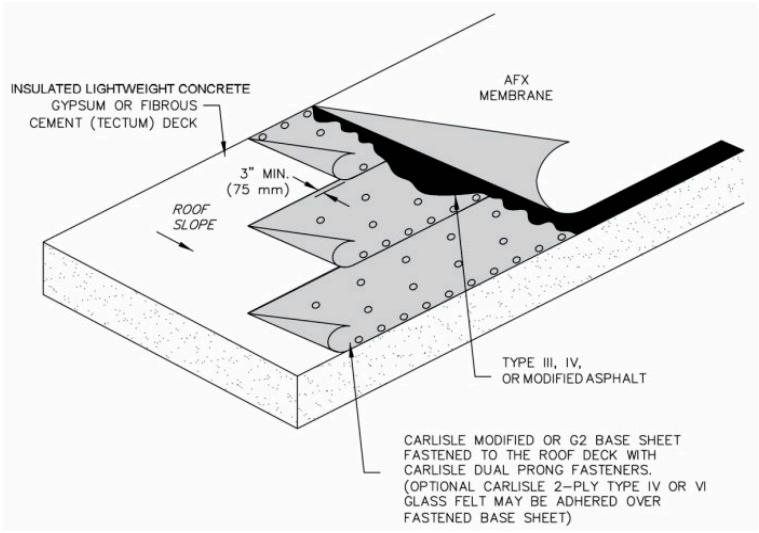


Figure 2

1. When specified, the membrane can be mopped with acceptable asphalt directly to a fastened Carlisle G2 or Modified Base Sheet.

2. Cold Applied Assemblies, the membrane may be adhered directly to a wood, gypsum, or lightweight concrete deck (cellular or perlite based). Over fibrous cement decks Carlisle G2 or Modified Base Sheet must be fastened to the deck.

3. Projects with vermiculite lightweight insulated concrete, FleeceBACK AFX or FleeceBACK KEE HP

membrane must be installed directly over Carlisle G2 Base Sheet prior to mopping the membrane and one-way vents are required. Vents shall be installed at the rate of 1 every 1000 square feet.

C. **Projects with Structural Concrete Decks**

1. In a Hot Mopped Assembly, the membrane may be applied directly to the deck after the surface has been primed with CCW-550 Cut Back Asphalt Primer. Projects where a two-ply vapor retarder/temporary roof has been specified, the membrane may be mopped directly to Carlisle's Type IV Glass Ply Felt.

2. In Cold Applied Assemblies, the membrane may be adhered directly to the structural concrete.

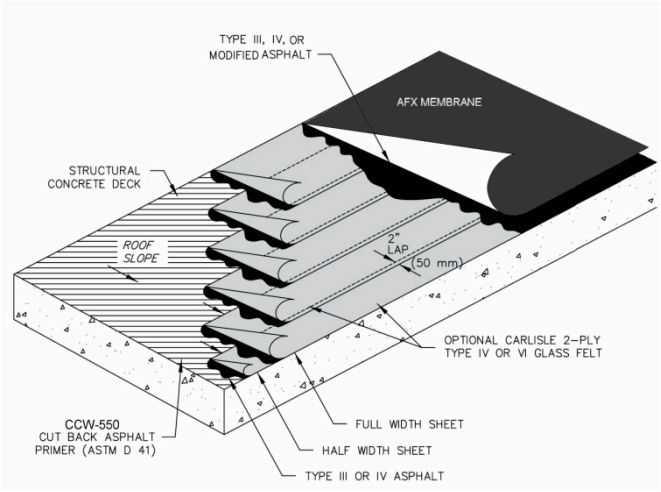


Figure 3

Caution: Curing compounds used in conjunction with structural concrete decks must be compatible with the attachment method and should be investigated. Certain concrete curing compounds develop a seal or oil coating on the concrete's surface that can prevent adhering to the substrate.

D. **Projects Where Additional Insulation is Specified**

1. **General**

a. For Hot Mopped Assemblies, when additional insulation is desired the new insulation must be overlaid with Carlisle 1/2" thick HP Recovery Board, or Securock.

b. Both new insulation and the membrane underlayment may be mechanically fastened or adhered with either Flexible FAST™ Adhesive or mopped in with Type III / IV or SEBS Modified Asphalt (maximum board size is 4' x 4').

c. On fluted/corrugated steel decks, insulation cannot be mopped to the steel deck. New insulation must be attached incorporating mechanical securement or Flexible FAST Adhesive.

2. **Projects with Gypsum and Fibrous Decks**

When mopping insulation to gypsum, fibrous cement and wood decks, Carlisle G2 Base Sheet or Carlisle Modified Base Sheet must be used and shall be fastened to the deck.

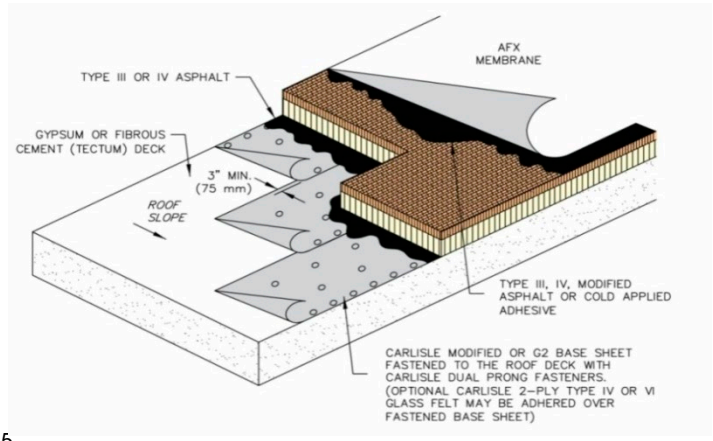


Figure 4

3. **Projects with Structural Concrete Decks**

On structural concrete decks, when mopping of new insulation is specified, the deck shall be primed with CCW-550 Cut Back Asphalt Primer prior to mopping of insulation boards. As an option, two plies of Carlisle Type IV or VI Glass Felt may be mopped to the primed concrete surface.

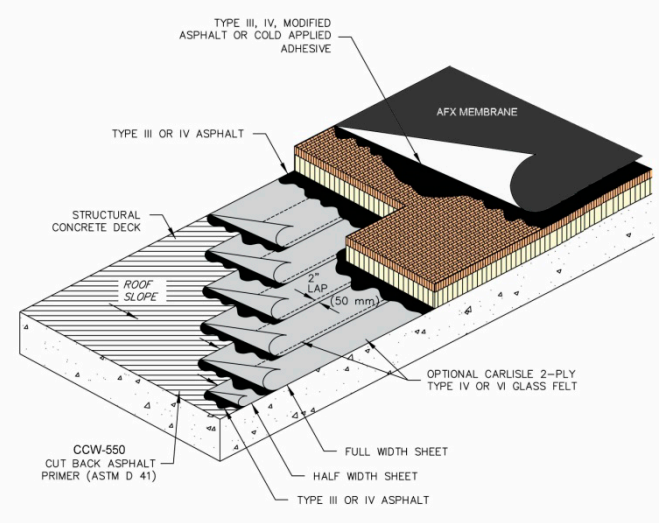


Figure 5

1.03 General Design Considerations

A. Petroleum based products, certain chemicals and waste products (i.e. grease, oil, animal fats, etc.) are not compatible with this roofing system. Carlisle should be contacted for verification of compatibility and recommendations concerning an acceptable roofing assembly.

B. It is the responsibility of the Specifiers to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

C. It is the responsibility of the building owner or his/her designated representative to verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is to be specified on an existing facility.

D. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent possible damage to the membrane roofing system.

E. Concentrated loads from rooftop equipment may cause deformation of insulation/underlayment and possible damage to the membrane if protection is not provided. At protection course or sleepers must be specified.

F. Roof Insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.

G. Multiple layers of insulation are recommended, with all joints staggered between layers.

H. For minimum recommended R-Values, previously published by American Society of Heating and Air-

Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.

I. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to **Design References DR-01 "Construction Generated Moisture"** included in the Carlisle Technical Manual.

J. Vapor Retarders

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:

2. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.

3. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

K. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation.

1.04 Quality Assurance

A. Building codes are above and beyond the intended purpose of this specification. The building **owner**, **owner's representative** or **Specifier** should verify 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, DORA (Directory of Roof Assemblies), Factory Mutual (FM) Approval Guide or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

B. When recovering or retrofitting an existing roof system, the addition of new insulation (type and thickness) may alter the fire performance characteristics of the assembly. Building owners or their designated representatives shall consult the local code enforcement agency to avoid potential code violation.

C. Carlisle recommends the use of Carlisle supplied products with this roofing system. 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.

D. The solar reflectance of the white membrane may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure the maximum solar reflectance.

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

F. There must be no deviations made from Carlisle's specifications or the approved shop drawings without the PRIOR APPROVAL of Carlisle.

G. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative of Carlisle SynTec to ascertain the membrane 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.

1.05 Submittals

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

1. Projects where building height exceeds 50 feet.

2. Air pressurized buildings or 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).

3. Cold storage buildings and freezer facilities.

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

5. Projects where wind speed warranty coverage greater than 90 mph is specified.

6. For all projects, prior to inspection by Carlisle, a final shop drawing should be approved. Depending on project complexity and number of roof levels, a project description/profile may be substituted. Contact Carlisle for clarification.

B. 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.

Shop drawings must include:

1. Outline of roof and size
2. Deck type (for multiple deck types)
3. Location and type of all penetrations
4. Perimeter and penetration details
5. Key plan (for multiple roof areas) with roof heights indicated

When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to Carlisle for revision and approval prior to inspection and warranty issuance.

C. 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.

D. As-Built Projects (roofing systems installed prior to project approval by Carlisle)

The Carlisle Authorized Applicator may supply Carlisle with an As-Built drawing for a project completed prior to Carlisle's approval. The As-Built drawings:

1. Must conform to Carlisle's most current published specifications and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.

1.06 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 2 “Products” Section in this specification and **Spec Supplement P-01 “Related Products”**.

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

1. **Table I – Membrane System Warranty Options - 5 YR to 30 YR.** Identifies minimum membrane thickness for membranes used in hot mopped and cold applied roofing systems.

2. **Table II – Base Sheet Requirements for Direct Hot Mopped Membrane.** Identifies base sheet options for hot mopped roofing systems.

3. **Table III – Underlayment/Insulation & Required Attachment New Construction/Tear-off – Up to 20 YR.** Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

4. **Table IV - Direct Application to Existing Roofing Materials - Up to 15 YR.** Identifies the acceptable existing roofing materials that the FleeceBACK AFX or FleeceBACK KEE HP membrane can be adhered directly to with either asphalt or Cold Applied Adhesive up to 15 year based on the wind speed coverage available.

5. **Table V – Underlayment/Insulation & Required Attachment Assemblies Hot Mopped 25/30 YR.** Identifies required underlayments for adhered roofing systems with Warranties up to 20 year based on the various wind speed coverages available. The Table also identifies fastening density or adhesive bead spacing and required edge terminations.

Table I Membrane System Warranty Options – 5 Year to 30 Year

General: When FleeceBACK AFX or FleeceBACK KEE HP membranes are adhered directly to an acceptable existing roofing material as shown in Paragraph 1.02.A or to a concrete deck as shown in Paragraph 1.02.C, the application will be limited to Maximum 15 Year Warranty with Peak Gust Wind Speed of 72 MPH. When greater warranty coverage is specified, Carlisle must be contacted to determine any added enhancements.

Years	Membrane Attachment (3)			Minimum Membrane Thickness	Additional Coverage (1)		
	55 or 72 mph	80 mph	90 mph		Accidental Puncture	1" Dia. Hail	2" Dia. Hail
5, 10, or 15 year	Type III / IV or Cold Applied	SEBS	SEBS & Modified Base Sheet	FleeceBACK AFX EPDM 90-mil	Up to 8 man-hours per year	Type III / IV or Cold Applied	NA (2)
				FleeceBACK AFX TPO 120-mil	NA (2)		
				FleeceBACK KEE HP 105-mil			
20 year	Type III / IV or Cold Applied	SEBS	SEBS & Modified Base Sheet	FleeceBACK AFX EPDM 90-mil	Up to 8 man-hours per year	Type III / IV or Cold Applied	NA (2)
				FleeceBACK AFX TPO 135-mil	Up to 16 man-hours per year		SEBS or Cold Applied
				FleeceBACK KEE HP 135-mil			
25 year	Type III / IV & Modified Base Sheet	SEBS & Modified Base Sheet	NA (2)	FleeceBACK AFX EPDM 105-mil	Up to 16 man-hours per year	SEBS	SEBS
				FleeceBACK AFX TPO 155-mil	Up to 32 man-hours per year		
				FleeceBACK KEE HP 135-mil	Up to 16 man-hours per year		
30 year	Type III / IV & Modified Base Sheet	SEBS & Modified Base Sheet	NA (2)	FleeceBACK AFX TPO 155-mil	Up to 32 man-hours per year	SEBS	SEBS

(1) Hail coverage option is available and requires underlayment of HP Recovery Board, or Securock
(2) NA = Not Available
(3) See Table III for Underlayment/Insulation Requirements

Table II Base Sheet Requirements for Direct Hot Mopped Membrane

General: When a base sheet is required in Paragraph 1.02 Assembly Options or when it is mandated by Warranty duration, the appropriate Carlisle base sheet must be used as outlined in Table II below. Applications where the base sheet is fastened to wood, gypsum, lightweight insulated concrete, or fibrous cement decks will be limited to Maximum 15 Year Warranty with Peak Gust Wind Speed of 72 MPH. When greater warranty coverage is specified, Carlisle must be contacted to determine any added enhancements.

Years	Carlisle Type IV or VI Glass Ply Felt	SureMB G2 Base	SureMB Vented Base	SureMB 70 SA Base Ply	SureMB 90TG Base	SureMB 90 Base Ply	SureMB 120TG Base
5, 10 or 15 year	√	√	√	√	√	√	√
20 year	√	√	√	√	√	√	√
25 year	NA	NA	NA	NA	NA	√√	√√
30 year	NA	NA	NA	NA	NA	√√	√√

Notes: √√ = Required √ = Acceptable NA = Not Available

Table III Underlayment/Insulation & Required Attachment New Construction/Tear-Off Up to 20 YR

Other Requirements are Listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Warranty Wind Speed	Hot Mopped	Cold Applied	Minimum Membrane Underlayment	Insulation/Underlayment Attachment				
				Asphalt Fully Mopped 4' x 4' size bd		Adhesive Ribbon Spacing for 4' x 4' size bd		# of Fasteners for 4' x 8' size bd (6)
						Field	Perimeter	
55mph		√	1" (20-psi) Polyiso	Type III or IV		12” (1)(2)	6” (1)	16
		√	1-1/2" (20-psi) Polyiso	Type III or IV		12” (1)(2)	6” (1)	10
		√	2" (20-psi) Polyiso	Type III or IV		12”(1)(2)	6” (1)	8
	√	√	1/2” HP Recovery Bd	Type III or IV		12”(1)(2)	6” (1)	16
72mph or 80mph		√	1/4" Securock	Not Recommended		12” (1)(2)(3)	6” (1)(3)	12
		√	1/2' SecurShield™ HD or 1/2' SecurShield HD Eco	72 mph Type III or IV	80 mph SEBS	12” (1)(2)(3)	6” (1)(3)	16
	√	√	1/2” HP Recovery Bd	72 mph Type III or IV	80 mph SEBS	12” (1)(2)(3)	6” (1)(3)	16
		√	1-1/2" (25-psi) Polyiso	72 mph Type III or IV	80 mph SEBS	12” (1)(2)(3)	6” (1)(3)	11
		√	2" (25-psi) Polyiso	72 mph Type III or IV	80 mph SEBS	12” (1)(2)(3)	6” (1)(3)	8
90mph	√	√	1/2" Securock	SEBS		6” (5)	6” (3)(4)	12
		√	1-1/2" (20-psi) SecurShield Polyiso or 1-1/2” (20-psi) SecurShield Eco	SEBS		6” (5)	6” (3)(4)	16
		√	2" (20-psi) SecurShield Polyiso or 2” (20-psi) SecurShield Eco	SEBS		6” (5)	6” (3)(4)	8
		√	2” SecurShield HD Composite	SEBS		6” (5)	6” (3)(4)	8

Notes:
√ = Acceptable

(1) Gravel Surface BUR - Field @ 6” O.C/ Perimeter @ 4” O.C.
(2) Steel Decks – Field & Perimeter @ 6” O.C.
(3) Cementitious Wood Fiber - Field @ 6” O.C/ Perimeter @ 4” O.C.
(4) Smooth BUR- Field @ 6” O.C/ Perimeter @ 4” O.C.
(5) Gravel Surface BUR – Full Spray or Ribbons @ 4” O.C.
(6) For steel, concrete, and wood plank decks.

Additional Design Considerations (Up to 20 YR Warranty)

1. Refer to Table I for minimum membrane thickness.
2. Local Wind Zone as shown in the ASCE 7 shall not exceed 130 mph.
3. All “T-joints” must be overlaid with appropriate flashing material.
4. For ponding locations, seams should be overlaid with pressure sensitive flashing.
5. 1/4” per horizontal foot slope is preferred; however, 1/8” slope with sufficient number of drains and crickets/saddles may be accepted.
6. Carlisle Termination bars are required for replacement of existing counterflashing. SecurEdge™ metal work is recommended.
7. All wet roofing materials must be totally removed.
8. See DR-05 for insulation fastening patterns.

Table IV Direct Application to Existing Roofing Materials - Up to 20 YR

Other requirements are listed in Additional Design Considerations following this Table.

Warranty Wind Speed	Existing Roofing Material (2)	Membrane Adhesion	
		Hot Mopped	Cold Applied
55mph or 72mph	Smooth Surface BUR / Mineral Surface Cap Sheet	Direct with Type III or IV Asphalt	Direct
	Modified Bitumen	Direct with Type III or IV Asphalt	Direct (1)

Notes:
(1) SBS modified bitumen only.
(2) Refer to paragraph 3.03 for existing material preparation.

Additional Design Considerations (Up to 15 YR Warranty)

1. Refer to Table I for minimum membrane thickness.
2. Local Wind Zone as shown in the ASCE 7 shall not exceed 130 mph.
3. All “T-joints” must be overlaid with appropriate flashing material.
4. For ponding locations, seams should be overlaid with pressure sensitive flashing.
5. 1/4” per horizontal foot slope is preferred; however, 1/8” slope with sufficient number of drains and crickets/saddles may be accepted.
6. Carlisle Termination bars are required for replacement of existing counterflashing. SecurEdge metal work is recommended.
7. All wet roofing materials must be totally removed.
8. Insulation/ cover board will be required for reroofing of Gravel Surface BUR, Coal Tar Pitch, or existing single-ply membrane. Refer to Table III.
9. For 20 additional wind coverage, please contact Carlisle for design considerations.

Table V Underlayment/Insulation & Required Attachment Assemblies Hot Mopped 25/30 YR

Cold applied assemblies are not acceptable to for 25 or 30-year warranties

Other requirements are listed in Additional Design Considerations following this Table

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties for lower speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Warranty Wind Speed	Min. Membrane Underlayment	Insulation/Underlayment Attachment			
		Asphalt Fully Mopped 4' x 4' size board	Adhesive Ribbon Spacing for 4' x 4' size board		# of Fasteners for 4' x 8' size board (4)
			Field	Perimeter	
55 mph	1/2" HP Recovery Bd or Securock	Type III or IV	6" (1)(2)	6" (2)	16
72 mph or 80 mph	1/2" HP Recovery Bd or Securock	SEBS	6" (1)(2)(3)	6" (2)(3)	16

(1) Structural Concrete - Field @ 12" O.C/ Perimeter @ 6" O.C.; 80-mph over structural concrete – Field & Perimeter @ 6" O.C.
(2) Cementitious Wood Fiber & Wood – Full Spray or Ribbons @ 4" O.C.
(3) 80-mph over Gypsum Decks – Full Spray or Ribbons @ 4" O.C.
(4) For steel, concrete, and wood plank decks.

Additional Design Considerations (Up to 30 YR Warranty)

1. Refer to Table I for minimum membrane thickness.
2. Local Wind Zone as shown in the ASCE 7 shall not exceed 130 mph.
3. All "T-joints" must be overlaid with appropriate flashing material.
4. For ponding locations, seams should be overlaid with pressure sensitive flashing.
5. 1/4" per horizontal foot slope is preferred; however 1/8" slope with sufficient number of drains and crickets/saddles may be accepted.
6. Carlisle Termination bars are required for replacement of existing counterflashing. SecurEdge metal work is recommended.
7. All wet roofing materials must be totally removed.
8. For 25/30 YR Splice Criteria refer to **Spec Supplement E-02 "EPDM Membrane Splicing and Splice Repairs"**

E. Access for warranty service

It shall be the owner's responsibility to expose the membrane in the event warranty service is required when access is impaired. Such impairment includes, but is not limited to:

1. Design features, such as window washing equipment, which requires the installation of traffic surface units in excess of 80 pounds per unit.

2. Any equipment, ornamentation, building service units and other top surfacing materials which are not defined as part of this specification.

3. Photovoltaic and Mounting Systems or other Rooftop equipment which do not provide Carlisle with reasonable access to the membrane system for purposes of warranty investigation and related repairs.

4. Severely ponded conditions.

CAUTION: APPLICATIONS SUCH AS WALKING DECKS, TERRACES, PATIOS OR AREAS SUBJECTED TO CONDITIONS NOT TYPICALLY FOUND ON ROOFING SYSTEMS WILL NOT BE ELIGIBLE FOR A SYSTEM WARRANTY.

F. Industrial pollutants, environmental dirt, and ponding conditions will discolor the surface of a white FleeceBACK AFX or FleeceBACK KEE HP membrane. Lack of additional membrane protection during application will increase the probability of soiling and will affect aesthetics of the roofing system. All these factors will result in minor color variations of the White membrane in comparison to the original undisturbed color. When aesthetics are of importance, the specifier's requirements must be added in the project specifications pertaining to precautionary installation methods and necessary clean up.

Carlisle disclaims responsibility for the cleanliness of discoloration of the membrane system caused by environmental conditions including, but not limited to, dirt, pollutants, or biological agents and discoloration caused by or resulting from initial installation.

G. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating / ventilation systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.07 Job Conditions / Cautions And Warnings

Safety Data Sheets (SDS) must be on location at all times during transportation, storage, and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

A. When FleeceBACK AFX TPO or FleeceBACK AFX EPDM (white) membrane are specified, a slope greater than 1/8" per horizontal foot is recommended to serve long-term aesthetics. For FleeceBACK AFX TPO when the roof slope exceeds 5' per horizontal foot, use of an automatic heat welding machine may be more difficult. Hand Held heat welders should be specified.

B. Asphalt slope restriction for membrane and/or insulation attachment

1. Type III Asphalt maximum roof slope of 1/2" in 12" (4 cm/m).

2. Type IV or Modified Asphalt can be used for projects with a maximum roof slope of 1-1/2" in 12".

3. Projects with roof slopes exceeding 1-1/2" in 12" must be submitted to Carlisle for review prior to installation.

C. Projects where lightweight insulated concrete fill is being removed, new insulation must be mechanically fastened or attached with modified SEBS asphalt after priming the deck surface. Lightweight insulated concrete slurry seals the concrete deck pores and prevents asphalt flowing into them, reducing asphalt attachment and wind uplift performance.

D. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on this roofing system.

E. Drainage

1. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in

low areas where ponding is anticipated.

Carlisle specifically disclaims responsibility for design and selection of an adequate drainage system and drain accessories. The selection must be made by the building owner or the owner's design professional.

2. Incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly should be designed to prevent ponding of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to prevent possible excessive live loads and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

3. Tapered edge strips, crickets or saddles are recommended where periodic ponding of water may occur.

F. Vapor Retarder

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, the following criteria should be considered by the specifier:

   a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.

   c. On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly

G. Wood Nailers

Wood nailers are required for the securement of metal edgings, metal scuppers, and certain curbs, pipes, etc., as shown on the applicable detail. Parapet walls and most curbs do not require the utilization of wood nailers.

A horizontal wood nailer is used to provide an effective substrate for some installation details and for other roof accessories. In addition, it is used to provide solid protection for the edge of the membrane underlayment. Minimum thickness of the nailer must be such that the top of the nailer is flush with the top of the membrane underlayment.

1. The width of the nailers must exceed the width of the metal flange of edgings, scuppers, etc.

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

   If non-treated lumber is to be specified, it must be stored to protect from moisture sources. A seal should be provided between the non-treated lumber and a concrete or gypsum substrate (similar to a sill sealer).

3. Methods used to fasten the nailer vary with building conditions; however, it is essential that secure attachment of durable stock be accomplished. Factory Mutual Loss Prevention Data Bulletin 1-49 (Perimeter Flashing) contains options for the spacing and sizing of fasteners based on the project wind zone.

4. Wood nailers are not covered by the Carlisle warranty.

H. Retrofit – Recover Projects (when existing roofing material is left in place).

1. The removal of existing wet insulation and membrane must be specified. The specifier shall select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.

2. When specifying over existing PVC membranes, the membrane may be totally removed or be cut into maximum 10 foot by 10 foot sections. An acceptable membrane underlayment shall be specified and must be mechanically secured, refer to Warranty Table III in this specification. All PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

3. When specifying this roofing system over existing gravel surfaced built-up roof, loose gravel must be removed to avoid entrapment of moisture. In all cases, a membrane underlayment is required.

4. Existing Phenolic Foam insulation must be removed prior to the installation of this roofing system.

1.08 Product Delivery, Storage, And Handling

A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.

B. Prolonged exposure of Pressure-Sensitive Flashing and SecurTAPE to temperatures below 40°F (5°C) will cause the pre-applied adhesive to lose tack and in extreme cases, not bond to the membrane.

C. Job site storage temperatures in excess of 90ºF (32ºC) may affect shelf life of curable materials (i.e. sealants, cleaners, primers, SecurTAPE, Pourable Sealer, Pressure-Sensitive Flashing and uncured flashing).

D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60ºF (16°C) before use. Do not store containers with opened lids due to loss of solvent that will occur from flash-off.

E. Do not store adhesive, primer, Weathered Membrane Cleaner, etc., containers with opened lids due to the loss of solvent, which will occur from flash-off.

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

G. When 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. Adhesive and sealant containers should be rotated to maintain their temperature of above 40°F (5°C). Refer to Product Data Sheets for individual products for temperature restrictions.

H. FleeceBACK AFX Membrane should be stored in its original plastic wrap or be covered to protect from moisture. Any moisture absorbed by the fleece-backing must be removed by using a wet-vac system, prior to membrane mopping.

I. When specified, insulation must be stored so 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.

J. When Flexible FAST Adhesive is specified for insulation attachment, refer to **Spec Supplement G-02 "Flexible FAST Adhesive Equipment and Set-Up Requirements"** for proper product delivery, storage and handling.

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 as compatible by Carlisle is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty. Other components (asphalt and pressure relief vents) which are not supplied by Carlisle, when required for the installation of this roofing system, may be included as part of the Carlisle Warranty.

2.02 Membranes

A. **FleeceBACK AFX EPDM Membrane**

The membrane incorporates 45-mil or 60-mil thick non-reinforced EPDM laminated to 7.5 ounce per square yard, non-woven polyester polypropylene blended fleece resulting in a total finished sheet thickness of 90-mil or 105-mil. Black membrane is available in 4.5' or 10' wide and lengths 50' or 100' with a nominal 3" or 6" wide Factory-Applied SecurTAPE. White membrane is available 4.5' wide and length 40' with a nominal 6" wide Factory-Applied SecurTAPE. SecurTAPE is provided on one edge along the length of the membrane for splicing. AFX membranes conform to ASTM Standard D 4637-95, Type III (Fabric-backed membrane) with the following physical properties:

Physical Property	Test Method	SPEC.(Pass)	Sure-Seal	Sure-White
Tolerance on Nominal Thickness, %	ASTM D 751	±10	±10	±10
Thickness over Fleece, min, in. (mm) 90 mil (2.286 mm) 105 mil (2.667 mm)	ASTM D4637 Annex	.030 (.762) .045 (1.14)	.045 (1.14) .060 (1.52)	- .060 (1.52)
Weight 1b/ft^2 (kg/m^2) 90 mil (2.286 mm) 105 mil (2.667 mm)	-	-	0.29 (1.42) 0.38 (1.86)	- 0.42 (2.1)
Breaking Strength, min, lbf (N) 90 &105-mil	ASTM D751 Grab Method	90 (400)	200 (890)	200 (890)
Elongation, Ultimate, min, %	ASTM D 412	300 **	480 **	500**
Tearing Strength, min, lbf (N) 90 & 105-mil	ASTM D 751 B Tongue Tear	10 (45)	45 (200)	45 (200)
Brittleness point, max, °F (°C)	ASTM D 2137	-49 (-45)	-67 (-55)	-67 (-55)
Resistance to Heat Aging * Properties after 4 weeks @ 240°F (116°C) for Sure-Seal Breaking Strength, min, lbf (N) Elongation, Ultimate, min, % Linear Dimensional Change, max, %	ASTM D 573 ASTM D 751 ASTM D 412 ASTM D 1204	80 (355) 200 ** ±1.0	200 (890) 225 ** -0.7	200 (890) 225 ** -0.7
Ozone Resistance * Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen wrapped around 3 inch (7.5 cm) mandrel	ASTM D 1149	No Cracks	No Cracks	No Cracks
Resistance to Water Absorption * After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D 471	+8.0, -2.0 **	2.0 **	3.6 **
Resistance to Outdoor (Ultraviolet) Weathering * Xenon-Arc, total radiant exposure at 0.70 W/m^2, 176°F (80°C) black panel temperature	ASTM G 155	No Cracks No Crazing @ 7560 kJ/m^2	No Cracks No Crazing @ 41580 kJ/m^2(black)	No Cracks No Crazing @ 25200 kJ/m^2(white)
Puncture Resistance, Joules 90-mil 105-mil	ASTM D5635		17.5 20	- 25
Puncture Resistance, lbf 90-mil 105-mil	FTM 101C Method 2031		280 292	- 280
Puncture Resistance, lbf 90-mil 105-mil	ASTM D120		21 22	- 19

* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.

** Specimens prepared from coating rubber compound.

B. **FleeceBACK AFX TPO Membrane**

The membrane incorporates 45-mil, 60-mil or 80-mil thick Sure-Weld (white) reinforced TPO laminated to 10 ounce per square yard, non-woven polyester, polypropylene blended fleece resulting in a total finished sheet thickness of 120-mil, 135-mil, or 155-mil. A nominal 3” wide selvage edge is provided on one edge along the length of the membrane for hot air welding. Membranes are available in widths of 6’ or 12’ and a length of 75’ and conform to the following physical properties:

Physical Property	Test Method	SPEC. (Pass)	Sure-Weld
Tolerance on Nominal Thickness %	ASTM D 751	+/-10	+/-10
Thickness of reinforced sheet over fleece min 120-mil (3.05mm) 135-mil (3.43mm) 155-mil (3.94mm)	ASTM D4637 Annex	.030 (.762) .045 (1.14) .080 (2.03)	.045 (1.14) .060 (1.52) .080 (2.03)
Weight lb/ft^2 (kg/m^2) 120-mil (3.05mm) 135-mil (3.43mm) 155-mil (3.94mm)			.31 (1.51) .40 (1.95) .50 (2.44)
Breaking Strength, min, lbf (N) 120-mil (3.05mm) 135-mil (3.43mm) 155-mil (3.94mm)	ASTM D751 Grab Method	90 (0.4)	300 (1.3) 400 (1.8) 425 (1.9)
Elongation at break of internal fabric, %	ASTM D751		25
Puncture Resistance, Joules 120-mil 135-mil 155-mil	ASTM D5635		17.5 22.5 30.0
Puncture Resistance, lbf 120-mil 135-mil 155-mil	FTM 101C Method 2031	350 400 425	525 575 600
Brittleness point, max, °F (°C)	ASTM D2137	-40 (-40)	-50 (-46)
Linear Dimensional Change,%	ASTM D1204	+/- 1 max	-0.2 typical
Field seam strength, lbf/in. (kN/m) 120-mil 135-mil 155-mil	ASTM D1876 Tested in peel	25 (4.4) 25 (4.4) 40 (7.0)	40 (7.4) 60 (10.5) 70 (12.3)
Water vapor permeance, Perms	ASTM E96 proc.B		0.10 max 0.05 typical
Resistance to microbial surface growth, rating (1 is very poor, 10 is no growth)	ASTM D3274		9-10 typical
Properties after heat aging, 670 hrs @ 240°F Breaking Strength, % retained Elongation Reinf. % retained Tearing Strength, % retained Weight Change, %	ASTM D573		90 min 90 min 60 min +/- 1.0 max
Ozone Resistance*, 100 pphm, 168 hours	ASTM D1149	No Cracks	No Cracks
Resistance to Water Absorption * After 7 days immersion @ 158°F (70°C) Change in mass, max, %	ASTM D471	+4	+2
Resistance to Outdoor (Ultraviolet) Weathering Xenon-Arc, total radiant exposure @ 0.70 W/m^2 irradiance, 80°C black panel temp 120-mill (17,640 kJ/m^2), 135-mil (20,160 kJ/m^2), 155-mil (27,720 kJ/m^2)	ASTM G155	No cracks or loss of breaking or tearing strength	No cracks or loss of breaking or tearing strength
* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.			

C. **FleeceBACK KEE HP membrane**

The membrane incorporates 50-, 60- or 80-mil thick Polyester Reinforced Elvaloy KEE HP PVC membrane laminated to a 55-mil non-woven fleece backing resulting in a total finished sheet thickness of 105-, 115, or 135- mils. Membrane sheets are available in rolls 10' wide by 100' long for 105- and 115-mil and 10’ wide by 75’ long for 135-mil. Sure-Flex FleeceBACK KEE HP Membrane is available in white, gray and tan and conforms to the following:

Property	Test Method	FleeceBACK KEE HP PVC 105-mil	FleeceBACK KEE HP PVC 115-mil	FleeceBACK KEE HP PVC 135-mil
Thickness of reinforced sheet over fleece, in. (mm)	ASTM D 4434	0.050 min. (1.27)	0.060 typ. (1.52)	0.080 typ. (2.03)
Thickness over scrim, in. (mm)	ASTM D 4434	0.024 min. (0.61)	0.029 typ. (0.74)	0.036 typ. (0.91)
Breaking Strength (MD x CD), lbf (kN/m)	ASTM D 751	410 x 360 (72 x 63)	450 x 410 (79 x 72)	500 x 490 (87 x 86)
Elongation break of reinforcement (MD x CD), %	ASTM D 751	35 x 30	35 x 30	35 x 30
Tearing Strength (MD x CD), lbf (N)	ASTM D 751	120 x 150 (534 x 222)	120 x 150 (534 x 222)	120 x 150 (534 x 222)
Low Temperature Bend	ASTM D 2135	PASS (-40º C)	PASS (-40º C)	PASS (-40º C)
Linear Dimensional Change, %	ASTM D 1204	0.4 typ.	0.4 typ.	0.4 typ.
Water Absorption Resistance, mass %	ASTM D 570	1.25	0.87	0.89
Puncture Resistance, Dynamic, J (ft-lbf)	ASTM D 5635	PASS	PASS	PASS
Puncture Resistance, Static, lbf (N)	ASTM D 5602	PASS	PASS	PASS
Xenon-Arc Resistance 12,600 kJ/m^2 total radiant exposure 10,000 hrs	ASTM G 155	PASS	PASS	PASS
Properties After Heat Aging, Breaking Strength, % retained	ASTM D 3045	90 min.	90 min.	90 min.
Properties After Heat Aging, Elongation Reinf., % retained	ASTM D 3045	90 min.	90 min.	90 min.

2.03 Insulation / Underlayment

A. **Product Information**

1. **Carlisle Polyisocyanurate**

1. **Carlisle InsulBase Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available.

2. **Carlisle InsulBase Eco** – A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to glass-reinforced felt (GRF) facers, meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. UL and FM approved for direct application over steel decks, polyiso provides the highest R-value per inch of any commercially available insulation product.

3. **Carlisle InsulBase HD Eco** – A rigid-roof insulation cover board with 5% ISCC-certified bio-attributed content composed of a high-density closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF), meeting ASTM C1289, Type II, Class 1, Grade 3. UL and FM approved for direct application over steel decks. Available in 1/2” thick, 4’ x 4’ and 4’ x 8’ panels with an R-value of 2.5. Suitable for both re-roofing and new construction applications, InsulBase HD is specifically designed for use as a cover board in mechanically-attached single-ply systems only. InsulBase HD delivers an R-value of 2.5.

4. **Carlisle SecurShield Polyisocyanurate** – A foam core insulation board covered on both sides with a coasted glass fiber mat facer meeting ASTM C 1289-06, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi). The product is available in 4’ x 8’ standard size with a thickness from 1 to 4

inches. 4’ x 4’ tapered panels are also available. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board.

5. **Carlisle SecurShield Eco -** A rigid roof insulation panel with 5% ISCC-certified bio-attributed content composed of a closed-cell polyisocyanurate foam core bonded to high performance coated glass facers (CGF). ASTM C 1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi), available in 4’ x 8’ standard size with a thickness from 1 to 4 inches. 4’ x 4’ tapered panels are also available. Ideal for use in adhered membrane systems. Achieves a UL Class A fire rating direct to combustible deck.

6. **Carlisle StormBase Polyiso Composite (OSB)** – HP-H Polyiso insulation bonded on the bottom side with a medium weight fiber-reinforced felt face and laminated with a top surface of 7/16” or 5/8” thick Oriented Strand Board (OSB) meeting ASTM C1289, Type V, Class1 Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 1-1/2” to 4”.

7. **Carlisle SecurShield HD Composite Polyisocyanurate –** Composite insulation panel comprised of 1/2-inch high-density (109 psi max) Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type IV, Grade 2 (20 psi) or Grade 3 (25 psi). Available in 4’ x 8’ boards with thickness from 2” to 4.5”. 4’ x 4’ panels are also available.

2. **Carlisle Cover Boards**

1. **Securock Cover Board** – A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier. Available in ¼” to 5/8” thick and 4’ x 4’ or 4’ x 8’ size boards. Long uninterrupted runs (>200’) may require slight gapping due to thermal expansion.

2. **Sure-Seal HP Recovery Board** - A 1/2” or 1” thick high-density wood fiberboard with an asphalt coated facer for use as a cover board or recover board. Available 1/2” or 1” thick and 4’ x 4’ or 4’ x 8’ size boards.

3. **DensDeck Prime** –gypsum core that incorporates glass-mat facings on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. Available in 1/4” to 5/8” and 4’ x 4’ or 4’ x 8’ size boards. Only for use with cold applied systems.

4. **DensDeck StormX Prime** – a reinforced gypsum cover board with an enhanced, moisture-resistant core and coated glass mat facers on the top and bottom side. The top surface is pre-primed and provides excellent bond strength for adhered membrane for use as a cover board. DensDeck StormX Prime is extremely durable and is approved for use in assemblies meeting FM’s Very Severe Hail (VSH) Classification. Available in 5/8” thickness and 4’ x 4’ or 4’ x 8’ size boards.

3. **Carlisle Base Sheets and Glass Ply Felts**

Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability	
			Hot Mopped	Cold Applied
Base Sheets				
SureMB 120TG Base Ply	120-mil	D6163 Type I, Grade S	√	√
SureMB 90 Base Ply	90-mil	D6163 Type I, Grade S	√	√
SureMB 90TG Base	94-mil	D6163 Type I, Grade S	√	√
SureMB 70 SA Base Ply	70-mil	D6163 Type I, Grade S	√	√
SureMB Vented Base	-	D4897 Type II	√	√
SureMB G2 Base Sheet	-	D4061 Type II	√	√
FR Base Sheet 1S	-	D4869 Type I or II	√	√
Carlisle Type IV Glass Ply Felt	-	D2178 Type IV	√	√
Carlisle Type VI Glass Ply Felt	-	D2178 Type VI	√	√

Notes: N/A = Not Acceptable √ = Acceptable

Base sheets may be installed directly under insulation or membrane and may be fastened with appropriate fasteners and plates over wood, fibrous cement, gypsum or lightweight insulated concrete. The base sheet may also be mopped directly to a primed concrete deck. Refer to Warranty Table II in this Specification for Warranty terms.

a. SureMB 120TG Base – 120-mil smooth-surfaced, torch-grade SBS base ply, reinforced with a non-woven polyester mat that is saturated and coated with asphaltic bitumen and SBS elastomers that meets ASTM D6163 Type I, Grade S for SBS-modified bituminous sheet materials. Designed for use as a base-ply or inter-ply in Carlisle's multiple-ply system and may be used as an air barrier, vapor barrier or temporary (Up to 60 days) roof. Available in 39-3/8" wide and 32'-9" long (107 square feet) weighing 0.79 lbs per square foot.

b. **SureMB 90 Base Ply** – 90-mil Glass fiber, reinforced, SBS-modified asphalt, base sheet that meets ASTM D 6163 Type I, Grade S for SBS-modified bituminous sheet materials. May be used as an air barrier, vapor barrier and temporary (Up to 60 days) roof. Available in 39-3/8" wide and 49'-1" long (161 square feet) weighing 0.58 lbs per square foot.

c. **SureMB 90TG Base** – 94-mil smooth-surfaced, SBS, torch-applied membrane. Reinforced with a fiberglass mat that is saturated and coated with asphaltic bitumen and SBS elastomers which meets ASTM D6163 Type I, Grade S. SureMB 90TG is designed for use as a base-ply or inter-ply in Carlisle's multiple-ply system and can be used as an air barrier, vapor barrier or temporary (Up to 60 days) roof. Available in rolls 39-3/8" wide and 49'-1" long (164 square feet) and weighing 0.57 lbs per square foot.

d. **SureMB 70 SA Base Ply** – 70-mil smooth surface, self-adhered base ply. Reinforced with a fiberglass mat that is saturated and coated with asphaltic bitumen and SBS elastomer and meets ASTM D6163 Type 1, Grade S. 70 SA is designed to be used as a base ply or interplay in Carlisle's multiple-ply system and can be used as an air and vapor barrier or temporary (up to 60 days) roof.

e. **SureMB Vented Base** – A heavyweight venting base sheet constructed from a fiberglass mat coated with weathering-grade asphalt which meets ASTM D4897 Type II and UL-G2. Typically used as a venting base sheet over lightweight insulating concrete or gypsum decks, used in conjunction with Carlisle Dual Prong Base Sheet Fastener. Available in rolls 39-3/8" wide and 33' long (100 square feet) and weighing 0.86 lbs per square foot.

f. **SureMB G2 Base Sheet** - A non-porous 28 pound base sheet that meets ASTM D4601 Type II

and UL-G2 which is mechanically fastened (using Carlisle approved fasteners) to the lightweight concrete, gypsum, or tectum substrate as the base ply with subsequent layers of SureMB G2 base sheet, Type IV, or Type VI Glass felt mopped to achieve a vapor/air retarder. Available in rolls 36" wide and 108' long (324 square feet) and weighing 0.11 lbs per square foot.

g. **FR Base Sheet 1S –** A non-asphaltic fiberglass-based underlayment that meets ASTM D4869 Type I or II. In hot-mopped systems, FR Base Sheet can provide a suitable substrate for deck types requiring a fastened base. FR Base Sheet is also an ideal substrate for direct applications of hot-mopped systems or mechanically fastened (using Carlisle approved fasteners) systems over wood, tectum, gypsum and lightweight concrete decks. Available in rolls 48" wide and 250' long (1,000 square feet) weighing 0.09 lbs per square foot.

h. **Carlisle Type IV Glass Ply Felt** - A heavyweight fiberglass mat containing heat-cured resinous binders saturated with type IV asphalt to meet ASTM D2178 Type IV and UL-G1, mopped over a nailed base sheet, a concrete deck, or an approved surface (minimum two plies) achieving a vapor/air retarder. When installed in a two-ply format, Type IV Glass Ply Felt may be used as a temporary (Up to 90 days) roof. Available in rolls 36" wide and 180' long (540 square feet) weighing 0.09 lbs per square foot.

i. **Carlisle Type VI Glass Ply Felt** - A heavyweight fiberglass mat containing heat-cured resinous binders saturated with type IV asphalt to meet ASTM D2178 Type VI and UL-G2, mopped over a nailed base sheet, a concrete deck, or an approved surface (minimum two plies) achieving a vapor/air retarder. When installed in a two-ply format, Type VI Glass Ply Felt may be used as a temporary (Up to 90 days) roof. Available in rolls 36" wide and 180' long (540 square feet) weighing 0.10 lbs per square foot.

2.04 Related Materials

A. Hot Asphalt

Asphalt (ASTM D 312): Type III or IV Hot Asphalt is typically specified for this roofing system and shall conform to the physical properties listed below. As an option, Modified SBS or SEBS Asphalt may be used when conforming to the requirements as follows:

Property/ASTM	Type III	Type IV	Modified Asphalt
Softening Point (° F) D-36	Min. – 195 Max. – 205	Min. – 210 Max. – 225	Min. – 215 Max. – 235
Flash Point (° F) D 92	Min. – 525 Max. – 600	Min. – 525 Max. – 600	Min. – 525 Max. – 600
Penetrations Units D 5	@ 32 ° F = 6 @ 77° F = 16-24	@ 32 ° F = 6 @ 77° F = 13-22	@ 32 ° F = 7 @ 77° F = 18
Ductility @ 77° F, cm D 113	3.0	2.0	7.0
Solubility in Trichloroethylene % D 2042	99.8	99.8	97.5

B. Cut Back Asphalt Primer

CCW-550 Primer is a Cut Back Asphalt Primer that meets ASTM D 41 and is used to prime structural concrete decks, existing smooth BUR, mineral surfaced cap sheet, or modified bitumen membranes prior to mopping. Coverage rate is 1 to 2 gallons per 100 square feet depending on surface porosity.

CAUTION: Curing compounds used in conjunction with concrete decks must be confirmed by the concrete curing compound manufacturer as compatible with this attachment method. Certain curing compounds develop a wax-like seal or oil coating on the concrete's surface that can prevent asphalt from adhering to

the substrate.

C. **Cold Applied Adhesive**

Carlisle's Cold Applied Adhesive is an asphalt-modified polyether VOC free adhesive. This product is a one sided, wet lay-in adhesive with FleeceBACK AFX and FleeceBACK KEE HP Membranes. Coverage rate is 1.5 gallons per square or 67 square feet (6.2 sq m) (26-mil) per gallon for smooth surfaces and 50 square feet (4.6 sq m) (32-mil) for uneven or semi-absorbent surfaces. Coverage rates are average and may vary due to conditions such as insulation type, surface, air temperature, and equipment (spreader), type of squeegee or paint roller.

D. **Primers, Adhesives, Sealants, And Cleaners**

Refer to Product Data Sheets for material coverage rates and proper usage. Prior to the use of any of the products listed below, consult the Material Safety Data Sheets for applicable cautions and warnings.

1. **Cut Back Asphalt Primer: CCW-550 Primer** is a Cut Back Asphalt Primer that meets ASTM D41 and is used to prime structural concrete decks, existing smooth BUR, mineral surfaced cap sheet, or modified bitumen membranes prior to mopping. Coverage rate is 1 to 2 gallons per 100 square feet depending on surface porosity.

   CAUTION: Curing compounds used in conjunction with concrete decks must be confirmed by the concrete curing compound manufacturer as compatible with this attachment method. Certain curing compounds develop a wax-like seal or oil coating on the concrete's surface that can prevent asphalt from adhering to the substrate.

2. **Cold Applied Adhesive:** Carlisle's Cold Applied Adhesive is an asphalt-modified polyether VOC free adhesive. This product is a one sided, wet lay-in adhesive with FleeceBACK AFX and FleeceBACK KEE HP Membranes. Coverage rate is 1.5 gallons per square or 67 square feet (6.2 sq m) (26-mil) per gallon for smooth surfaces and 50 square feet (4.6 sq m) (32-mil) for uneven or semi-absorbent surfaces. Coverage rates are average and may vary due to conditions such as insulation type, surface, air temperature, and equipment (spreader), type of squeegee or paint roller.

3. **Carlisle Weathered Membrane Cleaner:** A clear, solvent-based cleaner used to loosen and remove dirt and other contaminants from the surface of exposed membrane for splicing procedures at an approximate coverage rate of 400 square feet per gallon (one surface). Available in 1 and 5-gallon pails.

4. **Water Cut-Off Mastic:** A one-component, low viscosity, self-wetting, Butyl blend mastic used to prevent moisture migration at drains, compression terminations and beneath conventional metal edging at a coverage rate of approximately 10' per tube.

5. **Universal Single-Ply Sealant** A 100% solids, solvent free, VOC free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.

6. **Low-VOC Bonding Adhesive** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single-Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of membrane to various substrates. Available in 5 gallon pails.

   Note: This product **does not comply** with Southern California counties with additional restrictions on solvents. See Carlisle's Product Data Sheet for a listing of the counties involved.

7. **Low-VOC Bonding Adhesive 1168:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of membrane to various porous and non-porous substrates. Apply at a rate of 60 sq. ft. per gallon finished surface. Available in 5-gallon cans.

Note: This product **complies** with all counties in the State of California which have additional restrictions on solvents. See Carlisle's Product Data Sheet for a listing of the counties involved.

8. **Aqua Base 120 Bonding Adhesive:** A semi pressure-sensitive water based adhesive; used as a 2-sided contact adhesive for bonding Sure-Seal/Sure-White EPDM and Sure-Weld TPO membranes to various surfaces. Complies with the South Coast Air Quality Management District Rule 1168.

9. **Sure-Seal/Sure-White Products**

   a. **90-8-30A Bonding Adhesive:** A high-strength, yellow colored, synthetic rubber adhesive used for bonding EPDM membranes to various surfaces. Available in 5 gallon pails.

   b. **EPDM x-23 Low-VOC Bonding Adhesive:** A Low-VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Adhesive is available in 5 gallon pails.

   c. **HP-250 EPDM Primer:** A solvent-based primer used to prepare the surface of EPDM membrane for application of Splice Tape, Pressure-Sensitive. Available in 1 gallon pails.

   d. **Low-VOC EPDM and TPO Primer -** A Low-VOC (volatile organic compound) primer (less than 250 grams/liter) for priming of EPDM or TPO surfaces prior to application of FAT, Cover strip, SecurTAPE and all other pressure-sensitive products. Available in 1 gallon pails.

   e. **Sure-Seal or Sure-White Pressure-Sensitive SecurTAPE:** A 3" or 6" wide by 100' long splice tape used for splicing adjoining sections of EPDM membrane. Complies with the South Coast Air Quality Management District Rule 1168.

   f. **Sure-Seal or Sure-White Lap Sealant**: A black, heavy-bodied material used to seal the exposed edges of a membrane splice. A pre-formed Lap Sealant tool is included in each carton of Lap Sealant. Available in tubes.

   g. **Pourable Sealer:** A black, two-component, solvent-free, polyurethane based product used for tie-ins and as a sealant around hard-to-flash membrane penetrating objects such as clusters of pipes and for a daily seal when the completion of flashings and terminations cannot be completed by the end of each work day.

   h. **One-Part Pourable Sealer:** Available in black, a one-component, moisture curing, elastomeric polyether sealant used for attaching lightning rod bases and ground cable clips to the membrane surface and as a sealant around hard-to-flash penetrations such as clusters of pipes.

10. **Sure-Weld Products**

    a. **Sure-Weld Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

    b. **Cut-Edge Sealant:** A clear sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.

    c. **White One-Part Pourable Sealer:** A one-part, moisture curing, elastomeric polyether sealant used to fill TPO Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 2 TPO Molded Pourable Sealant Pockets**.**

    d. **TPO Primer:** A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Cover strip and TPO Pressure-Sensitive RUSS.

e. **TPO Low-VOC Primer:** A solvent-based, low solids primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Cover strip and TPO Pressure-Sensitive RUSS.

11. **Sure-Flex Products**

a. **Sure-Flex Low-VOC Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Flex membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Sure-Flex Cut-Edge Sealant:** A clear sealant used to seal cut edges of reinforced Sure-Flex membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8"diameter bead is applied. The use of cut edge sealant to seal cut edges of Sure-Flex membrane is not required.

c. **White One-Part Pourable Sealer:** A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Sealant Pockets. Packaged in four 1/2 gallon pouches per plastic bucket. One pouch will fill 122 cubic inches of volume within a molded sealant pocket.

d. **PVC and KEE HP Membrane Cleaner:** Used to prepare PVC and KEE HP PVC membrane that has been exposed to the elements for approximately 7 days prior to hot air welding or to remove general construction dirt. Approximate coverage rate of 400 square feet per gallon (one surface).

e. **Sure-Flex Low-VOC PVC Step 1 Activator:** A high-strength, solvent-based activator that allows PVC Pressure-Sensitive (PS) Cover Strip to be bonded to Sure-Flex PVC or KEE HP membranes. Low-VOC PVC Step 1 Activator meets the < 250 gpl VOC content requirements of the OTC Model Rule. It is specially formulated using a blend of VOC-exempt and non-exempt solvents and follows the state of California Clean Air Act of 1988 (updated in 1997) as further regulated by California's Air Quality Control Districts listing VOC limitations.

f. **Sure-Flex Low-VOC PVC Step 2 Primer:** A high-solids-content, polymer based splice primer. This product is applied to KEE HP and PVC membranes to improve the adhesion of PVC Pressure-Sensitive Cover Strip. Low-VOC PVC Step 2 Primer meets the < 250 gpl VOC content requirements of the OTC Model Rule.

g. **Sure-Flex PVC Step 2 Primer:** A high-solids-content, clear (translucent color), polymer-based splice primer used to prepare KEE HP and PVC membranes to be bonded to PVC Pressure-Sensitive Cover Strip.

2.05 Fastening Components

A. Fasteners

The following Table illustrates criteria for fastening of Carlisle Insulation with the referenced roof deck and includes minimum penetration requirements and pilot hole criteria.

Insulation/ Base Sheet Fastening Criteria

Deck Type	Carlisle Fasteners (1)	Min. Penetration	Pilot Hole Depth	Pilot Hole Diameter
Steel or Lightweight Insulating Concrete over Steel	ASAP or InsulFast ™	3/4"	N/A	N/A
Structural Concrete, rated 3,000 psi or greater	CD-10	1"	Note (2)	7/32"
	HD 14-10	1"	Note (2)	3/16"

Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP, ASAP or InsulFast	Min. 1" (3)	N/A	N/A
Cementitious Wood Fiber	Polymer Gyptec or Dual Prong Fastener(6)	1-1/2"	Note (4)	N/A
Gypsum	Polymer Gyptec or Dual Prong Fastener(6)	1-1/2"	Note (2)	7/16", 1/2" or 9/16" (5)

Notes:
N/A = Not Applicable
(1) Only 3" diameter insulation fastening plates can be used for insulation attachment.
(2) The pilot hole must be predrilled to a sufficient depth to prevent contact between the fastener point and any accumulated dust in the predrilled hole. This will help prevent bottoming out of the fastener during installation.
(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most cementitious wood fiber decks do not require pre-drilling; however, Carlisle should be contacted prior to installation for verification of specific types that may require a pilot hole to be predrilled.
(5) Pilot hole size may be varied to maximize pullout resistance.
(6) For Base Sheet Attachment Only.

1. **Carlisle Dual-Prong Fastener** – A factory pre-assembled, 1.8” long fastener consisting of a precision tube formed from galvanized (G-90) coated steel, a 2.7” diameter disk formed from Galvalume (AX-55) coated steel and a locking staple of high tensile steel wire used to secure base sheets to cementitious wood fiber, lightweight concrete, and gypsum providing 70 lbs. of pullout resistance is achieved (40 lbs. Min.). **Used for Carlisle Base Sheet Securement when specified.**

2. **InsulFast Fastener:** A threaded Phillips drive fastener used with Carlisle insulation plates for insulation attachment to steel or wood decks. **Used for Carlisle Insulation attachment when specified.**

3. **HP Fastener:** A threaded E-coat square drive fastener. Used in conjunction with Carlisle 3” diameter Metal plate for insulation securement or 2” diameter Seam fastening plates for base securement at angle change.

4. **HP-X™ Fastener**: A heavy duty #15 threaded fastener with a #3 Phillips drive used with Carlisle’s Piranha™ Fastening Plate for membrane securement at angle change or in conjunction with Carlisle 3” diameter Metal plate for insulation securement.

5. **Pre-Assembled ASAP Fastener:** Carlisle’s InsulFast Fastener pre-assembled with a 3" diameter plastic plate used **for insulation attachment only**. Installed using Olympic Fasteners’ Fastening Tool.

6. **CD-10 Fastener:** A hammer-driven, non-threaded E-Coat fastener for use with structural concrete decks rated 3,000 psi or greater.

7. **HD 14-10 Concrete Fastener:** A #14 threaded fastener with a #3 Phillips drive used for minimum 3,000 psi concrete decks.

8. **Polymer Gyptec Fastener:** A glass-filled nylon auger fastener designed for securing insulation and/or membrane to specialty decks such as cementitious wood fiber or gypsum.

9. **Insulation Adhesive:** Refer to **Spec Supplement P-01 “Related Products”.**

10. **HP Term Bar Nail-In:** A 1-1/4" long expansion anchor with threaded drive pin used for fastening Sure-Seal Termination Bar or Seam Fastening Plates to concrete, brick or block walls. The fastener is set by hammering the drive pin into place.

B. **Fastening/Insulation Plates**

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

2. **Seam Fastening Plates**: A 2" diameter metal plate used for membrane securement.

3. **Piranha Plate:** A 2-3/8" diameter metal barbed fastening plate used with Carlisle HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement.

4. **Gyptec Plates:** A 3” (26 gauge) steel plate for insulation and a 2” (22 gauge) steel plate for membrane attachment. The plates are stamped galvalume-coated steel.

2.06 Other Products

A. Flashing Accessories

1. Sure-Seal/Sure-White Products

a. **Sure-Seal Pressure-Sensitive “T” Joint Covers:** A factory cut 6" x 6" or 12” x 12” uncured 60-mil thick EPDM flashing (with rounded corners) laminated to a nominal 30-mil Factory-Applied TAPE, used to overlay field splice intersections and to cover field splices at angle changes.

b. **Sure-Seal/Sure-White Pressure-Sensitive Cured Cover Strip:** A 6" and 9” by 100’ and 12" wide by 50' long Sure-Seal or Sure-White 60-mil cured EPDM membrane laminated to a nominal 30-mil cured Factory-Applied TAPE. The Cured Cover Strip is ideal for flashing gravel stops, metal edging, Carlisle Seam Fastening Plates and for EPDM repairs.

c. **Sure-Seal Pressure-Sensitive Overlayment Strip:** A nominal 40-mil black, semi-cured EPDM membrane laminated to a nominal 30-mil cured, Factory-Applied TAPE. Available in 6" and 9" widths and 100’ long rolls used to overlay seams, flash gravel stops, metal edgings and Seam Fastening Plates used for additional membrane securement.

d. **Sure-Seal Pressure-Sensitive Elastoform® Flashing:** A 6” by 100’, 9" or 12" wide by 50' long, 60-mil thick Sure-Seal uncured EPDM Flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with EPDM Primer.

   Sure-Seal/Sure-White uncured Pressure-Sensitive Elastoform Flashing is used to flash inside and outside corners, pipes, scuppers and field fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

e. **Additional Accessories:** A complete line-up of Sure-Seal EPDM accessories including corners, curb wraps, pipe seals, and sealant pockets. For product information, refer to **Spec Supplement P-01 “Related Products”**.

2. Sure-Weld Products

a. **Sure-Weld Flashing:** Sure-Weld **non-reinforced flashing** is available in rolls 12" and 24" wide by 50' long. Flashing is used for inside/outside corners and field fabricated pipe flashings when the use of pre-molded or pre-fabricated accessories is not feasible. In addition, 45-mil by 6" wide by 100' long, 60-mil by 9” wide by 50’ long and 80-mil by 9” wide by 50’ long Sure-Weld reinforced membrane is available for overlaying fasteners and fastening plates.

b. **Sure-Weld Pressure-Sensitive Cover Strip:** A nominal 40-mil thick non-reinforced TPO membrane laminated to nominal 35-mil thick cured synthetic rubber pressure-sensitive adhesive used in conjunction with TPO Primer or Low-VOC TPO Primer to strip in flat metal flanges (i.e., drip edges or rows of fasteners and plates). Available in rolls 6" wide by 100' long in colors of white, gray or tan. Not for use on 25—year or 30-year Warranty projects.

c. **Sure-Weld TPO T-Joint Covers:** A 60-mil thick injection molded TPO flashing formed into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60, 72, and 80-mil TPO membrane systems and on 45-mil systems where step-offs have not been properly sealed. Packaged in boxes of 100.

d. **Pre-Molded Accessories:** A complete line-up of pre-fabricated Sure-Weld TPO accessories including corners, curb wraps, pipe seals, sealant pockets, and walkway pads. For product information, refer to **Spec Supplement P-01 "Related Products"**.

B. **One-Way Relief Vents**

Vents are required when the membrane is adhered over lightweight insulating concrete at the rate of 1 every 1,000 square feet for vermiculite and 2,000 square feet for cellular or perlite lightweight insulating concrete decks.

1. **Non-Weldable One-Way Pressure Relief Breather Vent:** 8" tall, spun aluminum vent with a base diameter of 11" and stack diameter of 5". Engineered to allow moisture and air to escape from within the roofing system. May be used in conjunction with Carlisle's ChannelDry EPS Insulation for a roof assembly over Lightweight Structural Concrete (See **Spec Supplement G-15**) or in conjunction with FleeceBACK AFX (EPDM and TPO) membranes over Lightweight Insulating Concrete (See **Spec Supplement G-04**).

2. **Weldable One-Way Pressure Relief Breather Vent:** 5.5" tall, stainless steel vent with a 60-mil weldable flange, a base diameter of 14" and stack diameter of 4". Engineered to allow moisture and air to escape from within the roofing system. May be used in conjunction with Carlisle's ChannelDry EPS Insulation for a roof assembly over Lightweight Structural Concrete (See **Spec Supplement G-15**) or in conjunction with FleeceBACK AFX (EPDM and TPO) membranes over Lightweight Insulating Concrete (See **Spec Supplement G-04).**

2.07 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment.

1. **Walkway types:**

   a. **Sure-Seal/Sure-White Pressure-Sensitive Walkway Pads:** Sure-Seal (black) or Sure-White (white) molded walkway pads with Factory-Applied TAPE used to provide protection for areas of EPDM membrane that are exposed to regular rooftop maintenance.

   b. **Sure-Weld Heat Weldable Walkway Rolls:** Designed to protect Sure-Weld membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Weld membrane using an automated heat welder or hand held heat welder. The diamond plate tread pattern offers superior slip resistance. The walk edges are trimmed in safety yellow to better define the designated traffic flow. Walkway Rolls are 34" wide by 50' long and are nominal 180 mils thick. Available in white, tan or gray.

   c. **Carlisle Interlocking Rubber Pavers:** 24" X 24" X 2" thick rubber paver weighing approximately 24 pounds per unit, 6 pounds per square foot manufactured from recycled rubber, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in black and terra cotta.

   d. **Hanover Pedestal Paver:** Used for light traffic areas associated with rooftop or garden roof applications. 23-1/2" x 23-1/2" x 2" thick precast concrete pavers weighing 25 psf with an elevated clearance of 1/2" from incorporated footing. Available in 8 standard colors, with special order colors available. The pedestal paver can either be installed in conjunction with a separation layer of HP Protective Mat or using Hanover Pedestal and shims.

   e. **Hanover Ballast and Lightweight Ballast Pavers:** The standard, 24" x 24" x 1-13/16" thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2" x 23-1/2" x 1-1/4" thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways

2.08 Edging And Terminations

A. Refer to **Spec Supplement P-01 "Related Products"**.

PART III EXECUTION

Prior to commencing with the installation of any of the Thermoplastic Membrane Systems refer to Paragraph 1.06 "Warranty Tables" for applicable components and proper securement method suitable for the appropriate warranty coverage.

Requirements listed in this specification are considered minimum and are intended for the sole purpose of obtaining a Carlisle Warranty. Additional requirements dictated by Regulatory Agencies, Building Insurance or Specifiers must be complied with and are considered to be beyond the scope of this specification.

3.01 General

A. Safety Data Sheets (SDS) must be on location at all times during transportation, storage, and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.

B. Subject to project conditions, it is recommended to begin application of this roofing system at the highest point of project area and work to lowest point to prevent water infiltration. This will include completion of all flashings, terminations, and daily seals.

C. Consult the Asphalt Manufacturer concerning asphalt heating temperature and minimum ambient temperature during installation.

D. Do not apply Cold Applied Adhesive when ambient temperatures are below 40°F (5°C).

E. Opened containers of Cold Applied Adhesive should be used within 2-3 weeks. The adhesive will form a thick surface skin that will not re-dissolve. Adhesive can be used once the skinned layer is removed.

F. Asphalt or Cold Applied Application Rate Tables

Table I

Asphalt/SEBS Application Rates	
AFX or KEE HP Membrane	18-22 pounds per square
Base Sheet	23-25 pounds per square
Insulation	28-32 pounds per square

Table II

Cold Applied Adhesive Application Rates	
Smooth Surfaces	1.5 gal per square or 67 square feet per gallon
Uneven or Semi-absorbent	2.0 gal per square or 50 square feet per gallon

Note: Coverage rates are average and may vary due to conditions such as insulation type, surface, air, and asphalt temperatures. Coverage rates may also vary based on the spreader and or type of squeegee or paint roller used for applications. When using a spreader with the Cold Applied Adhesive, it may be necessary to squeegee or back roll adhesive to obtain proper coverage

3.02 Roof Deck Criteria

A. General

1. Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system as well as construction and live loads in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

2. When mechanically fasteners are used to fasten the insulation, withdrawal resistance tests are strongly suggested to determine the suitability of a roof deck. Refer to **Design Reference DR-06 "Withdrawal Resistance Criteria"** in the Carlisle Technical Manual proper procedures for conducting pullout tests.

3. Defects in the roof deck 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.

3.03 Substrate Preparation

A. General

1. For all projects (new or retrofit), the substrate must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.

2. Prior to the placement of membrane underlayment, clear the substrate of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

3. For direct application over an acceptable roof deck/substrate the substrate must be smooth, steel trowel finished (structural concrete), free of debris, protrusions, sharp edges and loose and foreign material. Cracks or voids in the substrate, greater than 1/4", must be filled with an appropriate material.

4. On retrofit - recover projects, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation of type specified so it is relatively flush (+/-1/4") with the existing surface.

    a. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. If a vapor retarder or air barrier is not specified, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to allow the detection of moisture to enable the building owner to take corrective action.

    b. For existing PVC membranes, if the membrane is not removed, it must be cut into maximum 10' by 10' sections. A new membrane underlayment must be mechanically fastened and all PVC flashings at the perimeter, roof drains and roof penetrations must be removed.

    c. When installing this roofing system over existing gravel surfaced built-up roof, loose gravel must be removed. Power brooming is recommended by Carlisle to remove the loose gravel, which may trap moisture. Any uneven areas of the substrate must be leveled to prevent insulation from bridging.

    d. On retrofit projects, all existing phenolic insulation must be removed.

B. **Acceptable Decks/Substrates and Minimum Underlayment**

Construction Type	Acceptable Roof Deck/Substrate	Asphalt Applied	Cold Applied
Retrofit/No Tearoff	Existing Smooth Surface BUR or Mineral Surface Cap Sheet	Direct Application	Direct Application
	Gravel Surfaced BUR	Cover Board / Insulation*	Insulation*
	Coal Tar Pitch	Cover Board / Insulation*	Insulation*
	Modified Bitumen	Direct Application	Direct Application
	Existing Single-Ply	Cover Board / Insulation*	Insulation*
Retrofit/Tearoff*	Existing roof material removed (regardless of deck type)	Contact Carlisle	

* Refer to the Warranty Tables, Paragraph 1.06, of this specification, for the minimum underlayment requirements for a specific Warranty Coverage.

1. **Do not** adhere FleeceBACK AFX or FleeceBACK KEE HP Membranes directly onto low melting point asphalt. When the softening point of the asphalt falls below 185° F(85° C), the minimum membrane underlayment must be a fastened 1/2 inch thick HP Recovery Board, Securock, or an acceptable insulation.

2. For slopes less than 2 inches to one horizontal foot, the specifier must investigate the existing roofing material to ensure the asphalt has a minimum softening point of 185° F (85° C).

3. When a direct applied system is specified, the specifier should investigate previous repairs and contaminants to existing roofing material to determine if the softening point of the asphalt is below that mentioned above or other contaminants may contact the FleeceBACK AFX or FleeceBACK KEE HP Membranes. Temporary repairs completed with any contaminants (i.e., plastic roof cement) must be removed.

4. The substrate must be relatively smooth, dry and clear of debris, fins, loose edges, foreign materials, oils, grease, frost and fresh roof cement.

5. Prepare the existing material for mopping of FleeceBACK AFX or FleeceBACK KEE HP Membranes with CCW-550 Cut Back Asphalt Primer. For Cold Applied application, preparation by power-wash the existing roofing material.

6. On retrofit-recover projects, cut and remove wet insulation as identified by the specifier and fill all voids with new insulation, so that it is relatively flush.

C. **New Construction When No Insulation Required**

Construction Type	Acceptable Roof Deck/Substrate*	Asphalt Applied	Cold Applied
New Construction	Structural Concrete (minimum 3000 psi)	Direct Application	Direct Application
	Plywood (minimum 15/32" thick) or Oriented Strand Board (minimum 7/16")	Base Sheet	Direct Application
	Wood Planks (minimum 3/4" thick)	Base Sheet	Direct Application
	Gypsum	Base Sheet	Direct Application
	Lightweight Insulating Concrete	Base Sheet	Direct Application

* On Tearoff projects, conditions may vary depending on deck type and the existing roofing system being removed. In some cases, the new membrane assembly may be directly installed to the deck or in conjunction with a Carlisle Supplied base sheet. (Structural concrete, gypsum deck, fibrous cement, or lightweight insulating concrete.) When a complete Tearoff is specified, Carlisle may be contacted for a specific applicable requirement based on warranty duration.

D. **Structural concrete deck**

1. The substrate must be relatively smooth, dry and free of protrusions, debris, frost, sharp edges and loose / foreign materials. All gaps in the substrate greater than 1/4 inch must be filled with suitable material.

2. The membrane can be mopped directly to structural concrete which has been primed with CCW-550 Cut Back Asphalt primer prior to membrane mopping.

E. **Projects with new lightweight insulating concrete**

1. When no additional insulation is required, projects with new or existing lightweight insulating concrete substrates will require the use of a Carlisle supplied base sheet. Refer to Warranty Table II in this Specification for the appropriate base sheet to be utilized. Follow the fastening patterns in Figure 6.

2. Except when the lightweight insulating concrete is to be poured over slotted steel decks, pressure relief vents must be specified at a minimum rate of 1 every 2,000 square feet to relieve vapor pressure which may result from possible moisture entrapment beneath the lightweight insulating concrete between the time of concrete placement and membrane installation.

3. The surface of the lightweight insulating concrete must be smooth finished, free of protrusions, sharp edges, frost, and loose / foreign materials.

4. The direct application of this roofing system is not permitted when a lightweight insulating concrete (regardless of type) is specified over an existing roofing material.

3.04 Wood Nailer Installation

A. General

1. Methods used to fasten the nailer vary with building conditions; however, it is essential that secure attachment of durable stock be accomplished. Factory Mutual Global Property Loss Prevention Data Sheet 1-49 (Perimeter Flashing) contains options for the spacing and sizing of fasteners.

2. The wood nailer must be installed so the top of the wood nailer is relatively flush (+/- 1/4") with the top surface of the insulation/underlayment and the width of the wood nailer exceeds the width of the metal flange (edgings, scuppers, insulated collars, etc.) as shown on the appropriate Carlisle detail.

3. Install wood nailers in those locations that have been designated by the specifier and as approved by Carlisle.

4. Follow the specifier's guidelines for securement of wood nailers.

5. Avoid fastening into existing deteriorated or dry rotted wood nailers

6. Refer to **Design Reference DR-08 "Wood Nailers and Securement Criteria"**.

3.05 Base Sheet And Insulation Attachment

A. General

1. Do not install more insulation/underlayment that can be covered by membrane and made watertight in the same day.

2. All insulation boards must be butted together with no gaps greater than 1/4 inch. Gaps greater than 1/4 inch must be filled with same material.

3. Multiple layers of insulation are recommended, with all joints staggered between layers.

4. When the FleeceBACK AFX or FleeceBACK KEE HP Membranes is to be installed in conjunction with Carlisle Modified Base Sheet over roof insulation, 1/2 inch HP Recovery Board or 1/2 inch Securock is required as an underlayment. The underlayment may be mopped when used in conjunction with Polyisocyanurate Insulation or mechanically fastened when used with Polystyrene Insulation, see Section 2.03 of this Specification for further information.

B. **Base Sheet Attachment**

1. **For Concrete Decks**

   a) When base sheets are to be mopped to a structural concrete deck, the deck must be primed with CCW-550 Cut Back Asphalt Primer (ASTM D 41) prior to mopping base sheets. Depending on surface porosity, CCW-550 Cut Back Asphalt must be applied at a rate between of 1 to 2 gallons per 100 square feet.

   b) When specified, each layer of base sheet shall be hot mopped at the rate listed in Asphalt Application Rate Table I in Paragraph 3.01.

2. **For Gypsum, Lightweight Insulated Concrete, and Fibrous Cement Decks**

   a) Prior to installing either the FleeceBACK AFX or FleeceBACK KEE HP Membranes or insulation in asphalt, Carlisle Base Sheets shall be fastened into the gypsum, lightweight insulated concrete, or fibrous cement with Carlisle Dual Prong fasteners as shown.

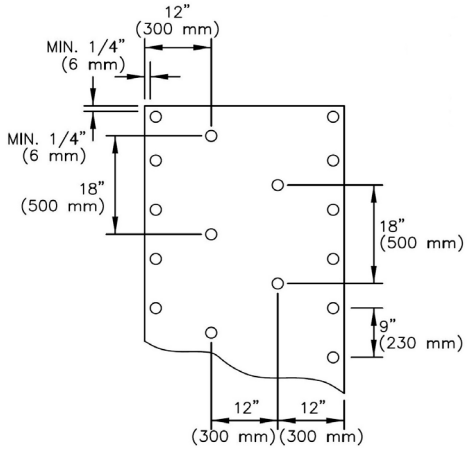
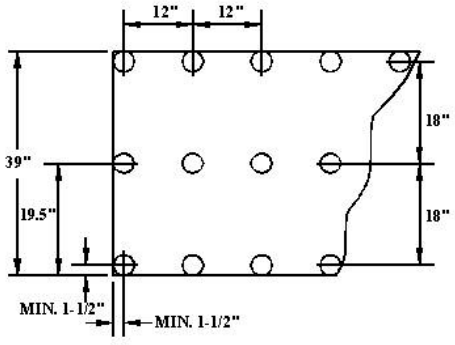


Figure 6

3. **Wood Decks (Wood Plank or Min. 15/32" thick Plywood ONLY)**

   a) When no insulation is specified and FleeceBACK AFX or FleeceBACK KEE HP Membranes is to be directly mopped to a Carlisle Modified Base Sheet. The base sheet must be fastened with Carlisle HP or HP-X Fasteners with 3" diameter insulation plates are used to attach the Carlisle Modified Base Sheet in rows 18" apart, 12" on center, refer to the fastening pattern in figure 7.

   Note: Projects with OSB Deck, regardless of thickness, must be submitted to Carlisle for suitable securement method.



MODIFIED BASE SHEET
FASTENING PATTERN
(EXCLUDING OSB)

Figure 7

C. **Insulation Attachment**

The approved Carlisle Insulation may be adhered with asphalt, adhered with FAST Adhesive, or mechanically attached, as outlined in Warranty Table III of this Specification.

1. When roof insulation is to be adhered individual board sizes shall be limited to 4' by 4' to ensure full

embedment. Board size may be extended to 4’ by 8’ when mechanically securement is specified. Use appropriate Carlisle fasteners for deck type and ensure minimum deck penetration as outlined in **Design Reference DR-06 “Withdrawal Resistance Criteria”**.

2. When insulation is to be mopped to a structural concrete deck, the deck must be primed with CCW-550 Cut Back Asphalt Primer (ASTM D 41) prior to mopping insulation to the deck. Depending on surface porosity, cut back asphalt must be applied at a rate between of 1 to 2 gallons per 100 square feet.

3. When specified, the insulation may be adhered with asphalt to a Carlisle Base Sheet or a primed concrete deck with Type III or IV Asphalt, or SEBS at the rate listed in Asphalt Application Rate Table I in Paragraph 3.01.

3.06 FleeceBACK AFX or FleeceBACK KEE HP Membranes Installation

A. General

1. Membrane shall be stored in a dry area to prevent absorption of moisture in the fleece backing. If moisture is present, it must be removed with a wet vac system and the membrane must be allowed to fully dry prior to membrane adhesion.

2. Position membrane over the acceptable substrate without stretching and overlap adjoining sheets.

3. When overlapping adjoining FleeceBACK AFX or FleeceBACK KEE HP Membranes, extend fleece backing approximately ½ inch above previously installed membrane. This will avoid direct contact between membrane in the seam area and hot asphalt or Cold Applied Adhesive.

4. Allow membrane to relax approximately 1/2 hour before Asphalt or Cold Adhesive Application.

   Note: Due to stiffness of the Sure-Weld membrane, temporarily weigh down the ends of the membrane rolls to control re-curling of membrane until membrane lays flat.

B. FleeceBACK AFX or FleeceBACK KEE HP Membranes Adhered with Asphalt

1. General

   a. The temperature of the asphalt during application shall be within 25° F (-4° C) from the EVT (Equiviscous Temperature). The manufacturer’s heating instructions (i.e., maximum heating temperature, prolonged storage temperature guidelines) must be strictly followed.

   b. When adhering the FleeceBACK AFX or FleeceBACK KEE HP Membranes with asphalt, refer to Asphalt Application Rate Table I in Paragraph 3.01, for coverage rates. It is important that “heavy spots” of asphalt, typically occurring at mopping overlaps or where the mop is first positioned, be avoided. At these areas, the asphalt must be spread evenly to avoid a heavy coverage rate that can cause asphalt saturation of the fleece backing. Asphalt saturation of the fleece must be avoided.

   c. Adhering the FleeceBACK AFX or FleeceBACK KEE HP Membranes with asphalt directly to Polyisocyanurate insulation is not permitted. Carlisle HP Recovery Board or Securock must be used as an overlayment when insulation is specified.

2. Hand Mopping Method

   a. When using a hand mop to apply asphalt, position the membrane over the substrate overlapping adjacent sheets to accommodate membrane splicing and fold in half lengthwise to expose the substrate and the back side of the membrane (full width of the membrane by approximately half the length).

b. Beginning at the membrane fold, apply asphalt to the substrate the full width of the membrane extending a maximum of 3 to 6 feet while rolling the membrane into the asphalt immediately. The asphalt temperature at the time of membrane adhesion must be above 325° F (163° C). Continue to apply asphalt for the full width of the membrane extending 3 to 6 feet at a time while embedding the membrane into the asphalt until the entire half of the sheet is adhered. Fold back the unbonded half of the membrane and repeat the bonding procedures identified above.

3. Asphalt Spreader Method

a. When using spreaders to apply asphalt, the membrane is folded widthwise dependent on the size of the spreader (36” – 57” wide); i.e., if a 36" wide spreader is used, the membrane will be folded to expose approximately a 36" wide by 50' long area. After the asphalt is applied in a single pass, the membrane is rolled into the asphalt. After adhering the first half of the membrane, apply asphalt to the remaining substrate area in single passes and continue to bond membrane as identified above.

b. Care must be taken to ensure the proper coverage rate is maintained. Do not overlap asphalt layers at multiple pass lines since the heavy coverage rate occurring at these overlapping areas must be avoided.

c. Membrane must be embedded into asphalt immediately after each spreader pass to ensure asphalt temperature is at least 325° F (163° C) at the time of membrane embedment.

d. Monitor that the asphalt is not dropped directly on the back of the membrane. Use a mop to spread asphalt at pass lines and under sheet folds to prevent a heavy coverage rate.

4. As the applicator installs the membrane by either method, the applicator should test embedment of membrane into the asphalt. After approximately 30 feet of membrane installed, the applicator should pull back the edge of the membrane and observe asphalt coating the white fleece in a uniform manner. If discovered that this is not occurring, the applicator should review temperature and heating process of the asphalt.

5. After membrane applying the Cold Applied Adhesive, immediately after adhesion, brush down the sheet with a stiff bristled broom using light to medium pressure.
CAUTION: Do not use weighted rollers or heavy pressure when brooming the membrane to avoid asphalt saturation of the fleece.

Note: Foot traffic should be avoided until the asphalt has cooled sufficiently.

C. **FleeceBACK AFX or FleeceBACK KEE HP Membranes Adhered with Cold Applied**

1. Fold the membrane widthwise and apply the adhesive to the substrate.

2. Apply Carlisle Cold Applied adhesive to the substrate in a bead or serpentine pattern avoiding globs, puddles and uncoated areas. Use a flat blade squeegee, paint roller, or an acceptable spreader to spread adhesive at the coverage rates specified in the Cold Adhesive Application Rate Table II in Paragraph 3.01.

3. Broom the sheet using a stiff bristled broom applying light to medium pressure. The use of a 75lb weighted roller is optional. To avoid over-saturation of the AFX fleece do not roll more than once or twice and if temperatures exceed 75° F (74° C), rolling is not allowed. All adhesive residues in the splice area must be removed before splicing.

4. Fold back the unbounded half of the membrane sheet and repeat the bonding procedure.

5. Install adjoining membrane sheets in the same manner, overlapping edges to provide for the minimum splice width. Good roofing practice recommends all splices to be shingled to avoid bucking of water.

3.07 FleeceBACK AFX EPDM Membrane Splicing With Factory-Applied SecurTAPE

A. **General**

1. FleeceBACK AFX EPDM membrane has a selvage edge (fleece backing is discontinued) along the length of the sheet for membrane splicing.

2. If membrane becomes contaminated with field dirt, etc., remove dirt or excess dust from mating surfaces of overlapping sheets by wiping with Sure-Seal HP Splice Wipes or clean natural fiber rags. Accumulated dirt, footprints, etc. must be removed by scrubbing membrane with Weathered Membrane Cleaner or an EPDM primer.
3. **Projects with 10, 15 and 20 year Warranties - Detail AFX-2A**

   Side Laps: Tape splices must be a minimum of 2-1/2" wide using **3" wide field-applied Pressure Sensitive SecurTAPE OR 3" Factory-Applied TAPE (FAT)**. (**Detail AFX-2A**).

   End Laps: A minimum of 6" wide Pressure-Sensitive Cured Cover strip or Pressure-Sensitive Overlayment Strip shall be used at all end laps and shall be centered over the leading edge (butt edge) of the splice. (**Detail AFX-2A**).

   Splice Intersections: All intersections between the Pressure-Sensitive Cover strip and side laps shall be overlaid by a 6"x6" minimum (black) or 7"x9" (white) Pressure-Sensitive 'T'-Joint cover with a bead of Lap Sealant. (**Detail AFX-2A**).

   Note: In lieu of the 7"x9" Sure-White Pressure Sensitive 'T'-Joint cover, a 6"x6" section of white Pressure-Sensitive Elastoform flashing may be used. White Pressure-Sensitive Elastoform flashing is available in rolls of 6", 9" and 12".

4. **Projects with 25 and 30 year Warranties - Detail AFX-2A.1**

   Side Laps: Must be a minimum of 5-1/2" wide using 6" wide Field-Applied or Factory-Applied Tape (FAT) OR if 3" wide Factory-Applied Tape (FAT) SecurTAPE is used, the 3" Tape must be overlaid with 6" Pressure-Sensitive Cured Cover Strip. (**Detail AFX-2A.1**).

   End Laps: Use two layers of Pressure-Sensitive Flashing as an overlay for the end laps. The first layer shall be 6" wide Pressure-Sensitive Overlayment Strip or Pressure-Sensitive Cured Cover Strip and the top layer shall be 12" wide Pressure-Sensitive Elastoform Flashing. Both layers shall be centered over the butt edges of the sheet.

   Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and 6"x6" (black) or 7"x9" (white) Pressure-Sensitive 'T'-Joint Cover. Apply a second layer of 12"x12" Pressure-Sensitive 'T'-Joint Cover centered over 6" x 6" 'T'-Joint Cover. (**Detail AFX-2A.1**).

   Note: In lieu of the 7"x9" Sure-White Pressure-Sensitive 'T'-Joint cover, a 6"x6" section of white Pressure-Sensitive uncured Elastoform flashing may be used. White Pressure-Sensitive Elastoform flashing is available in rolls of 6", 9" and 12".

5. For splicing procedures refer to **Spec Supplement E-02 "EPDM Membrane Splicing and Splice Repairs"**.

3.08 FleeceBACK AFX TPO or FleeceBACK KEE HP Heat Welding Procedure

A. **General**

1. Heat weld the FleeceBACK AFX TPO or FleeceBACK KEE HP membrane sheets using the Automatic Heat Welder or Hot Air Hand Welder and silicone roller.

2. When roof slope exceeds 5" per horizontal foot, use of the Automatic Heat Welding Machine may become more difficult; use of the Hand Held Hot Air Welder is recommended.

3. Check the surfaces of the membrane to be heat welded to ensure they are properly prepared.

   The surfaces to be heat welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned with Weathered Membrane Cleaner. Weathered Membrane Cleaner should be wiped dry with a clean HP Splice Wipe prior to welding. No residual dirt or contaminants should be evident.

B. **Automatic and/or Hand Held Heat Welder Equipment**

1. Refer to **Spec Supplement T-01 "Heat Welding Equipment"** for:

   a. Temperature Settings.
   b. Equipment Set-up.
   c. Additional Information.

C. **Membrane Welding**

1. Prepare the Automatic Heat Welder and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2. Position the Automatic Heat Welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

3. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap. Immediately begin moving the machine along the seam to prevent burning the membrane.

4. Weight plates provided on Automatic Welders must be utilized.

5. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

   CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

6. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of FleeceBACK AFX TPO membrane sheets.

   Note: When using 135-mil or 155-mil Sure-Weld Membrane, a TPO "T" Joint Cover must be applied over all "T" joint splice intersections. When FleeceBACK KEE HP 115- or 135-mil membranes, a surface splice of non-reinforced flashing or "T-Joint" Cover must be applied over all "T-Joint" splice intersections.

7. To remove the Automatic Heat Welder from the finished splice, stop the movement of the machine and immediately remove the nozzle from the seam area.

8. Mark the end of the heat welded seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Heat Welder is stopped and restarted.

D. **Preventing Membrane Creeping During Welding**

The operator of automatic welding equipment must apply foot pressure to the membrane, keeping the membrane tight under the welder. Refer to **Spec Supplement T-01 "Heat Welding Equipment"** for

additional information.

E. **Test Cuts**

Perform a test weld at least at the start of work each morning and afternoon. Refer to **Spec Supplement T-01 "Heat Welding Equipment"** for additional information.

F. **Seam Probing**

A blunt or dull cotter pin puller is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Refer to **Spec Supplement T-01 "Heat Welding Equipment"** for additional information.

G. **Seam Sealing**

Apply Cut-edge Sealant on all cut edges of the reinforced membrane (where the scrim reinforcement is exposed) after seam probing is completed. Cut-Edge Sealant is not required on vertical splices. When a 1/8" diameter bead of Cut-Edge Sealant is applied, approximately 225 – 275 linear feet of coverage per squeeze bottle can be achieved.

3.09 Welding Problems/Repairs

A. A Hand Held Hot Air Welder and a 2" wide silicone roller must be used when repairing the FleeceBACK AFX TPO membrane. When the entire heat welded seam is to be overlaid, an Automatic Heat Welder may be used.

B. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned with Weathered Membrane Cleaner. The membrane can typically be repaired with standard cleaning methods. In cases where the standard cleaning method is not sufficient, the following procedures must be used.

1. Scrub the area to be welded with a "Scotch Brite" Pad and Weathered Membrane Cleaner.

2. Clean all residue from the area to be welded with a Splice Wipe or a clean natural fiber (cotton) rag.

3. Weld the new membrane to the cleaned area using standard welding procedures.

C. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller. Depending on conditions, a splice overlay may be required.

D. Position the Hand Held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

E. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test weld areas must be repaired by overlaying the damaged area with a separate piece of Sure-Weld reinforced membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

F. Probe all edges of the overlay once cooled to ensure a proper weld has been achieved.

Note: The same overlay repair procedures may be used for punctures in the FleeceBACK AFX TPO membrane.

3.10 Additional Membrane Securement For FleeceBACK AFX or FleeceBACK KEE HP Membrane Adhered With Cold Applied Adhesive

Caution: Regardless of membrane type, FleeceBACK AFX (EPDM or TPO) or FleeceBACK KEE HP Membrane, when cold applied adhesive is used, 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 published details.

A. Approved Seam Fastening Plates may be installed horizontally into the structural deck or vertically into walls or curbs. Refer to Fastening Components Section 2.05 of this Specification for product information.

B. Securement of the FleeceBACK AFX or FleeceBACK KEE HP Membrane with the approved Carlisle Fasteners and Seam Fastening Plates must be a maximum of 12" on center starting 6" minimum to 9" maximum from inside and outside corners.

C. If horizontal wood nailers are provided, along parapet walls/curbs, secure the membrane with Seam Fastening Plates to the wood nailer with Carlisle HP Fasteners. Roofing nails are not acceptable for securement.

D. After securing the Seam Fastening Plates, flash in accordance with the appropriate detail.

3.11 Flashing Considerations

In addition to listed below, **Spec Supplement G-05 "Flashing Considerations / Metal Work"** must be referenced for other requirements.

A. General Flashing Considerations

1. At roof drains and compression seal terminations such as terminations bars and coping stones, the fleece-backing must be removed from the back of the membrane so Water Cut-Off Mastic can be applied directly to the membrane surface.

2. Cut edges of FleeceBACK AFX TPO membrane or Sure-Weld reinforced membrane (when used for flashing), where scrim reinforcement is exposed, must be sealed with Cut-Edge Sealant (not required on vertical surfaces). The use of PVC Cut-Edge Sealant on cut edges of FleeceBACK KEE HP membrane is not required.

3. Care must be taken when setting the flashing to avoid bridging greater than 3/4" at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by applying heat to the membrane and creasing the membrane into the angle change.

4. For the FleeceBACK AFX EPDM Membrane, all vertical field splices must be overlaid at the base of a wall or curb. Use a 6" x 6" section (with rounded corners) of Sure-Seal Pressure-Sensitive Overlayment Strip centered over the field splice.

5. Sure-Seal Pressure-Sensitive Uncured Flashing must be limited to overlayment of vertical seams (as required at angle changes), or to flash inside/outside corners, vent pipes, scuppers and other unusually shaped penetrations where the use of pre-molded pipe seals, membrane, Pressure-Sensitive Overlayment Strip (semi-cured), or Cured Cover Strip is not practical.

6. Adhering FleeceBACK AFX or FleeceBACK KEE HP membrane to a wall surface with asphalt, the continuous deck membrane may be used as flashing. Care must be taken and any large drips and pools of asphalt accumulated at the base of the wall must be removed. Flashing height is limited to a maximum of 18".

7. FleeceBACK AFX or FleeceBACK KEE HP membrane adhered to the wall with appropriate bonding adhesive. When applying bonding adhesive to the fleece backed membrane, apply a coat to the fleece side of the membrane and allow to completely dry. Once dry, apply bonding adhesive to the wall substrate and the back of the membrane previously coated with bonding adhesive at a coverage rate of 60 square feet per gallon (finished surface).

8. For additional flashing considerations, refer to **Spec Supplement G-05 "Flashing Considerations / Metal Work"**.

9. **Flashing of Difficult Penetrations,** refer to **Spec Supplement G-13 for "LIQUISEAL Liquid Flashing"** for additional information and specific requirements.

3.12 Related Products Installation

A. Metal Work

Factory-fabricated metal edge systems must be secured to the wood nailer as specified by the manufacturer. Shop-fabricated edging and Carlisle TPO Coated Metal must be installed in compliance with appropriate Carlisle Detail in order to achieve ES-1 Compliance. Refer to the appropriate Universal Details, **Spec Supplement G-05 "Flashing Considerations / Metal Work"**, and **Design Reference DR-12 "Metal Edging"** for flashing considerations.

B. Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to **Spec Supplement G-06 "Roof Walkway Installations"**.

C. Daily Seal/Clean Up Procedures

On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration. For additional information refer to **Spec Supplement G-07 "Daily Seal / Clean Up"**.

Attach copies of the applicable Carlisle Details that pertain to the individual project to complete a bid package submittal.

FleeceBACK® AFX
Roofing Systems

"Attachment I"
Mechanically Fastened Option
For Recover Application

July 2024

A. Description

The Mechanically Fastened membrane option is available when using either AFX EPDM or AFX TPO membrane. In lieu of adhering the AFX Membrane to an approved substrate with asphalt or cold applied adhesive, the AFX Membrane may be mechanically fastened along the side laps over an approved substrate to an acceptable deck using the appropriate Carlisle Fasteners and seam plates.

B. Approved Substrates

Existing Type III or IV smooth built-up roofing, mineral surfaced cap sheets, or modified bitumen. Substrate must be dry and free of debris or other contaminants. For other substrates, Carlisle may be contacted for recommendations and specific substrate preparations and requirements

C. Warranty Criteria for 55-mph 20-year Membrane System Warranty

Projects requiring extended wind speed coverage must be submitted to Carlisle for review prior to installation.

1. Membrane sheet width, fastener types, and fastening density

Membrane Type	Field Sheet Width	Perimeter Sheet Width	Fastener / Seam Plate	Fastening Density in the Seams
AFX EPDM	10-ft	4.5-ft	HP Fastener / Polymer Plate	12" o.c.
AFX TPO	12-ft	6-ft	HP-X Fastener / Piranha Plate	12" o.c.

Table I FleeceBACK Adhered Systems Warranty Options

Years	Minimum Membrane Thickness	Warranty Wind Speed			Additional Hail Coverage(4)				Accidental Puncture (6)
		55, 72 or 80 mph	90 or 100 mph	110 or 120 mph	1" Dia. Hail	2" Dia. Hail	3" Dia. Hail	4" Dia. Hail	(man hours per year)
5,10, or 15 year	FleeceBACK EPDM 100-mil or FleeceBACK TPO 100-mil	√	√	√	√	√ (1)	N/A	N/A	8
	FleeceBACK PVC 115-mil (3)	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK KEE HP 105-mil	√	√	√	√	√ (1)	N/A	N/A	8
20 year	FleeceBACK EPDM 115-mil or FleeceBACK TPO 115-mil	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK PVC 115-mil (3)(5)	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK KEE HP 105-mil	√	√	√	√	√ (1)	N/A	N/A	8
25 year	FleeceBACK EPDM 115-mil	√	√	√	√	√	√ (1)	N/A	16
	FleeceBACK PVC 135-mil (3)(5)	√	√	√	√	√	√	N/A	32
	FleeceBACK TPO 135-mil	√	√	√	√	√	√	N/A	32
	FleeceBACK KEE HP 115-mil	√	√	√	√	√	√ (1)	N/A	16
30 year	FleeceBACK EPDM 145-mil	√	√	√	√	√	√	√ (2)	32
	FleeceBACK TPO 135-mil	√	√	√	√	√	√	N/A	32
	FleeceBACK KEE HP 135-mil	√	√	√	√	√	√	N/A	32

Notes: N/A = Not Acceptable √= Acceptable

General: Mechanical Fastening limited to 72 mph, refer to Attachment II, for number of fastening sheets and fasteners.

(1) Requires Flexible FAST in full coverage or beads spaced at 4” o.c.
(2) Require Flexible FAST in full coverage or beads spaced at 4” o.c. Contact Carlisle for underlayment requirements.
(3) FleeceBACK PVC with Polyester or Fiberglass Reinforced Scrim (FRS).
(4) Flexible FAST Splatter application (50% coverage or 1/2 gallon per 100 square feet) does not qualify for additional puncture or hail warranties.
(5) FleeceBACK PVC 115- or 135-mil membranes in Slate Gray are limited to Warranties Up to 20 Year.
(6) Flexible FAST in full coverage or beads spread @ 4” o.c. can receive an additional 4 hours accidental puncture coverage.

Table II Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty

Other Requirements are Listed in Additional Design Considerations following this Table.

All Carlisle Products listed for higher wind speed coverage can also be used for Warranties with lesser speed coverage. (i.e. 72 MPH underlayment may be used for 55 MPH underlayment)

Peak Gust Wind Speed Warranty	Minimum Membrane Underlayment (Carlisle Supplied Only)	Insulation/Underlayment Attachment			Metal Edging
		# of Fasteners per 4' x 8' board size (1)	Adhesive Ribbon Spacing for 4' x 4' and 4' x 8' size board (11)		
			Field	Perimeter	
55 or 72 MPH	1" (20 psi) Polyisocyanurate	16 (9)	12" (4)	6" (4)	Carlisle Drip Edge, SecurEdge™ 200 or 300
	1-1/2" (20-psi) Polyisocyanurate	10			
	2" (20 -psi) Polyisocyanurate	8			
	1/2" SecurShield HD (2)	12			
	1/4" DensDeck or 1/4" Securock	12			
80 MPH	1/2" SecurShield HD Plus (2)	8	12" (4)(6)	6" (4)(6)	Carlisle Drip Edge, SecurEdge 200 or 300 (10)
	1/2" HP Recovery Board (2)	16			
	2" SecurShield HD Composite	6			
	1/2" DensDeck Prime or 1/2" Securock (2)	8			
	1-1/2" (25-psi) Polyisocyanurate	10			
	2" (25-psi) Polyisocyanurate	8			
90 MPH	1/2" DensDeck or 1/2" Securock (2)	12	6" (8)	6" (6)(7)	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
	1/2" SecurShield HD (2) or 1-1/2" (20-psi) SecurShield Polyiso	16			
	1/2" SecurShield HD Plus (2)	12			
	2" (20-psi) SecurShield Polyiso	8			
	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	8			
	2" SecurShield HD Composite	8	6" (4)(6)	6" (4)(6)	
	1-1/2" Insulfoam HD Composite	16			
100 MPH	2" (25-psi) SecurShield Polyiso (1)	16	FS	FS	Carlisle Drip Edge (3), SecurEdge 2000 or 3000.
110 MPH	1-1/2" StormBase (OSB/Polyiso Composite) or 1/2" EcoStorm VSH (2)	16	FS	FS	SecurEdge 2000 or 3000
	1/2" SecurShield HD Plus (2)				
120 MPH	5/8" DensDeck or 5/8" DensDeck StormX Prime or 5/8" Securock (2)	16	FS	FS	SecurEdge 2000 or 3000
	1-1/2" StormBase (OSB/Polyiso Composite) (1) or 1/2" EcoStorm VSH (2)	17			
	1/2" SecurShield HD Plus (2)	24			
	2" SecurShield HD Composite	16			

FS = Full Spray, Equipment (Rig) Splatter or Ribbons @ 4" O.C.
(1) For Building heights between 51-100', enhance 12'-wide perimeter with 50% more fasteners and plates.
(2) Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.
(3) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
(4) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C
(5) Steel Decks - Field & Perimeter @ 6" O.C.
(6) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
(7) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
(8) Gravel Surface BUR – FS
(9) Reduced fastening (11 fasteners per 4 x 8 board) is acceptable on Reroof/No Tear off projects with a maximum roof height of 40'.
(10) May be fastened with ring shank nails staggered 4" on center. Carlisle HP or HP-X™ Fasteners may also be used fastened 12" on center.
(11) Maximum 4' x 4' insulation boards when the adhesive is extruded at 12" o.c. or when boards exceed 4" thickness. 4' x 8' insulation boards may be used when the adhesive is applied at Full-Spray, Equipment (Rig) Splatter, 4", or 6" beads)

Table II - Additional Design Considerations (Up to 20 YR Warranty)
(Required in conjunction with Table II)

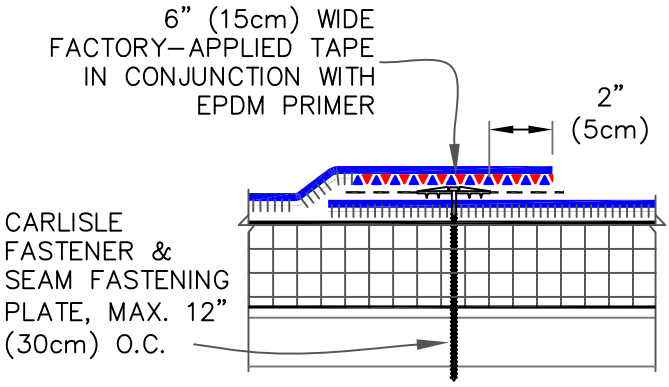
1 - Building height shall not exceed 100 foot*
2 - Local Wind Zone per ASCE 7 shall not exceed 130 mph*
3 - Acceptable decking: 22-gauge or heavier steel, structural concrete, 1-1/2" wood plank, or 15/32" plywood.
4 - All "T-joints" must be overlaid with appropriate flashing material
5 - Membrane Attachment: 15 YR Warranty - Adhesive Bead Spacing 12" o.c. field, 6" o.c. perimeter up to 55 MPH; 6" o.c. field, 6" perimeter 72 MPH ; 4" o.c. Splatter, or Full Spray field and perimeter 80 MPH
6 - Membrane Attachment: 20 YR Warranty - Adhesive Bead Spacing 6" o.c. field and perimeter up to 55 MPH; 6" o.c. field, 4" o.c perimeter 72 MPH ; 4" o.c. Splatter, or Full Spray field and perimeter 80 MPH

* For projects where building height exceeds 100' or wind speed exceeds 130 mph, please submit to Carlisle for review.

D. Associated Installation Details

End of Attachment

MEMBRANE SPLICE



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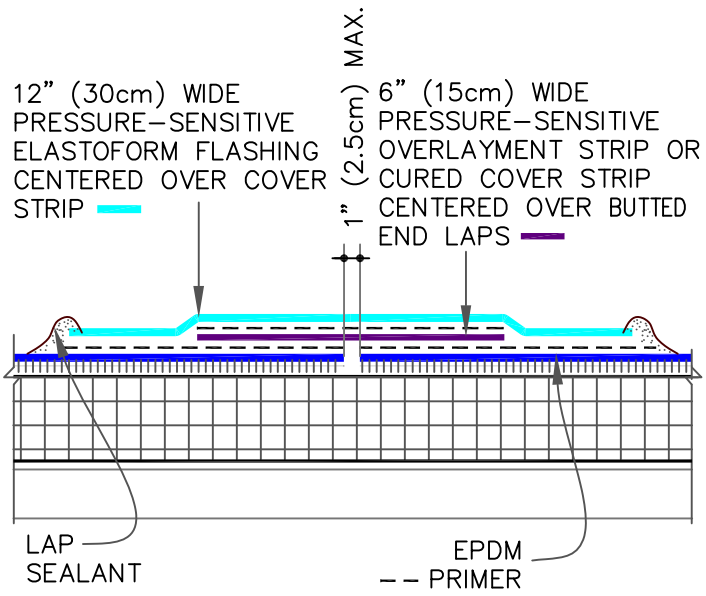
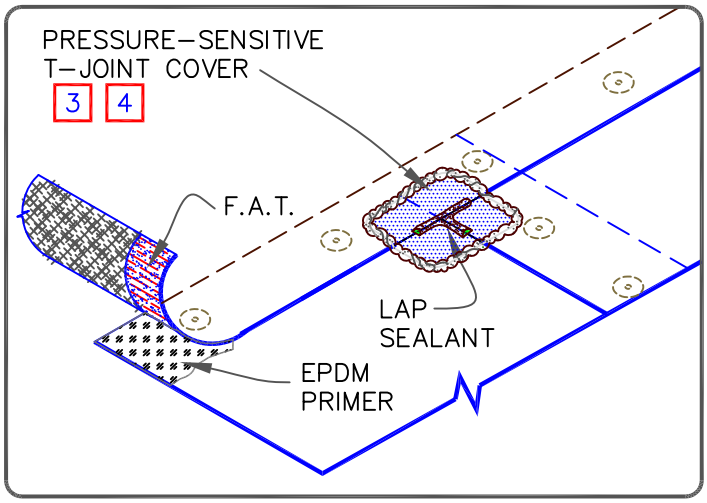
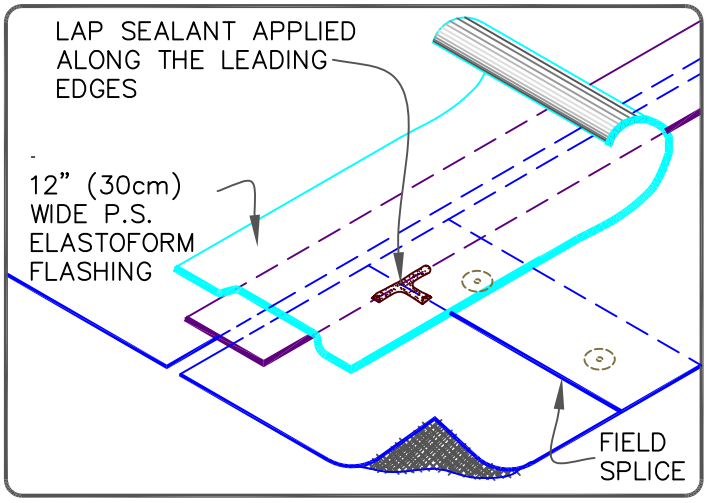






NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENER/PLATE AND FASTENING DENSITY.

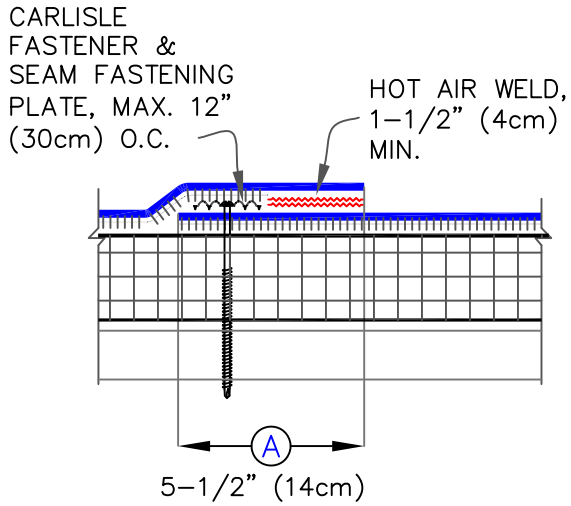
2. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

3. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6"(15cm X 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (13 mm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

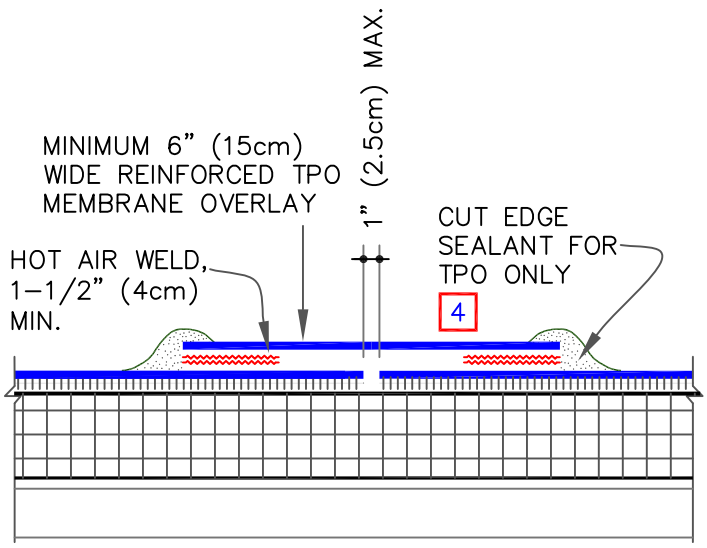
4. 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING MAY ALSO BE CENTERED OVER THE FIELD SPLICE INTERSECTION.

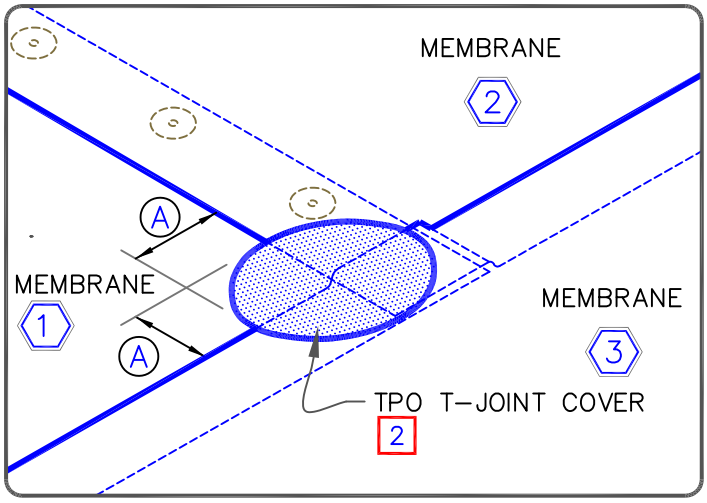
AFX EPDM MEMBRANE APPROVED SUBSTRATE 0 — SEE NOTE(S)	AFX EPDM MECHANICALLY FASTENED MEMBRANE & END LAP SPLICES For additional information, refer to Specifications	DETAIL NO. AFX–MF1 MECHANICALLY FASTENED

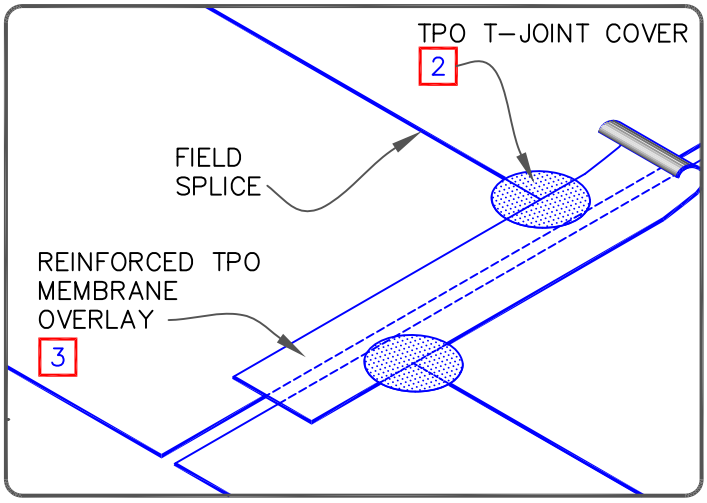
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENER/PLATE AND FASTENING DENSITY.

2. WHEN USING 135 OR 155–MIL AFX TPO MEMBRANE, APPLY A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

3. WHEN USING 60 OR 80 MIL TPO REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER, AS SHOWN.

4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

AFX TPO/KEE HP MEMBRANE
APPROVED SUBSTRATE
0 — SEE NOTE(S)

AFX TPO MECHANICALLY FASTENED MEMBRANE & END LAP SPLICES

For additional information, refer to Specifications

DETAIL NO.
AFX–MF2
MECHANICALLY FASTENED

FleeceBACK® AFX Roofing Systems

AFX EPDM / AFX Sure-Weld®
Hot Mopped / Cold Applied Adhered Roofing System

Installation Details

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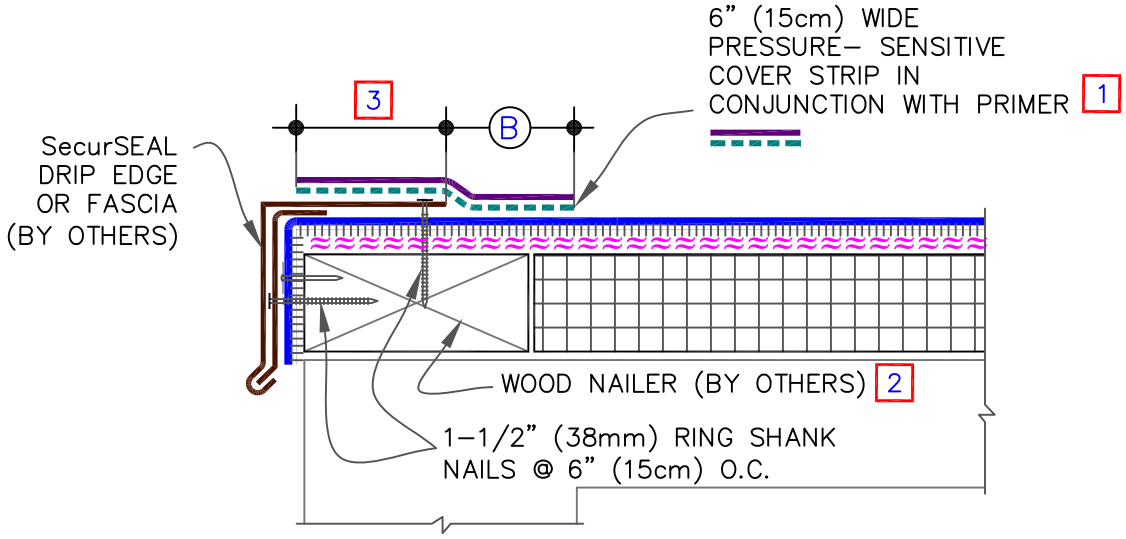
July 2024

CAUTION

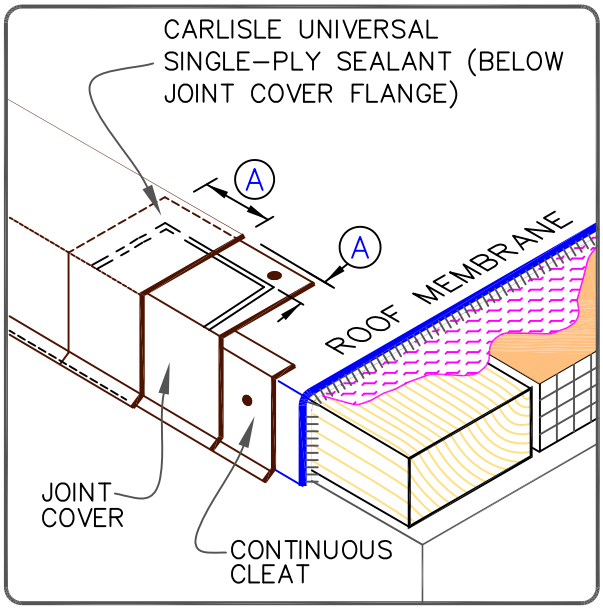
DETAIL NOT FOR USE ON 25–YEAR WARRANTY PROJECTS. ACCEPTABLE EDGING SHALL CONFORM WITH THERMOSET DETAIL U–1A.1 WHEN USING EPDM MEMBRANE OR AFX–1B WITH TPO MEMBRANE.



NOTES:

1. USE APPROPRIATE COVER STRIP & PRIMER BASED UPON MEMBRANE TYPE. FOR EPDM, REFER TO THERMOSET U–1A. FOR TPO, REFER TO THERMOPLASTIC U–1A.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
3. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY PRESSURE–SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
4. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING PRIMER.
5. APPLY PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING.
6. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.

DIMENSIONS		cm	
A	1/2"	1.5	TO
	1"	2.5	
B	2"	5	MIN.

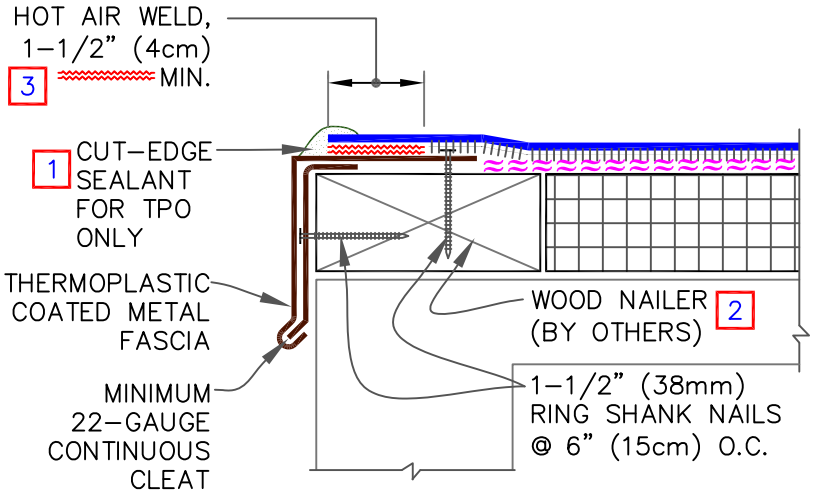


CARLISLE SYNTEC SYSTEMS

SecurSEAL DRIP EDGE FASCIA

MAXIMUM WARRANTY: 20 YEARS

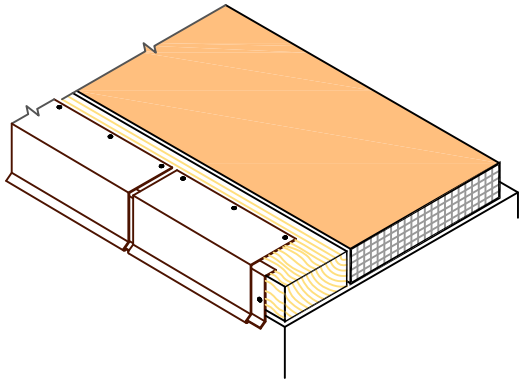
DETAIL NO.
AFX–1A
AFX ADHERED



NOTES:

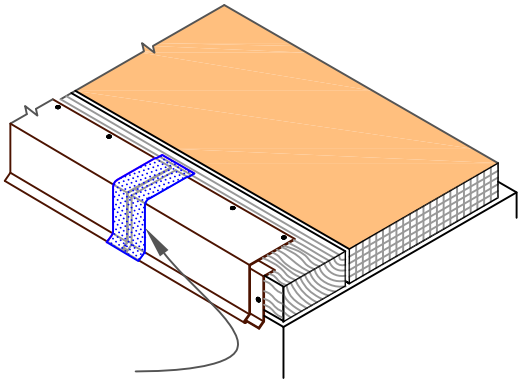
1. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
3. POSITION MEMBRANE WITH SELVAGE EDGE TO AVOID REMOVAL OF FLEECE BACKING.

1



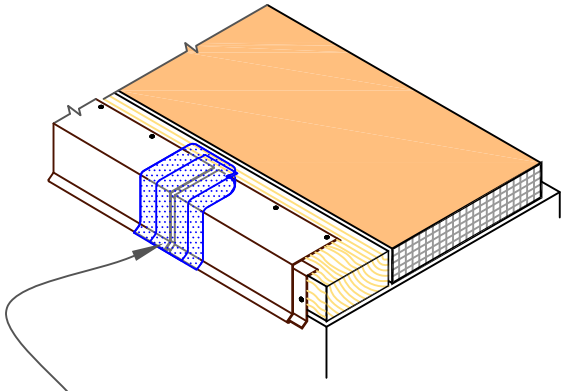
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"–1/4" (0.5–1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



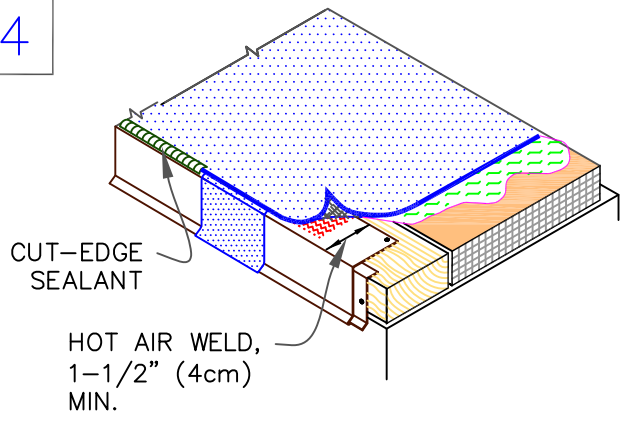
HEAT WELD 3" (7.5cm) WIDE PIECE OF NON–REINFORCED THERMOPLASTIC MEMBRANE OVER JOINT

3



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

4



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

CARLISLE SYNTEC SYSTEMS

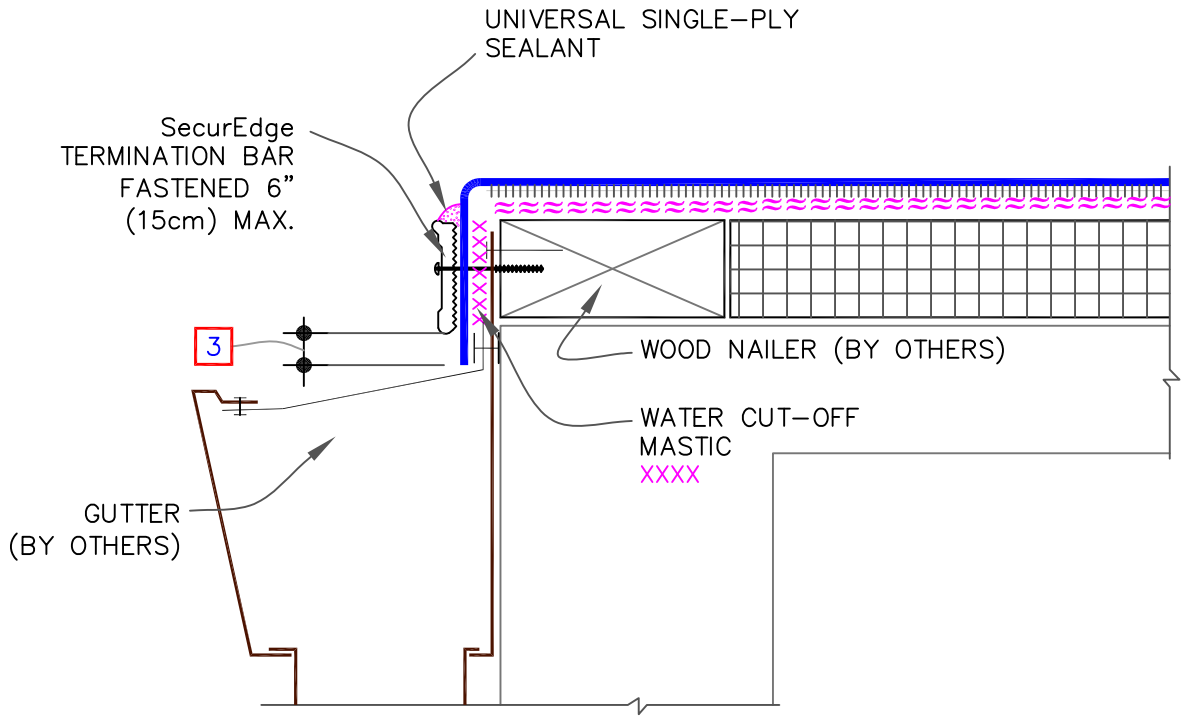
SecurWELD COATED DRIP EDGE FASCIA – TPO

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

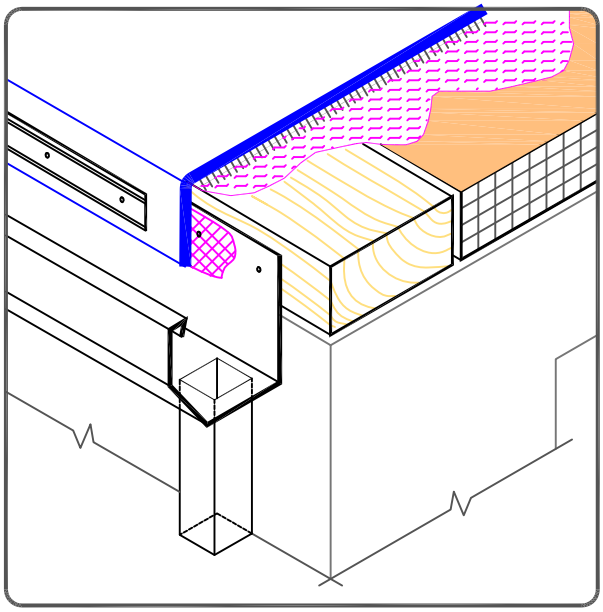
AFX–1B

AFX ADHERED



NOTES:

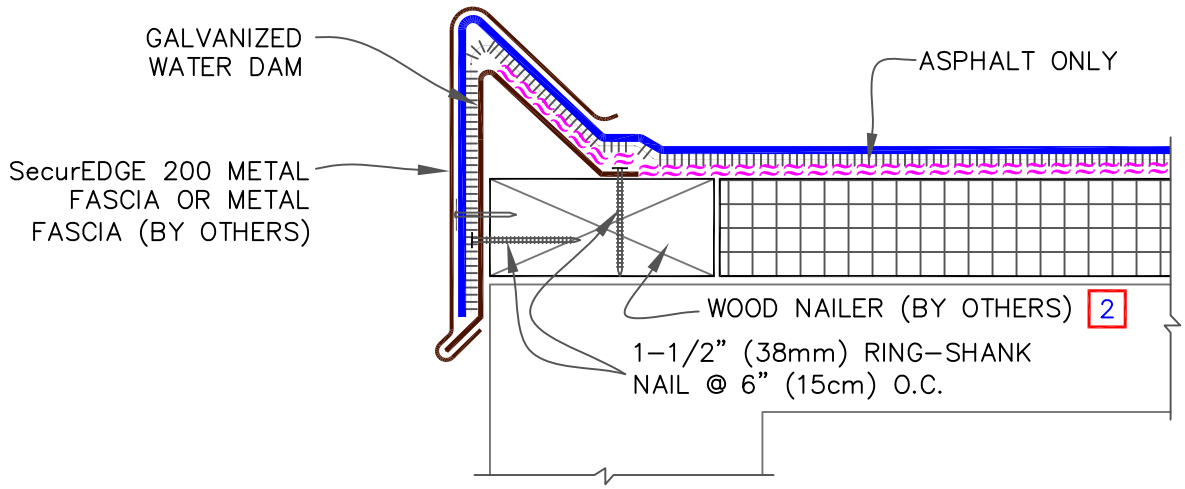
1. POSITION MEMBRANE WITH SELVAGE EDGE AT TERMINATION BAR LOCATION TO AVOID REMOVAL OF FLEECE BACKING.
2. FASTENING OF METAL TERMINATION BAR MUST PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
3. ALLOW MEMBRANE SHEET TO EXTEND 1/2" (1.5cm) MINIMUM BELOW THE METAL TERMINATION BAR.



CARLISLE SYNTEC SYSTEMS	METAL BAR EDGE TERMINATION	DETAIL NO. AFX–1C
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED

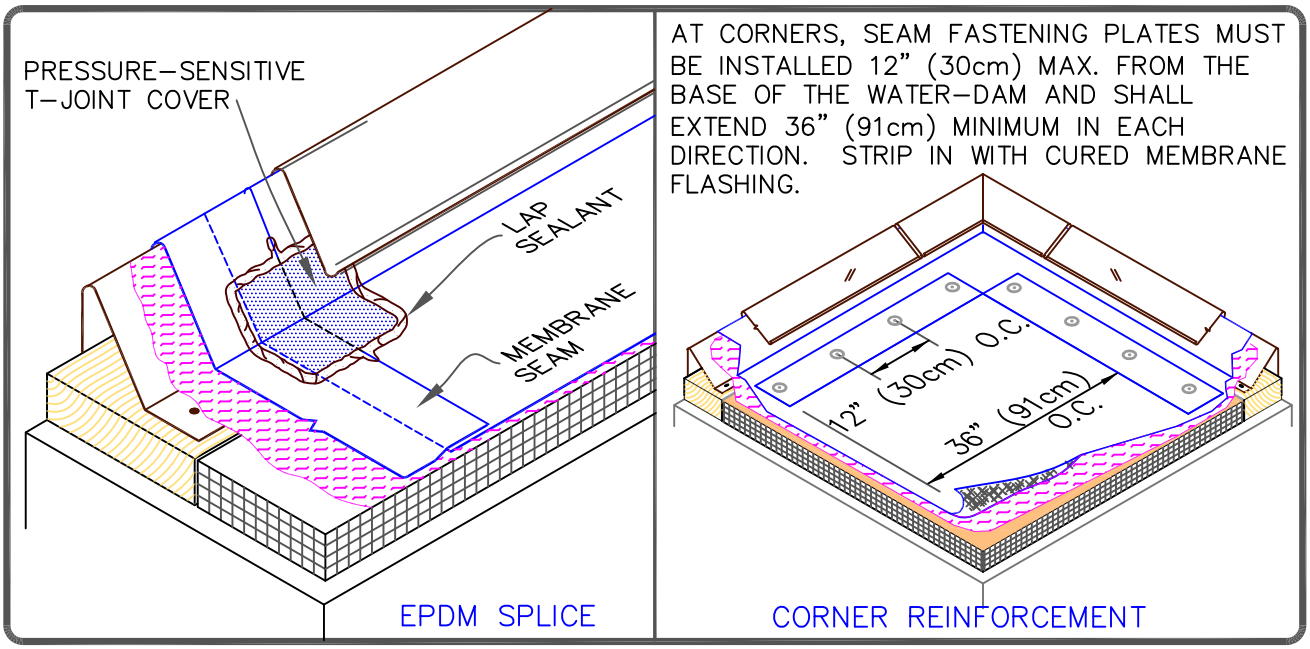
CAUTION

FOR PROJECTS WITH 25–YEAR WARRANTIES, ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT.



NOTES:

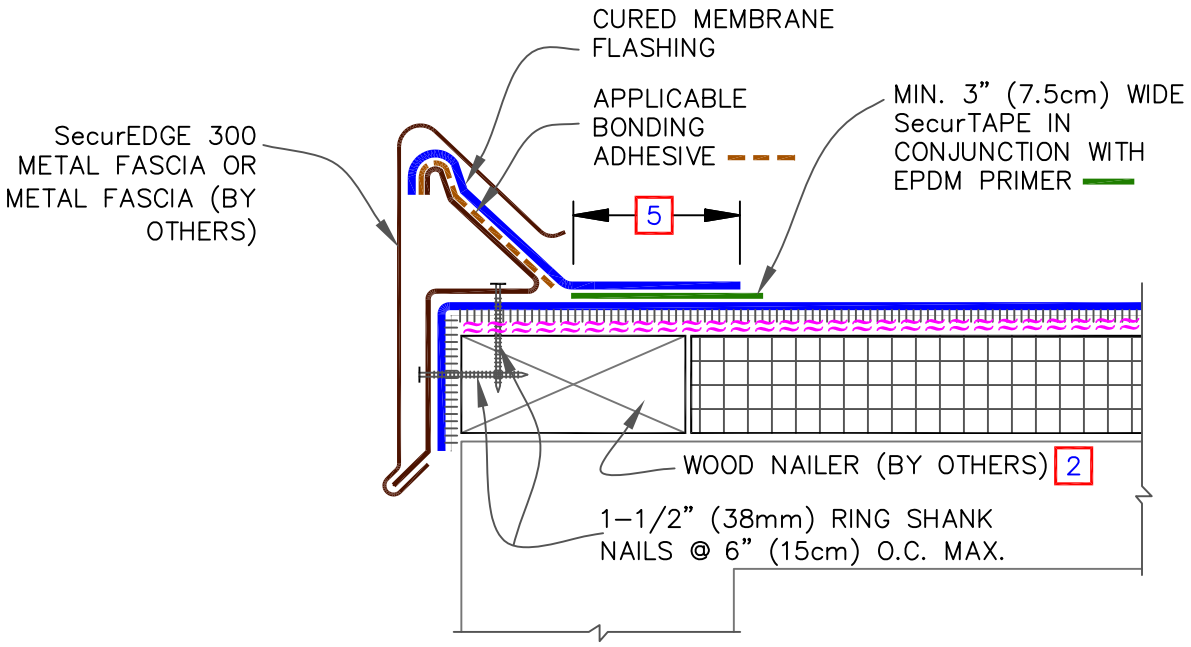
1. REFER TO SecurEdge 200 INSTALLATION INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF GRAVEL STOP DECK FLANGE.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 200		DETAIL NO. AFX–1D
	MAXIMUM WARRANTY: 30 YEARS		AFX ADHERED

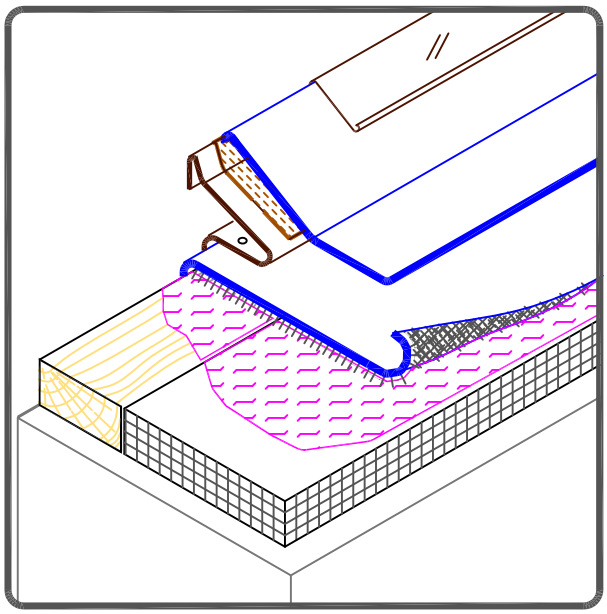
CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



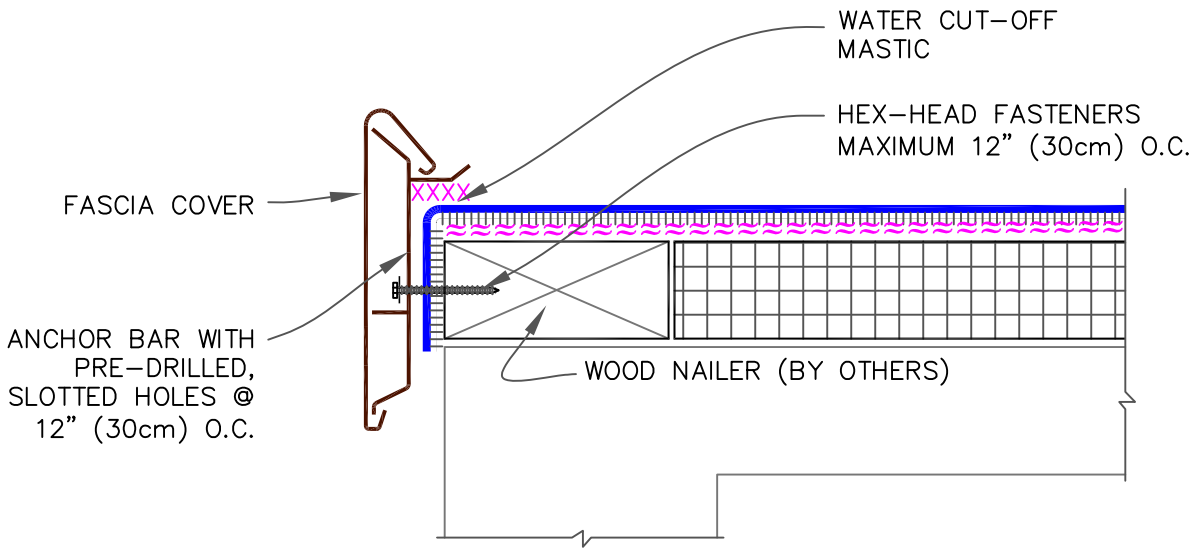
NOTES:

1. REFER TO SecurEdge 300 INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF GRAVEL STOP DECK FLANGE.
3. PRESSURE-SENSITIVE T-JOINT COVER OR 6" (15cm) WIDE PRESSURE-SENSITIVE FLASHING, IN CONJUNCTION WITH EPDM PRIMER, MUST BE CENTERED OVER EPDM FIELD SPLICES AT THE ANGLE CHANGE. PROJECTS WITH 25-YEAR WARRANTIES REQUIRE EPDM FIELD SPLICES TO BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6" (15cm) WIDE COVERED WITH A 12" WIDE TOP LAYER (30cm). BOTH LAYERS SHALL BE CENTERED AND SEALED WITH CONTINUOUS LAP SEALANT.
4. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



5. MEMBRANE SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/EPDM PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/KEE HP.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

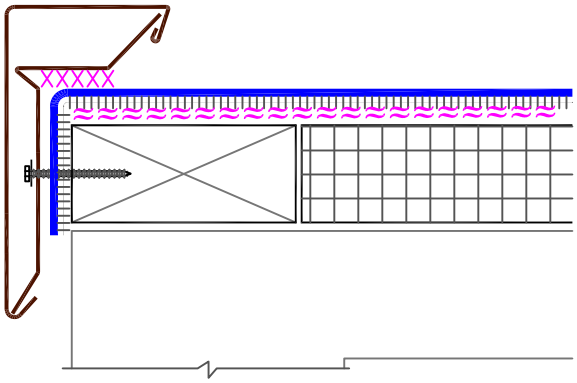
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 300	DETAIL NO. AFX-1E
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED



SecurEDGE 2000

NOTES:

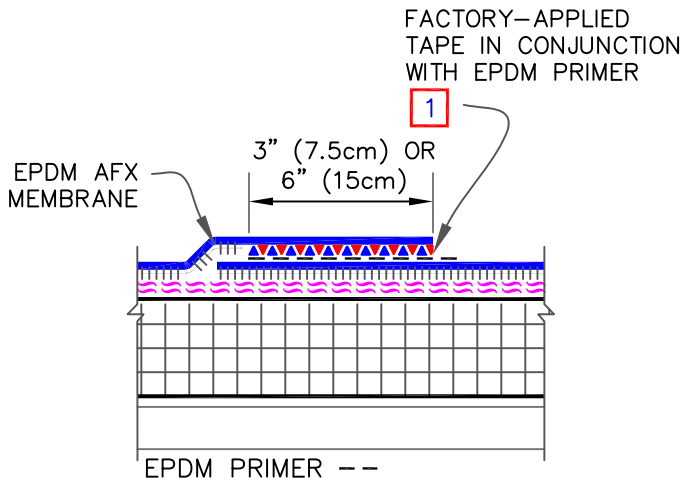
1. REFER TO SecurEdge 2000 OR 3000 INSTRUCTION MANUALS FOR THE STEP BY STEP INSTALLATION PROCEDURES.
2. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SecurEdge MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.
3. ENSURE ROOF SLOPES AWAY FROM SecurEDGE.



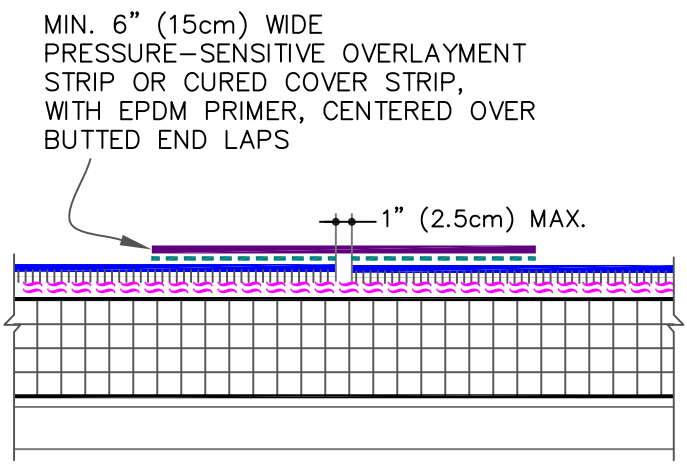
SecurEDGE 3000

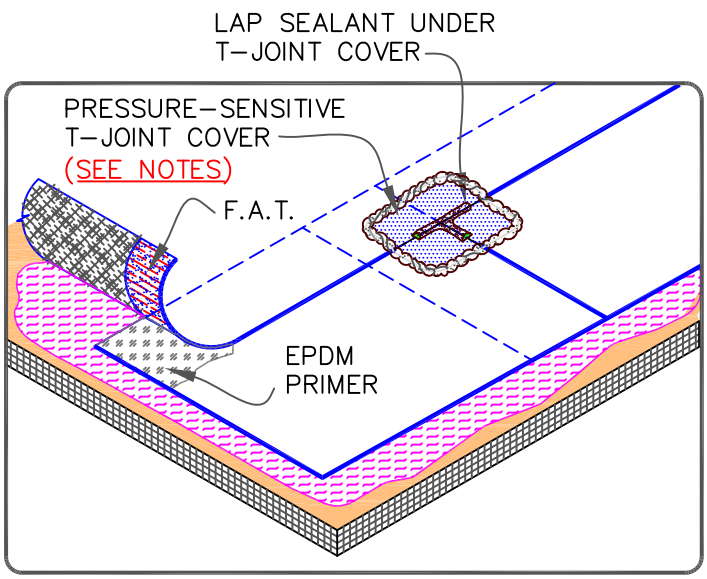
CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge 2000 & 3000		DETAIL NO. AFX-1F
	MAXIMUM WARRANTY: 30 YEARS		AFX ADHERED

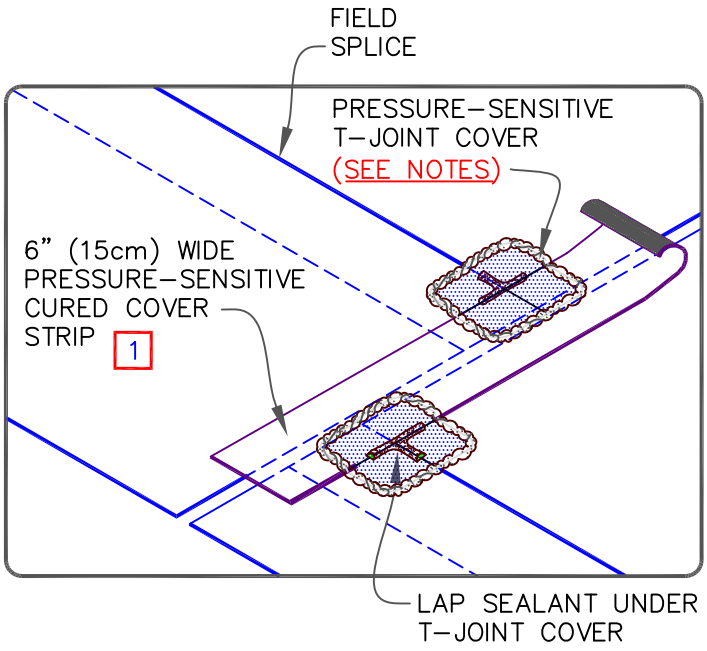
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

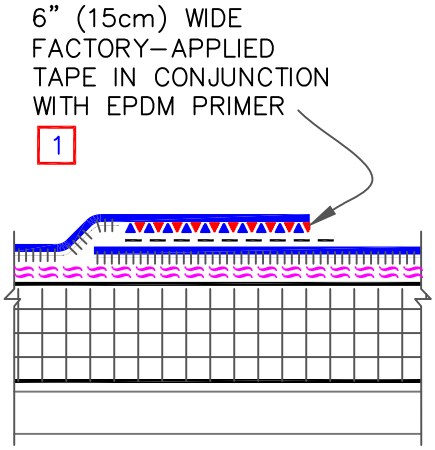
1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm x 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

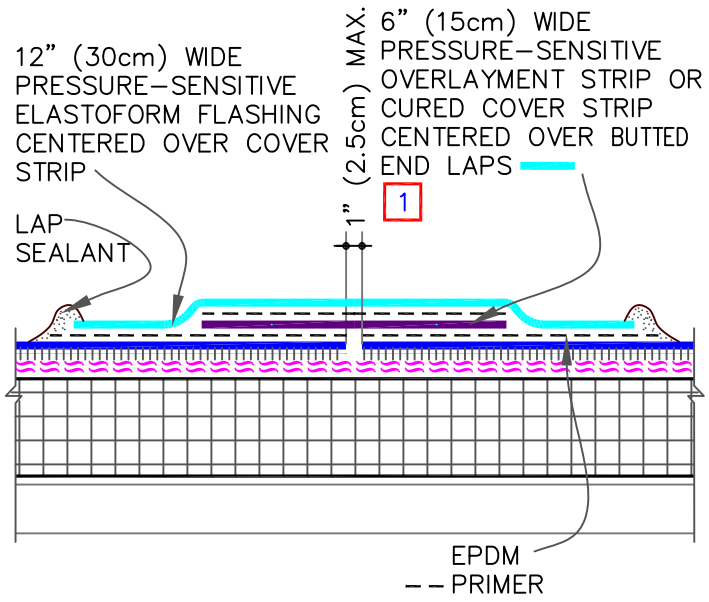
3. 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING MAY ALSO BE CENTERED OVER THE FIELD SPLICE INTERSECTION.

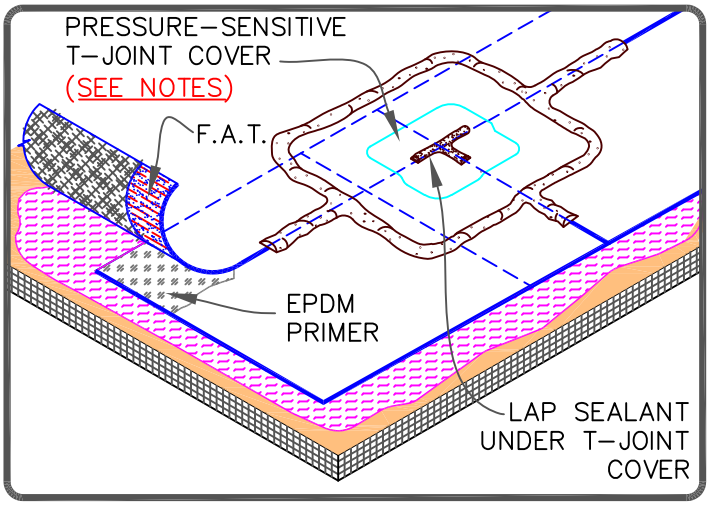
CARLISLE SYNTEC SYSTEMS	AFX EPDM MEMBRANE SPLICE		DETAIL NO. AFX–2A
	MAXIMUM WARRANTY: 20 YEARS		AFX ADHERED

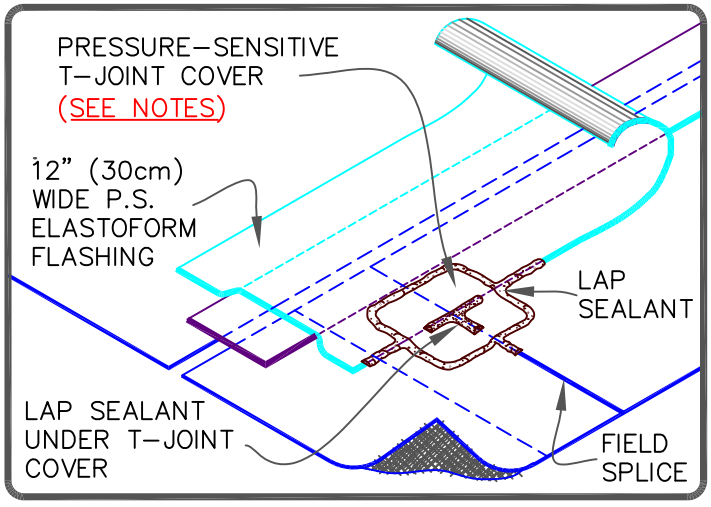
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

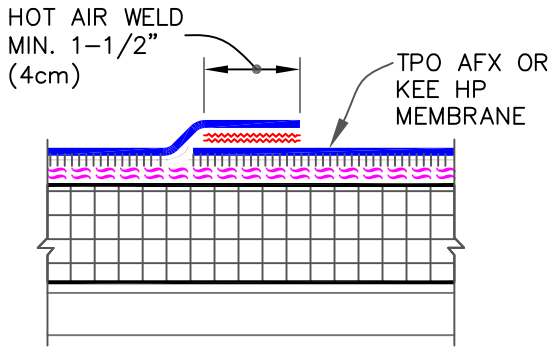
1. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

2. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6"(15cm X 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

3. ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE–SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" (30cm X 30cm) TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, AS SHOWN.

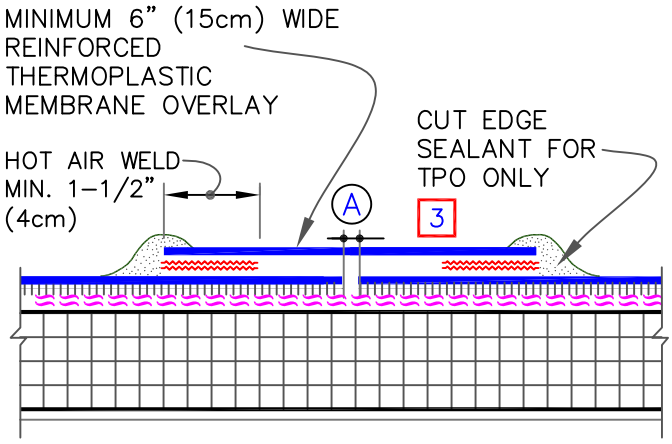
CARLISLE SYNTEC SYSTEMS	AFX EPDM MEMBRANE SPLICE (25–YEAR WARRANTIES)		DETAIL NO. AFX–2A.1
	MAXIMUM WARRANTY: 30 YEARS		AFX ADHERED

MEMBRANE SPLICE

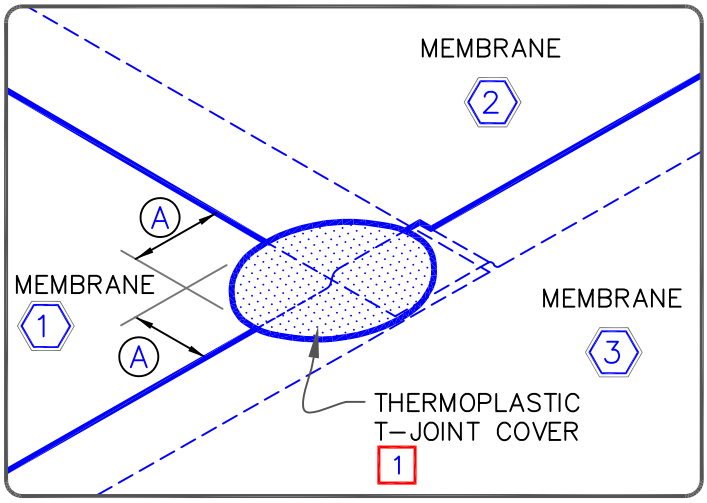


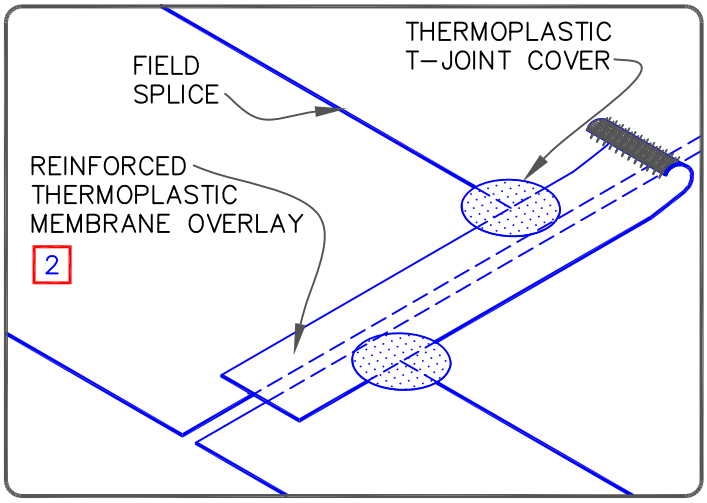
DIMENSION		cm	
A	2–1/4"	6	

END LAP SPLICE



DIMENSION		cm	
A	1"	2.5	MAX.





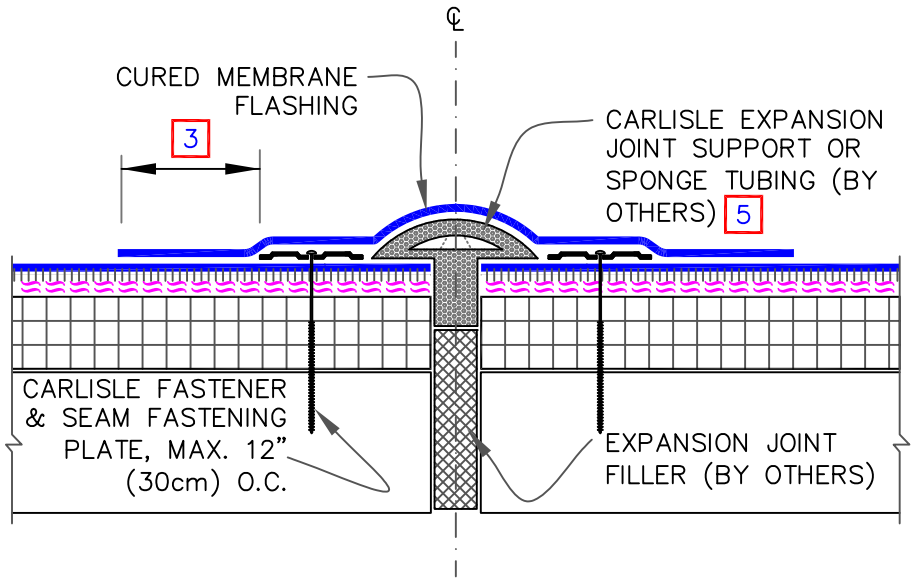
NOTES:

1. WHEN USING 115, 135 OR 155–MIL TPO AFX OR FleeceBACK KEE HP, APPLY A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.
2. WHEN USING 60 OR 80 MIL TPO REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF TPO REINFORCED MEMBRANE.

CARLISLE SYNTEC SYSTEMS	TPO MEMBRANE SPLICES		DETAIL NO. AFX–2B
	MAXIMUM WARRANTY: 30 YEARS		AFX ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (2cm) AND SHALL NOT EXCEED 3" (7.5cm).

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

3. MEMBRANE SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO.

4. WHEN USING 60 OR 80-MIL REINFORCED TPO MEMBRANE FLASHING, APPLY A 4-1/2" (11cm) DIAMETER TPO "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

   ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH A PRESSURE-SENSITIVE T-JOINT COVER. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION. PROJECTS WITH 25-YEAR WARRANTIES MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, REFER TO AFX-2 DETAILS.

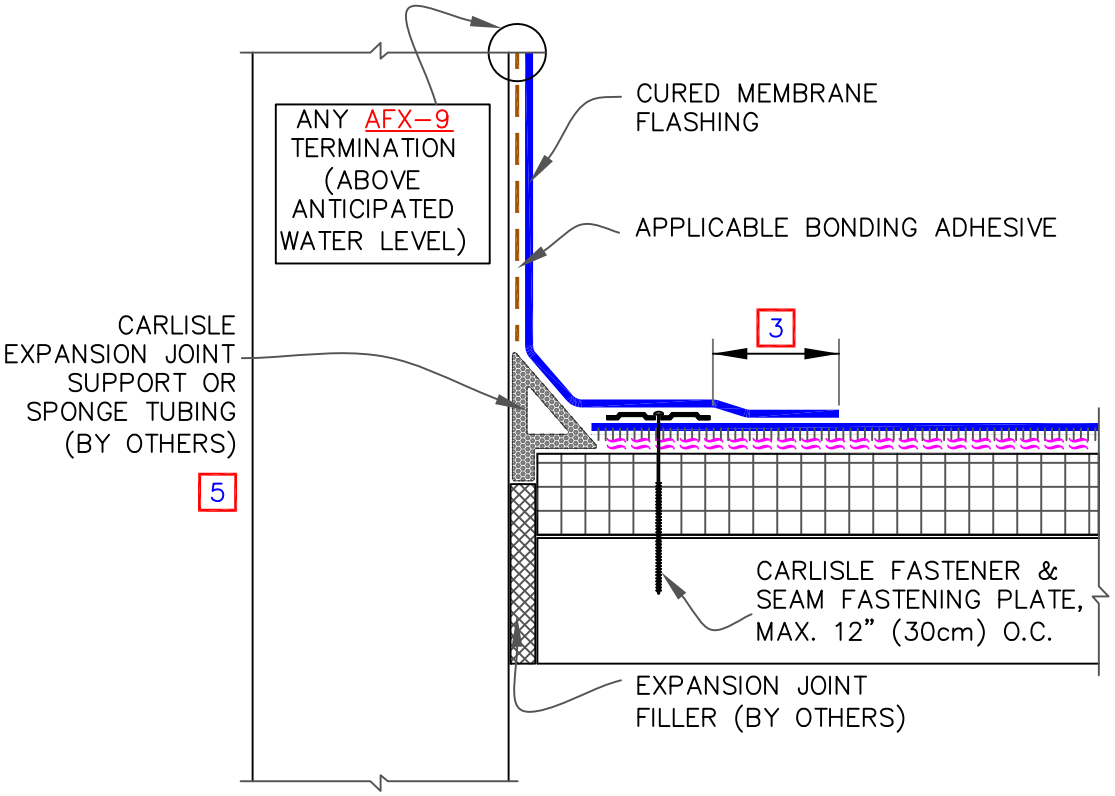
5. ROOF MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

6. FOR EPDM APPLICATIONS, USE TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING WITH EACH LAYER 3" (7.5cm) LARGER THAN THE PREVIOUS LAYER IN ALL DIRECTIONS FOR EXPANSION JOINT INTERSECTIONS BETWEEN EXPANSION JOINTS TO WALL OR EDGING.

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK EXPANSION JOINT	DETAIL NO. AFX-3A
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (2cm) AND SHALL NOT EXCEED 2" (5cm).

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

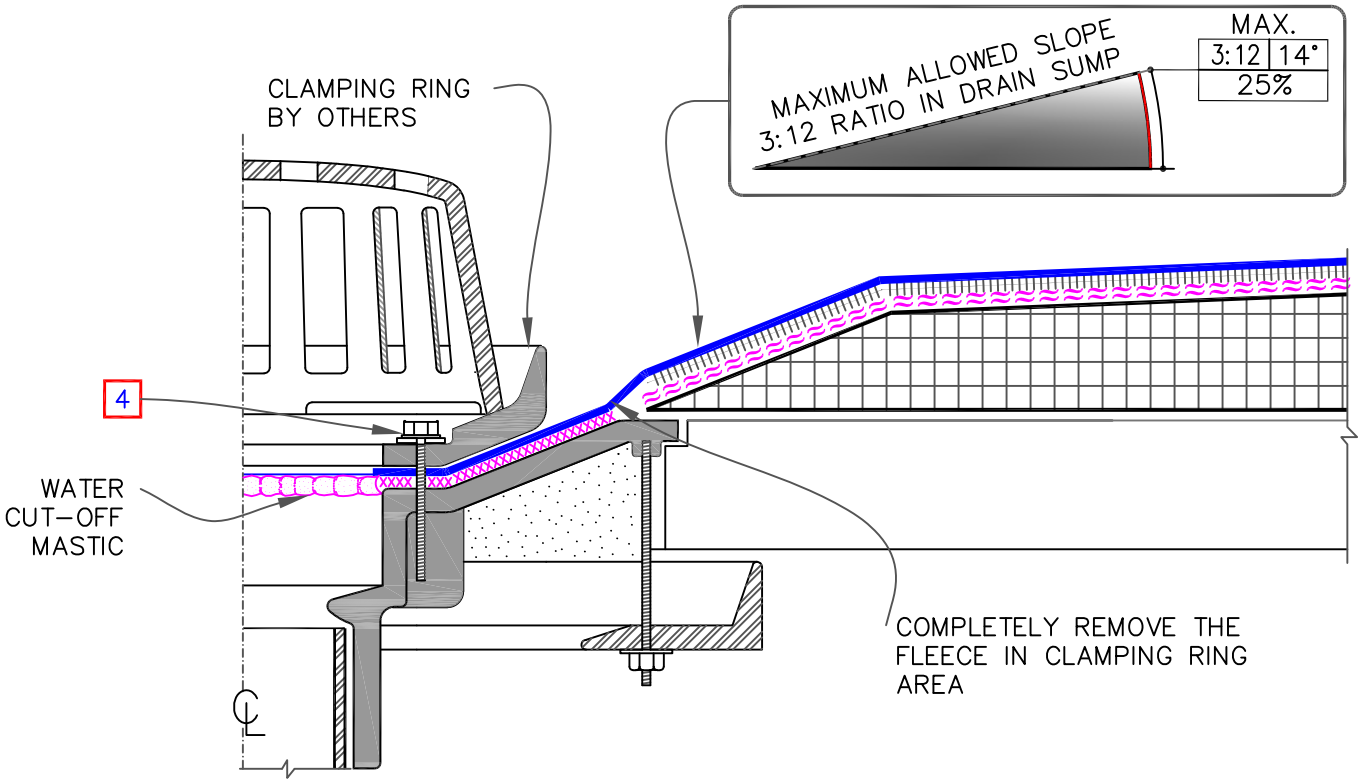
3. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO.

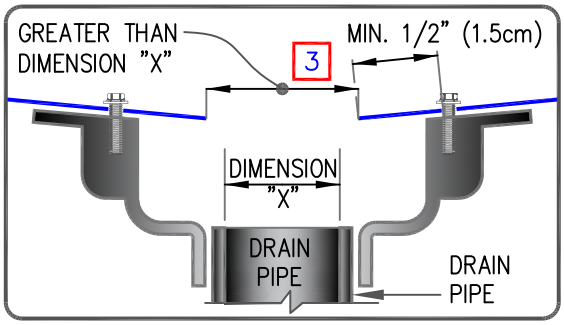
4. WHEN USING 60 OR 80-MIL TPO AND 80-MIL KEE HP REINFORCED THERMOPLASTIC MEMBRANE FLASHING, APPLY A 4-1/2" (11cm) DIAMETER THERMOPLASTIC "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

   ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH A PRESSURE-SENSITIVE T-JOINT COVER. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm x15cm) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION. PROJECTS WITH 25-YEAR WARRANTIES MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, REFER TO AFX-2 DETAILS.

5. ROOF MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

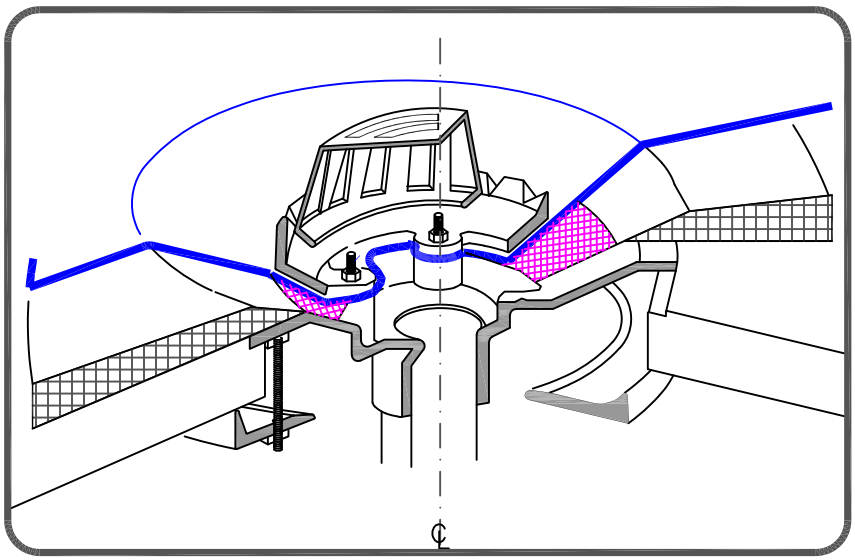
CARLISLE SYNTEC SYSTEMS	DECK-TO-WALL EXPANSION JOINT	DETAIL NO. AFX-3B
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED





NOTES:

1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
2. FLEECE–BACKING MUST BE REMOVED FROM THE MEMBRANE SO THAT WATER CUT–OFF MASTIC IS IN DIRECT CONTACT.
3. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
4. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
5. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



CARLISLE SYNTEC SYSTEMS

ROOF DRAIN WITH CONTINUOUS MEMBRANE

MAXIMUM WARRANTY: 30 YEARS

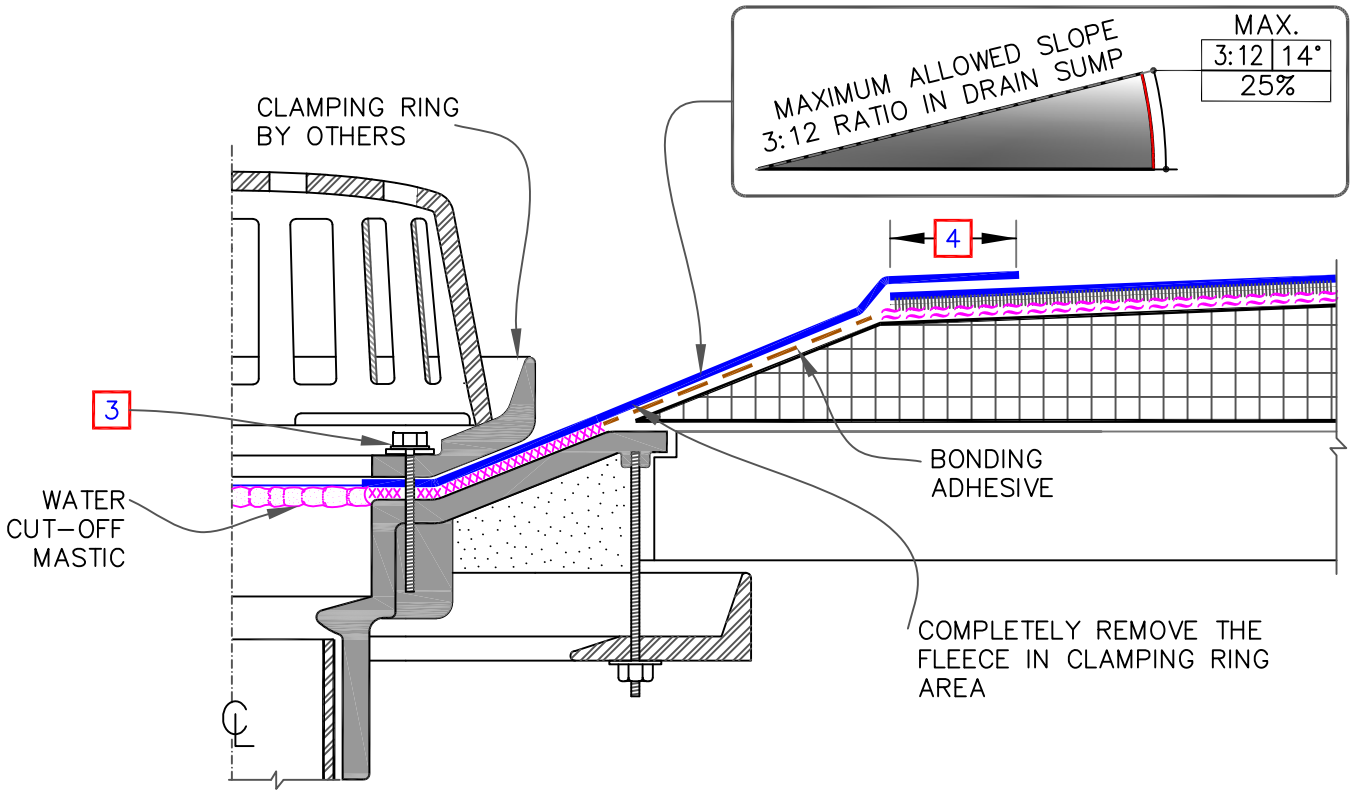
DETAIL NO.

AFX–6A

AFX ADHERED

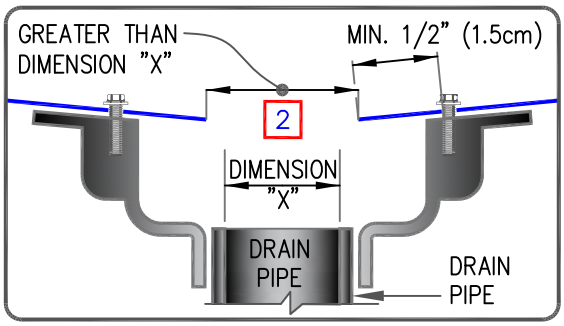
CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



NOTES:

1. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. SPLICES SHALL BE COMPLETED USING MIN. 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO/KEE HP.
5. FIELD SPLICES MUST BE LOCATED AT LEAST 6 INCHES (15cm) OUTSIDE THE DRAIN SUMP.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.
7. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.



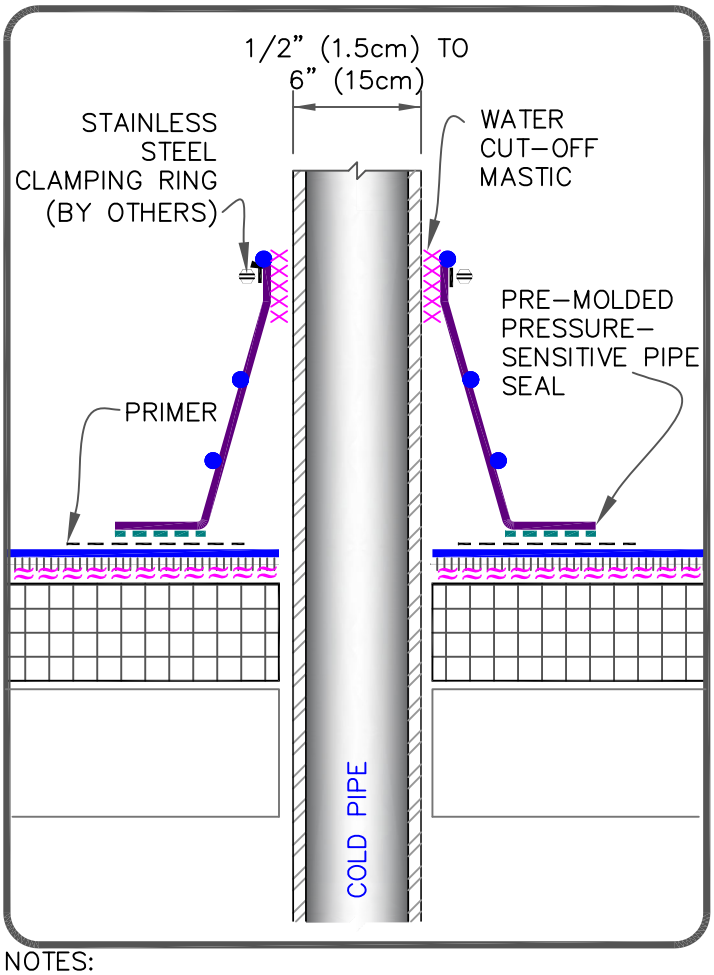
CARLISLE SYNTEC SYSTEMS

ROOF DRAIN WITH SEPARATE TARGET SPLICE

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX-6B
AFX ADHERED

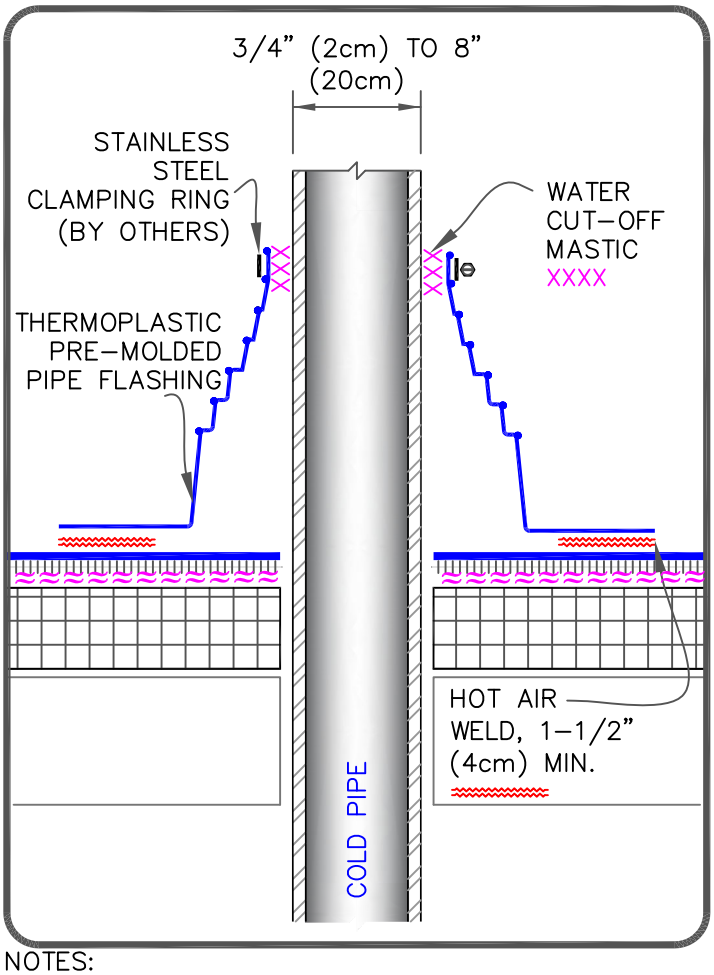
EPDM



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. APPLY EPDM PRIMER TO SPLICE AREA.
4. PRE–MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
5. DECK FLANGES OF THE PRE–MOLDED PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
6. WHEN A FIELD SPLICE INTERSECTS A PIPE SEAL, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION & OVERLAY WITH A 6"X6" (15 X 15cm) T–JOINT COVER.

TPO



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 160°F (71°C).
3. PRE–MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE PRE–MOLDED PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.

CARLISLE SYNTEC SYSTEMS

PRE–MOLDED PIPE SEALS

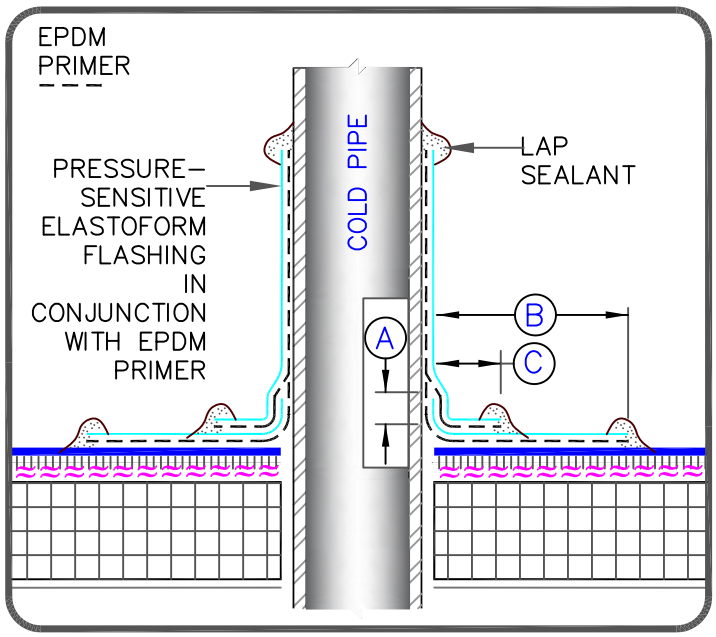
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX–8A
AFX ADHERED

CAUTION

DETAIL NOT FOR USE ON 25-YEAR WARRANTY PROJECTS. ACCEPTABLE PIPE FLASHINGS SHALL CONFORM WITH AFX-8A DETAIL OR REFER TO THERMOSET/THERMOPLASTIC UNIVERSAL DETAILS.

EPDM

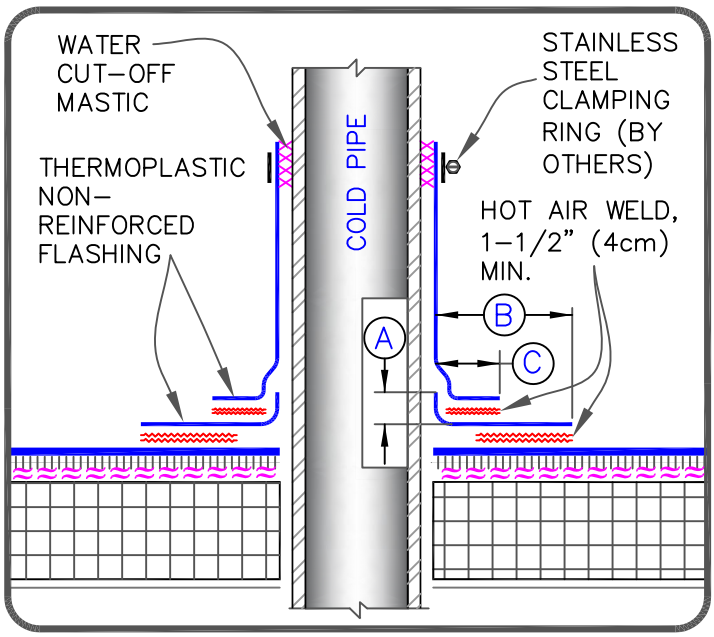


DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	3"	7.5	MIN.
C	1"	2.5	MIN.

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD-FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 180°F (82°C).
3. PRIOR TO APPLYING PRESSURE-SENSITIVE ELASTOFORM FLASHING, APPLY EPDM PRIMER TO SPLICE AREAS.
4. MECHANICAL SECUREMENT IS REQUIRED AROUND ALL PIPES GREATER THAN 18" (46cm) IN DIAMETER.
5. IN COLDER TEMPERATURES A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING.
6. REFER TO EPDM UNIVERSAL DETAILS FOR HOT STACK, STEEL TUBING & FLEXIBLE PIPE PENETRATIONS.

TPO/KEE HP



DIMENSIONS		cm	
A	1/2"	13	MIN.
B	1-1/2"	4	TO
	2"	5	
C	1"	2.5	MIN.

NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF PIPE MUST NOT EXCEED 140°F (60°C) WHEN USING KEE HP AND 160°F (71°C) WHEN USING TPO FLASHING.
3. APPLY HEAT TO FLASHING AND FORM BY HAND PRIOR TO HOT AIR WELDING
4. MECHANICAL SECUREMENT IS REQUIRED AROUND ALL PIPES GREATER THAN 18" (46cm) IN DIAMETER.
5. REFER TO THERMOPLASTIC UNIVERSAL DETAILS FOR HOT STACK, STEEL TUBING & FLEXIBLE PIPE PENETRATIONS.

CARLISLE SYNTEC SYSTEMS

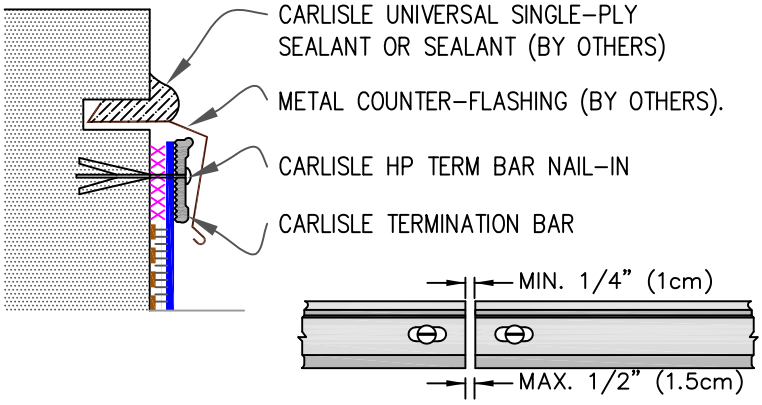
FIELD FABRICATED PIPE FLASHING

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. AFX-8B

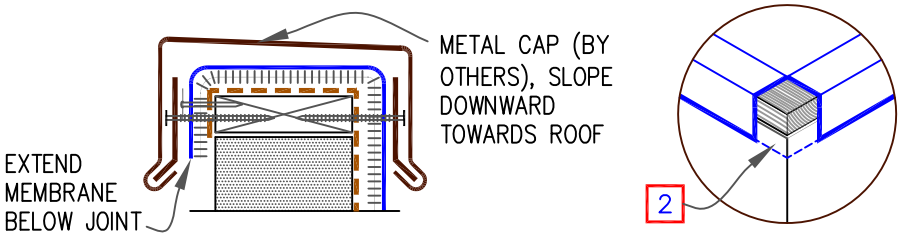
AFX ADHERED

9A MECHANICAL TERMINATION WITH COUNTER FLASHING



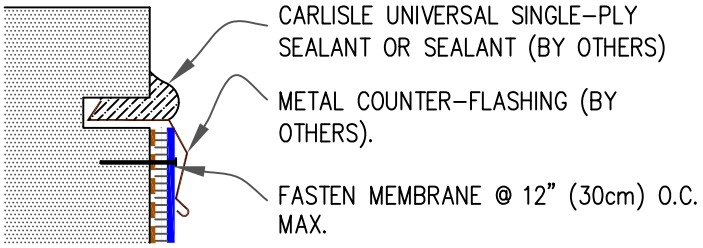
NOTES:
1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. FLEECE-BACKING MUST BE REMOVED FROM THE MEMBRANE SO THAT WATER CUT-OFF MASTIC IS IN DIRECT CONTACT.
4. DETAIL REQUIRED FOR USE ON WARRANTY PROJECTS EXCEEDING 20-YEARS. MAY BE USED FOR ANY PROJECT REGARDLESS OF WARRANTY.
5. DETAIL 9E MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

9B SHEET METAL COPING



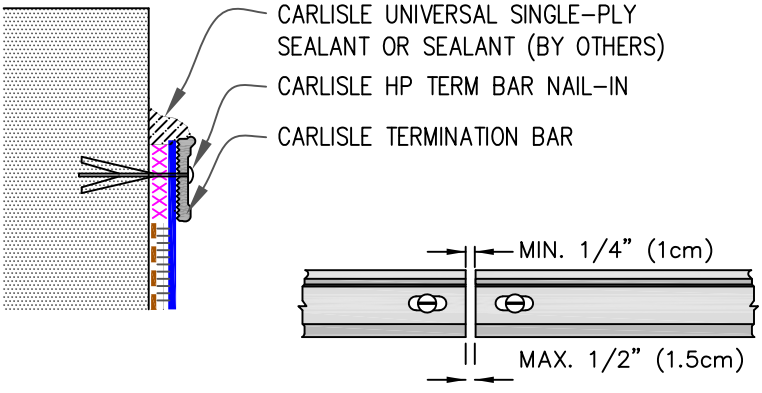
NOTES:
1. FOR CARLISLE SecurEdge COPING, REFER TO INSTALLATION INSTRUCTIONS PUBLISHED SEPARATELY.
2. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE.

9C COUNTER FLASHING TERMINATION



NOTES:
1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER THE COUNTER-FLASHING OR CAULK THE FASTENER HEADS.
2. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 10-YEARS.

9D MECHANICAL TERMINATION



NOTES:
1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.
3. FLEECE-BACKING MUST BE REMOVED FROM THE MEMBRANE SO THAT WATER CUT-OFF MASTIC IS IN DIRECT CONTACT.
4. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20-YEARS.
5. DETAIL 9E MUST BE USED AT VERTICAL JOINTS IN PANEL WALLS.

BONDING ADHESIVE, TYPE III OR IV ASPHALT OR COLD APPLIED ADHESIVE

XXXXXXXX CARLISLE WATER CUT-OFF MASTIC MUST BE UNDER COMPRESSION

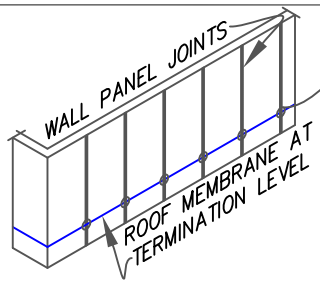
CARLISLE SYNTEC SYSTEMS

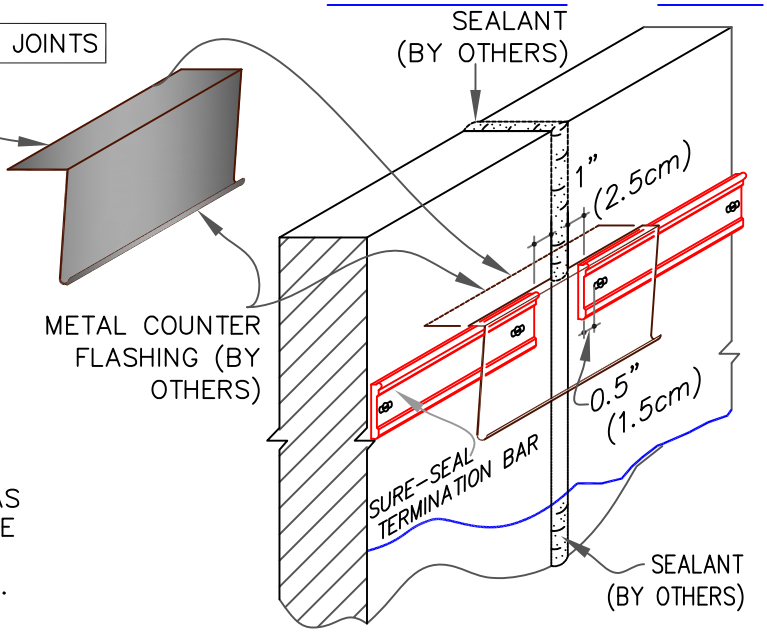
MEMBRANE TERMINATIONS
PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX-9
AFX ADHERED

9E MECHANICAL TERMINATION AT VERTICAL JOINTS

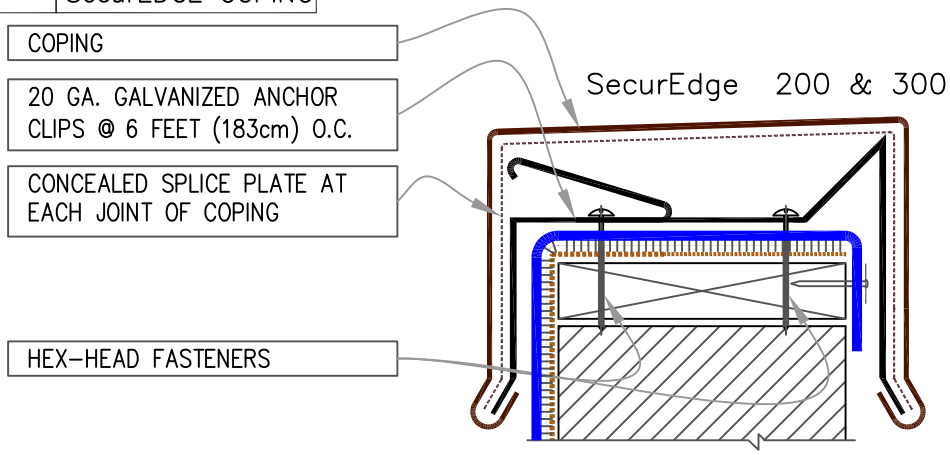




NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.
5. THIS DETAIL MUST BE USED FOR ANY PROJECT REGARDLESS OF WARRANTY.

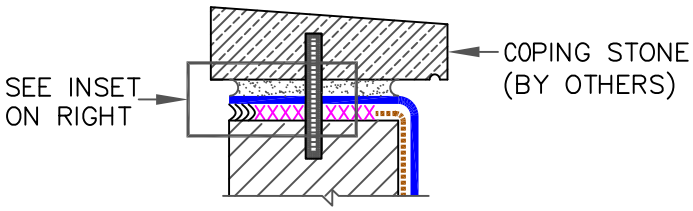
9F SecurEDGE COPING

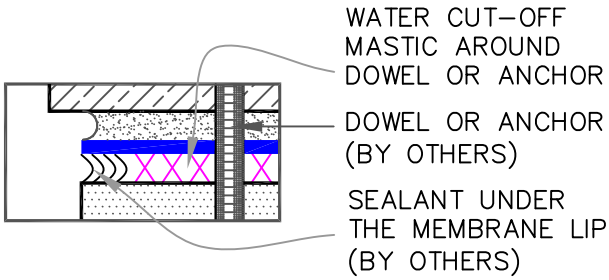


NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. REFER TO DETAIL U-9B.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.

9G COPING STONE TERMINATION





BONDING ADHESIVE, TYPE III OR IV ASPHALT OR COLD APPLIED ADHESIVE

xxxxxxxx CARLISLE WATER CUT-OFF MASTIC MUST BE UNDER COMPRESSION

CARLISLE SYNTEC SYSTEMS

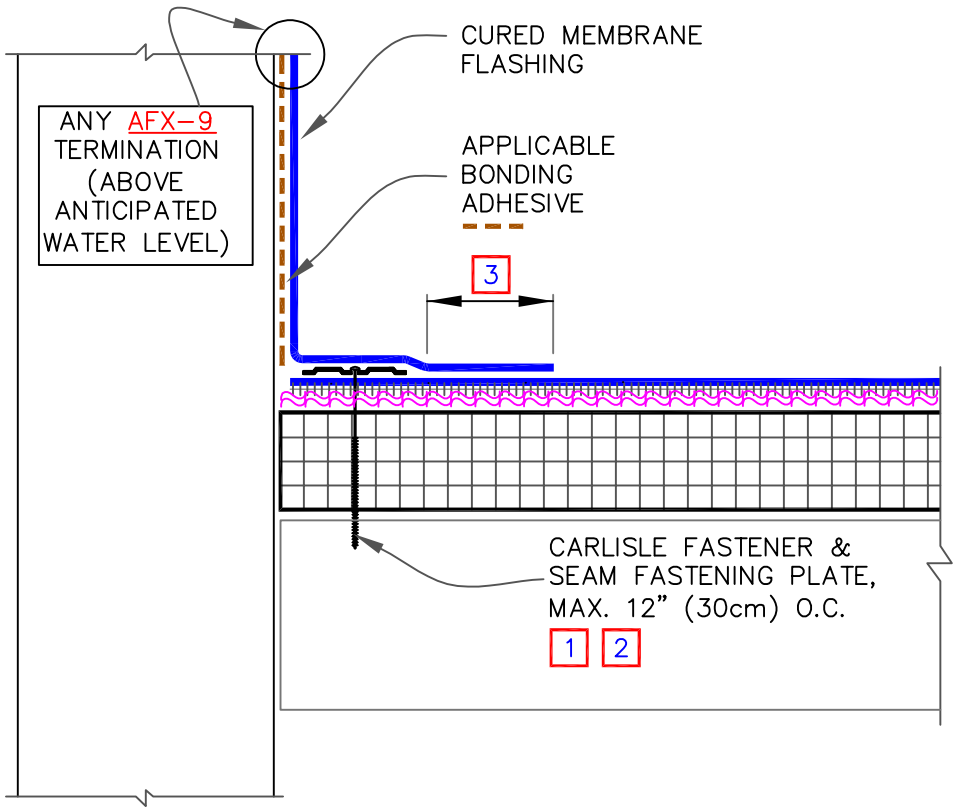
MEMBRANE TERMINATIONS
PAGE 2 OF 2

MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX-9
AFX ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 3" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



NOTES:

1. MECHANICAL SECUREMENT IS NOT NECESSARY WHEN AFX MEMBRANE IS ADHERED WITH HOT ASPHALT.

2. IN A CASE WHERE FASTENERS MUST BE FASTENED INTO THE VERTICAL SUBSTRATE, CARE MUST BE TAKEN TO CREASE THE MEMBRANE TIGHTLY INTO THE ANGLE CHANGE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE MEMBRANE IN THE PROPER POSITION.

3. SPLICES SHALL BE COMPLETED USING MINIMUM 3" (7.5cm) WIDE SecurTAPE/ PRIMER WITH EPDM MEMBRANE AND MINIMUM 1-1/2" (4cm) HOT AIR WELD WITH TPO.

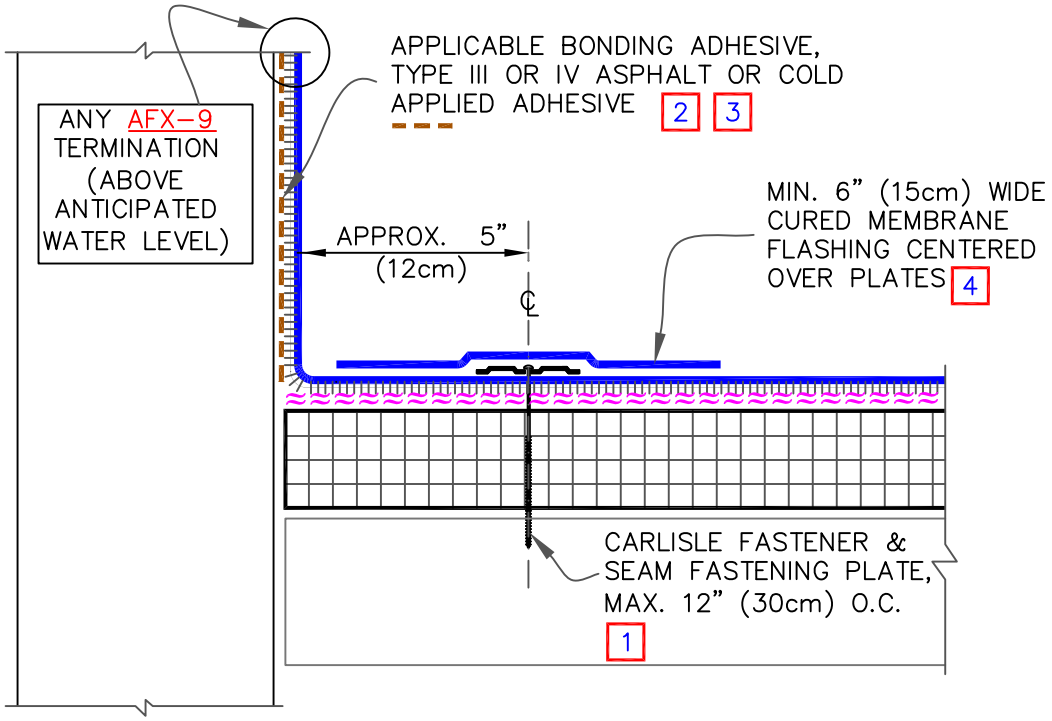
4. WHEN USING 60 OR 80-MIL REINFORCED TPO MEMBRANE FLASHING, APPLY A 4-1/2" (11cm) DIAMETER TPO "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

   ALL EPDM SPLICE INTERSECTIONS MUST BE OVERLAID WITH A PRESSURE-SENSITIVE T-JOINT COVER. PRIOR TO DOING SO, APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6" (15cm X 15cm) T-JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 2" (5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION. PROJECTS WITH 25-YEAR WARRANTIES MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. THE BOTTOM LAYER SHALL BE 6"X6" (15cm X 15cm) COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm). BOTH LAYERS SHALL BE CENTERED OVER THE SPLICE INTERSECTION AND SEALED WITH CONTINUOUS LAP SEALANT, REFER TO AFX-2 DETAILS.

CARLISLE SYNTEC SYSTEMS	PARAPET/CURB WITH SEPARATE MEMBRANE FLASHING	DETAIL NO. AFX-12A
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED

CAUTION

EPDM MEMBRANE SPLICES SHALL INCORPORATE 6" (15cm) WIDE FIELD APPLIED SecurTAPE FOR PROJECTS WITH 20 AND 25-YEAR WARRANTIES.



NOTES:

1. MECHANICAL SECUREMENT IS NOT NECESSARY WHEN AFX MEMBRANE IS ADHERED WITH HOT ASPHALT.

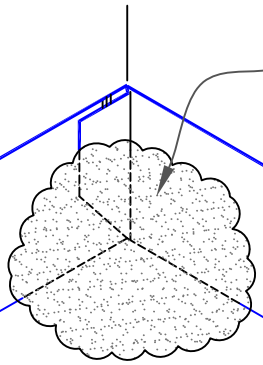
2. WHEN APPLYING BONDING ADHESIVE TO AFX MEMBRANE, APPLY A COAT TO THE FLEECE SIDE OF THE MEMBRANE AND ALLOW TO DRY. ONCE DRY, APPLY A SECOND COAT OF BONDING ADHESIVE TO THE FLEECE SIDE OF THE MEMBRANE AND TO THE SUBSTRATE, ALLOW TO FLASH OFF AND MATE THE TWO SURFACES TOGETHER.

3. WHEN APPLYING ASPHALT OR COLD APPLIED ADHESIVE TO A VERTICAL SUBSTRATE, CARE MUST BE TAKEN TO AVOID DRIPPING OR PUDDLING AT THE BASE OF A WALL. MAXIMUM FLASHING HEIGHT SHALL NOT EXCEED 18" (46cm).

4. WHEN USING EPDM AFX MEMBRANE, MINIMUM 6" (15cm) WIDE PRESSURE-SENSITIVE CURED COVER STRIP MUST BE CENTERED OVER THE MECHANICAL FASTENERS AND PLATES. WHEN USING TPO AFX MEMBRANE, MINIMUM 6" (15cm) WIDE REINFORCED TPO MEMBRANE FLASHING SHALL BE CENTERED OVER THE MECHANICAL FASTENERS AND PLATES AND HEAT WELDED ON ALL SIDES.

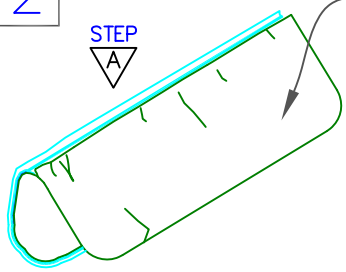
CARLISLE SYNTEC SYSTEMS	PARAPET/CURB WITH CONTINUOUS MEMBRANE FLASHING		DETAIL NO. AFX-12B
	MAXIMUM WARRANTY: 30 YEARS		AFX ADHERED

1

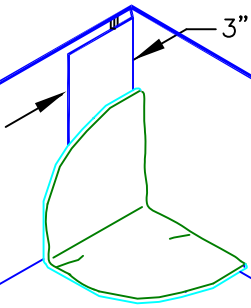


CLEAN DRY SPLICE AREA OF THE EPDM MEMBRANE BY SCRUBBING WITH EPDM PRIMER.

2

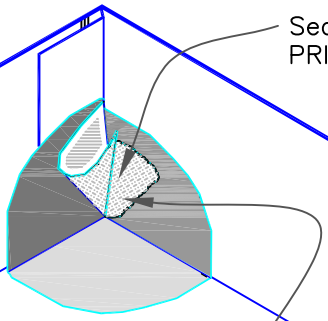


3



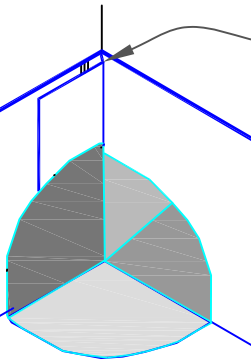
PLACE QUARTER SECTION ONTO DECK WITH LONG FOLDED SIDE FACING THE WALL. REMOVE REMAINING RELEASE PAPER. PRESS FIRMLY AND PROCEED WITH SECOND QUARTER GOING UP THE VERTICAL WALL BY PRESSING FIRMLY INTO CORNER.

4

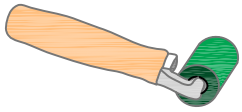


FORM A PIG EAR. APPLY PRIMER/SecurTAPE TO THE PIG EAR AND ADHERE TO THE WALL.

5



ROLL WITH TWO INCH WIDE ROLLER.



NOTES:

1. FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES, ALL INSIDE CORNERS MUST BE OVERLAID WITH TWO LAYERS OF PRESSURE-SENSITIVE FLASHING. THE BOTTOM LAYER SHALL BE A 7"X9" (18cm X 23cm) PRESSURE-SENSITIVE PRE-CUT INSIDE/OUTSIDE CORNER OR A 6'X6" (15cm X 15cm) PRESSURE-SENSITIVE ELASTOFORM FLASHING PIECE COVERED WITH A 12"X12" TOP LAYER (30cm X 30cm) OF PRESSURE-SENSITIVE ELASTOFORM FLASHING. BOTH LAYERS SHALL BE CENTERED AND SEALED WITH CONTINUOUS LAP SEALANT.
2. EPDM PRIMER MUST BE APPLIED TO ALL SPLICE AREAS AND FOR EACH LAYER OF PRESSURE-SENSITIVE FLASHING.

CARLISLE SYNTEC SYSTEMS

EPDM PRESSURE-SENSITIVE INSIDE CORNER

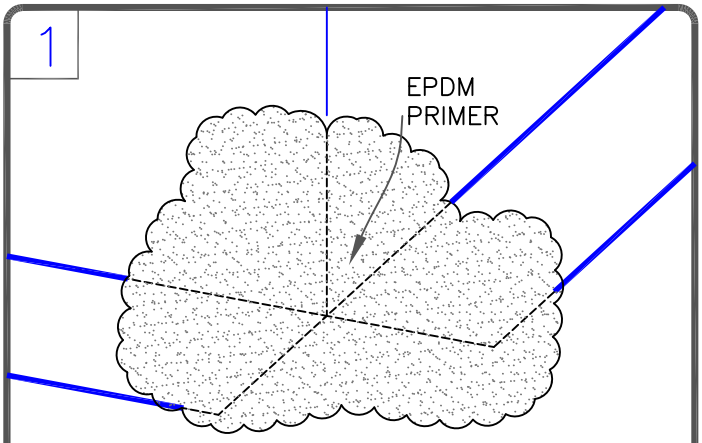
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

AFX-15A

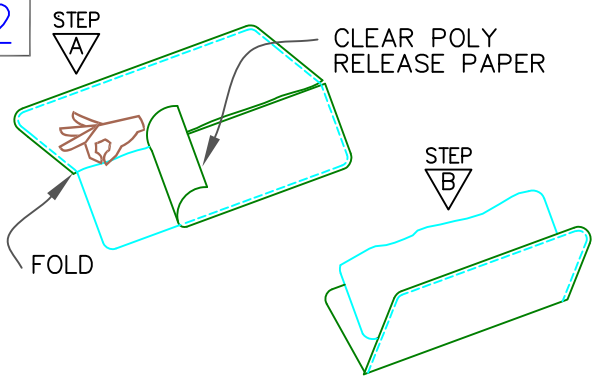
AFX ADHERED

1



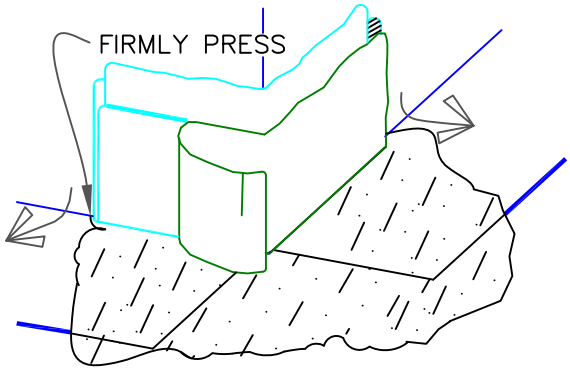
CLEAN THE DRY SPLICE AREA OF THE EPDM MEMBRANE BY SCRUBBING WITH EPDM PRIMER.

2



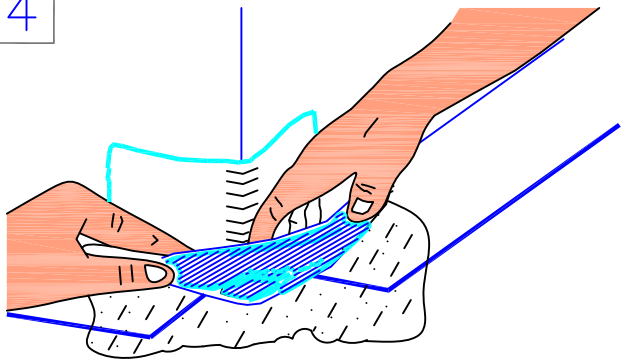
PRIOR TO PLACEMENT OF SURE-SEAL CORNER, PEEL OFF THE BLUE POLY RELEASE FILM AND HEAT THE FLASHING SIDE WITH A HEAT GUN. RE-APPLY THE POLY LOOSELY. FOLD THE FLASHING IN HALF.

3



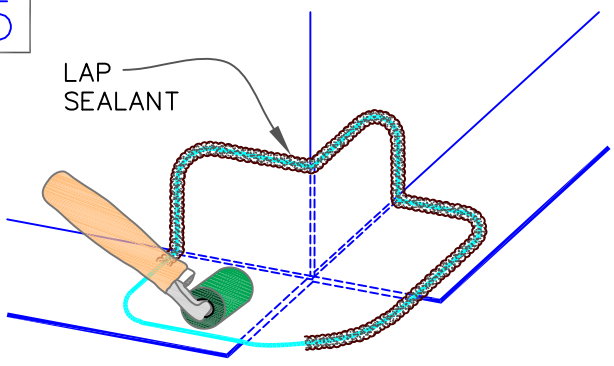
PLACE SURE-SEAL INSIDE/OUTSIDE CORNER AS SHOWN AND REMOVE RELEASE PAPER. PRESS FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING AGAINST THE VERTICAL SURFACE.

4



PLACE FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING ONTO THE DECK FLANGE BY PRESSING THE FLASHING AGAINST THE HORIZONTAL SURFACE.

5



ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGE.

NOTE:

FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES OR WHEN USING 145-MIL MEMBRANE, REFER TO THERMOSET DETAIL U-15H FOR REQUIRED FLASHING ENHANCEMENTS.

CARLISLE SYNTEC SYSTEMS

EPDM PRESSURE-SENSITIVE OUTSIDE CORNER

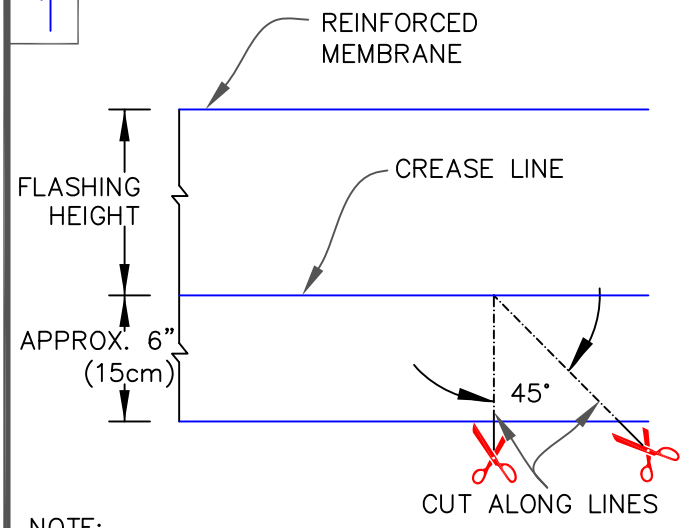
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.

AFX-15B

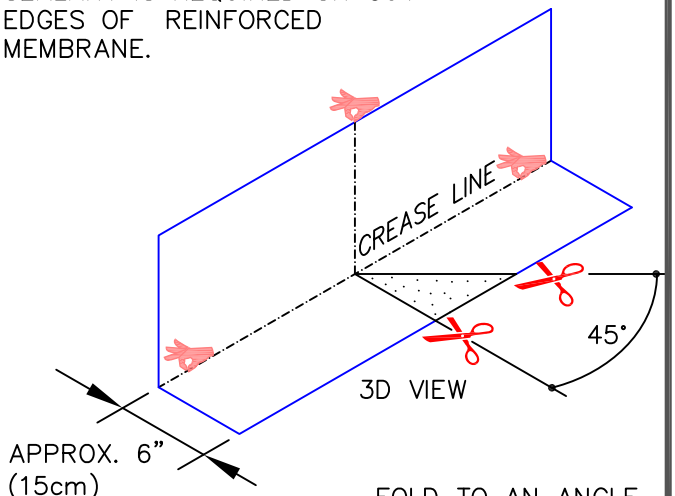
AFX ADHERED

1

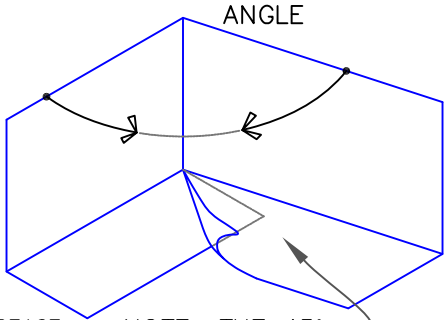


NOTE:

APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED MEMBRANE.



FOLD TO AN ANGLE TO FIT THE EXISTING INSIDE CORNER ANGLE

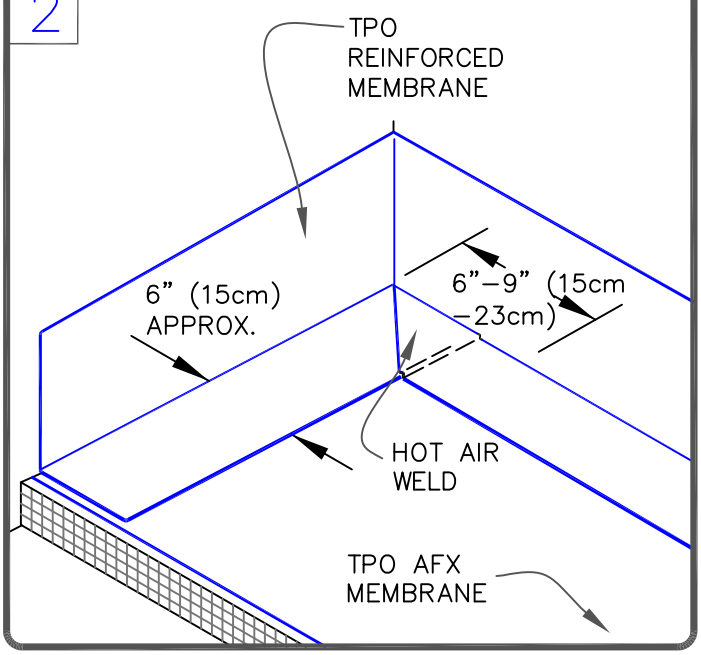


MAKE CREASE

CUT MEMBRANE

NOTE: THE 45° CUT SIDE GOES ABOVE THE 90° CUT SIDE.

2



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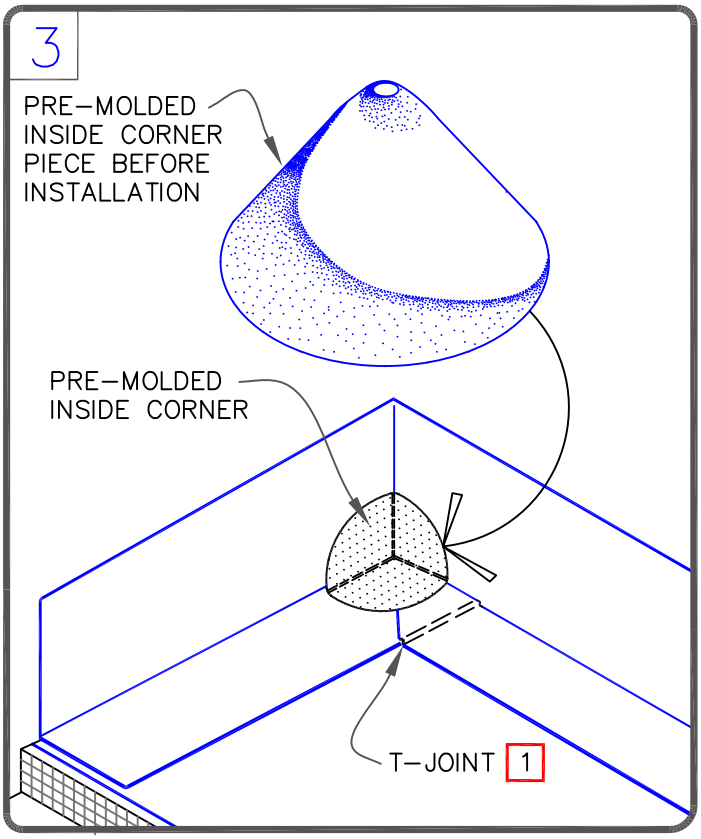


NOTES:

1. WHEN USING 60 OR 80-MIL MEMBRANE, APPLY A 4-1/2" (11cm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

CARLISLE SYNTEC SYSTEMS

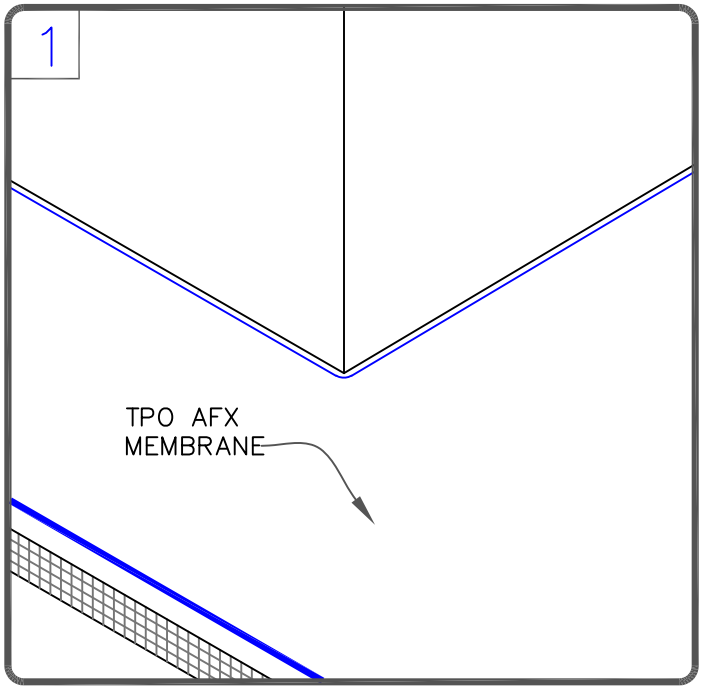
TPO PRE-MOLDED INSIDE CORNER

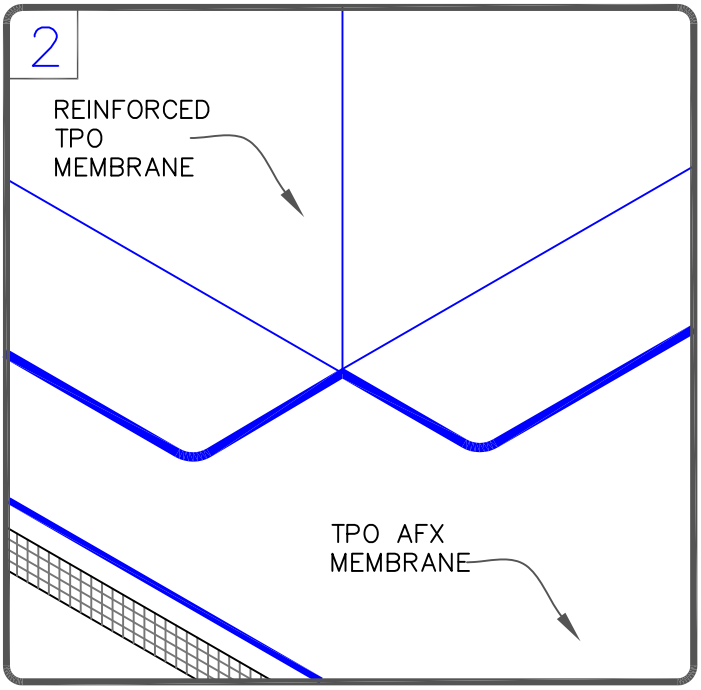
MAXIMUM WARRANTY: 30 YEARS

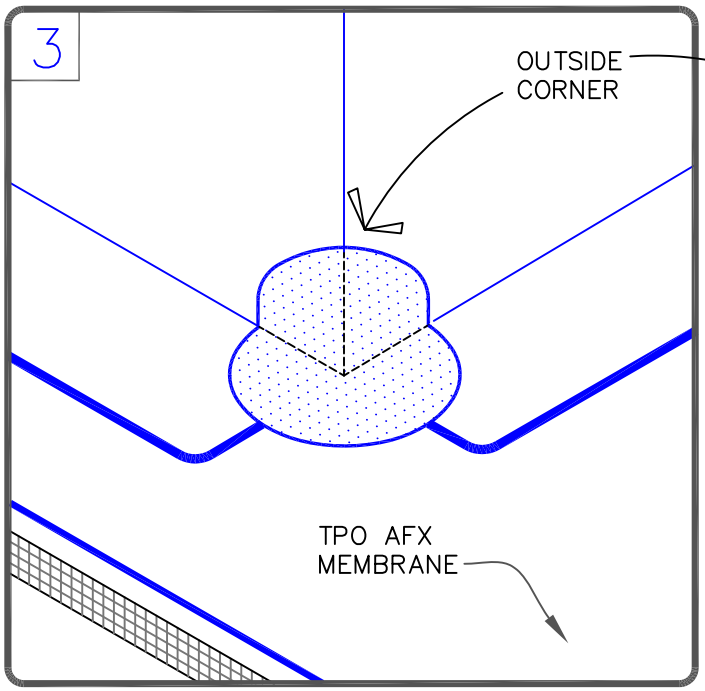
DETAIL NO.

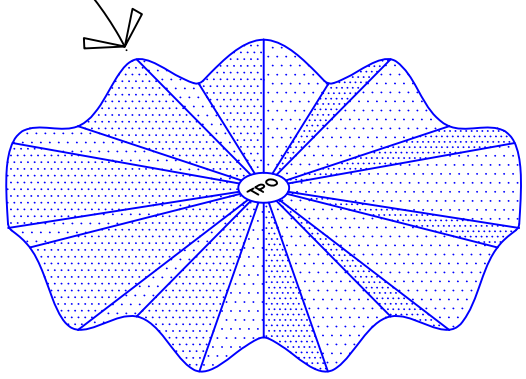
AFX-15C

AFX ADHERED









OUTSIDE CORNER
BEFORE INSTALLATION

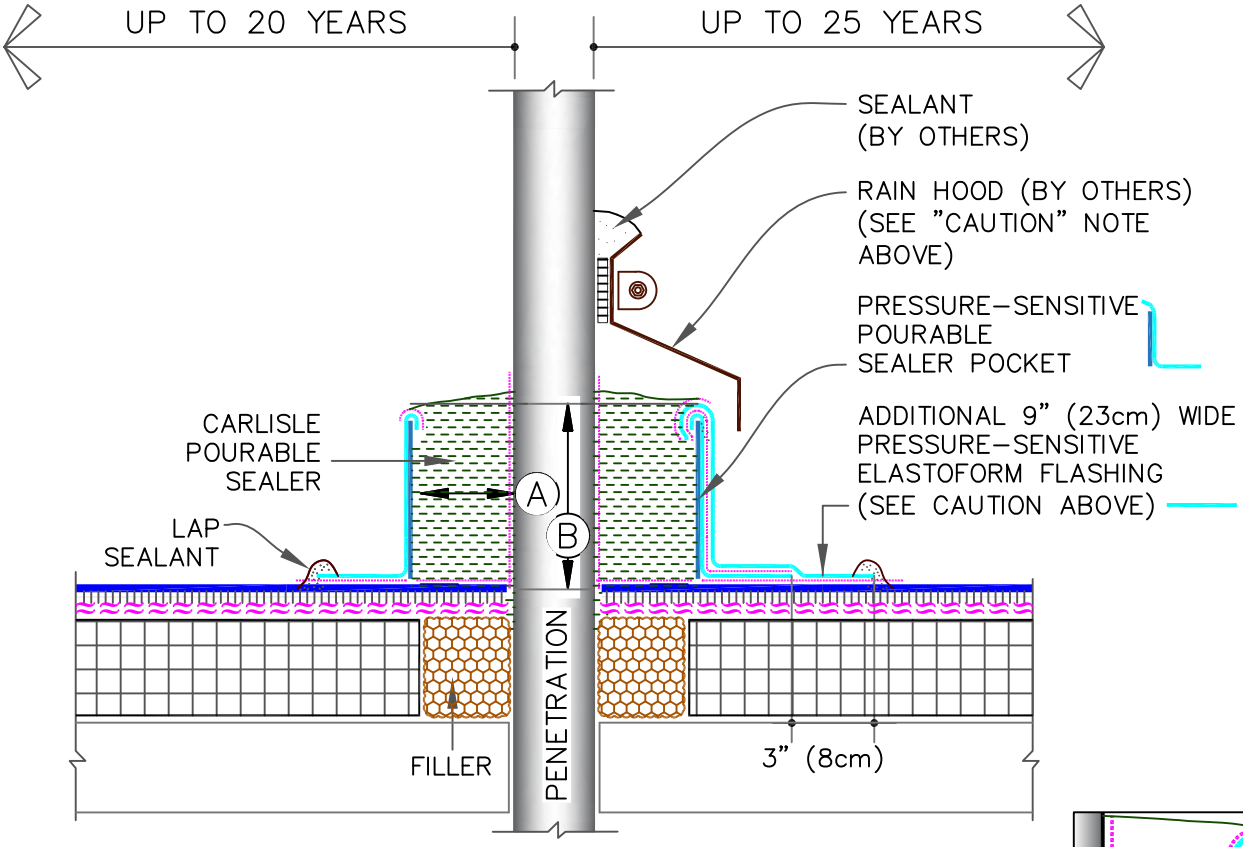
NOTE:

APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS	TPO PRE-MOLDED OUTSIDE CORNER	DETAIL NO. AFX-15D
	MAXIMUM WARRANTY: 30 YEARS	AFX ADHERED

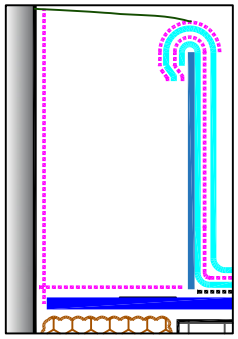
CAUTION

POURABLE SEALER POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS AND AN EXTRA LAYER OF PRESSURE SENSITIVE ELASTOFORM FLASHING [EXTENDING 3" (7.5cm) BEYOND THE BASE LAYER OF FLASHING] FOR PROJECTS WITH 25-YEAR WARRANTIES.



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. PENETRATIONS, MEMBRANE, FLASHING AND METAL (INSIDE POCKET) MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.
8. WHEN COLD APPLIED ADHESIVE IS USED TO ADHERE THE AFX MEMBRANE TO AN APPROVED SUBSTRATE, SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER.



MANDATORY EPDM PRIMER AT ALL INTERFACES OF POURABLE SEALER EXCEPT BLUE PLASTIC SUPPORT STRIP

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

CARLISLE SYNTEC SYSTEMS

EPDM PRESSURE-SENSITIVE POURABLE SEALER POCKET

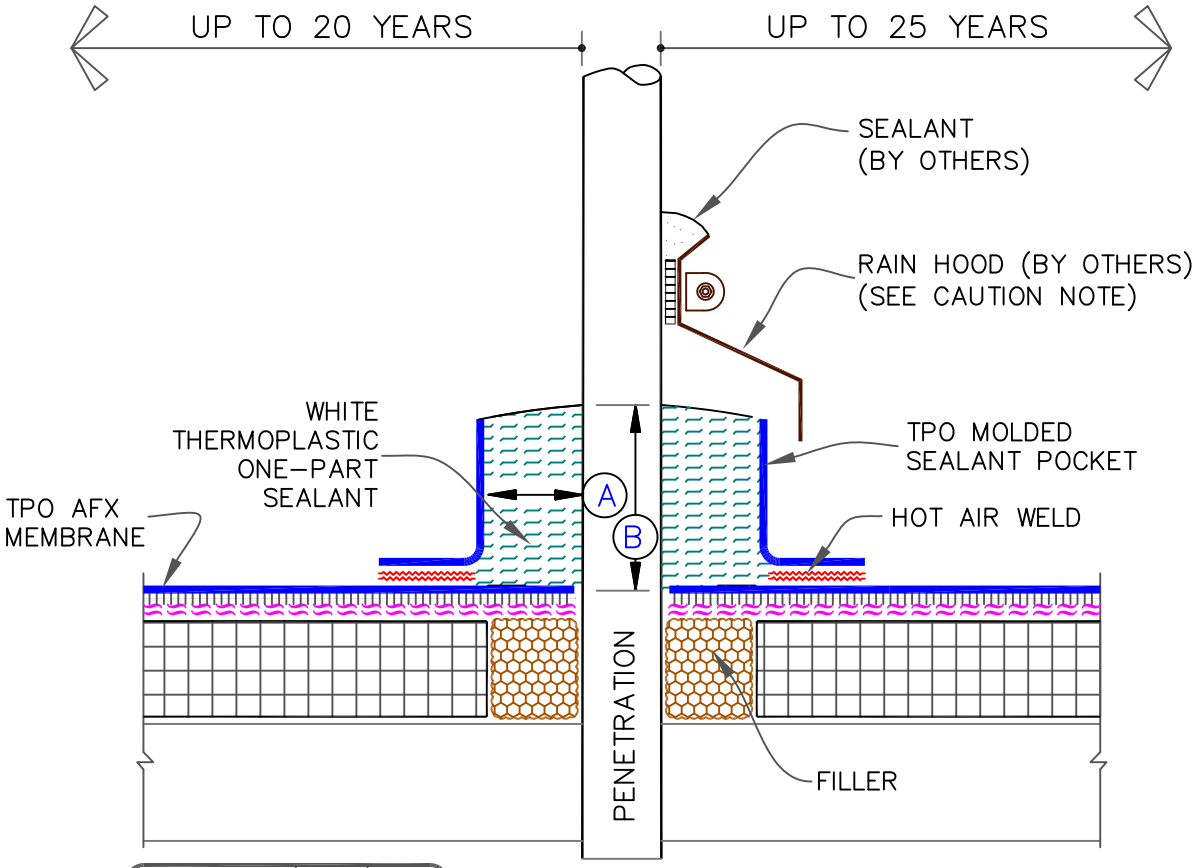
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO. AFX-16A

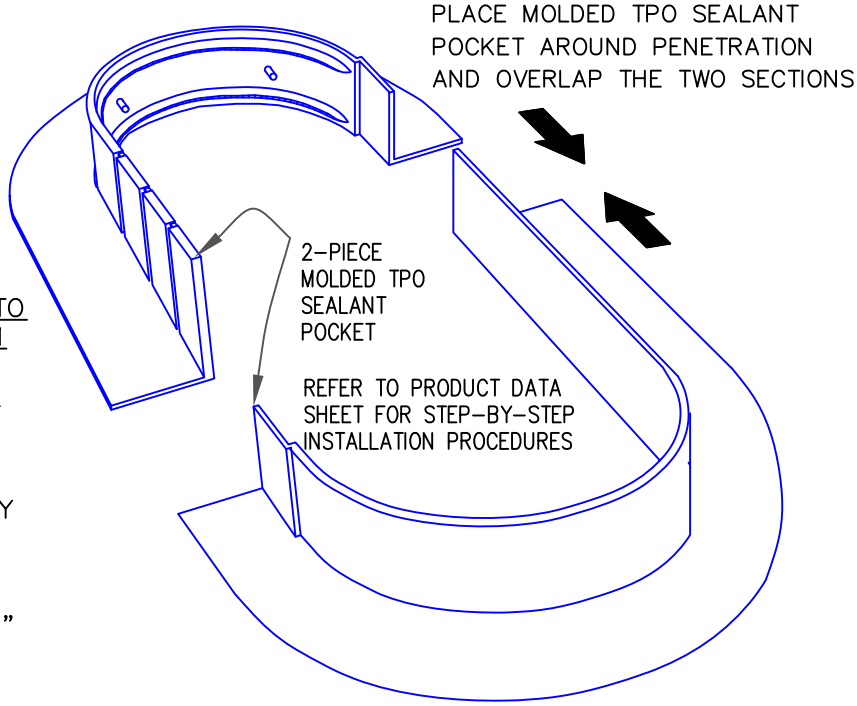
AFX ADHERED

CAUTION

MOLDED SEALANT POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS FOR PROJECTS WITH 25 YEAR WARRANTIES.



DIMENSIONS	cm	
(A) 1"	2.5	MIN.
(B) 2"	5	MIN.



NOTES:

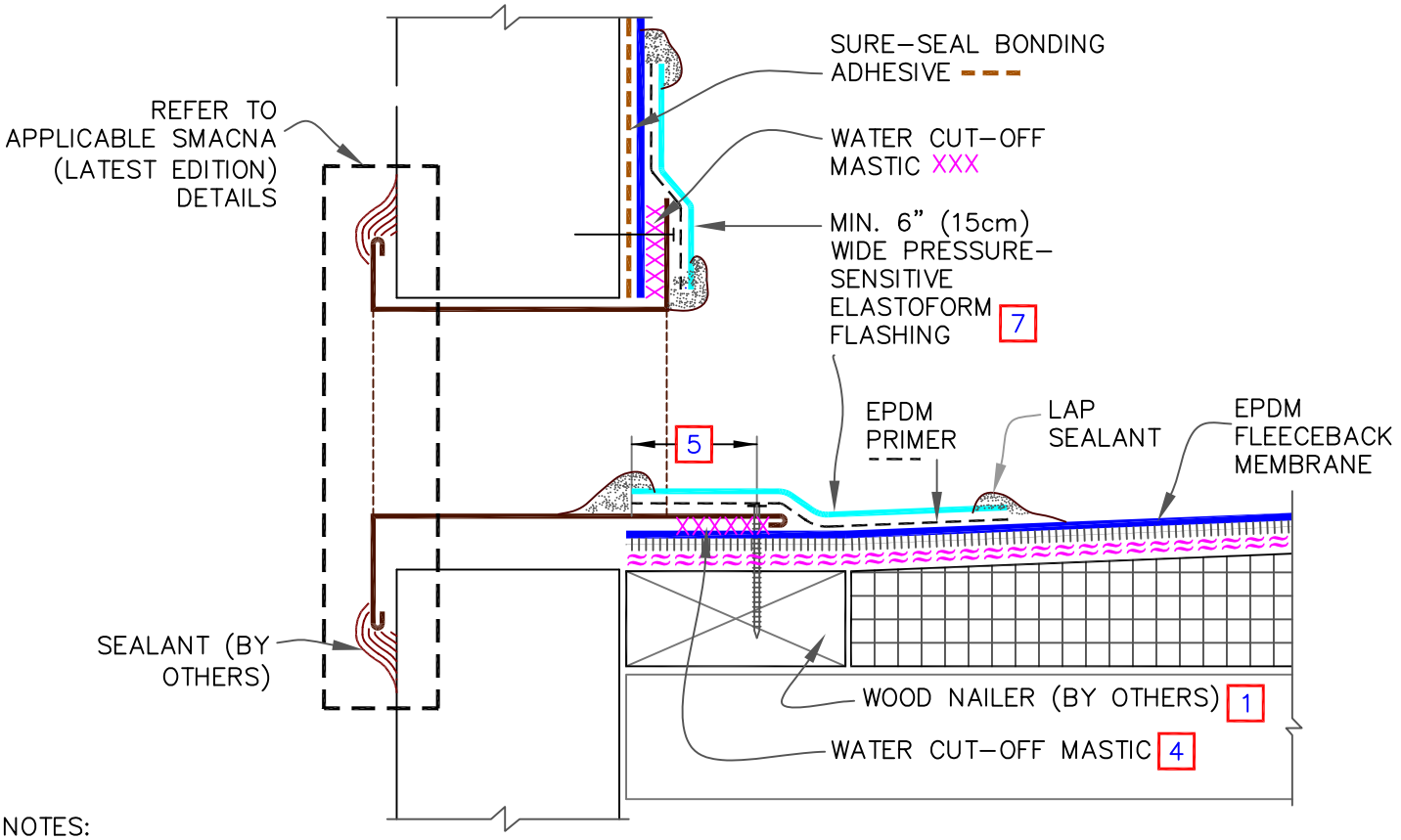
1. TEMPERATURE OF PIPE MUST NOT EXCEED 160°F (71°C).
2. APPLY A THIN COAT OF TPO PRIMER TO THE INSIDE AND AROUND THE TOP RIM OF THE POCKET, TO THE DECK MEMBRANE ENCLOSED BY THE POCKET AND TO THE PENETRATION USING A SMALL PAINT BRUSH.
3. ONE-PART SEALANT MUST COMPLETELY FILL MOLDED SEALANT POCKET TO PREVENT PONDING OF WATER.
4. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5mm) CLEARANCE BETWEEN PENETRATIONS.

CARLISLE SYNTEC SYSTEMS

TPO MOLDED SEALANT POCKET

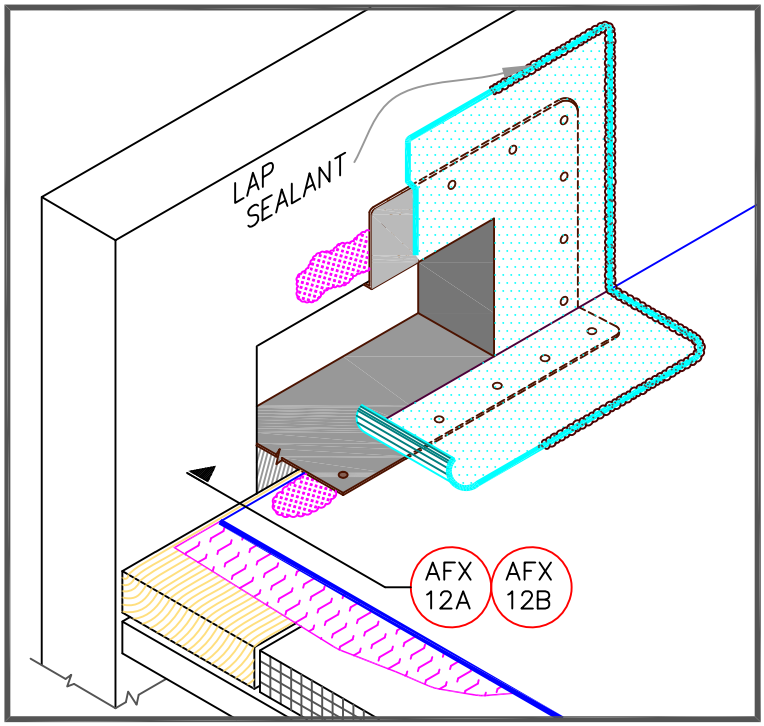
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX-16B
AFX ADHERED



NOTES:

1. WOOD NAILERS ARE INSTALLED ONLY AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. INSTALL WALL FLASHING PRIOR TO SCUPPER INSTALLATION.
3. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS. SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
4. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
5. SCUPPER FLANGES MUST BE TOTALLY COVERED BY PRESSURE-SENSITIVE ELASTOFORM FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
6. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING EPDM PRIMER.
7. APPLY EPDM PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING PRESSURE-SENSITIVE ELASTOFORM FLASHING.

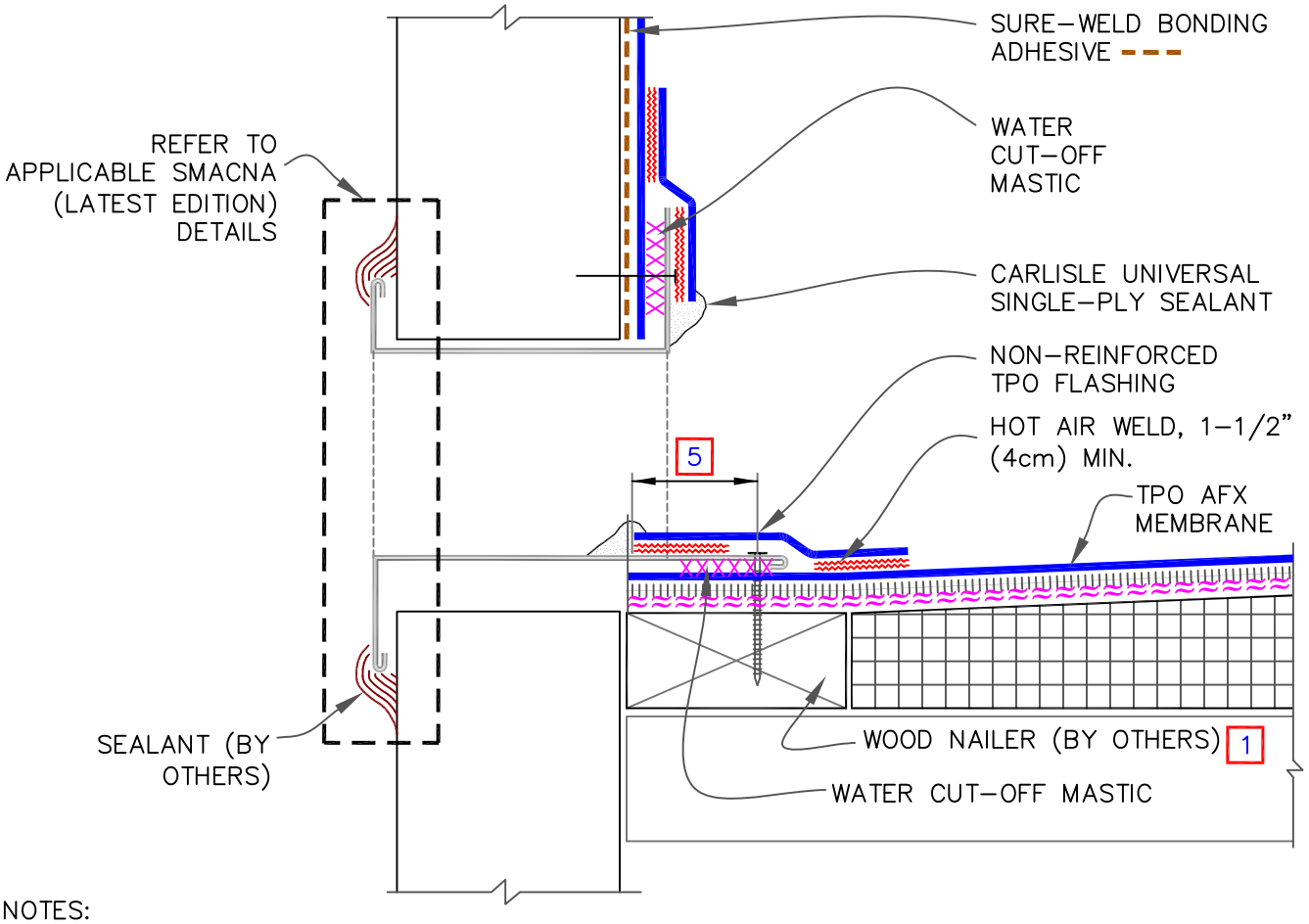


CARLISLE SYNTEC SYSTEMS

THROUGH-WALL SCUPPER WITH PRESSURE-SENSITIVE EPDM FLASHING

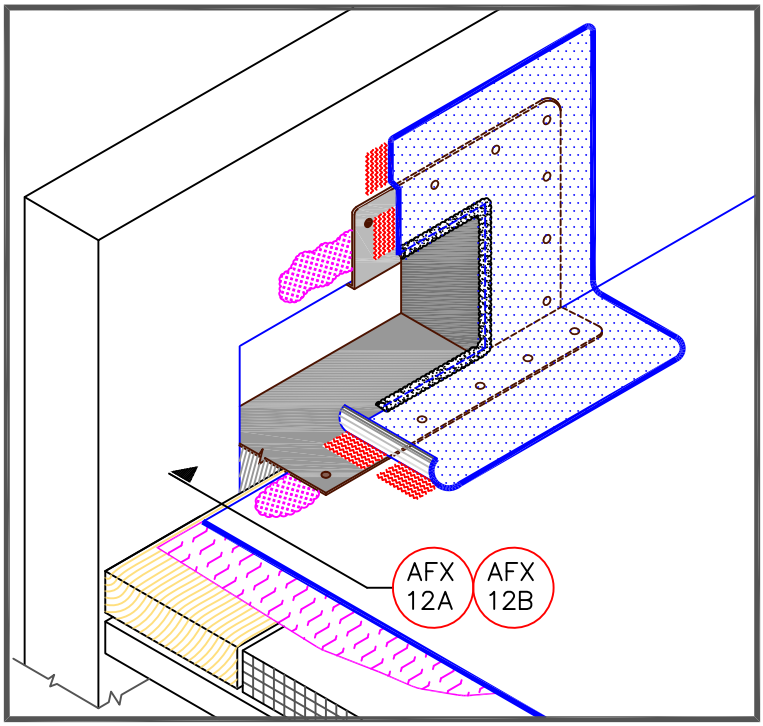
MAXIMUM WARRANTY: 30 YEARS

DETAIL NO.
AFX-18A
AFX ADHERED



NOTES:

1. WOOD NAILERS ARE INSTALLED ONLY AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. INSTALL WALL FLASHING PRIOR TO SCUPPER INSTALLATION.
3. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS. SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
4. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
5. SCUPPER FLANGES MUST BE TOTALLY COVERED BY NON-REINFORCED TPO FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.
6. UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.



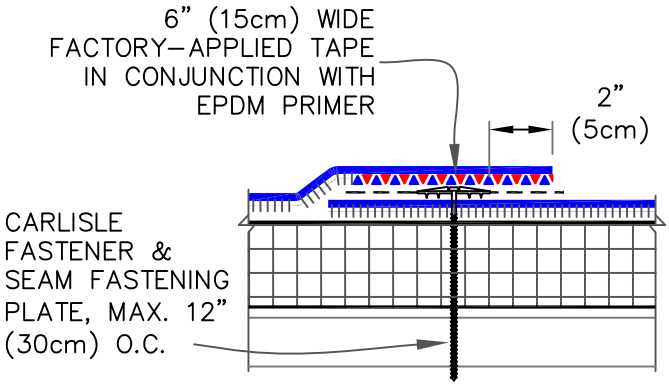
CARLISLE SYNTEC SYSTEMS

THROUGH-WALL SCUPPER WITH SecurWELD METAL

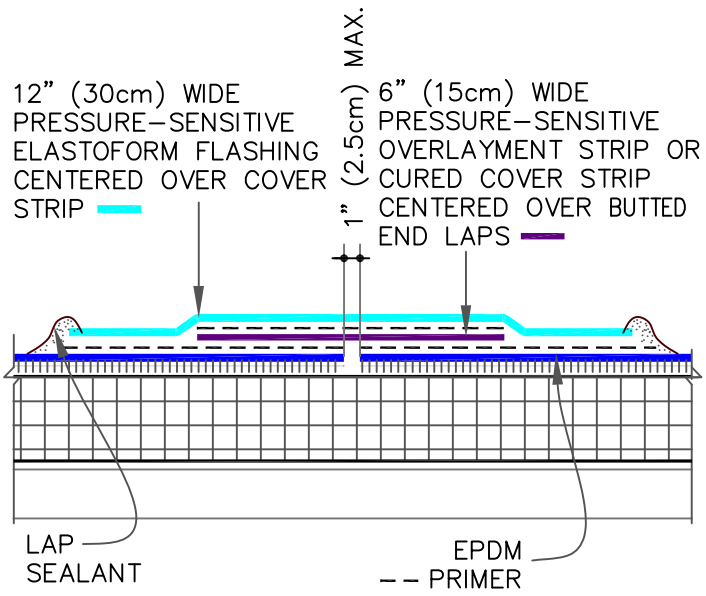
MAXIMUM WARRANTY: 30 YEARS

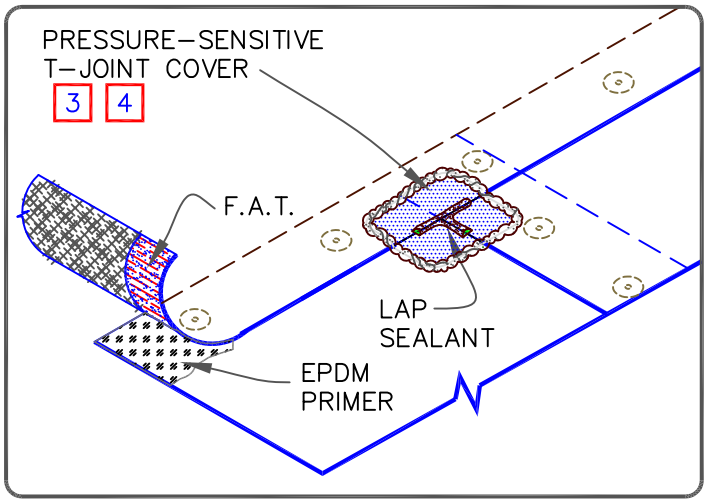
DETAIL NO.
AFX-18B
AFX ADHERED

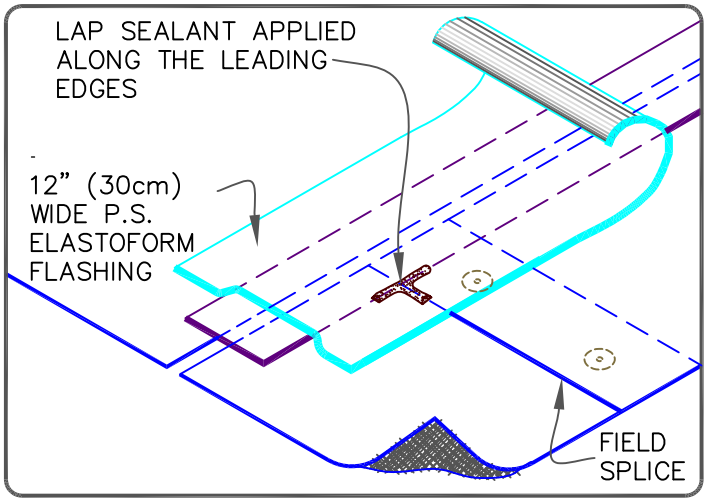
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENER/PLATE AND FASTENING DENSITY.

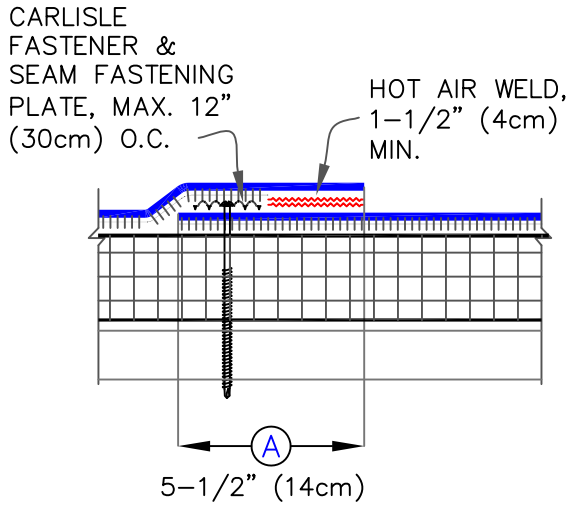
2. APPLY EPDM PRIMER TO MEMBRANE SURFACES PRIOR TO INSTALLING PRESSURE–SENSITIVE FLASHING AND/OR FACTORY APPLIED SecurTAPE.

3. APPLY LAP SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE (UNDER THE 6"x6"(15cm X 15cm) T–JOINT COVER) COVERING THE EXPOSED SPLICE TAPE 1/2" (13 mm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION.

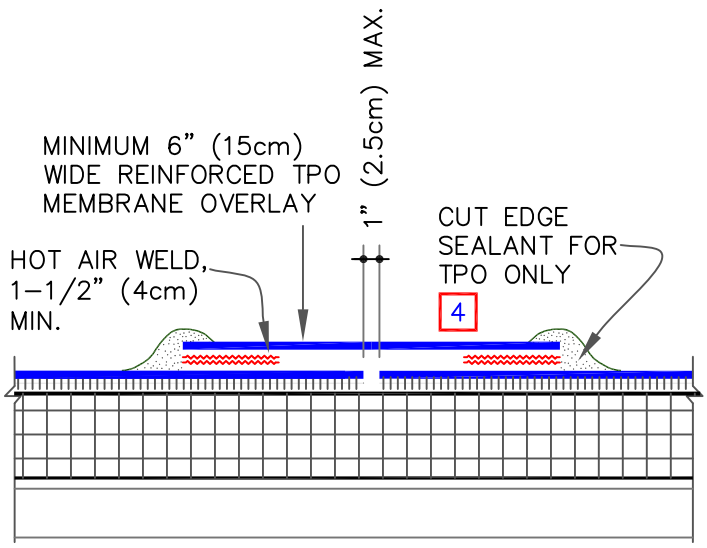
4. 6" (15cm) WIDE PRESSURE–SENSITIVE ELASTOFORM FLASHING MAY ALSO BE CENTERED OVER THE FIELD SPLICE INTERSECTION.

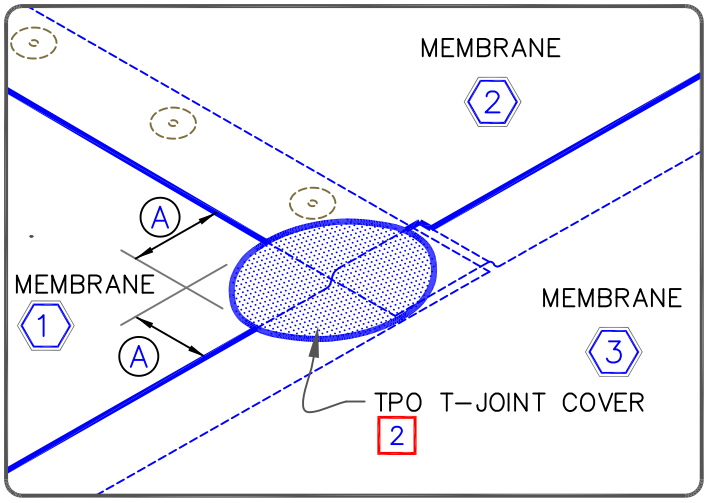
AFX EPDM MEMBRANE APPROVED SUBSTRATE 0 — SEE NOTE(S)	AFX EPDM MECHANICALLY FASTENED MEMBRANE & END LAP SPLICES For additional information, refer to Specifications	DETAIL NO. AFX–MF1 MECHANICALLY FASTENED

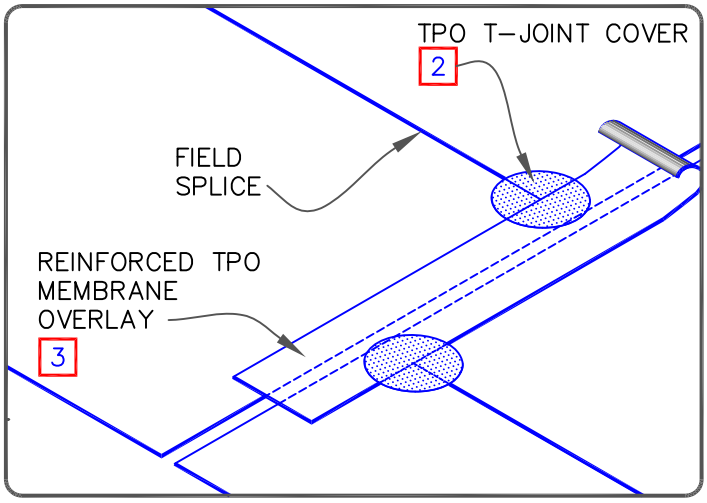
MEMBRANE SPLICE



END LAP SPLICE







NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENER/PLATE AND FASTENING DENSITY.

2. WHEN USING 135 OR 155–MIL AFX TPO MEMBRANE, APPLY A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

3. WHEN USING 60 OR 80 MIL TPO REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER, AS SHOWN.

4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

AFX TPO/KEE HP MEMBRANE
APPROVED SUBSTRATE
0 — SEE NOTE(S)

AFX TPO MECHANICALLY FASTENED MEMBRANE & END LAP SPLICES

For additional information, refer to Specifications

DETAIL NO.
AFX–MF2
MECHANICALLY FASTENED

CARLISLE'S SPEC SUPPLEMENT

Table of Contents

July 2024

The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing system 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.

The information contained in these Supplements are to serve as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the roof systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

General

Products

CARLISLE SYNTEC SYSTEMS

Thermoplastics

EPDM

CARLISLE'S SPEC SUPPLEMENT

G-02

Flexible FAST™ Adhesive Equipment and Set-Up Requirements for Full Spray, Bead and Splatter Applications

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. Equipment for Flexible FAST

The following is a list of necessary equipment for application of Flexible FAST Adhesive.

1. **Proportioning Unit (Pump)** - a mechanically operated, high or low pressure metering unit capable of providing 1000 to 2000 psi operating pressure for full spray or 300-500 psi operation for bead application and designed to accurately dispense two component chemical foam systems.

2. **Hoses** (for carrying Part-A and B materials from Proportioning Unit to dispensing unit) – either non-heated or heated hose assemblies available in lengths of 50'.

3. **Dispensing Method** (for applying Flexible FAST Adhesive) - a low or high-pressure dispensing gun for the application of two- component polyurethane foams and/or adhesives.

4. **Air Compressor** – If applicable for dispensing equipment, consult equipment vendor for individual recommendations.

5. **Generator** – If applicable, consult equipment vendor for individual recommendations.

Conventional two-component pumping systems manufactured by Graco, 4C's Spray Equipment, Amped Equipment and ARI are readily available new and used. Contact the respective manufacturer for additional information.

B. Equipment Settings by Application Method

1. **Full Spray Application Equipment Settings**

   a. Flexible FAST Adhesive is to be dispensed at a minimum dynamic pressure of 900 psi.
   b. Dispensing gun should be a Fusion Air Purge gun by Graco, or equivalent, with a splatter tip.

2. **Bead Application Equipment Settings**

   a. Follow manufacturer's instructions for setting up spray rig for dispensing beads.

3. **Splatter Application Equipment Settings**

   a. Flexible FAST Adhesive should be dispensed in large droplets, not a fine mist. Air pressure/flow is too high if the Flexible FAST adhesive is dispensing in a fine mist.

   b. Patriot Spray Rig Settings

      1) Follow equipment vendor setup for the first-time use.
      2) Ensure Patriot has an air compressor and VEE-AIR Manifold installed.
      3) Air compressor: 80 psi.
      4) Patriot Setting: 6
      5) VEE-AIR gun: Air Valve to 0.5, Fluid 100% open
      6) Recommended Air Setting for material temperatures of 70-80^{o}F. When material is warmer, air pressure may need to be reduced to ensure proper flow.

   c. HULK Spray Rig Settings

      1) Follow equipment vendor setup for the first-time use.
      2) Machine pressure: 60 psi.
      3) Gun Pressure: 80 psi.
      4) HULK gun: Air Valve to 100% open, Fluid 100% open.
      5) Recommended Air Setting for material temperatures of 70-80^{o}F. When material is warmer, air pressure may need to be reduced to ensure proper flow.

   d. Dual Tank Settings

      1) Follow setup on Flexible FAST Dual Tank Product Data Sheet.
      2) The 14" extension nozzle should not be used for splatter application.

C. Installation Considerations

1. **Bead Adhesive Spacing –** Beads must be applied following spacing approved for specific project conditions (i.e. height, wind zone, and warranty wind speed coverage).

   a. While 12-inch on-center bead spacing is commonly used in the field of the roof, projects with higher wind speed coverage most likely require narrower spacing between beads.

   b. Perimeter bead spacing is typically at 6-inches on-center except for those projects with higher wind speed coverage where narrower bead spacing of 4-inches on-center may be required.

c. Refer to **Detail A-27G** in **Spec Supplement G-09** "Insulation Attachment and Details" and **Detail FB-27** in FleeceBACK Specification for Membrane Attachment using Bead Adhesive or contact Carlisle prior to installation.

d. Substrate irregularity, which is commonly associated with gravel surfaced built-up roofing, must be compensated to ensure insulation boards are fully embedded. Do not apply thin beads of adhesive (less than 1/2 inch wide, wet bead for Non-Dual Tank applications and 1.5" wide, wet bead for Dual Tank Applications), and if necessary increase width of the adhesive bead in uneven areas.

2. **Residual Asphalt**

a. **Incompatibility of the Substrate (Residual Un-Weathered Asphalt) –** While urethane adhesive is compatible with existing asphaltic roofs that have been exposed and weathered, it is difficult to adhere to **slick, smooth and un-weathered asphalt**. This condition may be encountered when an existing roof is removed, exposing an asphaltic vapor barrier or leaving asphalt residue.

b. To ensure proper adhesive attachment, one of the following options may be followed:

1) Prime the surface with Carlisle's CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB Primer for splatter and bead application.

2) Switch to full spray of Flexible FAST Adhesive applied from heated spraying rig to increase surface contact. 100% full coverage is required. Splatter applications are not accepted.

3) Install Carlisle's VapAir Seal 725TR Air & Vapor Barrier with CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB Primer over the existing asphalt.

4) Use mechanical securement to attach the first layer of insulation in lieu of adhesive.

3. **Air Infiltration**

a. On structural concrete decks, gaps between the structural deck and walls and those around penetrations, allows hot humid air from within the building to infiltrate the roofing assembly and possibly condense during cold season. Lower membrane temperature, especially those associated with white membranes, increase the probability of condensation and promote freezing during low temperatures. Collected frozen moisture trapped above the structural deck when thawed, will eventually lead to weakening of the bottom insulation facer. Weakening of the bottom of the insulation facer subsequently separation of the foam during wind event.

It is important to seal gaps around the perimeter and around penetrations, refer to **Design Reference DR-01 "Construction Generated Moisture",** to eliminate moisture infiltration.

b. The same phenomenon with migrating moisture could occur on steel decks, where gaps are not sealed or vapor retarders are not used. In such a case, condensed moisture could result in insulation gapping, rusting of metal fasteners or steel decks and cause insulation to become wet. Refer to **Design Reference DR-01 "Construction Generated Moisture".**

CARLISLE'S SPEC SUPPLEMENT

G-03

FleeceBACK and Insulation Attachment and Coverage Rates with Flexible FAST™ Adhesive

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. General

Flexible FAST Adhesive may be used to attach the following roof insulations to an approved roof deck/substrate:

1. 1” (Min.) Polyisocyanurate, 1/2” SecurShield HD, 1/2” SecurShield HD Plus, 1.5” StormBase, 1/2” EcoStorm VSH, 1/2" HP Recovery Board, 1/4” Securock or minimum 1/4” DensDeck, DensDeck Prime or DensDeck StormX. If tapered Polyisocyanurate insulation is used, 1/2” minimum thickness is acceptable.

2. Expanded Polystyrene (EPS) insulation overlaid with SecurShield HD, 1/2” SecurShield HD Plus, HP Recovery Board, Securock or DensDeck/DensDeck Prime. A composite board can be used to eliminate the need for an additional layer of Flexible FAST Adhesive.

3. Extruded Polystyrene (XPS) insulation overlaid with SecurShield HD, 1/2” EcoStorm VSH, 1/2” SecurShield HD Plus, HP Recovery Board, Securock, or DensDeck/DensDeck Prime/DensDeck StormX.

4. When oriented strand board (OSB) is proposed as the membrane underlayment, a polyisocyanurate/OSB composite board may be used since attachment of individual OSB panels is not recommended due to board stiffness and potential bowing on uneven surfaces.

Insulation board sizes up to 4' x 8' may be used providing full attachment (full spray, equipment (rig) splatter, 4” or 6” o.c. extrusions) is achieved. Trimming or slitting of boards may be required on uneven surfaces. If necessary, use maximum 4' x 4' boards so full embedment of boards may be achieved.

B. Cautions and Warnings

1. Do not apply Flexible FAST Adhesive when surface and/or ambient temperatures are below 25°F (-4°C). The temperature of Flexible FAST Adhesive must be between 70°F (21°C) and 90°F (32°C), at the time of use. Use blanket heaters and hot boxes when

necessary.

2. Flexible FAST may be applied when surface and/or ambient temperatures are below 25°F (-4°C) when heated equipment is used that includes the following: heated blankets, preheater, and heated hose.

3. When using Flexible FAST Adhesive in non-heated spray equipment, substrate and/or ambient temperatures must be between 25°F (-4°C) and 120°F (49°C).

4. **Bead Adhesive Spacing –** Beads must be applied following spacing approved for specific project conditions (i.e. height, wind zone, and warranty wind speed coverage).

   a. 12-inch on-center bead spacing is accepted in the field of the roof. Projects with higher wind speed coverage will require narrower spacing between beads.

   b. Perimeter bead spacing is typically at 6-inches on-center except for those projects with higher wind speed coverage where narrower bead spacing of 4-inches on-center may be required.

   c. Refer to **Detail A-27G** in **Spec Supplement G-09 "Insulation Attachment and Details"** and **Detail FB-27** in FleeceBACK Specification for Membrane Attachment using Bead Adhesive or contact Carlisle prior to installation.

   d. Substrate irregularity, which is commonly associated with gravel surfaced built-up roofing, must be compensated to ensure insulation boards are fully embedded. Do not apply thin beads of adhesive (less than 1/2-inch wide, wet bead for Non-Dual Tank Applications and 1.5" wide wet bead for Dual Tank Applications), and if necessary increase width of the adhesive bead in uneven areas.

5. **Residual Asphalt**

   a. **Incompatibility of the Substrate (Residual Un-Weathered Asphalt) –** While urethane adhesive is compatible with existing asphaltic roofs that have been exposed and weathered, it is difficult to adhere to **slick, smooth and un-weathered asphalt**. This condition may be encountered when an existing roof is removed, exposing an asphaltic vapor barrier or leaving asphalt residue.

   b. To ensure proper adhesive attachment, one of the following options may be followed:

      1) Prime the surface with Carlisle's CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB Primer for splatter and bead application.

      2) Switch to full spray of Flexible FAST Adhesive applied from heated spray rig to increase surface contact. 100% full coverage is required. Splatter applications are not accepted.

      3) Install Carlisle's VapAir Seal 725TR Air & Vapor Barrier with CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB Primer over the existing asphalt.

4) Use mechanical securement to attach the first layer of insulation in lieu of adhesive.

6. **Air Infiltration**

a. On structural concrete decks, gaps between the structural deck and walls and those around penetrations, allows hot humid air from within the building to infiltrate the roofing assembly and possibly condense during the cold season. Lower membrane temperature, especially those associated with white membranes, increase the probability of condensation and promote freezing during low temperatures. Collected frozen moisture trapped above the structural deck when thawed, will eventually lead to weakening of the bottom insulation facer. Weakening of the bottom of the insulation facer can subsequently lead to separation of the foam during a wind event.

It is important to seal gaps around the perimeter and around penetrations, refer to **Design Reference DR-01 "Construction Generated Moisture",** to eliminate moisture infiltration.

b. The same phenomenon with migrating moisture could occur on steel decks, where gaps are not sealed or vapor retarders are not used. In such a case, condensed moisture could result in insulation gapping, rusting of metal fasteners or steel decks and cause insulation to become wet. Refer to **Design Reference DR-01 "Construction Generated Moisture".**

C. Roof Deck/Substrate Criteria

Flexible FAST Adhesive can be used to attach insulation to new or tear-off construction over structural concrete, fibrous cement (i.e., Tectum), gypsum, cellular or perlite lightweight insulating concrete (min. 225 psi compressive strength), wood and steel decks.

Flexible FAST Adhesive may also be used to attach insulation to an existing asphalt or coal tar pitch, modified bitumen or mineral surfaced cap sheets as follows:

1. On tear off projects, the existing roof deck must be investigated, and all wet and deteriorated material must be replaced. All loose base sheet material or asphalt must be removed prior to Flexible FAST Adhesive application.

2. The deck surface must be cleaned using compressed air, vacuum equipment or hand/power brooms to remove dust, loose dirt or debris. If excessive dust or dirt is present, a primer may be required prior to application of the adhesive. Contact Carlisle for specific primer requirements.

3. For new galvanized steel decks, power washing is required to remove finishing oils, if present.

4. For projects with existing Type III or IV asphalt, coal tar pitch, modified bitumen or mineral surface cap sheets, the existing roof must be inspected to determine if moisture is present within the existing assembly. Wet insulation and membrane shall be removed and replaced with compatible materials.

a. Blisters, buckles, wrinkles and fish mouths shall be cut out or mechanically fastened.

b. Remove loose gravel, dust and residue from a gravel surfaced BUR by using a Hydro-Vac (wet vacuum equipment). Power vacuum equipment or a power sweeper followed by air blowing or another suitable means are also acceptable. Care shall be exercised in areas where evidence of ponding is obvious (remove residue from low areas prior to proceeding).

CAUTION: On coal tar pitch, when using white membrane, minimum 1" thick polyisocyanurate is the required membrane underlayment. If gray or tan membrane is used, minimum 1.4" thick polyisocyanurate is required.

D. Adhesive Coverage Rates

1. The overall coverage rate for Flexible FAST Adhesive will vary depending on jobsite conditions, product container size, and the substrate as follows:

Flexible FAST Adhesive Coverage Rates					
Approximate Coverage Rate (Sq. Ft.)					
Package Type	**Full Spray**	**Splatter**	**4" o.c.**	**6" o.c.**	**12" o.c.**
Dual Cartridges	N/A	N/A	100-200	200 -300	400 - 600
Dual Tanks	N/A	2,600-2,800	1,100-1,300	1,700-1,900	3,500-3,700
5-Gallon Jugs	1,000	1,800-2,000	670 - 900	1,000 - 1,250	2,000 - 2,500
15-Gallon Drums	1,800-3,000	5,400-6,000	2,110-2,700	3,000-3,750	6,000-7,500
50-Gallon Drums	5,000-10,000	18,000-20,000	6,700 - 9,000	10,000 - 12,500	20,000 - 25,000

Fig 1. Full Spray Application

2. **Full Spray Application and Coverage Rates** (See Figure 1 above)

   a. Flexible FAST is to be dispensed by the appropriate spray rig and gun to achieve 100% coverage of the substrate at a rate of 1 gallon per 100 square feet. Substrate irregularity, which is commonly associated with gravel surface, built-up roofing, may take up to 2 gallons per square to compensate so the insulation boards are fully embedded in tot the Flexible FAST.
   b. To achieve proper coverage, spray in a horizontal, sweeping motion, overlapping each new pass with the previous pass by 50%.

Fig 2. Bead Application

3. **Bead Application and Coverage Rates** (See Figure 2 above)

   a. Flexible FAST is to be dispensed in ribbons or beads to achieve spacing approved for specific project conditions (i.e. height, wind zone and warranty wind speed coverage).

Fig 3. Correct Coverage – Splatter Application

Fig 4. Light Coverage – Splatter Application

4. **Splatter Application and Coverage Rates** (See Figures 3 and 4 above)

   a. Spray Rig and Gun

      1) Flexible FAST is to be dispensed by the appropriate spray rig and gun to achieve 50% coverage of the substrate at a rate of 1/2 gallon per 100 square feet.
      2) To achieve proper coverage, spray in a horizontal, sweeping motion, from a minimum 24" height, overlapping each new pass with the previous pass by 50%.
      3) Adhesive should be applied in large droplets, not a fine mist. Air pressure is too high if the adhesive is in a fine mist.

   b. Dual Tanks

      1) Flexible FAST is to be dispensed using Dual Tanks to achieve 50% coverage of the substrate at a rate of 3.75 lbs per 100 square feet.
      2) To achieve proper coverage, spray in a horizontal, sweeping motion, from a minimum of 24" height, overlapping each new pass with the previous pass.
      3) When applying, the 14" extension nozzle should NOT be used.

E. Installation Criteria

1. Check to ensure the substrate is dry. Flexible FAST Adhesive cannot be applied to a wet or damp surface.

2. Dispense Flexible FAST Adhesive over the dry substrate area at the coverage rate indicated previously to allow for full coverage, splatter or proper bead spacing.

3. Allow the adhesive to rise up approximately 1/4" to 3/4", depending on dispensing method, and develop string-time prior to setting insulation boards into adhesive.

   Note: String-time is measured by touching the adhesive with a splice wipe and looking for development of "strings" of adhesive as you pull the splice wipe out of the adhesive. With Flexible FAST Adhesive, string time is generally around 1-1/2 – 2 minutes after application at room temperature.

4. Walk the boards into the adhesive and roll using the 30" wide, 150 lb segmented steel roller to ensure full embedment. The proper roller can be purchased from Rooftop Equipment or one of their distribution partners. Optimal set up time should be approximately 5 to 7 minutes.

   CAUTION: Walking on the boards immediately after placement in adhesive can cause slippage/movement until the adhesive has started to set up. On roofs with a slope greater than 1/2" in 12", begin adhering insulation at the low point and work upward to avoid slippage. One person should be designated to walk/roll in all boards and trim/slit or apply weight as needed to ensure adequate securement.

   CAUTION: If boards easily slide, string time has not been achieved.

5. Position all edges of the boards on the top flutes of steel decks for adequate support.

6. If multiple layers of insulation are specified or required, spray, equipment (rig) splatter or bead-apply Flexible FAST Adhesive over the base layer once fully secured and follow procedures noted above for attachment of each insulation layer.

This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information that has subsequently been made available.

Review the appropriate Carlisle Warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S SPEC SUPPLEMENT

G-04

Adhered Applications Over Lightweight Insulating Concrete
For
EPDM, TPO and FleeceBACK Membranes

July 2024

This supplement is to serve as criteria for Specifiers and Authorized Applicators regarding Direct Application Over Lightweight Insulating Concrete. For installation details Specifiers and Authorized Applicators are advised to reference all applicable technical manuals/details or the Carlisle website.

When specified, the EPDM and TPO membranes or FleeceBACK (EPDM, TPO, PVC or KEE HP) membrane may be adhered directly to an approved **cellular or perlite lightweight insulating concrete** with a minimum compressive strength of 225 psi.

A. EPDM membrane can be adhered with 90-8-30A Bonding Adhesive. Sure-Weld Bonding Adhesive shall be used when using TPO membrane. Sure-Flex Low-VOC Bonding Adhesive shall be used when using PVC or KEE HP membrane. Maximum warranty available (Non-FleeceBACK membrane) for direct application is 15 year with peak gust warranty wind speed of 55 mph.

B. Flexible FAST Adhesive must be used when FleeceBACK (EPDM, TPO, PVC or KEE HP) membrane is specified. Maximum warranty available with FleeceBACK 115-mil membranes for direct application is 20 year with peak gust warranty wind speed of 80 mph.

C. For direct application over **cellular** lightweight insulating concrete, Aqua Base 120 can be used as a two-sided contact adhesive with Non-FleeceBACK EPDM or TPO membrane. When Aqua Base 120 Bonding adhesive is specified refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for Warranty information.

   Note: Use of FleeceBACK membranes in conjunction with Water Based adhesives over lightweight insulating concrete is not permitted.

Non-FleeceBACK membranes are not to be adhered directly to **vermiculite lightweight insulating concrete.** When a FleeceBACK membrane is to be adhered directly to **vermiculite lightweight insulating concrete,** Carlisle must be contacted to determine applicable requirements pertaining to priming, venting, warranty duration and wind speed coverage. Projects where the FleeceBACK membrane has been approved, will be limited to a wind speed coverage of 55 mph peak gust wind speed unless otherwise approved by Carlisle.

The Authorized Applicator must provide Carlisle with a copy of a certification letter from the lightweight insulating concrete manufacturer (on new construction projects), which references the project name and location and contains the manufacturer's brand name, minimum compressive strength, average wet and air dry densities.

Application Cautions

1. The substrate must be dry, free of debris, fins, frost, loose and foreign materials. Fill any gaps in the substrate greater than 1/4" with Flexible FAST Adhesive or VapAir Seal 725TR or VapAir Seal MD (when FleeceBACK membrane is to be used or other appropriate material).

2. Do not proceed with membrane installation until the lightweight insulating concrete has cured a minimum of 48 hours. If necessary, consult with the lightweight insulating concrete manufacturer concerning additional drying time.

3. After rain or other precipitation, follow the manufacturer's requirements concerning proper visual inspection and additional drying time prior to adhering the membrane.

4. Prior to membrane installation, darker areas, especially along hairline cracks in the concrete, may serve as an indication of moisture entrapment and possible standing water beneath the surface. If this condition is found, consult with the lightweight insulating concrete manufacturer for proper corrective measures.

5. Except when lightweight insulating concrete is poured over slotted steel decks, the authorized roofing contractor must conduct core cuts at the minimum rate of 1 every 2,000 square feet. The core cuts should be located around hairline cracks (if present) where darker areas are visible. After core cuts have been taken, the substrate must be examined for evidence of moisture above the structural deck and, if found, a wet/dry vacuum system, as recommended by the lightweight insulating concrete manufacturer, must be utilized to remove standing water from beneath the surface of the concrete.

    a. To ensure the efficient operation of the vacuum system, a tight seal must be provided between the nozzle of the vacuum and the lightweight concrete substrate.

    b. Carlisle's Non-Weldable or Weldable, One-Way Pressure Relief Breather vents, must be installed over each core cut in accordance with Carlisle Detail. See **Spec Supplement P-01 "Related Products"** for more information.

CARLISLE'S SPEC SUPPLEMENT

G-05

Flashing Considerations / Metal Work

July 2024

This supplement is to serve as criteria for Specifiers and Authorized Applicators regarding flashing of walls, curbs, metal work, pipes, drains and other penetrations for EPDM, Thermoplastics, AFX and FleeceBACK membranes. For individual roofing system information, Specifiers and Authorized Applicators are advised to reference the appropriate roofing system specification and associated roofing details.

A. General Flashing Considerations

1. For projects specified with greater than 20 year membrane system warranty, Carlisle's Termination Bar in conjunction with Water Cut-Off Mastic, must be specified under all metal counterflashings. Refer to applicable Carlisle Detail.

2. The height of the new wall flashing and termination must extend above the anticipated water level (due to heavy rain) or slush line (due to water under accumulated snow).

3. All existing loose flashing must be removed prior to the application of new membrane. New membrane flashing must extend above all existing intact flashing but must not conceal weep holes or cover existing through wall counterflashing.

4. Install surface mounted reglets and compression bar terminations directly to the wall surface.

5. Bitumen based roof cement must be removed or concealed with an acceptable underlayment.

   CAUTION: Residual asphalt left on walls and curbs could cause discoloration of white membranes. All residual asphalt must be primed with one of the following, CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB primer, for further information refer to **Spec Supplement 'Insulation Attachment with Flexible FAST Adhesive' G-03**.

6. It is highly recommended for all deck to wall joints, vertical joints between tilt up panels, and any gaps in metal walls to be sealed to prevent any moisture infiltration and possible condensation beneath the membrane. Unsealed joints must be brought to the attention of the Specifier for assessment and proper detailing.

7. The Specifier must examine structural supports for rooftop equipment to determine if reasonable access to the membrane beneath the equipment is provided.

8. When sleepers are used for mounting rooftop equipment, they must be designed to provide adequate support. An appropriate detail must be selected to prevent depression of the insulation and possible damage to the membrane. Caution is to be exercised for sleeper mounted pipes and gas pipes could shift due to heavier snow accumulation on white roofs, due to lack of solar gain. Designer or Specifier may opt to use structurally secured mounting system or possibly increase sleeper height to reduce the force of sliding snow. Periodic snow removal to reduce accumulation is strongly recommended especially on sleepers running perpendicular to roof slope.

9. Depending on the type of the existing roofing system, the tie in method will vary. Total isolation between the two roofing systems or weep holes may be required to address moisture migration from one roofing system to the other. For PVC membrane total isolation between the two roofing systems is required.

10. Flexible penetrations (braided cables, conduits, wires, etc.) must be enclosed in a stable gooseneck.

11. Hot pipes exceeding the temperatures greater than those included in the “chart” below must be insulated with metal collars and rain hoods. Ensure that rain hood does not fit snug around insulated collars to allow for adequate air circulation and prevent heat transfer.

Hot Pipe Limitations	
Membrane	Temperature
EPDM	180°F
TPO	160°F
PVC	140°F

12. On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on applicable details. Fastening plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

13. When FleeceBACK or AFX membrane is specified, at roof drains and compression seal terminations, such as terminations bars and coping stones, the fleece backing must be removed from the back of the membrane so Water Cut-Off Mastic can be applied directly to the membrane surface.

B. Application of Flexible FAST for Vertical Walls

1. Flexible FAST must be applied directly to the wall in a spray method out of high pressure dispensing equipment. Bead/splatter methods are not allowed for wall application.

2. Wait for proper string time and apply the FleeceBACK membrane to the vertical substrate. Apply pressure to the FleeceBACK membrane adhered to the wall with a roller.

C. **Application of CAV-GRIP III for Vertical Walls**

1. CAV-GRIP III may be used as a contact adhesive to apply FleeceBACK EPDM/TPO/PVC/KEE HP or bareback EPDM/TPO membranes (not for use with bareback PVC or KEE HP) to vertical walls.

2. Application of CAV-GRIP III shall be applied continuously with 50 percent overlap on each pass.

D. **Application of CAV-GRIP PVC for Vertical Walls**

1. CAV-GRIP PVC may be used as a contact adhesive to apply FleeceBACK EPDM/TPO/PVC or bareback PVC membranes (not for use with bareback KEE HP) to vertical walls.

2. Application of CAV-GRIP PVC shall be applied continuously with 50 percent overlap on each pass.

E. **Application of Bonding Adhesive**

Use appropriate adhesive for the membrane selected and when FleeceBACK membrane is used for wall flashing refer to FleeceBACK Specification for various adhesion methods.

1. Membrane shall be adhered to vertical surfaces with appropriate bonding adhesive. The Bonding Adhesive shall be applied continuously, without globs or puddles.

2. After the Bonding Adhesive has properly dried to a tack, roll the membrane into the adhesive and broom into place.

3. When FleeceBACK Membrane is selected, the Bonding Adhesive must be applied to the membrane and allowed to flash off fully. Apply a layer of Bonding Adhesive to the vertical wall and second coat of Bonding Adhesive to the FleeceBACK Membrane. After the Bonding Adhesive has properly dried, roll the membrane into the adhesive.

4. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

5. Terminate the edges of the installed membrane in accordance with Carlisle's applicable Termination Details.

F. **Roof Drains**

1. Provide a smooth transition from the roof surface to the drain clamping ring. Prepare the substrate around each roof drain to avoid membrane bridging in excess of 2" at the sump area and possible distortion at the drain clamping ring.

2. For drain sumps with slopes greater than 3" in 12":

a. When reinforced EPDM membrane is specified a separate piece of cured non-reinforced EPDM membrane must be extended into the drain sump as shown on the applicable detail.

b. When thermoplastic membrane has been specified, a separate piece of appropriate thermoplastic reinforced membrane must be extended into the drain sump as shown on the applicable detail.

3. The mating surfaces between the clamping ring and drain base must be clean and have a smooth finish. When using FleeceBACK Membrane, remove fleece along the area of the membrane to placed in the drain bowl and clamping ring.

4. Field splices at roof drains must be located at least 6" outside the drain sump.

5. Cut membrane so it extends approximately 1/2" beyond the attachment points of the clamping ring. The hole in the membrane must not restrict water flow or be smaller than the drain pipe.

6. Remove all existing flashing material to prepare for the membrane seal (application of Water Cut-Off Mastic).

7. All bolts and/or clamps must be in place to provide compression on the Water Cut-Off Mastic.

8. Use drain strainers, which have been approved by the specifier in accordance with applicable codes.

G. **Metal Work**

1. Carlisle recommends SecurEdge Metal Edging/Coping, Termination Bar or Drip Edge for membrane termination. Installation instruction sheets for Carlisle supplied accessories are available from Carlisle.

   Note: Refer to Warranty Tables in applicable membrane system specification for metal edge requirements for projects with extended peak gust wind speed coverage greater than 80 miles per hour.

2. When specified, shop fabricated SecurWeld coated metal configured and installed as shown in Thermoplastic Edge Details will achieve ES-1 Compliance.

3. Metal work by others, when specified and approved by Carlisle, must be fastened to prevent metal from pulling free or buckling and sealed to prevent moisture from entering the roofing system or building. Unless supplied by Carlisle, metal work securement is not included in this specification and is excluded from the Carlisle Warranty. Refer to **Design Reference DR-12 "Metal Edging"** for applicable standards and **Spec Supplement G-11 "Metal Edging"** for recommended design parameters.

4. On retrofit projects, existing counterflashing, edging, expansion joint covers, copings, etc., shall not be reused unless investigated by the specifier to determine its compliance to Carlisle's current details.

H. EPDM Flashing Installation Criteria

1. General

a. **Pressure-Sensitive Uncured Elastoform Flashing** must be limited to the overlayment of vertical seams (as required at angle changes), or to flash inside/outside corners, vent pipes, scuppers and other unusually shaped penetrations where the use of Pre-molded Pipe Seals, cured EPDM membrane or Pressure-Sensitive Cured Cover Strip or Overlayment Strip is not practical.

Note: Even when working in warmer temperatures, in most cases a heat gun will be required to elevate the temperature of Pressure-Sensitive Uncured Flashing between 105°F and 110°F (40°C and 43°C) to permit proper forming of the uncured flashing.

b. **Pressure-Sensitive Cured Cover Strip or Semi-Cured Overlayment Strip** is used to overlay Seam Fastening Plates or metal edging flanges, etc., Applicable Carlisle **Primer** must be used to clean the membrane and metal flanges.

2. Walls, Parapets, Curbs, Skylights, etc

a. Continuous deck membrane for wall flashing.

1) When using Pressure-Sensitive RUSS (Reinforced Universal Securement Strip) secure with proper seam fastening plates and fasteners at a rate of 12-inches on center at the base of the wall. Prime the continuous deck membrane and adhere to Pressure-Sensitive RUSS and the wall. Terminate the membrane in accordance with the applicable Termination Details.

2) When securing the membrane at the base of the wall with proper seam fastening plates and fasteners through the continuous deck membrane, use minimum 6" wide Pressure-Sensitive Cured Cover Strip or Overlayment Strip to overlay fasteners and plates.

3) When using FleeceBACK membranes you must use a minimum of 9" of FleeceBACK Membrane with fleece side up, at any location that requires membrane securement. FleeceBACK Membrane must be fastened at a spacing not to exceed 12" O.C.

b. When the use of continuous deck membrane for wall flashing is not feasible, a separate piece of cured EPDM membrane may be used.

1) When **SecurTAPE** is used, the **membrane and flashing** (Cured EPDM Flashing) must be cleaned and then primed with **EPDM Primer**.

c. All vertical field splices at the base of a wall or curb must be overlaid with Pressure-Sensitive “T” Joint Covers or a 6" by 6" section (with rounded corners) of Sure-Seal Pressure-Sensitive Uncured Elastoform Flashing centered over the field splice.

3. **Other Penetrations**

CAUTION: Projects with Warranties greater than 20 Years may require additional enhancement and double layer application of flashing. The Carlisle appropriate flashing detail should be referenced for specific requirements.

a. Flash pipes and round supports with Pressure-Sensitive Pipe Seals, when feasible, in accordance with the applicable detail.

b. Form Field Fabricated Pipe Seals using Pressure-Sensitive Uncured Elastoform Flashing around pipes, round supports and structural steel tubing with corner radius greater than 1/4".

c. When flashing seamless metal posts, maximum 4" by 4", with a corner radius less than 1/4", apply a field fabricated pipe flashing with a double vertical wrapping.

d. For pipe clusters or unusually shaped penetrations, a pourable sealer pocket must be utilized.

I. Thermoplastic Flashing Installation Criteria

1. **General**

a. Where feasible, Pre-Molded Accessories should be used for corners, pipes, and sealant pockets, Pre-Fabricated Pourable Sealer Pockets for sealant pockets and Pre-Fabricated Curb Wrap Corners for Curb Corners. Projects with warranties greater than 20 years or specify 25/30 year warranties require the use of pre-molded and/or pre-fabricated accessories unless prohibited by a specific field condition. Refer to **Spec Supplement P-01 “Related Products”.**

b. When the use of Pre-Molded Accessories is not feasible, Non-reinforced thermoplastic membrane can be used for flashing pipe penetrations, sealant pockets and scuppers as well as inside/outside corners.

c. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

d. For Thermoplastic membranes, when possible, all reinforced membrane splices are heat welded with the Automatic Heat Welder. The Hand Held Hot Air Welder should be utilized in hard to reach areas, smaller curbs, vertical splices and when using non-reinforced membrane

e. Cut edges of TPO membrane, where scrim reinforcement is exposed, must be sealed with Cut-Edge Sealant (not required on vertical surfaces). Cut edges of PVC membrane are not required to be sealed with Cut-Edge Sealant.

f. When flashing walls with PVC membrane, bitumen based roof cement must be removed or concealed with an acceptable underlayment. Bitumen based roof cement and asphaltic-based flashing material, if allowed to remain in contact with a PVC membrane, will cause severe membrane discoloration and promote plasticizer migration.

CAUTION: Some discoloration of the TPO Membrane may be experienced due to contact with residual asphalt which may have been left in place.

2. **Walls, Parapets, Curbs, Skylights, etc.**

a. For Thermoplastic membranes, flashing of parapets, curbs, expansion joints and other parts of the roof must use the appropriate thermoplastic reinforced membrane.

b. For Thermoplastic membranes, the flashing height must be calculated so that the membrane flashing includes a minimum 1-1/2 inch heat weld beyond the Fastening Plates.

c. Fasten at angle change as with the required Carlisle Fastener and plate.

d. Flash the fasteners/plates with a separate piece of thermoplastic reinforced membrane; apply heat and crease the flashing into the angle change before attaching it to the vertical surface.

This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information that has subsequently been made available.

Review the appropriate Carlisle Warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S
SPEC SUPPLEMENT

G-06

Roof Walkway Installation

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment.

1. Walkway types:

a. **Sure-Seal®/Sure-White® Pressure-Sensitive Molded Walkway Pads**: Sure-Seal (black) or Sure-White (white) molded walkway pads with Factory-Applied TAPE used to provide protection for areas of EPDM membrane that are exposed to regular rooftop maintenance.

CAUTION: Molded Walkway pads not recommended within 10 feet of the perimeter of the roof on ballasted systems to avoid discontinuation of the primary membrane securement (ballast). In lieu of molded walkway pads, concrete pavers can be used when walkway is to be extended into the perimeter area.

b. **Sure-Weld® TPO Heat Weldable Walkway Rolls** are required when walkway pads are to be specified. The Walkway Rolls are heat welded to the Sure-Weld membrane using an Automated Heat Welder or Hand-Held Heat Welder. Walkway Rolls are 34 inches wide by 50 feet long and are nominal 180 mils thick. Available in white, gray or tan with safety yellow welding tabs along each edge.

c. **Sure-Flex™ PVC Heat Weldable Walkway Rolls** are required when walkway pads are to be specified. The Walkway Rolls are heat welded to the Sure-Flex (PVC/KEE HP) membrane using an Automated Heat Welder or Hand-Held Heat Welder. Walkway Rolls are 36 inches wide by 60 feet long and are nominal 80 mils and 110 mils thick. Available in gray only.

d. **Sure-Weld TPO Crossgrip Walkway Rolls** may be used in lieu of standard Sure-Weld TPO Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip TPO Walkway Rolls are effective for winds up to 55 mph. Rolls are 36” wide by 33’ long, available in white, gray and yellow.

e. **Sure-Flex PVC Crossgrip Walkway Rolls:** Manufactured from PVC and may be used in lieu of standard Sure-Flex PVC Walkway Rolls when a walkway is to be loose-laid

and not secured to the membrane. Loose-laid Crossgrip PVC Walkway Rolls are effective for winds up to 55 mph. Rolls are 36” wide by 33’ long, available in white, gray and yellow.

f. **Carlisle Interlocking Pavers**™, 24" X 24" X 2", weighing approximately 6 pounds per square foot, may be specified loose laid directly over the membrane. Installation Instruction sheets are available from Carlisle.

g. **Smooth concrete pavers**, when specified in conjunction with insulation that is mechanically fastened, must be loose laid over a slip sheet of membrane or 2 layers of HP Protective Mat. When insulation is attached with Flexible FAST Adhesive, concrete pavers may be placed over one layer of HP Protective Mat. Pavers cannot weigh more than 100 pounds per paver for ease of removal. For other Applicable Carlisle Products refer to Product Data Sheets for information.

h. **Hanover Prest Plaza Paver** – A pre-cast concrete paver used in conjunction with roof garden applications or for ballasted roof applications. 23-1/2” x 23-1/2” x 2” thick precast concrete pavers weighing 25 psf. Available in a sandstone finish for aesthetic projects and non-slip diamond or stippled finish for ballasted roof projects. Prest pavers are available in 8 standard colors, with special order colors available. The Prest paver can either be installed in conjunction with a separation layer of HP Protective Mat or using Hanover EPDM Pedestals, High-Tab Pedestals, or Elevated Pedestals.

i. **Hanover Guardian Paver** – A pedestal paver system designed to meet severe site conditions and high winds, the guardian paver system utilizes a unique three-piece pedestal system and shaped paver which incorporates a top and bottom plate with a bolt connecting the entire paver system together which creates a monolithic surface and provides increased wind performance. The pavers are 23-1/2” x 23-1/2” x 2” or 3” thick. 2” pavers weigh 25 psf and 3” pavers weigh 38 psf. Available in a sandstone finish for aesthetic projects and non-slip diamond or stippled finish for ballasted roof projects. Guardian pavers are available in 8 standard colors, with special order colors available. The Guardian paver can either be installed in conjunction with a separation layer of HP Protective Mat or using Hanover Elevated Pedestals.

j. **Hanover Pedestal Paver** – Used for light traffic areas associated with rooftop or garden roof applications. 23-1/2” x 23-1/2” x 2-1/4” thick precast concrete pavers weighing 22 psf with an elevated clearance of 1/2” from incorporated footing. Available in 8 standard colors, with special order colors available. The pedestal paver can either be installed in conjunction with a separation layer of HP Protective Mat, no pedestals are required.

k. **Hanover Ballast and Lightweight Ballast Paver** - The standard, 24” x 24” x 1-13/16” thick, Ballast Paver comes in a natural color and a non-slip Diamond finish and weighs 22 lbs/sq. ft. The Lightweight, 23-1/2” x 23-1/2” x 1-1/4” thick, Ballast Paver comes in a natural color and a non-slip diamond finish and weighs 15 lbs/sq. ft. Both pavers can be used as ballast or walkways.

l. **Sunny Brook Paver** - A pre-cast concrete paver used in conjunction with roof garden applications or for ballasted roof applications. 23-1/2” x 23-1/2” x 2” thick precast concrete pavers weighing 24 psf. Available in 17 standard colors, with special order colors available. The pedestal paver can either be installed in conjunction with a separation layer of HP Protective Mat or using MRP Pedestal and shims.

m. **MRP Pedestals** – Designed to support concrete pavers, a pedestal system with a self-

leveling head and adjustment key which can modify the height of the pedestal from the top with a special tool. 100% recyclable and a loading capacity of each support is more than 2,205 lbs and the supporting base is 49.6 sq. in.

2. Pavers are not recommended for use as walkways on projects where the roof slope exceeds 2 inches per horizontal foot.

3. Walkways are considered a maintenance item and are excluded from the Carlisle warranty.

4. Window washing equipment will require special maintenance. Runways or window washing tracks must be utilized to prevent damage to membrane or insulation. Such details must be reviewed by Carlisle to determine reasonable access to the membrane and associated insulation/underlayment components.

NOTE: Pavers are not recommended for use as walkways where slippery conditions may be encountered. Paver slippage may occur due to the lower membrane surface temperature and the presence of frost or ice.

B. Walkway Installation

1. Install walkways in those locations as designated by the specifier.

2. Sure-Seal/Sure-White Pressure-sensitive Molded Walkway Pads

   a. Use Weathered Membrane Cleaner to remove dirt or other contaminants from the area.

   b. Adhere Walkway Pads using Carlisle EPDM Primer. Apply primer to deck surface where tape will contact deck surface.

   c. Allow a 1” wide break between Walkway Pads. Discontinue Walkways over field splices allowing a minimum 1” space.

3. Sure-Weld/Sure-Flex Heat Weldable Walkway Rolls

   a. Use Weathered Membrane Cleaner (TPO) or PVC and KEE HP Membrane Cleaner (PVC/KEE HP) to remove dirt or other contaminants from the area to be welded to the walkway material.

   b. Position the walkway material and cut the Walkway Rolls into maximum 10' lengths (when positioned parallel to field splices) and position with a minimum 1" gap between adjacent pieces to allow for water drainage. When walkways are to be installed perpendicular to field splices, adjust walkway length to provide a 4" - 6" minimum gap at field splices. (Because the attachment of the walkway to the membrane is permanent, this will allow access to the field seams).

   c. Using an Automatic Heat Welder, weld all 4 sides of the walkway material to the membrane. (Typically the same speed and temperature settings will be used for this procedure as for welding membrane to membrane. A test weld is always recommended prior to performing welds to the installed membrane). A hand held welder may be utilized, however, productivity will be decreased.

If, possible, allow the walkway to warm by the sun prior to welding so distortion will not occur due to expansion.

4. Sure-Weld TPO or Sure-Flex PVC Crossgrip Walkway Rolls

   a. Loose-lay Crossgrip in areas of high traffic or around mechanical units that might require servicing.

5. Concrete Paver Blocks

   a. For the protection of the deck membrane, install a slip-sheet of roofing membrane under all concrete pavers designated for use as a walkway. The protective layer must extend a minimum of 2" on each side of the walkway.

6. Carlisle Interlocking Rubber Pavers

   a. Rubber Pavers can be loose laid directly over the membrane.

      Note: Pavers are not recommended for walkways when slopes exceed 2" per horizontal foot. Slippage could be encountered during colder seasons.

CARLISLE'S SPEC SUPPLEMENT

G-07

Daily Seal & Clean Up

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. DAILY SEAL

1. On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration.

2. Temporarily seal any loose membrane edge down slope using Sure-Seal Two Part Pourable Sealer (EPDM only), Flexible FAST Adhesive, VapAir Seal Flashing Foam, hot asphalt, or a similar product so that the membrane edge will not buck water. Caution must be exercised to ensure positive draining during installation, temporary seal locations should be designated so that drainage is not restricted during construction by partially installed roof sections.

    a. When applying Flexible FAST Adhesive or other sprayed urethane foam, prime the surface of the membrane with Carlisle Primer to ensure proper adhesion

    b. Sure-Seal Pourable Sealer, when utilized, shall be applied as follows:

        1) The two Pourable Sealer components must be mixed in accordance with the instructions on the container labels.

        2) Apply the Pourable Sealer along the loose edge of the EPDM membrane. If necessary, use a trowel to spread Pourable Sealer to achieve complete coverage.

3. When tie-in to existing built-up roofs, remove the gravel. The surface must be clean and dry.

4. After embedding membrane in daily seal material, CHECK FOR CONTINUOUS CONTACT. Provide continuous pressure over the length of the temporary seal. Provide weight evenly distributed along the length of the daily seal to reduce the wind effect on the continuous temporary seal.

    Note: The use of rigid wood nailers is not recommended due to warping. Constant compression cannot be achieved on an uneven substrate.

5. When work is resumed, pull the imbedded membrane free; trim and remove daily seal material from membrane before continuing installation of adjoining sections.

B. CLEAN UP

1. If required by the specifier to ensure the aesthetics of the surface of the membrane, hand prints, footprints, general traffic grime, industrial pollutants and environmental dirt may be cleaned from the surface of the membrane by scrubbing with soapy (non-abrasive soap) water and rinsing the area completely with clean water.

    a. For Sure-Seal, Sure-White, or Sure-Weld membrane, Weathered Membrane Cleaner can be used to clean the surface of the membrane.

    b. For Sure-Flex PVC and KEE HP Membranes, PVC and KEE HP Membrane Cleaner can be used to clean the surface of the membrane.

2. Bonding Adhesive, Flexible FAST Adhesive and VapAir Flashing Foam residue may be cleaned by using the following procedures:

    a. Saturate a clean HP Splice Wipe with Weathered Membrane Cleaner (EPDM and TPO) or PVC and KEE HP Membrane Cleaner (PVC).

    b. Scrub exposed adhesive with the saturated HP Splice Wipe until all residue is removed from the membrane. For easier removal, it may be necessary to change Splice Wipes frequently.

CARLISLE'S SPEC SUPPLEMENT

G-08

Application Procedures for Carlisle's VapAir Seal 725TR Air and Vapor Barrier / Temporary Roof

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. General

1. **Carlisle's VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

2. **Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a Low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application.

3. **CCW-702 Primer and 702LV Primer (Low-VOC)** - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., Dens-Deck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

4. **CCW-702WB –** a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, Dens-Deck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

B. Approved Substrates

Carlisle's VapAir Seal 725TR Air and Vapor Barrier, in conjunction with either Carlisle's CAV-GRIP III, CCW-702, CCW-702LV or CCW-702WB Primers, can be used over structural concrete, gypsum and wood decks. In addition, Securock/Dens-Deck Prime (typically used over steel deck construction) is a suitable substrate providing it is mechanically fastened to the deck at the minimum rate of 1 per 2 per square foot or adhered to the deck with Flexible FAST Adhesive per Carlisle Specifications.

CAUTION: Use of standard Dens-Deck is not recommended due to excessive primer absorption. When the use of standard Dens-Deck is specified, two coats of Carlisle/CCW Primer will be required along with a trial test to verify adequate adhesion of the Carlisle's VapAir Seal 725TR Air and Vapor Barrier.

C. **Limitations**

1. Do not apply primer or vapor barrier to frozen substrates. Best results are obtained when temperatures are above 40°F (4°C).

2. Do not apply primer or vapor barrier to damp or contaminated surfaces.

3. Carlisle's VapAir Seal 725TR Air and Vapor Barrier is not recommended for use over sealants containing coal tar or polysulfides. If these materials are present, they must be removed and the surfaces thoroughly cleaned.

D. **Installation**

1. **Surface Preparation**: The surface shall be dry, have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, latence and form release agents. In the event of rain, concrete must be allowed to dry before primer is applied.

2. **Primer**: Surfaces to receive Carlisle's VapAir Seal 725TR Air and Vapor Barrier must be clean and dry. Prime with Carlisle's CAV-GRIP III, CCW-702, 702LV or 702WB Primer. Apply Primer by spray, brush or with a long nap roller at the applicable coverage rate noted above. At 75°F allow CCW-702, CCW-702LV or CCW-702WB primer to dry 75 minutes minimum or allow CAV-GRIP III to dry for approximately 5 minutes. Primer has a satisfactory cure when it will not transfer when touched. Prime only areas to be waterproofed the same day. Re-prime if area becomes dirty.

3. **Application**: Apply Carlisle's VapAir Seal 725TR Air and Vapor Barrier from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at least 2". End laps shall be staggered. Seams and end laps must be rolled with a 2" seam roller. Place membrane carefully to avoid wrinkles and fishmouths. Immediately after installation, roll with a 30" wide, 150 pound weighted segmented steel roller.

4. **Repairs**: Following application, inspect 725TR membrane for tears, punctures, fishmouths, air bubbles and voids due to misalignment at seams. Remove damaged membrane. Prime exposed substrate and allow primer to dry. Apply a new section of Carlisle's VapAir Seal 725TR Air and Vapor Barrier to primed substrate, extending onto adhered membrane 6" on all sides. Firmly press air and vapor barrier repair section to ensure a good seal. Slit fishmouths and overlap the edges. Place a section of Carlisle's VapAir Seal 725TR over the repair and extend 6" in all directions. Firmly press repair section to ensure a good seal.

5. **Insulation and FleeceBACK Membrane Installation**: Ensure surface of Carlisle's VapAir Seal 725TR Air and Vapor Barrier is dry prior to installing insulation. Place insulation over

the surface and mechanically fasten to the roof deck or adhere to the vapor barrier with Flexible FAST Adhesive in accordance with this Carlisle Specification. Complete the installation by adhering FleeceBACK membrane over the insulation.

6. **Installation at angle changes**: For FleeceBACK Systems where insulation is adhered to the vapor retarder and adhered roofing systems with vertical base wall securement and adhered insulation, one of the following options must be incorporated to ensure continuous seal is provided during climatic changes, especially in northern regions:

   a. Option One: Mechanically secure the first course of insulation (bottom layer) with insulation fasteners and plates. A row of fasteners shall be installed within 6” of the angle change spaced 12” O.C.

   b. Option Two: In lieu of fastening, install a 3” diameter backer rod along the angle change to accommodate for movement and prevent the effect of the vapor retarder pulling away from angle change.

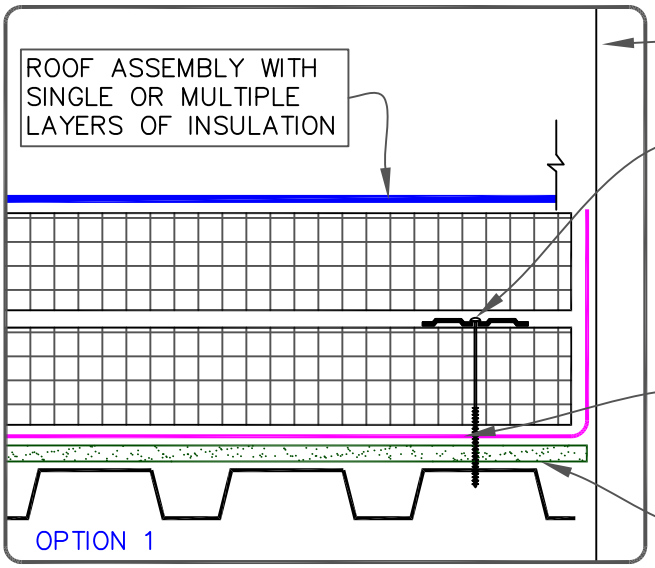
      Note: Maintain mylar backing at the sponge tubing to prevent the 725TR from adhering to the tubing. As shown in the applicable Carlisle Detail.

   c. Option Three: In lieu of fastening and when the use of backer rod is not possible, the 725TR can be installed with a double fold, allowing extra material to accommodate for structural movement.

      Note: Maintain mylar backing within the fold to allow for material expansion in the event of movement. Refer to applicable Carlisle Detail.

This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information that has subsequently been made available.

Review the appropriate Carlisle Warranty for specific warranty coverage, terms, conditions and limitations.

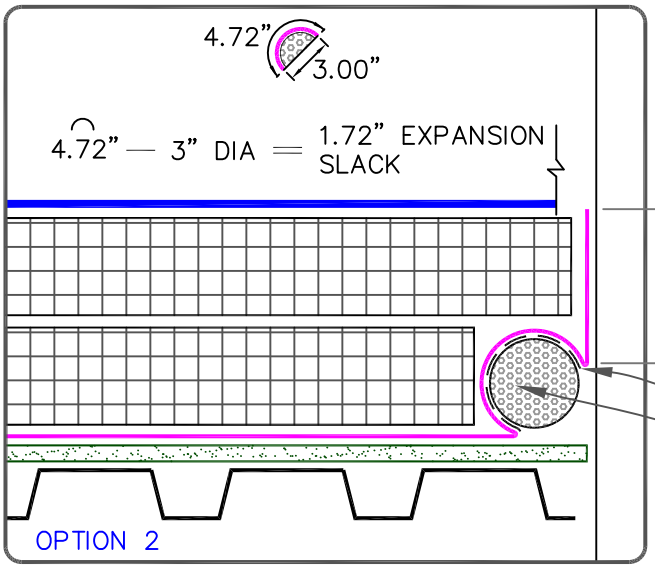


PARAPET WALL/LOW CURB

SECURE BOTTOM LAYER OF INSULATION AT 12" (30cm) O.C. PARALLEL TO WALL AT 6" (15cm) DISTANCE NOTE: WHEN MEMBRANE BASE SECUREMENT IS PROVIDED INTO THE DECK, INSULATION FASTENER MAY BE ELIMINATED

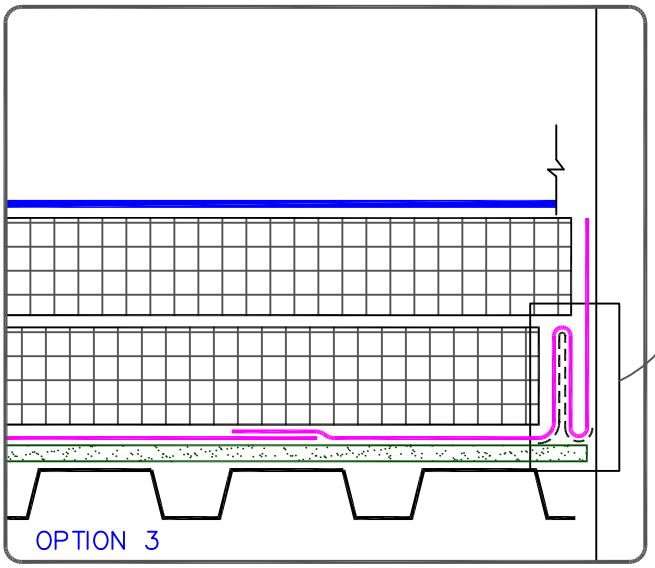
725TR SELF-ADHERING VAPOR RETARDER FULLY ADHERED TO PRIMED SUBSTRATE

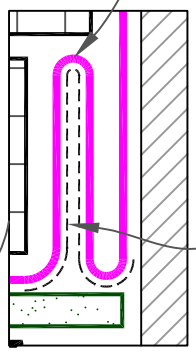
SUBSTRATE BOARD



MYLAR SHEET (DASH LINE) AS BOND BREAKER

CONTINUOUS OPEN CELL POLYURETHANE FOAM BACKER ROD





CONTINUOUS STRIPPING OF SELF-ADHERING VAPOR RETARDER 725TR FULLY ADHERED TO WALL AND SUBSTRATE WITH DOUBLE FOLD CREASES MIN. 2" (5cm) HIGH, SET VERTICALLY UP AGAINST THE WALL. DO NOT ADHERE THE FOLDS TOGETHER

MYLAR SHEET (DASH LINE) AS BOND BREAKER

MEMBRANE

APPROVED SUBSTRATE

0 — SEE NOTE(S)

DECK-TO-WALL VAPOR RETARDER EXPANSION DETAIL

For additional information, refer to Specifications

DETAIL NO.

G-08

CARLISLE'S SPEC SUPPLEMENT

G-09

Insulation Attachment and Details

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

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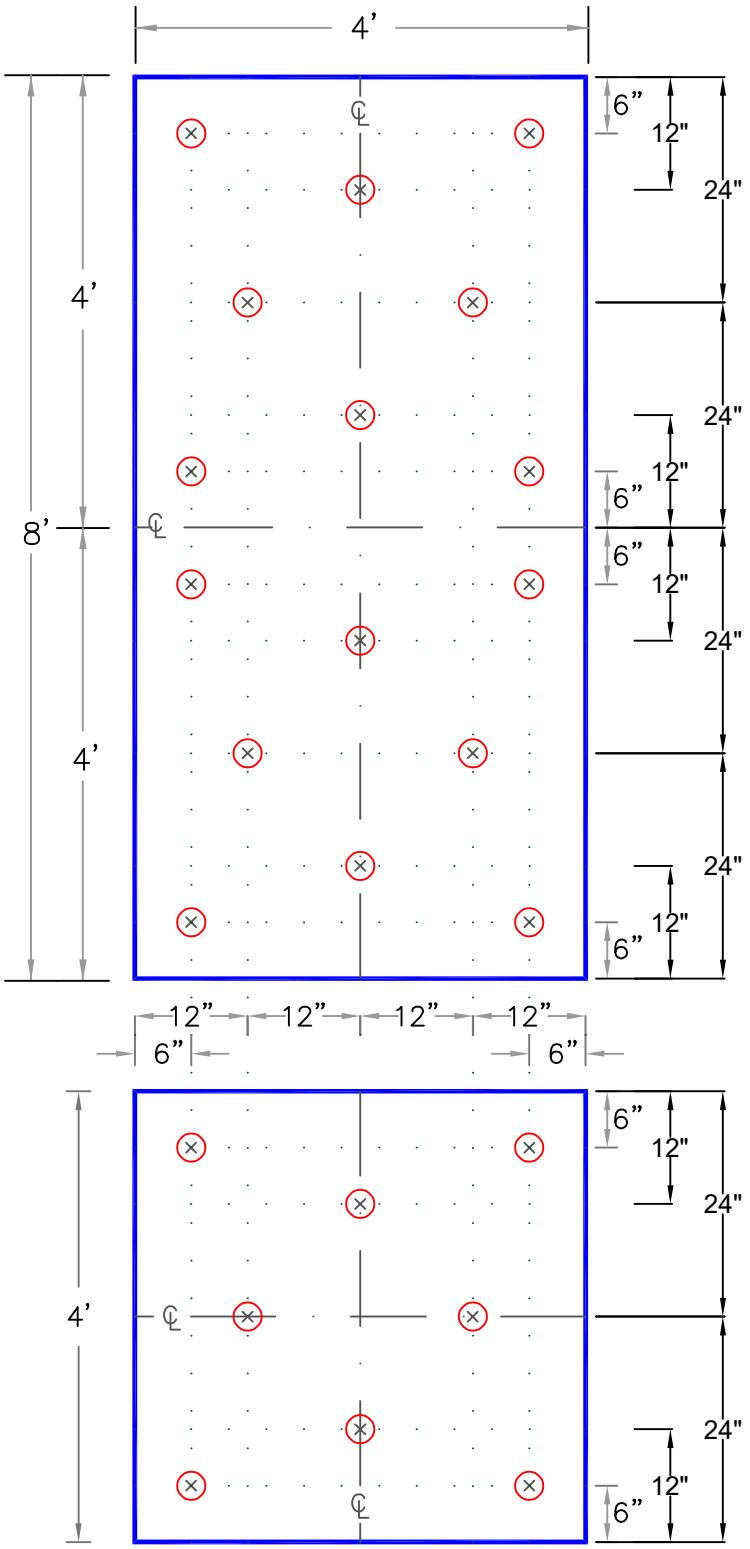


NOTES:

1. WHEN ENHANCED INSULATION FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1, OR MIAMI–DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR–05–11.
2. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
3. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.

FEET TO CENTIIMETERS	
4'	8'
120	250

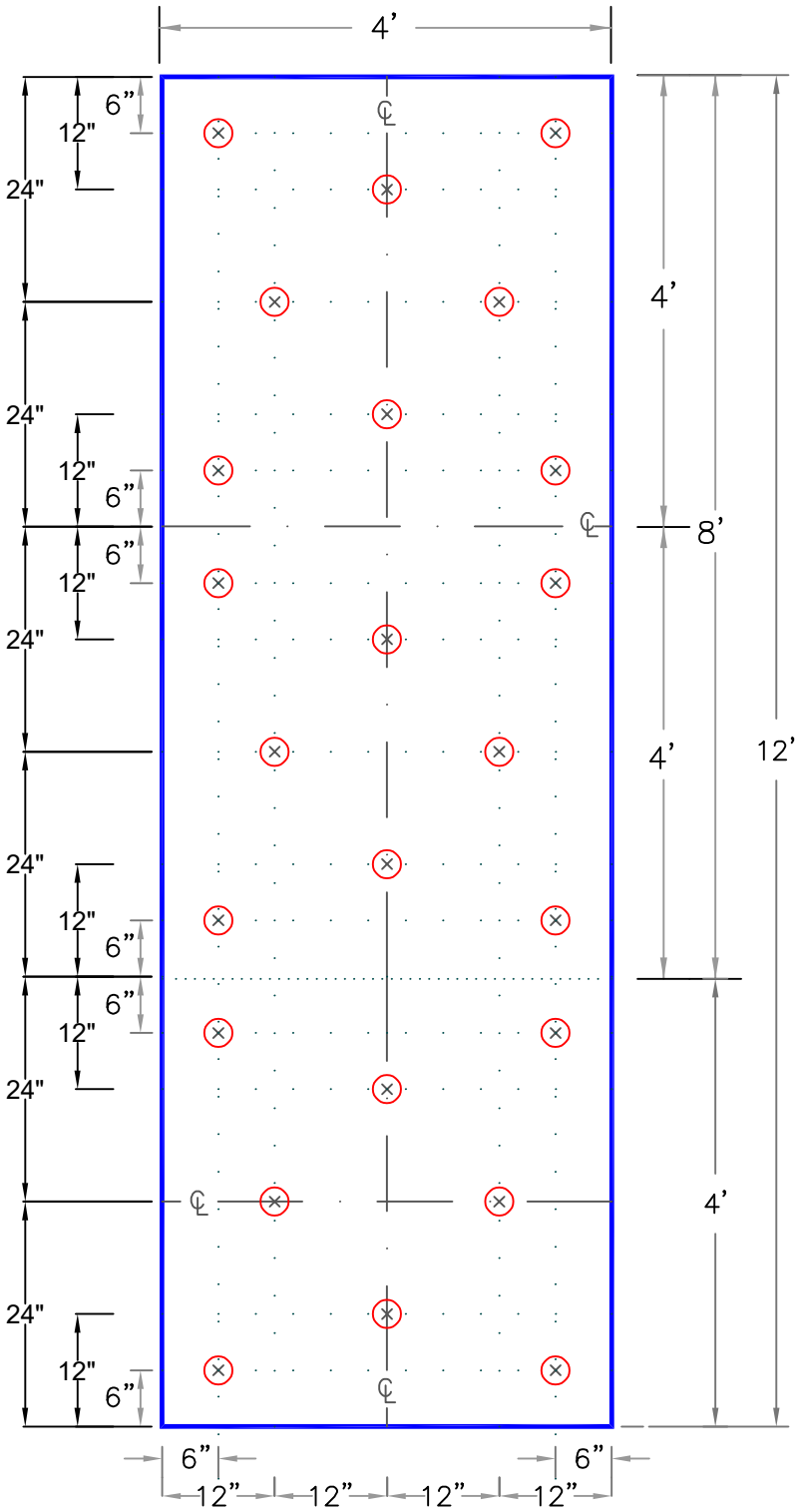
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

CARLISLE INSULATION/ COVER BOARD ATTACHMENT

For additional information, refer to Specifications

DETAIL NO.
A-27A
ADHERED SYSTEM



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FEET TO CENTIIMETERS	
4'	8'
120	250

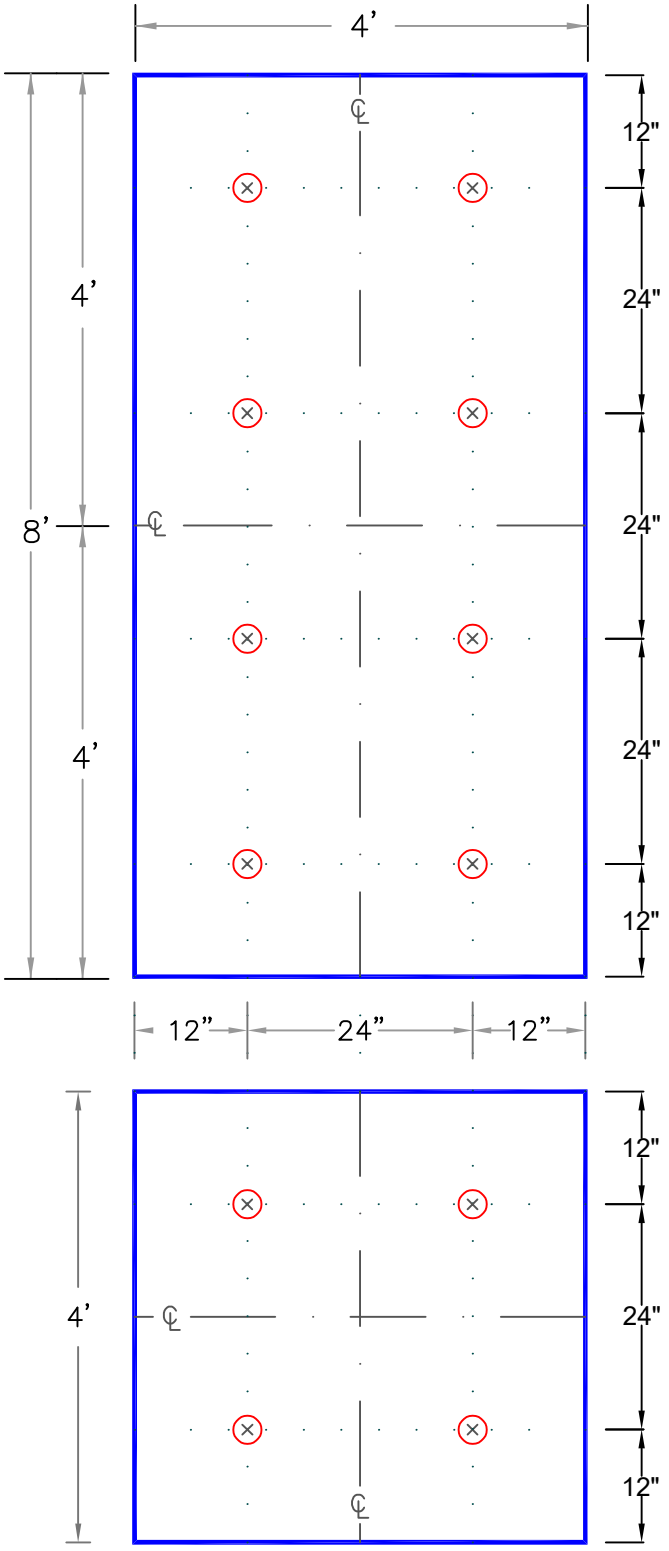
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

CARLISLE INSULATION BOARD ATTACHMENT (12' BOARD)

For additional information, refer to Specifications

DETAIL NO.
A-27A.1
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO MIN. 2" (51mm) THICK (SINGLE OR TOP LAYER) CARLISLE POLYISOCYANURATE INSULATION WHEN FASTENED INTO 22-GAUGE (0.8mm) STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1-1/2" (38mm) THICK WOOD PLANK ROOF DECKS.
2. WHEN ENHANCED INSULATION FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1-29, ANSI/SPRI WD-1 OR MIAMI-DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR-05.
3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20-YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
5. DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, CEMENTITIOUS WOOD FIBER (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK THINNER THAN 22-GAUGE (0.8mm), REFER TO DETAIL A-27A FOR ACCEPTABLE FASTENING.

FEET TO CENTIIMETERS	
4'	8'
120	250

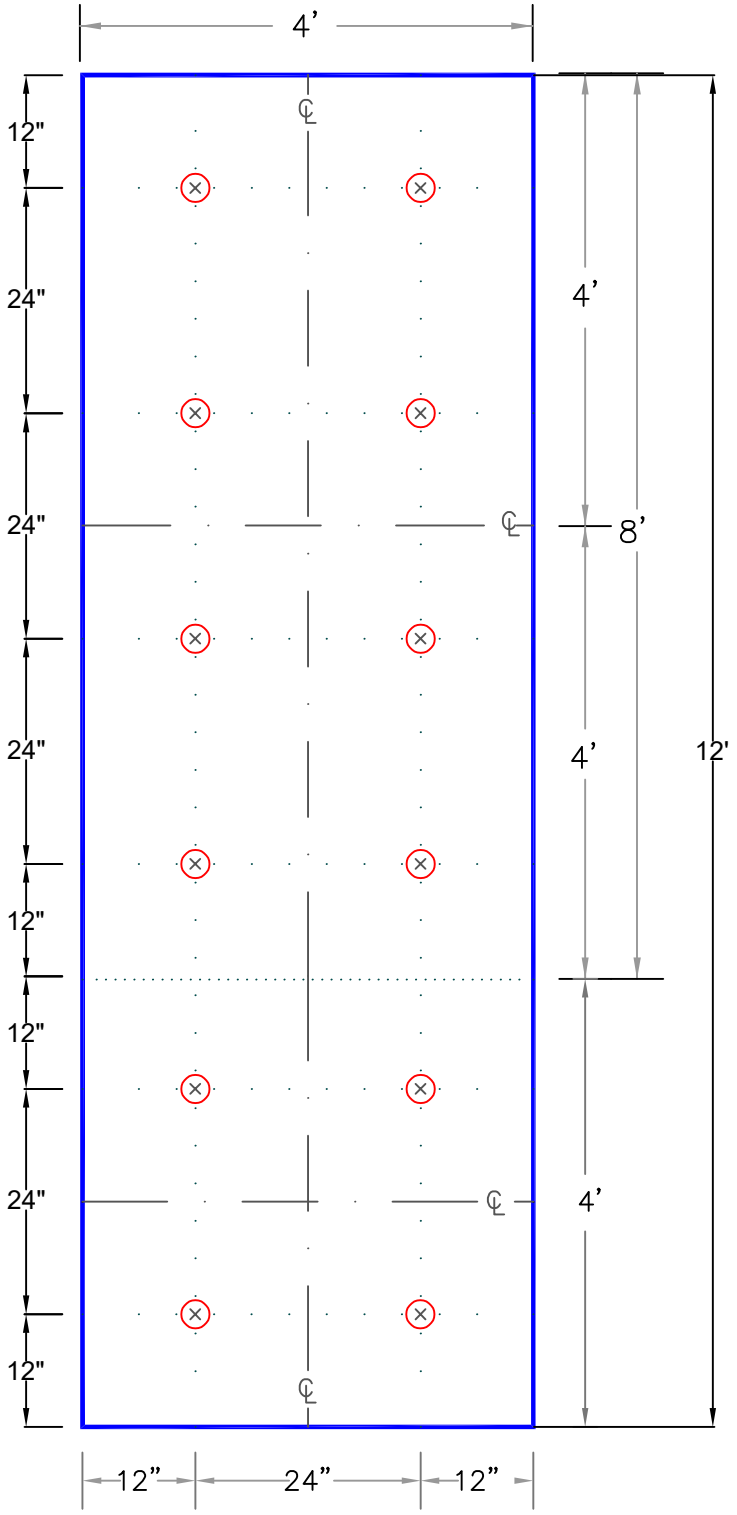
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

MINIMUM 2" THICK CARLISLE HP-H / INSULBASE / SECURSHIELD POLYISOCYANURATE INSULATION

For additional information, refer to Specifications

DETAIL NO.
A-27B
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO MIN. 2" (51mm) THICK (SINGLE OR TOP LAYER) CARLISLE POLYISOCYANURATE INSULATION WHEN FASTENED INTO 22–GAUGE (0.8mm) STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1–1/2" (38mm) THICK WOOD PLANK ROOF DECKS.

2. WHEN ENHANCED INSULATION FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR MIAMI–DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR–05.

3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.

4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.

5. DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, CEMENTITIOUS WOOD FIBER (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK THINNER THAN 22–GAUGE (0.8mm), REFER TO DETAIL A–27A FOR ACCEPTABLE FASTENING.

FEET TO CENTIIMETERS	
4'	8'
120	250

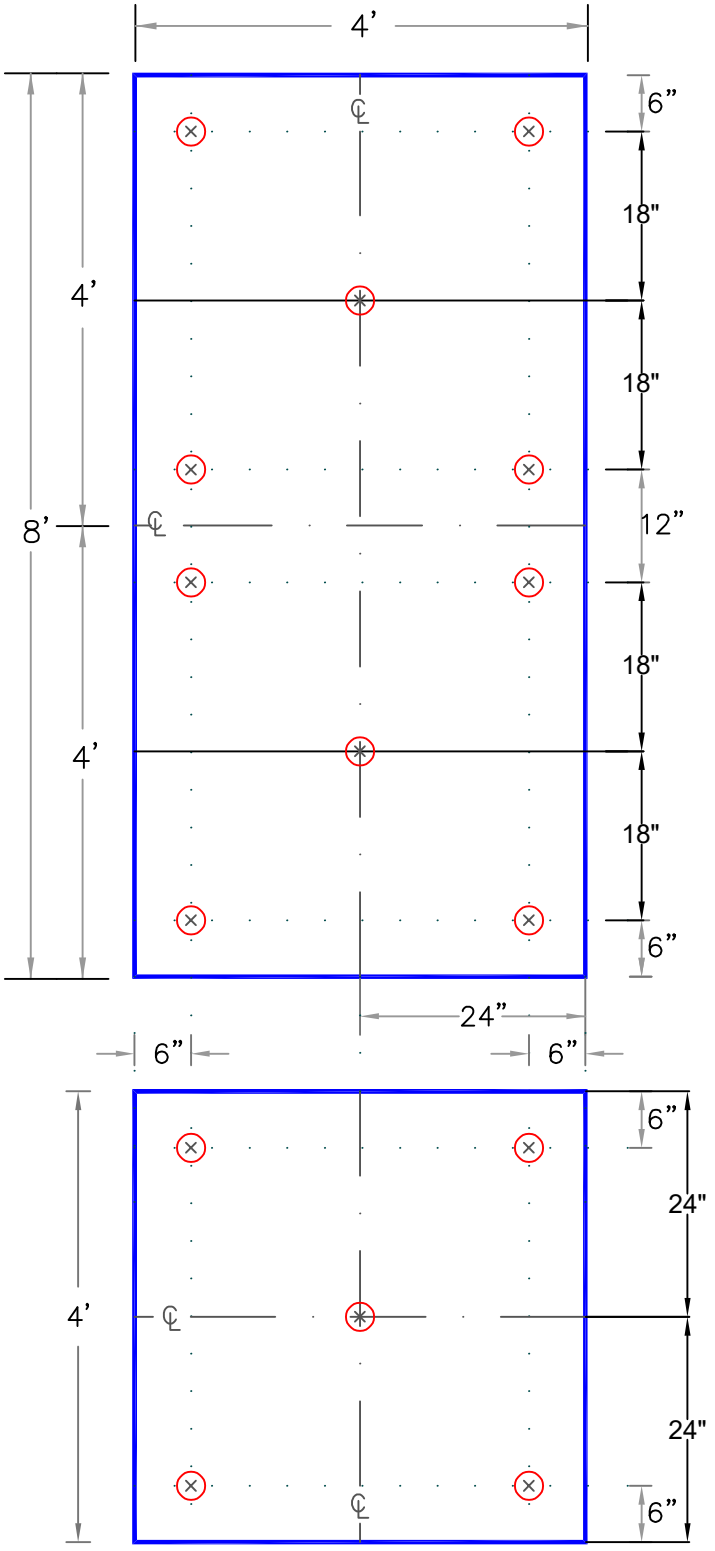
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

MINIMUM 2" THICK CARLISLE HP-H / INSULBASE / SECURSHIELD POLYISOCYANURATE INSULATION (12' BOARD)

For additional information, refer to Specifications

DETAIL NO.
A-27B.1
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO MIN. 1–1/2" (38mm) THICK (SINGLE OR TOP LAYER) CARLISLE POLYISOCYANURATE INSULATION WHEN FASTENED INTO 22–GAUGE (0.8mm) STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1–1/2" (38mm) THICK WOOD PLANK ROOF DECKS.
2. WHEN ENHANCED INSULATION FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR CARLISLE'S DESIGN REFERENCE DR–05.
3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
5. THIS DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, FIBROUS CEMENT (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK THINNER THAN 22–GAUGE (0.8mm), REFER TO DETAIL A–27.1 FOR ACCEPTABLE FASTENING.

FEET TO CENTIIMETERS	
4'	8'
120	250

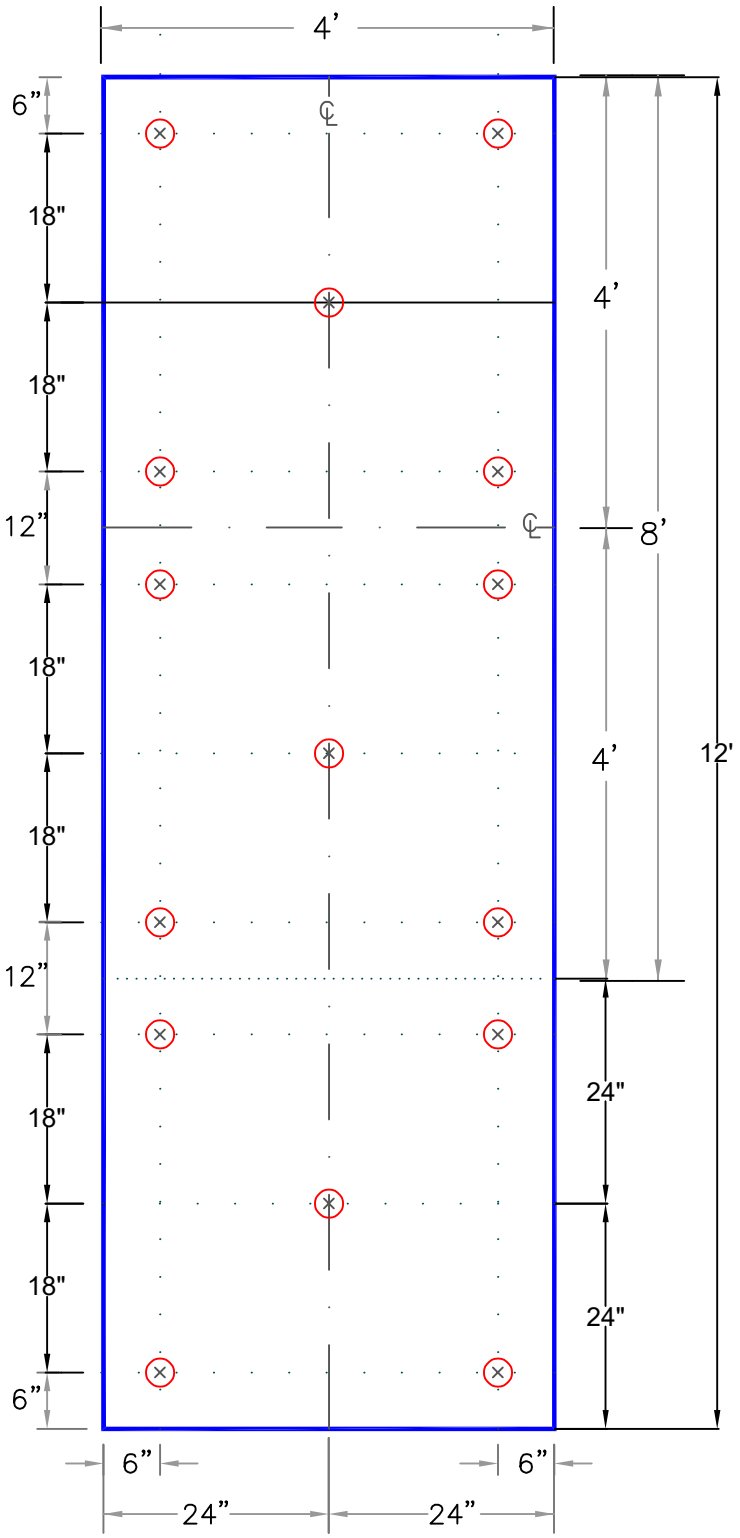
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

MINIMUM 1-1/2" THICK CARLISLE HP-H / INSULBASE / SECURSHIELD POLYISOCYANURATE INSULATION

For additional information, refer to Specifications

DETAIL NO.
A-27C
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO MIN. 1–1/2" (38mm) THICK (SINGLE OR TOP LAYER) CARLISLE POLYISOCYANURATE INSULATION WHEN FASTENED INTO 22–GAUGE (0.8mm) STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1–1/2" (38mm) THICK WOOD PLANK ROOF DECKS.
2. WHEN ENHANCED INSULATION FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR CARLISLE'S DESIGN REFERENCE DR–05.
3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
5. THIS DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, FIBROUS CEMENT (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK THINNER THAN 22–GAUGE (0.8mm), REFER TO DETAIL A–27.1 FOR ACCEPTABLE FASTENING.

FEET TO CENTIIMETERS	
4'	8'
120	250

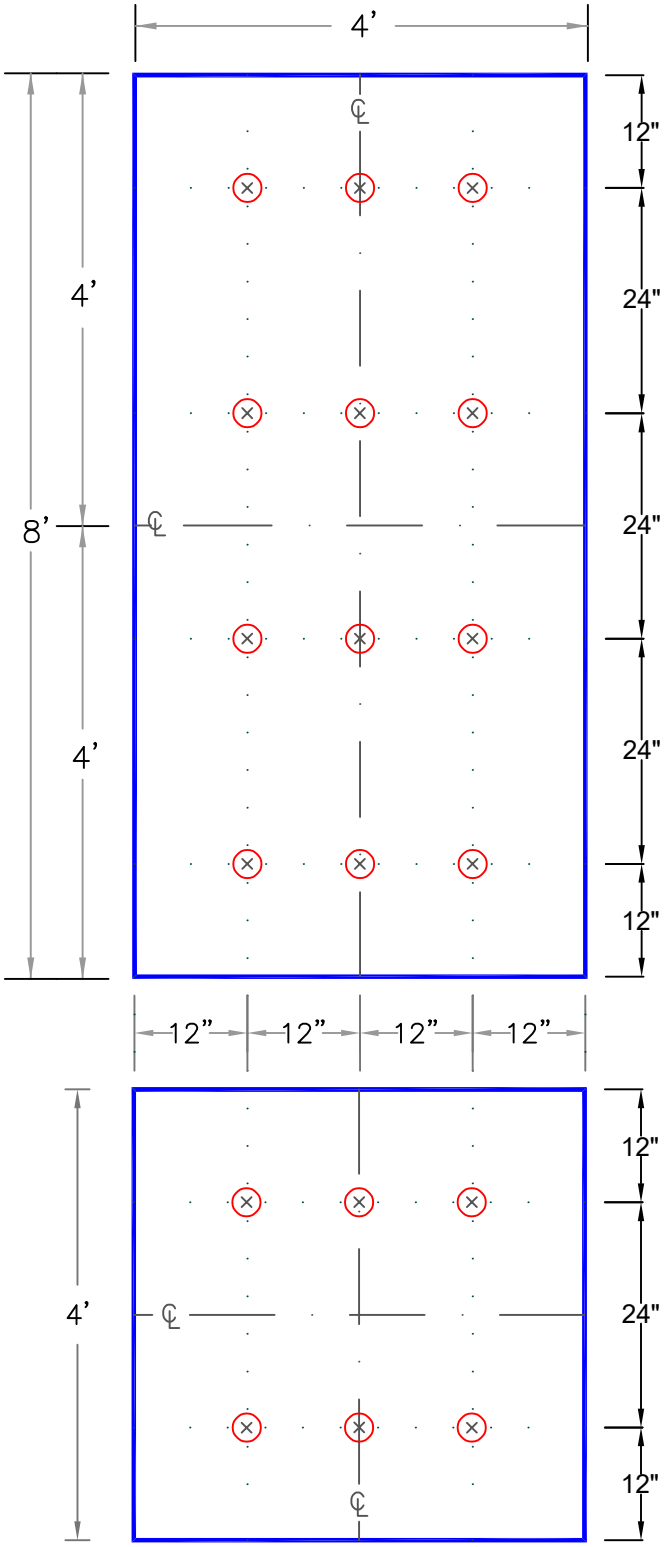
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

MINIMUM 1-1/2" THICK CARLISLE HP-H / INSULBASE / SECURSHIELD POLYISOCYANURATE INSULATION (12' BOARD)

For additional information, refer to Specifications

DETAIL NO.
A-27C.1
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO 1/4" (6mm) AND 1/2" (13mm) THICK SECUROCK OR DENS DECK PRIME (OVER AN APPROVED INSULATION) WHEN FASTENED INTO 22–GAUGE (0.8mm) STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1–1/2"(38mm) THICK WOOD PLANK ROOF DECKS.
2. WHEN ENHANCED FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR MIAMI–DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR–05.
3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED, ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
5. DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, FIBROUS CEMENT (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK LESS THAN 22–GAUGE (0.8mm), REFER TO DETAIL A–27.1 FOR ACCEPTABLE FASTENING.
6. WHEN INSTALLED OVER COMBUSTIBLE WOOD DECKS OR INSULATIONS, ALL JOINTS SHALL BE STAGGERED.
7. LONG UNINTERRUPTED RUNS GREATER THAN 200' (>61 METERS) OF SECUROCK MAY REQUIRE SLIGHT GAPPING DUE TO THERMAL EXPANSION.

FEET TO CENTIIMETERS	
4'	8'
120	250

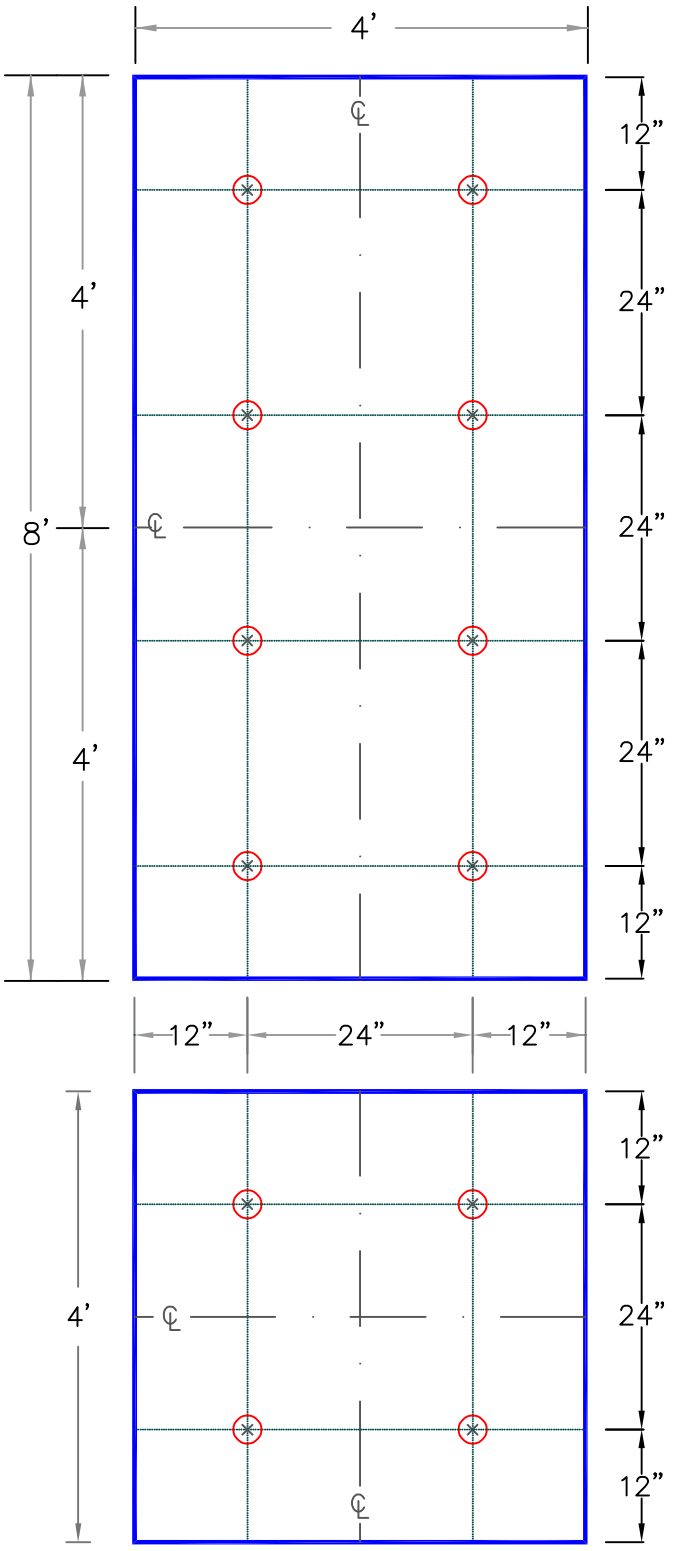
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

FASTENER & PLATE
CENTER LINE
GUIDE LINE

1/4" OR 1/2" THICK SECUROCK OR DENS DECK PRIME

For additional information, refer to Specifications

DETAIL NO.
A-27D
ADHERED SYSTEM



NOTES:

1. THIS DETAIL APPLIES TO 5/8" (16mm) THICK SECUROCK, DENS DECK PRIME, DENS DECK STORMX PRIME OR STORMBASE POLYISO (OVER AN APPROVED INSULATION) WHEN FASTENED INTO 22–GAUGE STEEL, STRUCTURAL CONCRETE, MINIMUM 15/32" (12mm) PLYWOOD OR 1–1/2" (40mm) THICK WOOD PLANK ROOF DECKS.
2. WHEN ENHANCED FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR MIAMI–DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR–05.
3. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
4. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED OR FOR SYSTEMS OVER 50' (15 METERS), ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
5. DETAIL NOT FOR USE OVER ORIENTED STRAND BOARD, GYPSUM, FIBROUS CEMENT (TECTUM), LIGHTWEIGHT INSULATING CONCRETE OR STEEL ROOF DECK LESS THAN 22–GAUGE (0.8mm), REFER TO DETAIL A–27.1 FOR ACCEPTABLE FASTENING.
6. WHEN INSTALLED OVER COMBUSTIBLE WOOD DECKS OR INSULATIONS, ALL JOINTS SHALL BE STAGGERED.
7. LONG UNINTERRUPTED RUNS GREATER THAN 200' (> 61M) OF SECUROCK MAY REQUIRE SLIGHT GAPPING DUE TO THERMAL EXPANSION.
8. STORMBASE POLYISO ACHIEVES UP TO A 20–YEAR, 90–MPH WARRANTY WITH (8) FASTENERS.

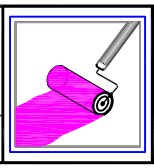
FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

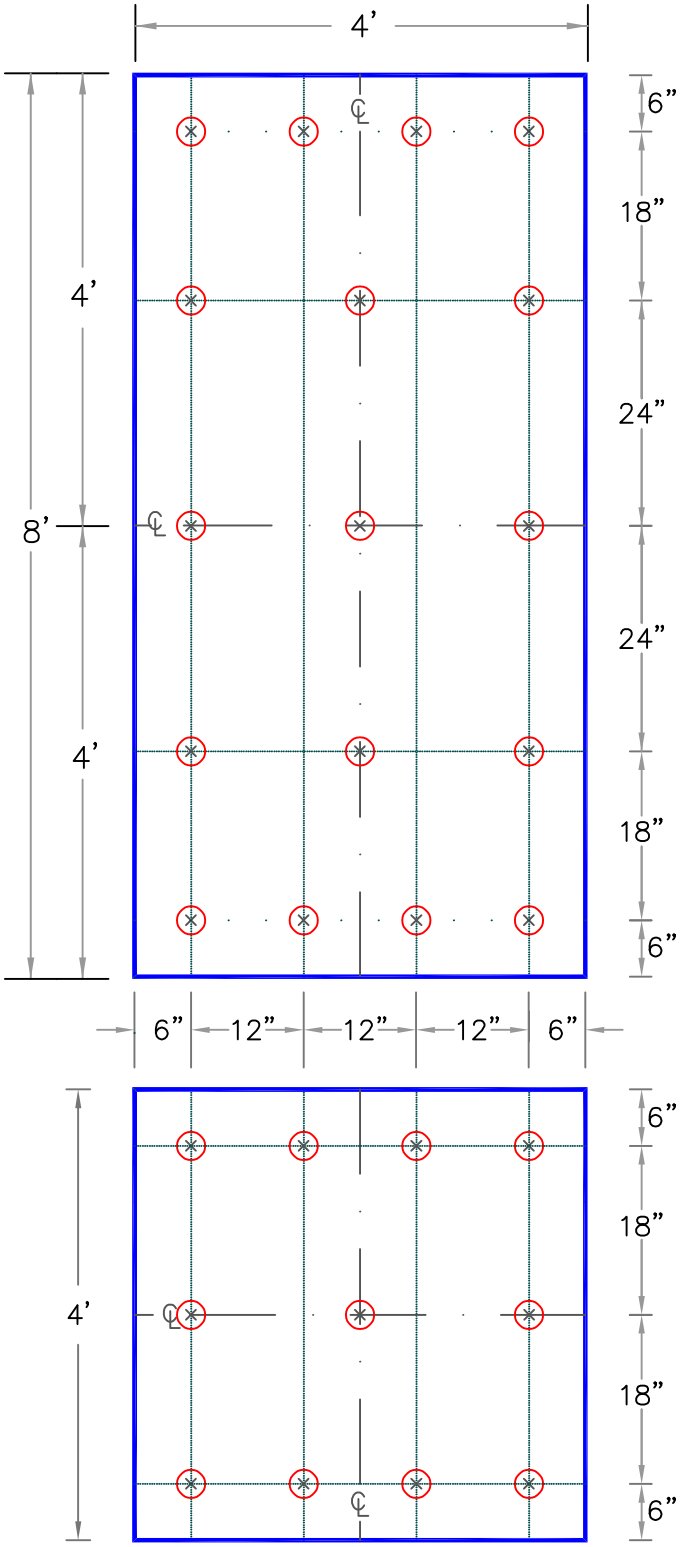
⊗ FASTENER & PLATE
℄ CENTER LINE
..... GUIDE LINE

5/8" THICK SECUROCK, DENS DECK PRIME DENS DECK STORMX PRIME OR STORMBASE POLYISO

For additional information, refer to Specifications



DETAIL NO.
A–27E
ADHERED SYSTEM



NOTES:

1. WHEN ENHANCED FASTENING IS REQUIRED AS PRESCRIBED IN FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1–29, ANSI/SPRI WD–1 OR MIAMI–DADE COUNTY, REFER TO CARLISLE'S DESIGN REFERENCE DR–05.
2. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
3. IF A WIND SPEED WARRANTY GREATER THAN 55 MILES PER HOUR (25 METERS PER SECOND) OR A WARRANTY TERM GREATER THAN 20–YEARS IS SPECIFIED OR FOR SYSTEMS OVER 50'(15METERS), ADDITIONAL FASTENING MAY BE REQUIRED, REFER TO CARLISLE SPECIFICATIONS.
4. OSB (ORIENTED STRAND BOARD) MUST BE POSITIONED WITH AN 1/8" (0.5m) GAP BETWEEN BOARDS.
5. WHEN SPECIFIED, JOINTS IN OSB (ORIENTED STRAND BOARD) MUST BE STAGGERED WITH JOINTS IN INSULATION BELOW.

FEET TO CENTIIMETERS	
4’	8’
120	250

	INCHES TO CENTIMETERS																			
inch	1/8”	1/4”	15/32”	1/2”	5/8”	3/4”	1”	1.5”	2”	2.5”	3”	4”	6”	8”	9”	11”	12”	18”	24”	36”
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE

OSB SHEATHING ATTACHMENT

For additional information, refer to Specifications

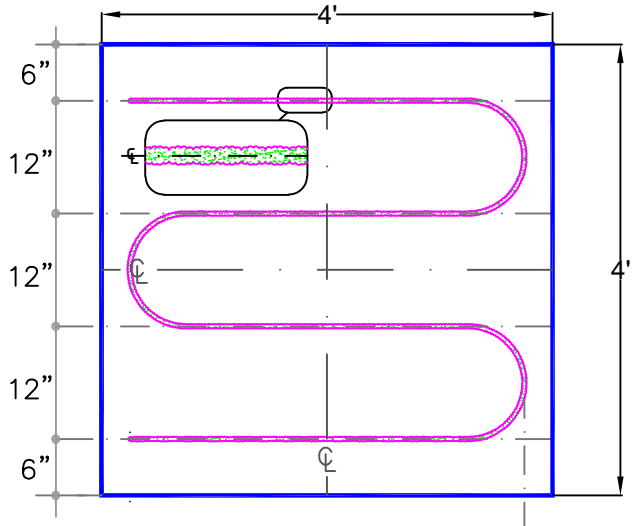
DETAIL NO.
A–27F
ADHERED SYSTEM

ATTACHMENT DETAILS — INSULATION/ COVER BOARD

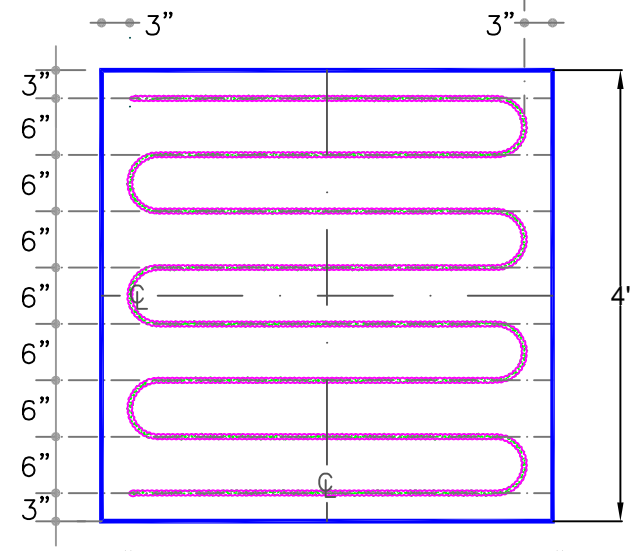
NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR PRODUCT DATA SHEETS FOR APPROPRIATE BEAD SPACING BASED UPON THE BUILDING HEIGHT, WARRANTY TERM AND ACCEPTABLE SUBSTRATE.
2. THE SURFACE TO WHICH ADHESIVE IS TO BE APPLIED SHALL BE DRY, FREE OF FINS, PROTRUSIONS, SHARP EDGES, LOOSE AND FOREIGN MATERIALS, OIL AND GREASE. AREA SHOULD BE CLEANED WITH AN AIR BLOWER.
3. PREVIOUSLY UNEXPOSED ASPHALT OR RESIDUE MUST BE PRIMED WITH CARLISLE CAVGRIP, 702 OR 702LV PRIMER.
4. SEAL ALL GAPS IN THE CONCRETE DECK WITH CARLISLE 725TR OR OTHER SUITABLE MATERIAL TO AVOID CONDENSATION ISSUES OR FILL WITH CARLISLE INSULATION ADHESIVE.
5. AT THE BEGINNING OF THE INSULATION ATTACHMENT PROCESS AND PERIODICALLY THROUGHOUT THE DAY, CHECK THE ADHESION OF BOARDS TO ENSURE A TIGHT BOND IS CREATED AND MAXIMUM CONTACT IS ACHIEVED.
6. ALL BOARDS SHOULD BE IMMEDIATELY WEIGHED DOWN AT CORNERS & CENTER. SLIT THE BOARD TO CONFORM TO THE CONTOURS OF THE SUBSTRATE AS NEEDED.

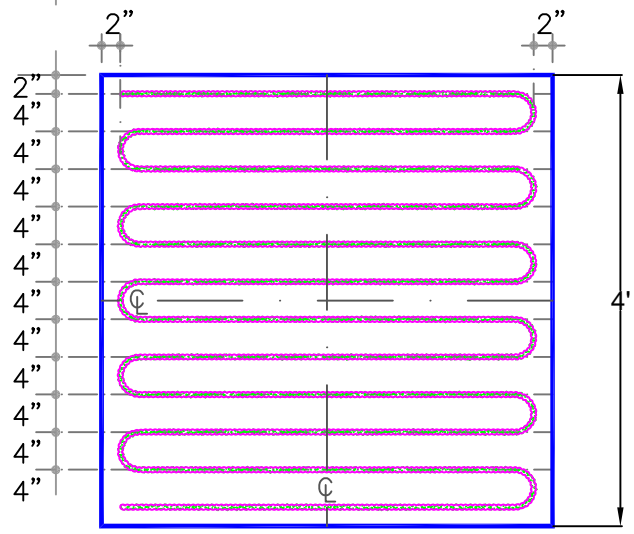
12" BEAD SPACING



6" BEAD SPACING



4" BEAD SPACING



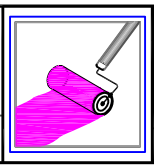
FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE
FOAM ADHESIVE

INSULATION/ COVER BOARD ATTACHMENT USING BEAD ADHESIVE

For additional information, refer to Specifications



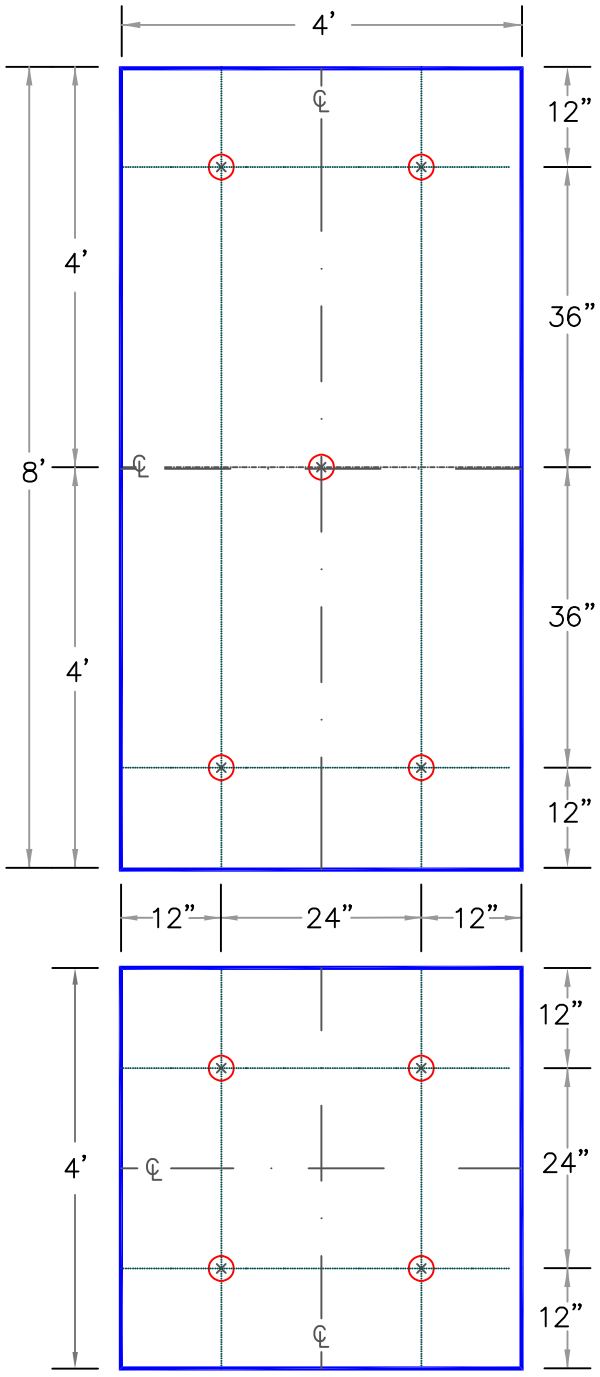
DETAIL NO.

A-27G

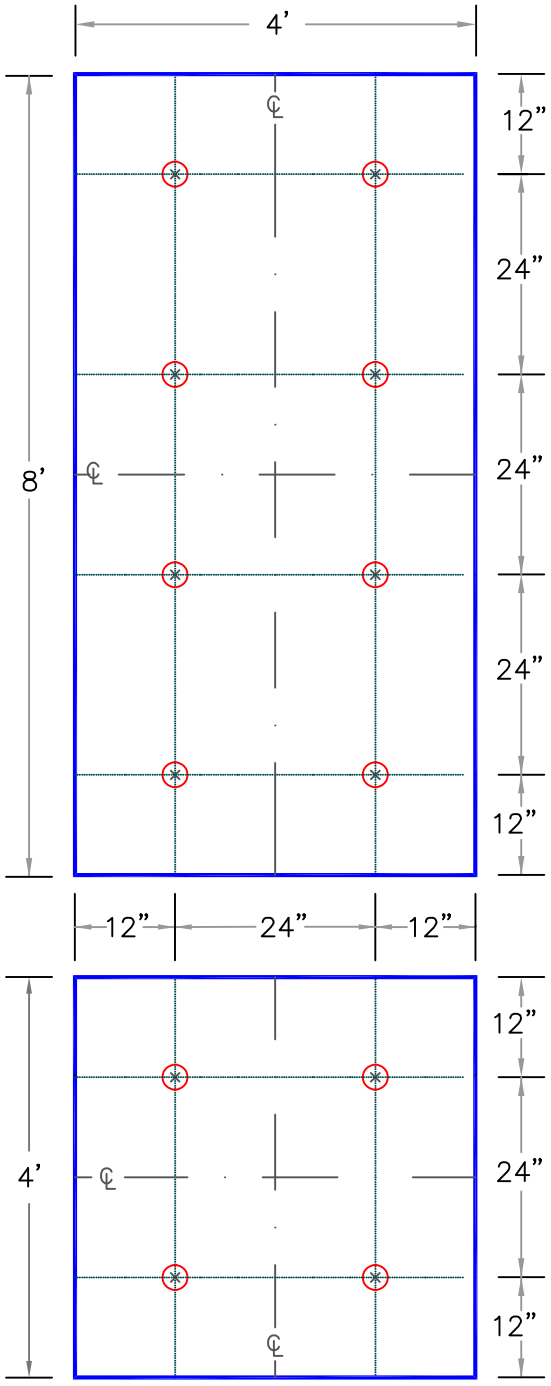
ADHERED SYSTEM

ATTACHMENT DETAILS — INSULATION/ COVER BOARD

NEW CONSTRUCTION OR RE-ROOF/TEAR OFF PROJECTS WITH SECUROCK, DENS-DECK, HP RECOVERY BROAD OR ANY CARLISLE APPROVED INSULATION MIN 1-1/2" (40mm) THICK



RE-ROOF/NO TEAR OFF PROJECTS WITH POLYISOCYANURATE LESS THAN 1-1/2" (40mm) THICK



NOTES:

1. FOR CRITERIA ON INSULATION FASTENERS AND PLATES, REFER TO CARLISLE SPECIFICATIONS.
2. 25 AND 30-YEAR WARRANTY PROJECTS REQUIRE COMPLETE TEAR OFF.

FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ —— FASTENER & PLATE

℄ —— CENTER LINE

GUIDE LINE

FOAM ADHESIVE

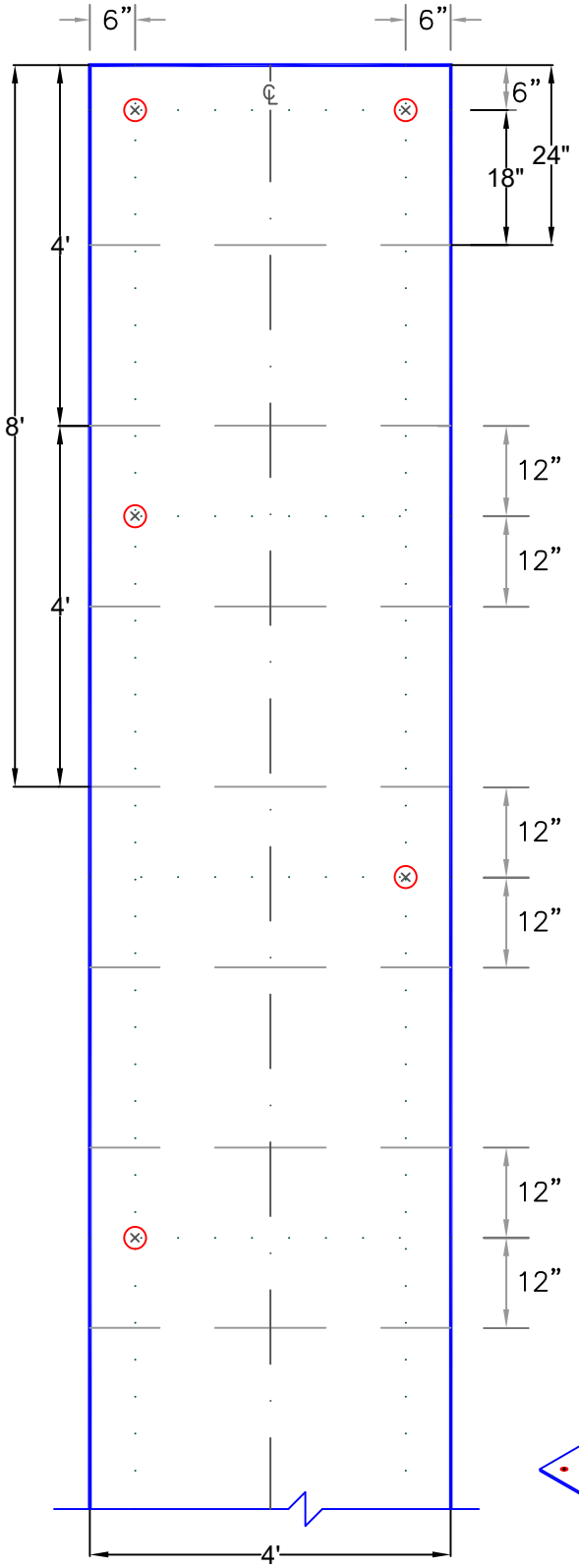
INSULATION/COVER BOARD ATTACHMENT FOR ALL WARRANTY DURATIONS

For additional information, refer to Specifications

DETAIL NO.

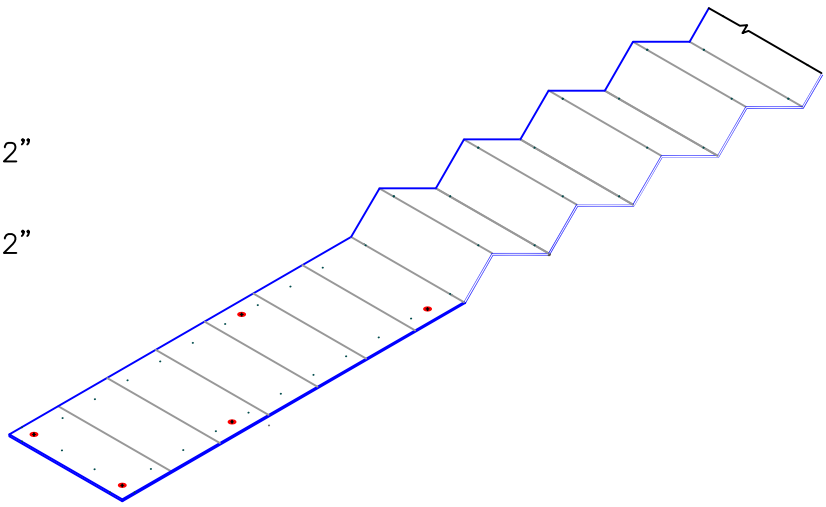
MF-27

MECHANICALLY FASTENED



NOTES:

1. INSTALL R–TECH RECOVER BOARD WITH CONTINUOUS SIDE JOINTS AND END JOINTS STAGGERED SO THEY ARE OFFSET BY A MINIMUM OF 12" (305mm) FROM THE END JOINTS IN ADJACENT ROWS.
2. INSULATION SHOULD ABUT TIGHTLY AGAINST ADJACENT BOARDS.
3. IF R–TECH FANFOLD RECOVER BOARD IS BEING INSTALLED OVER AN EXISTING LAYER OF INSULATION, ALL JOINTS MUST BE OFFSET A MINIMUM OF 6" (152mm) BETWEEN LAYERS.
4. FASTENERS SHOULD NEVER BE CLOSER THAN 6" (152mm) FROM THE EDGES OF THE BOARD.
5. CARE MUST BE TAKEN TO AVOID OVERDRIVING OR UNDER–DRIVING THE FASTENER AND PLATE ASSEMBLY.
6. METALLIC FACER PERMITS THE USE OF R–TECH RECOVER BOARD UNDER EPDM MECHANICALLY FASTENED ASSEMBLIES IN NORTHERN CLIMATES (CONTACT CARLISLE FOR ACCEPTANCE).



FEET TO CENTIIMETERS	
4'	8'
120	250

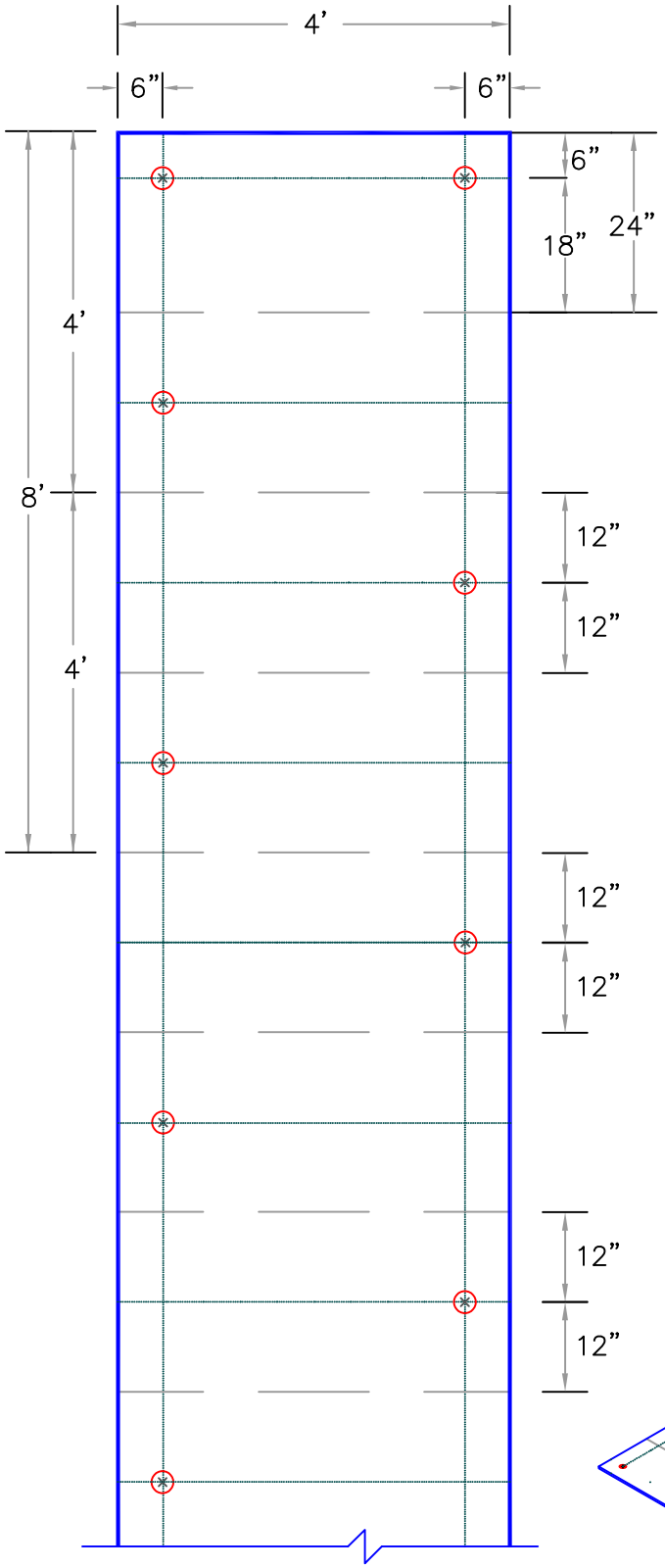
	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

FASTENER & PLATE
CENTER LINE
GUIDE LINE
FOAM ADHESIVE

R-Tech FANFOLD ROOF UNDERLAYMENT

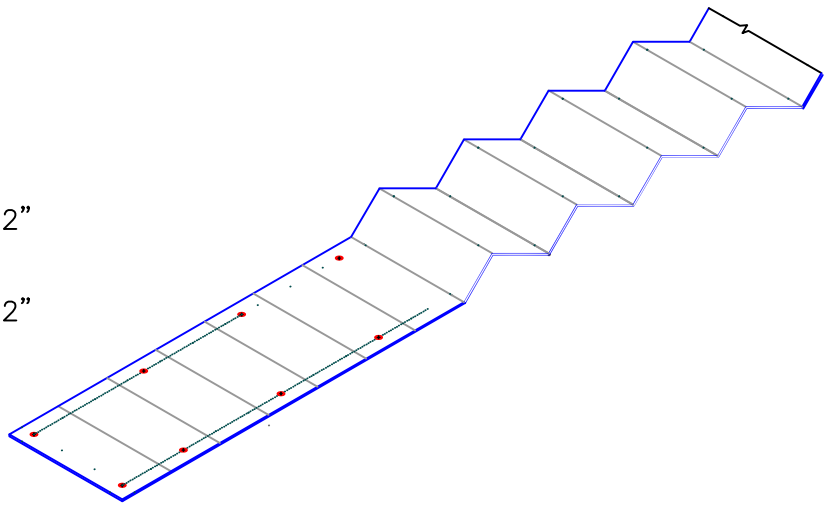
For additional information, refer to Specifications

DETAIL NO.
MF-27C
MECHANICALLY FASTENED



NOTES:

1. INSTALL R–TECH RECOVER BOARD WITH CONTINUOUS SIDE JOINTS AND END JOINTS STAGGERED SO THEY ARE OFFSET BY A MINIMUM OF 12" (30cm) FROM THE END JOINTS IN ADJACENT ROWS.
2. INSULATION SHOULD ABUT TIGHTLY AGAINST ADJACENT BOARDS.
3. IF R–TECH FANFOLD RECOVER BOARD IS BEING INSTALLED OVER AN EXISTING LAYER OF INSULATION, ALL JOINTS MUST BE OFFSET A MINIMUM OF 6" (15cm) BETWEEN LAYERS.
4. FASTENERS SHOULD NEVER BE CLOSER THAN 6" (15cm) FROM THE EDGES OF THE BOARD.
5. CARE MUST BE TAKEN TO AVOID OVERDRIVING OR UNDER–DRIVING THE FASTENER AND PLATE ASSEMBLY.
6. METALLIC FACER PERMITS THE USE OF R–TECH RECOVER BOARD UNDER EPDM MECHANICALLY FASTENED ASSEMBLIES IN NORTHERN CLIMATES (CONTACT CARLISLE FOR ACCEPTANCE).
7. FOR NON–FM ASSEMBLY REFER TO DETAIL MF–27C



FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

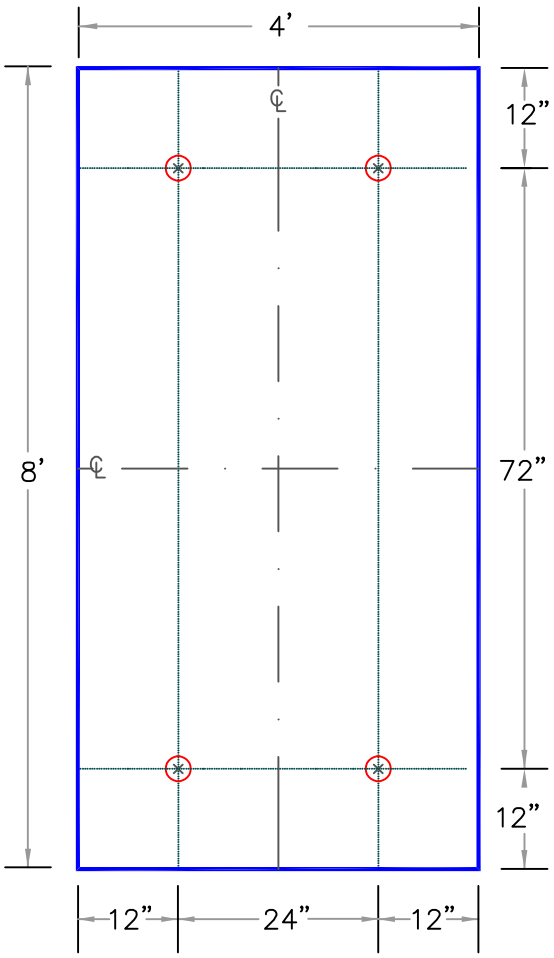
⊗ —— FASTENER & PLATE
℄ —— CENTER LINE
GUIDE LINE
FOAM ADHESIVE

R–Tech FANFOLD ROOF UNDERLAYMENT FOR FM ASSEMBLIES

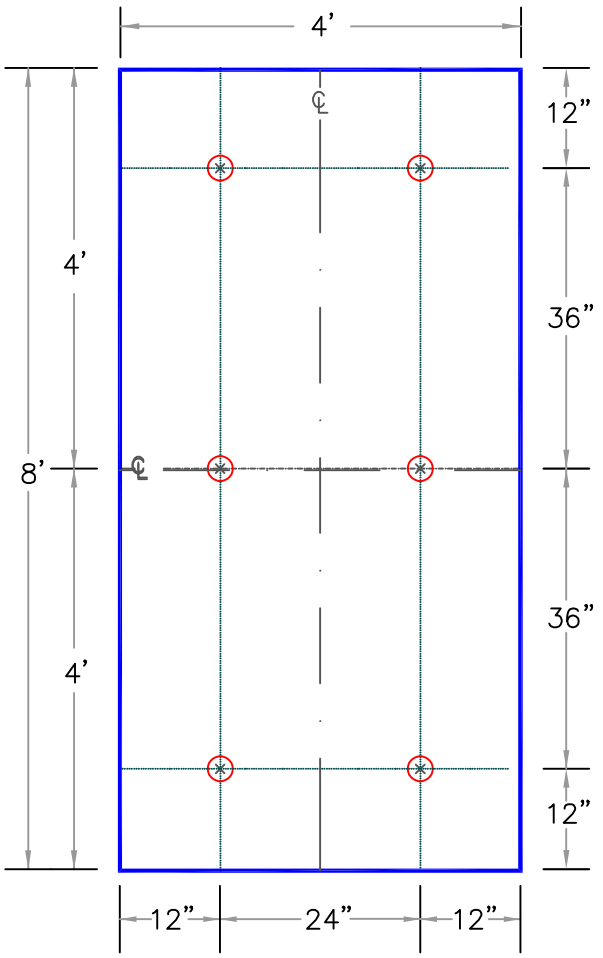
For additional information, refer to Specifications

DETAIL NO.
MF–27D
MECHANICALLY FASTENED

NEW CONSTRUCTION OR RE-ROOF/TEAR OFF PROJECTS WITH 1/2" SecurShield HD COATED GLASS FACER



NEW CONSTRUCTION OR RE-ROOF/TEAR OFF PROJECTS WITH 20 OR 25 PSI SecurShield ANY THICKNESS



FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE
℄ CENTER LINE
GUIDE LINE
FOAM ADHESIVE

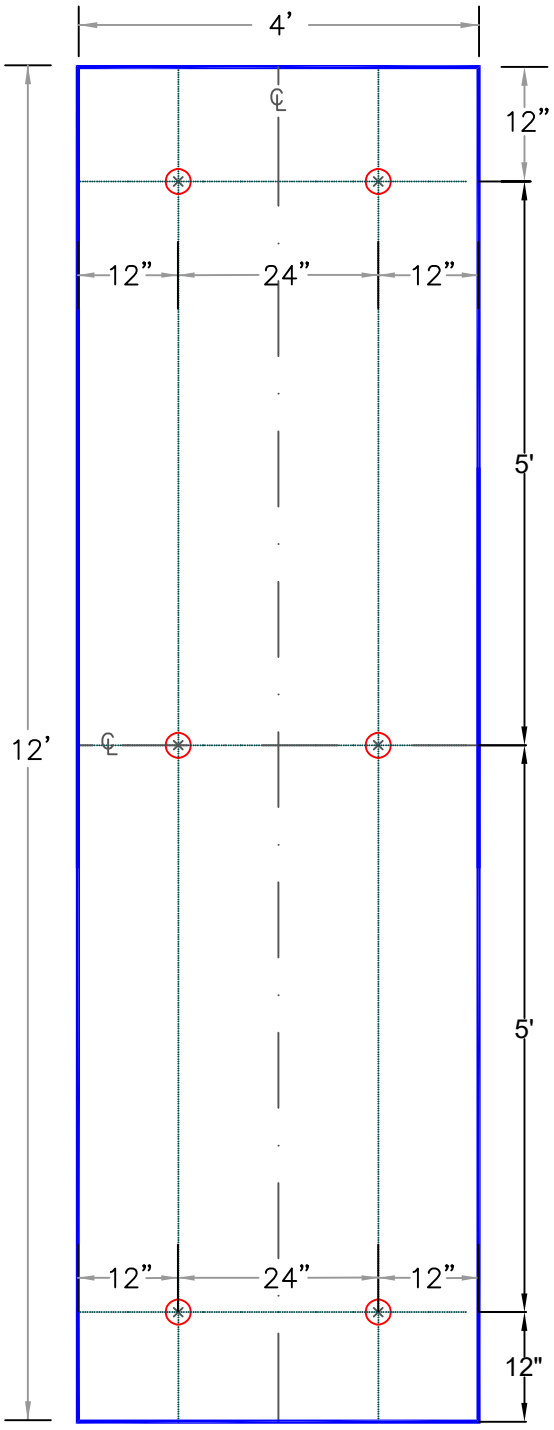
INSULATION/COVERBOARD ATTACHMENT WHEN USING SecurShield FAMILY PRODUCTS FOR ALL WARRANTIES LENGTHS

For additional information, refer to Specifications

DETAIL NO.
MF-27E
MECHANICALLY FASTENED

NEW CONSTRUCTION OR RE-ROOF/TEAR OFF PROJECTS WITH 1/2" SecurShield HD COATED GLASS FACER

UP TO 20-YEAR WARRANTY

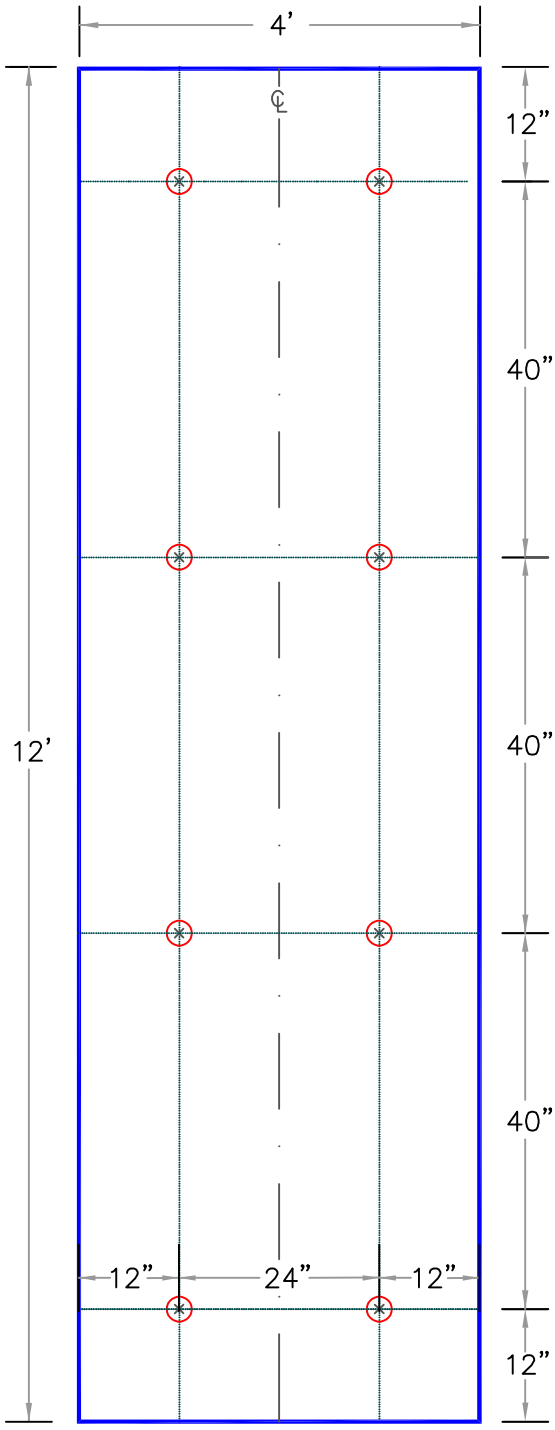


6 FASTENERS

NEW CONSTRUCTION OR RE-ROOF/TEAR OFF PROJECTS WITH 20 OR 25 PSI SecurShield ANY THICKNESS

25 / 30 YR. WARRANTY

RECOVER



8 FASTENERS

FEET TO CENTIIMETERS	
4'	8'
120	250

	INCHES TO CENTIMETERS																			
inch	1/8"	1/4"	15/32"	1/2"	5/8"	3/4"	1"	1.5"	2"	2.5"	3"	4"	6"	8"	9"	11"	12"	18"	24"	36"
cm	0.5	1	1.2	1.5	1.6	2	2.5	4	5	6.5	7.5	10	15	20	23	28	30	46	61	91

⊗ FASTENER & PLATE

℄ CENTER LINE

GUIDE LINE

INSULATION ATTACHMENT FOR ALL WARRANTY LENGTHS (12' BOARDS)

For additional information, refer to Specifications

DETAIL NO.

MF-27E.1

ADHERED SYSTEM

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturers Representative for any information, which has subsequently been made available.

CARLISLE'S SPEC SUPPLEMENT

G-10

Aqua Base 120 Bonding Adhesive

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

Aqua Base 120 Bonding Adhesive may be used as a one-sided, wet lay-in adhesive on horizontal surfaces with Sure-Seal, Sure-White or Sure-Weld FleeceBACK membranes. It can also be used as a two-sided contact adhesive with standard EPDM or TPO membranes.

NOTE: The use of Aqua Base 120 Bonding Adhesive to adhere FleeceBACK membrane directly to lightweight insulating concrete is not permitted.

A. General Cautions and Warnings

1. Review the applicable Safety Data Sheet for complete safety information prior to use.

2. This adhesive is designed to be applied when the ambient temperature is 40°F (4°C) and rising. Do not apply if ambient temperature will drop below 32°F (0°C) before adhesive dries. Do not allow to freeze. Do not store below 40°F (4°C).

3. **Extended drying times can be expected in cool, overcast, humid, shaded or late day applications. The adhesive must be dry to avoid permanent blisters from trapped moisture.**

4. Opened containers of Aqua Base 120 Bonding Adhesive should be used within 48 hours. The adhesive will form a thick surface skin that will not re-dissolve. Adhesive can be used once the skinned layer is removed.

5. Aqua Base 120 Bonding Adhesive is not acceptable over existing roof systems or decks with residual adhesive or asphalt. A porous substrate is required for Aqua Base to work properly.

6. Immediately roll the bonded portion of the sheet with a 30" wide, 150 lb segmented, weighted roller to achieve maximum contact. **Rolling is critical.**

7. When selecting an approved underlayment from the Table included in this specification supplement, the corresponding specification should be referenced to determine the acceptable underlayment attachment method.

8. Tables included in Warranty Section of the appropriate Roofing System Specification contain various fastening densities which shall be referenced.

B. **Warranty Considerations**

Projects incorporating the use of **Aqua Base 120 Adhesive are limited to warranties with peak gust wind speed coverage of 72 mph, see "Aqua Base Warranty Criteria" Table**. Carlisle may be contacted for projects where greater warranty coverage is required.

Aqua Base Warranty Criteria

Membranes	Membrane Adhesion Method	Warranty Duration	
		Up to 15 Year	20 Year Max
		Minimum Underlayments (1)	
(Non-Fleece) **EPDM and TPO**	**Two Sided Contact Method** (Adhesive applied to both surfaces)	1-1/2" (20-psi) Polyisocyanurate, SecurShield or SecurShield Eco	1-1/2" (20-psi) Polyisocyanurate, SecurShield or SecurShield Eco
		7/16" Oriented Strand Board (OSB) or 15/32" 5-Ply Plywood	7/16" Oriented Strand Board (OSB) or 15/32" 5-Ply Plywood
		1/2" SecurShield HD, SecurShield HD Eco or HD Plus	1/2" SecurShield HD, SecurShield HD Eco or HD Plus
		1/4" Securock (2)	1/2" Securock (2)
		Structural Concrete or Cellular Lightweight Concrete (3)	Structural Concrete or Cellular Lightweight Concrete (3)
FleeceBACK (EPDM and TPO)	**Wet Lay-in Method** (Adhesive applied to substrate only)	1-1/2" (20-psi) Polyisocyanurate, SecurShield, or SecurShield Eco (4)	1-1/2" (20-psi) SecurShield or SecurShield Eco (4)
		7/16" Oriented Strand Board (OSB) or 15/32" 5-Ply Plywood	7/16" Oriented Strand Board (OSB) or 15/32" 5-Ply Plywood
		1/2" SecurShield HD, SecurShield HD Eco or HD Plus (4)	1/2" SecurShield HD, SecurShield HD Eco or HD Plus (4)
		1/4" Securock (2)	1/4" Securock (2)
		Structural Concrete	Structural Concrete

(1) All Carlisle Products listed for higher duration coverage can also be used for Warranties for lower duration coverage. (i.e. 20 YR underlayment may be used for 15 YR underlayment).
(2) Application over insulation only.
(3) Over Vented Steel Deck
(4) FleeceBACK EPDM and water-based adhesives should not be used over coated glass facer.

C. **Application**

1. Stir the Aqua Base 120 Bonding Adhesive until settled material or phased liquid is redistributed and the adhesive is uniform in color.

2. Apply adhesive to the membrane and the substrate (at the recommended rate) in a uniform manner avoiding globs, puddles, and uncoated areas.

3. The typical application rate is approximately 100-120 ft^2 per gallon per finished surface. When using the Wet Lay-in Method, one coat is applied to the substrate at a rate of 100-120 ft^2/gal. When using the Two-sided Contact Method, one coat is applied to the membrane at a rate of 200-240 ft^2/gal AND another coat is applied to the substrate at a rate of 200-240 ft^2/gal (NOTE: Both methods result in the same adhered membrane square footage using the same rate of adhesive coverage rate). Refer to Product Data Sheet for additional information.

4. Application methods:

   a) Roller Application – Use a medium nap roller.

   b) Mechanical Roller Application – Follow the manufacturer's safety and use procedures.

   c) Mechanical Spray Application – Follow the manufacturer's safety and use procedures.

      1) Tip sizes between .017" to .025" in a Graco Ultra or Ultra Max II gun.

      2) A minimum fluid pressure of 2,500 psi is required for a fair pattern.

      3) Back rolling is recommended.

      4) Flush with water at the end of the day.

5. **Two-sided Contact Method** (Standard Membrane):

   a) Apply Aqua Base 120 Bonding Adhesive to the membrane and the substrate at the recommended rate.

      1) The adhesive must be allowed to dry until it turns translucent yellow and does not transfer to a dry finger touch or pull away from the membrane. The dried adhesive should remain tacky before assembly.

      2) Mate the membrane with the adhesive-coated substrate, while avoiding wrinkles.

      3) Immediately roll the bonded portion of the sheet with a 30" wide, 150 lb segmented, weighted roller to achieve maximum contact.

         CAUTION: Pay particular attention to rolling the membrane along the insulation joints due to the slight step-off of the facer. The adhesive contains no solvents to react with the membrane, and therefore rolling the sheet is critical.

         NOTE: Extended drying times can be expected in cool, overcast, humid, shaded or late day applications. The adhesive must be dry to avoid permanent blisters from trapped moisture.

      4) Coated areas exposed to moisture shall be allowed to dry and then recoated.

      5) All adhesive residues in the splice area must be removed.

b) **For vertical walls**, allow the wall flashing membrane relax and warm to minimize the natural tendency of the membrane to curl.

1) Apply a medium to heavy coat of adhesive to the wall first and then a standard coat to the flashing membrane and allow thorough drying. Adhesive will turn translucent yellow in color when dry.

CAUTION: Not allowing the adhesive to dry completely will result in poor adhesion strength or blisters occurring over time.

2) Mate the membrane with the adhesive-coated wall, while avoiding wrinkles.

3) Immediately broom the bonded portion of the sheet with a stiff-bristle push-broom and roll the membrane, starting in the angle change and working the membrane up the wall, using a 3"-wide "J" roller (preferred) to achieve maximum contact. Roll up from the base evenly and work in small sections gaining good attachment at the lower portions before moving up to the top of the membrane.

NOTE: Temporary pinning or taping the top membrane edge to the wall may be necessary to prevent membrane curl back until the termination detail can be completed.

6. **Wet Lay-in Method** (FleeceBACK Membrane)

a) Coat the substrate with Aqua Base 120 Bonding Adhesive and roll FleeceBACK 100-, 115- or 135-mil membrane into the wet adhesive.

1) Avoid heavy or thin application of adhesive. Immediately install the membrane while the adhesive is still wet. If adhesive has become translucent, recoat with additional adhesive.

CAUTION: Care must be taken with the "barn door" method of sheet installation to avoid dry (translucent) adhesive. Lift the membrane in a few areas to ensure adhesive is transferring to the fleece.

2) Roll with a 30" wide, 150 lb steel segmented roller to achieve maximum contact.

NOTE: Pay particular attention to rolling the membrane along the insulation joints due to the slight step-off of the facer. All adhesive residue in the splice area must be removed.

3) Cure rates are between 12-72 hours depending on porosity of substrate and weather conditions. Re-rolling within 24 hours may be necessary if the substrate is uneven or the sheet contains some fullness. Temporary weighting of the membrane may be necessary until the adhesive cures to address pronounced sheet fullness.

CAUTION: Do not use the FleeceBACK AFX membranes for the wet lay-in application.

b) **For vertical walls**, Coat the fleece backing and allow the adhesive to completely dry.

1) Test for dryness by pressing the back of a finger into the fleece to check that the adhesive is dry throughout the fleece layer.

2) Once the adhesive on the fleece is dry, apply a standard coat of adhesive to the

wall and a second coat to the fleece backing and allow to completely dry. Adhesive will turn translucent yellow in color when dry.

3) Mate the membrane with the adhesive-coated wall, while avoiding wrinkles.

4) Immediately broom the bonded portion of the sheet with a stiff-bristle push-broom or roll the membrane using a 3”-wide “J” roller (preferred) to achieve maximum contact.

   CAUTION: The fleece will develop a dry top surface while still holding moisture in the fleece and does require complete drying prior to the mating of the membrane to the wall substrate. Installing the membrane while the adhesive is still wet will trap moisture and cause blisters or loose membrane.

   NOTE: Extended drying times can be expected in cool, overcast, humid, shaded or late day applications. The adhesive must be dry to avoid permanent blisters from trapped moisture.

5) Coated areas exposed to moisture shall be allowed to dry and then recoated.

6) All adhesive residue in the splice area must be removed.

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturers Representative for any information, which has subsequently been made available.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S SPEC SUPPLEMENT

G-11

Metal Edging

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

Introduction

One of the leading causes of wind related disturbances is improperly designed, manufactured or installed metal fascia systems. Most of the time, shop fabricated metal accessories do not meet industry recognized standards.

Countless studies, many initiated by hurricanes, have pointed to metal edge components as a major contributor to roof failures. These components are vulnerable since the building edge is first hit, with winds and uplift pressures are always greatest at perimeters and especially roof corners.

General

When metal edging or coping is to be installed (particularly when shop fabricated), it is strongly advised that the design conforms with the Factory Mutual recommendations identified in Loss Prevention Data Bulletin 1-49 and with SMACNA (Sheet Metal and Air Conditioning National Association) specifications. To ensure such compliance, FM 1-90 approved metal edge systems should be specified.

The securement of perimeter wood nailers, play an equally important role in the overall performance of metal fascia systems. Design Criteria for the attachment of wood nailers and associated metal edge components are identified in the FM 1-49 Bulletin and summarized in the **Design Reference DR-08 "Wood Nailers and Securement Criteria".** This information should be referenced when selecting an appropriate attachment method.

Often metal edging costs are solely judged on the material linear foot cost alone. Significant savings can be realized when closer attention is given to overall installed costs, where labor and associated material savings are factored in. Edge systems that minimize flashing material and reduce installation time can be of significant benefit when looking at overall roof edge costs. Products reusability (for the purpose of repairs and eventual roof replacement) is also seldom accounted for, although the owner can recognize overall life cycle cost savings if properly evaluated.

Carlisle Edging/Coping

Carlisle supplies a wide range of metal fascia systems which meet the ES-1 design guidelines and carry FM Class 1-90 approval or greater. Carlisle's metal edging is also covered by the Carlisle Membrane System Warranty. Contact Carlisle for detailed information concerning available pre-fabricated metal edging and coping.

Pre-Fabricated Edgings and Copings

1. **SecurEdge 200 Fascia**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar® 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI/FM-4435 ES-1 certified.

2. **SecurEdge 300 Fascia System**: A snap-on edge system consisting of a 24 gauge galvanized metal spring clip water dam and 50 or 63-mil thick aluminum Kynar 500, colored anodized finish or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 10". Custom fascias and colors are available upon request. ANSI/SPRI/FM-4435 ES-1 certified.

3. **SecurEdge 2000 Fascia:** An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 2000 Extended Fascia** (Up to 13" Face Height) and **SecurEdge 2000 Canted Fascia**.

4. **SecurEdge 3000 Roof Edge System:** A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 32, 40, 50 or 63-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 3000XT Roof Edge System** (Up to 13" Face Height) with an extruded aluminum retainer bar for added performance.

5. **SecurEdge 4000 HP Fascia:** A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 40-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI/FM-4435 ES-1 certified (up to 8" face height).

6. **SecurEdge One Fascia System:** A snap-on edge system consisting of a 20 gauge steel or 50-mil aluminum retainer bar, corrosion resistant fasteners and a 24 gauge or 40, 50 or 63-mil Kynar finished aluminum fascia cover. Available in face sizes up to 8". ANSI/SPRI/FM-4435 ES-1 certified.

7. **SecurEdge 200 Coping:** A snap-on coping system that incorporates 20 gauge anchor cleats with pre-slotted holes, a concealed joint cover and 10' or 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 200 Gold Coping** with 16 gauge anchor cleats for added performance and **SecurEdge 200 Cantilever Coping** for parapet walls with a non-structural exterior building facade.

8. **SecurEdge 300 Coping:** A snap-on coping system that incorporates 20 gauge anchor cleats with pre-slotted holes, a concealed joint cover and 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 300 Plus Coping** with 16 gauge anchor cleats for added performance.

9. **SecurEdge 400 Coping:** two-piece assembly that consists of a continuous cleat and a decorative snap-on coping cover. This product features two cleat options: a 22-gauge (G90) pre-punched continuous cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched continuous cleat with fasteners spaced at 12" on center. SecurEdge 400 Coping is offered in 10' cleat and coping cover lengths.

10. **SecurEdge 400 Spring-Tite Gravel Stop:** is a three-piece assembly that consists of a continuous cleat, spring-stop, and decorative snap-on Gravel Stop cover. This product is available in 10' standard lengths, and features a 22-gauge (G90) continuous cleat with pre-punched slotted holes for fasteners at 12" on center. Concealed splice plates and fasteners are included with purchase.

11. **SecurEdge 400 Snap Lock Gravel Stop**: is a two-piece assembly that consists of a continuous cleat and a decorative snap-on Gravel Stop cover. This product features two cleat options: a 22-gauge (G90) pre-punched cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched cleat with fasteners spaced at 12" on center. SecurEdge 400 Snap Lock Gravel Stop is offered in 10' standard cleat and coping cover lengths.

12. **SecurEdge One Coping:** A mechanically fastened coping system consisting of a 22 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Available for wall thicknesses up to 12". ANSI/SPRI/FM-4435 ES-1 Certified.

13. **SecurSeal 200/300/400 Drip Edge:** Designed for use on Adhered and Mechanically Fastened Roofing Systems. Includes a 22 gauge continuous 12' pre-punched 90-degree angle cleat and 10' or 12' long fascia sections. Incorporates concealed joint covers and strong 1-1/4" ring shank nails to provide long-term holding power. A selection of colors in 24 gauge steel, Kynar 500 and 32 or 40-mil aluminum finish or Kynar 500 is available. ANSI/SPRI/FM-4435 ES-1 Certified.

14. **SecurWeld™ Heat-Weldable Drip Edge:** Pre-fabricated PVC or TPO-coated metal edging. Heat-weld membrane directly to edge. Available in sizes up to 8" fascia height and in colors: white, gray or tan. Also available with factory-applied TPO or PVC flashing.

15. **SecurEdge Term Bar Fascia:** A 1.75" wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040" aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12' lengths for fewer joints/seams, fewer sections to handle and faster installation.

Carlisle Metal Edging			
Product	**Type**	**FM Approval**	**ES-1 Compliant**
SecurEdge 4000 HP	Coping	-	Yes
SecurEdge 4000 HP	Fascia	-	Yes
SecurEdge 400 Spring-Tite	Coping	-	Yes
SecurEdge 400	Coping	-	Yes
SecurEdge 400 Spring-Tite	Fascia	-	Yes
SecurEdge 400 Snap Lock	Fascia	-	Yes
SecurEdge 300	Coping	1-90 (20 ga cleat)	Yes
SecurEdge 300	Fascia	1-135	Yes
SecurEdge 3000	Fascia	1-135	Yes
SecurEdge 3000XT	Fascia	1-135	Yes
SecurEdge 200	Coping	1-90	Yes
SecurEdge 200	Fascia	1-150	Yes
SecurEdge 2000	Fascia	1-225	Yes
SecurEdge 2000	Extended Fascia	1-135	Yes
SecurEdge 2000	Canted Fascia	1-105	Yes
SecurEdge One	Fascia	1-120	Yes

Shop Fabricated Edging

Supplied by Carlisle

A. **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. Coated metal is available in sheets 4' x 10' and comes packaged 25 sheets per pallet (also available packaged 10 sheets per pallet on a direct ship basis). Available in white, gray or tan.

B. **Sure-Flex PVC Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 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.

C. **Carlisle PVDF (Kynar) Coated Metal:** Galvalume steel or 3000 series Aluminum sheet coated with a PVDF (Kynar) finish. The sheet is cut to the appropriate width and used to fabricate metal coping or roof perimeter fascia profiles. Carlisle metal flat sheets are available in 31 colors in 4’x10’ sheets. Mill finish aluminum, anodized aluminum and bare G90 steel are available.

Shop Fabricated Edging Requirements

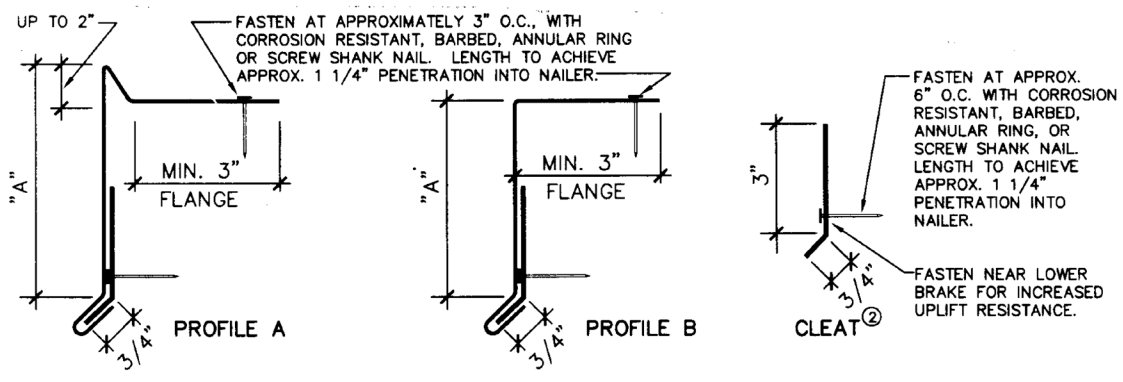
A. Shop Fabricated Metal Edging and Coatings must comply with SMACNA standards and design parameters outlined in the NRCA Waterproofing Manual. For ES-1 compliance, third-party testing of any fascia or coping detail should be conducted and documented per ANSI/SPRI/FM-4435 ES-1 parameters.

Guide for Sheet Metal Fascia Edges

Reprinted from the NRCA Roofing and Waterproofing Manual
Refer to latest edition for additional information

Recommended Minimum Gauges for Fascia and Cleat[1]				
Exposed Face Without Brakes "A" Dimension	Aluminum Alloy (3003-H14)	Galvanized or Coated (G60 & G90) Steel	Stainless Steel (302 & 304)	Cleat[2]
Up to 3" Face	.032"	24 ga.	26 ga.	Same gauge as fascia metal
3" to 6" Face	.040"	24 ga.	24 ga.	One gauge heavier than fascia metal
6" to 8" Face	.040"	24 ga.	24 ga.	One gauge heavier than fascia metal
8" to 10" Face	.050"	22 ga.	22 ga.	One gauge heavier than fascia metal
More Than 10"	Add brakes to stiffen or use two-piece face	Add brakes to stiffen or use two-piece face	Add brakes to stiffen or use two-piece face	One gauge heavier than fascia metal

Recommended Profiles and Fastening for Fascia and Cleat[1]



Notes:

1. Consideration must be given to wind zone and local conditions in regard to the selection of metal gauge, profile, and fastening schedule. Severe conditions or code and regulatory

bodies may require more conservative designs. When using the above table, additional items should be considered, such as fastening pattern.

2. All cleats shall be continuous with lengths not to exceed 12 feet. Allow a 1/4" gap between pieces. Joints in cleat should not coincide with joints in fascia metal.

3. Inclusion of shop fabricated metal edging in the Carlisle Membrane System Warranty is limited to warranties with a duration of 20 years or less and peak wind speed coverage of less than 80 mph.

CARLISLE'S SPEC SUPPLEMENT

G-12

Application Procedures for Carlisle's VapAir Seal MD Air and Vapor Barrier

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. General

1. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23' long (460 square feet).

2. **Carlisle CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal MD and various substrates. Coverage rate is approximately 2,000-2,500 sq. ft. per 40 lb cylinder and 4,000-5,000 sq. ft. per 85 lb cylinder as a primer, in a single-sided application.

3. **CCW 702 Primer and 702LV Primer (Low VOC)** - A single component, solvent based, high-tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., Dens-Deck Prime gypsum board). Available in 5-gallon containers. CCW 702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

4. **CCW 702 WB –** a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, Dens-Deck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW 702 WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

B. Approved Substrates

VapAir Seal MD Air and Vapor Barrier is specifically designed for direct application to fluted steel decks. It may also be used in conjunction with Carlisle's CAV-GRIP III on vertical wall

surfaces, such as structural concrete, gypsum, Securock, DensDeck Prime and plywood substrates.

CAUTION: Use of standard DensDeck is not recommended due to excessive primer absorption. When the use of standard DensDeck is specified, two coats of Carlisle Primer will be required along with a trial test to verify adequate adhesion of the Carlisle's VapAir Seal MD Air and Vapor Barrier.

C. **Limitations**

1. Do not apply primer or vapor barrier to frozen substrates. Best results are obtained when temperatures are above 40°F (4°C).

2. Carlisle's VapAir Seal MD Air and Vapor Barrier may be installed in temperatures as low as 10°F (-12°C) based on the following criteria:

   a. All materials (Vapor Barrier and Primer) must be stored in temperatures above 60°F (15°C) prior to installation.

   b. For best results, CAV-GRIP III primer should be applied to the metal deck to ensure proper adhesion during the roofing installation. CAV-GRIP III primer will allow for the shortest flash off time (approximately 5 minutes). **Note: The propellant in CAV-GRIP III will revert back to a liquid when the cylinder temperature falls below 45°F (7°C). If this occurs, simply warm the cylinder up above 60°F (15°C) and the propellant will revert back to a gas.**

   c. In temperatures below 40°F (4°C) priming the seams is recommended to ensure seam performance.

3. Do not apply primer or vapor barrier to damp or contaminated surfaces.

4. Carlisle's VapAir Seal MD Air and Vapor Barrier is not recommended for use over sealants containing coal tar or polysulfides. If these materials are present, they must be removed and the surfaces thoroughly cleaned.

D. **Installation**

1. **Surface Preparation**: The surface shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, laitance and form release agents. In the event of rain, concrete must be allowed to dry before primer is applied.

2. **Primer**: Non-metal surfaces to receive VapAir Seal MD must be clean and dry. Prime with CAV-GRIP III, CCW 702, 702LV or CCW WB Primer. Apply Primer by spray, brush or with a long nap roller at the applicable coverage rate noted above. At 75°F allow 702, 702LV and 702WB primer to dry 75 minutes minimum. Primer has a satisfactory cure when it will not transfer when touched. Prime only areas to be waterproofed the same day. At 75°F allow CAV-GRIP III primer to dry approximately 5 minutes minimum. Re-prime if area becomes dirty.

3. **Application**: Apply VapAir Seal MD Air and Vapor Barrier to the metal deck from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at lease 2-1/2". End laps shall be staggered. Place either a 6" wide section of 24 gauge sheet metal or a 6" wide section of VapAir Seal MD directly on the metal under each end lap, perpendicular to the end lap, to ensure a solid surface to roll the end lap together. Seams and end laps must be rolled with a 2" seam roller or stand-up seam roller. Place

membrane carefully so as to avoid wrinkles and fish mouths. Immediately after installation, broom the sheet to ensure proper contact to the metal.

a. Apply a bead of lap seal should be applied at the interior of all T-Joint intersection. Please refer to applicable Carlisle Details.

4. **Repairs**: Following application, inspect VapAir Seal MD membrane for tears, punctures, fish mouths, air bubbles and voids due to misalignment at seams. Remove damaged membrane. Prime exposed substrate and allow primer to dry. Apply a new section of VapAir Seal MD Air and Vapor Barrier to primed substrate, extending onto adhered membrane, 6" on all sides. With a seam roller; roll VapAir Seal MD repair section to ensure a proper seal. Slit fish mouths and overlap the edges.

5. **Insulation Installation**: Ensure surface of VapAir Seal MD Air and Vapor Barrier is dry prior to installing insulation. Place insulation over the surface and mechanically fasten to the roof deck accordance with this Carlisle Specification.

6. **Installation at angle changes**: To ensure proper installation, the vertical wall must me clean of debris and residual asphalt. Prime the vertical surface ensuring the primer extends a minimum of 2” above where the VapAir Seal MD meets the vertical wall. After installing the VapAir Seal MD, use a seam roller on the vertical surface to ensure contact to the wall. There are two options for applying the MD to the vertical surface:

   a. Option One: Apply the VapAir Seal MD up the vertical surface to the height of the insulation or a minimum of 2”.

   b. Option Two: Apply the VapAir Seal MD over the entire vertical surface ensuring the membrane extends over the top of the vertical surface and ties into exterior wall air barrier when applicable. Refer to applicable Carlisle details.

      Note: When utilizing option 2, mechanically fastened 1/2” SecurShield HD board, 1/2” SecurShield HD Plus board, 1/2” DensDeck, 1/2” Securock or 1/2” plywood over the VapAir Seal MD surface to ensure a solid substrate to adhere the roofing membrane.

7. **Angle Change**: The VapAir Seal MD should be applied to the vertical surface at a 90° angle and be adhered to a firm substrate. When a gap is present between the metal deck and the vertical surface, loose lay a 6” wide section of 24 gauge sheet metal at the angle change to ensure a solid surface for adhering the membrane. When the gap between the metal deck and vertical substrate is greater than 2”, install a section of insulation to fill in the gap prior to loose laying the 6” wide section of sheet metal.

8. **Details:** Proper details ensure the integrity of the Air and Vapor Barrier. Details must be completed using the following materials: VapAir Seal MD material, Pressure-Sensitive ElastoForm Flashing and VapAir Seal Foam Flashing. Please refer to applicable Carlisle details for penetrations and ties-ins.

This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information that has subsequently been made available.

Review the appropriate Carlisle Warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S SPEC SUPPLEMENT

G-13

LIQUISEAL Liquid Flashing

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and use of liquid flashing to complete tie-in details and flash unusual and round penetrations. In addition to the information contained herein, attachment details 1 through 3 are included to provide the Specifiers and Authorized Applicators with quick access to specific information. Specifiers and Authorized Applicators are advised to reference all applicable details included with this spec supplement.

A. General

LIQUISEAL Liquid Flashing is a two-component, polyurethane-based system which creates a reinforced, cold-applied liquid flashing that is compatible with all Carlisle EPDM, TPO, PVC, and KEE HP membranes. LIQUISEAL Liquid Flashing is designed for use with oddly shaped penetrations and tying together dissimilar roofing systems without building an isolation curb or impeding drainage. LIQUISEAL Liquid Flashing is UV- and color-stable, solvent-free, low-VOC, and virtually odorless.

LIQUISEAL Liquid Flashing consists of the following products:

1. LIQUISEAL Resin – Two-component polyurethane-based resin, when mixed will be white or gray in color. Available in 0.56 gallon (2.1 l) sachets and 1.03 gallon (3.9 l) pails. Coverage rate of 13.6 square feet (1.26 meters square) per gallon (3.8 l).
2. LIQUISEAL Fleece – 50-mil thick, white, Non-woven, needle-punched polyester fabric reinforcement. Available in rolls of 13.8" (350 mm) and 27" (685 mm) widths by 164'-0" (50 m) length.
3. LIQUISEAL Metal Primer – A solvent-free, high solids, two-part, cold-applied polyurethane resin. Used to prime metal, EPDM, and other non-porous surfaces. Available in 0.25 gallon (0.9 l) sachets. Coverage rate of 25 square feet (2.3 square meters) per 0.25 gallon (0.9 l) sachet.
4. LIQUISEAL Concrete & Masonry Primer – A solvent-free, two-part, cold-applied liquid epoxy resin. Used with Surfacing Sand to prime concrete, masonry, and other porous surfaces. Available in 0.25 gallon (0.9 l) sachets and 1.1 gallon (4.2 l) pails. Coverage rate of 19 square feet (1.76 square meters) per 0.25 gallon (0.9 l) sachet.
5. LIQUISEAL Spiral Mixing Agitator – A 3" (7.62 cm) long steel spiral agitator with a 1/2" (1.27 cm) hex drive for use with handheld drills and mixers. Used to properly mix resin.
6. LIQUISEAL Surfacing Sand – Kiln-dried #00 - #35 graded sand suitable for broadcasting into LIQUISEAL Liquid Flashing Concrete & Masonry Primers for use in substrate preparation. Used with Concrete & Masonry Primer to promote proper adhesion and mechanical bond. Packaged in 50lb (22.6 kg) bags.

B. **Warranty**

Projects meeting the conditions below can be eligible for a maximum 20 year System Warranty with wind speed coverage up to 90 mph peak gusts. Projects requiring extended wind speed coverage warranty must be submitted to Carlisle for review prior to installation.

C. **Precautions**

1. Always store in a cool, dry location between 35 – 80°F (1.7– 27°C). Do not store in direct sunlight. Approximate shelf life is 12 months with proper storage. Best practice is to store material at 65 – 70°F (18 – 21°C) for 24 hours before use.

2. Do not install if ambient temperature is below 40°F (4°C) or above 90°F (32°C).

3. Do not break down work packs into smaller quantities; mix the entire work pack.

4. Prepare surfaces and pre-cut all fleece before mixing resin. Pot life will be shorter as ambient temperature rises.

5. Use appropriate safety glasses and protect hands and wrists by wearing gloves.

D. **Installation**

1. **Surface Preparation**: Prepare all substrates by removing any irregularities and any loose or foreign material such as dirt, water, grease, oil, lacquers, or release agents. Prepare membrane by sanding with 60-grit sandpaper.

2. **Metal Primer Application**:

   a. All metal surfaces must be prepared using a grinder. Do not use a wire brush. Ensure that all metal surfaces are ground down to expose bare metal.

   b. Use membrane cleaner to wipe clean.

   c. Remove bag from the aluminum packaging. Knead cream-colored resin (Component A) thoroughly until a uniform color is achieved.

   d. Pull away the rubber cord separating the two components so that Components A and B can be mixed together. Knead the bag quickly and thoroughly for approximately 1 minute so that a homogenous primer is formed. The primer should be a uniform color, with no light or dark streaks present.

   e. After the primer is mixed, cut off one corner of the bag and pour all primer into a clean, new mixing pail. Working quickly, apply approximately 25 square feet (2.3 square meters) per 0.25 gallon (0.9 l) sachet. The primer should be rolled or brushed evenly onto the surface in a cross-directional method to fully cover the substrate in one application. Allow to set for approximately 3 hours or until fully cured prior to application of the LIQUISEAL Liquid Flashing Resin.

      Note: LIQUISEAL Liquid Flashing Resin must be applied when the primer is completely dry and without tack. Do not apply LIQUISEAL Liquid Flashing Resin to tacky or wet primer.

3. **Concrete & Masonry Primer Application**:

   a. Prepare all substrates by removing any irregularities and any loose or foreign materials such as dirt, water, grease, oil, lacquers, or release agents using a grinder. All concrete substrates should be dry and fully cured.

b. Remove bag from the aluminum packaging. Knead translucent yellow resin (Component A) thoroughly until a uniform color is achieved.

c. Pull away the rubber cord separating the two components so that Components A and B can be mixed together. Knead the bag quickly and thoroughly for approximately 1 minute so that a homogenous primer is formed. The primer should be a uniform color, with no light or dark streaks present.

d. After the primer is mixed, cut off one corner of the bag and pour all primer into a clean, new mixing pail. Working quickly, apply at a rate of approximately 19 square feet (1.76 square meters) per 0.25 gallon (0.9 l) sachet. The primer should be rolled or brushed evenly onto the surface in a cross directional method to fully cover the substrate in one application.

e. After applying the primer, immediately broadcast LIQUISEAL Liquid Flashing Concrete & Masonry Preparation Sand into the uncured primer at the approximate rate of 50 lbs (22.6 kg) per 100 square feet (9.29 square meters). Allow to set for approximately 4 hours or until fully cured prior to application of the LIQUISEAL Liquid Flashing Resin.

f. In warm climates, higher contents of moisture or vapor within a concrete substrate may cause pin-holing of the primer due to vapor drive. Applying primer later in the day when temperatures are lower can improve this condition.

Note: LIQUISEAL Liquid Flashing Resin must be applied when the primer is completely dry and without tack. Do not apply LIQUISEAL Liquid Flashing Resin to tacky or wet primer.

4. **LIQUISEAL Liquid Flashing Application**:

a. Apply the appropriate primer to membrane and allow to flash off. Apply appropriate primer to all other surfaces to which flashing will be applied.

b. Cut and prepare all reinforcing fleece before mixing resin.

1) For LIQUISEAL Resin in 1.03 gallon (3.9 l) Pail Packaging

a) Mix resin (Component A) with a clean spiral agitator until the liquid is a uniform white or gray color.

b) Add hardener (Component B) to Component A and mix with a spiral agitator for 2 minutes or until both liquids are thoroughly blended.

2) For LIQUISEAL in 0.25 gallon (0.9 l) Sachet Packaging

a) Remove bag from the aluminum packaging.

b) Knead white or gray resin (Component A) thoroughly until a uniform color is achieved.

c) Pull away the rubber cord separating the two components so that Components A and B can be mixed together. Knead the bag quickly and thoroughly for approximately 1 minute so that a homogenous resin is formed. The resin should be a uniform color, with no light or dark streaks present.

d) After the resin is mixed, cut off one corner of the bag and pour entire sachet of resin into a clean, new mixing pail. Working quickly, apply at a rate of approximately 13.6 square feet (1.3 square meter) per gallon (3.8 l).

c. Using a nap roller or brush, apply two-thirds of the resin evenly onto the substrate using even strokes.

d. Roll the LIQUISEAL Liquid Flashing Fleece directly into the LIQUISEAL Liquid Flashing Resin, ensuring that the SMOOTH SIDE IS FACING UP (natural unrolling procedure) and avoiding folds, wrinkles, and air pockets.

e. Apply the remaining one-third of the resin and use the roller or brush to work the resin into the fleece, saturating from the bottom up. All areas of the fleece should be completely saturated with resin.

f. Repeat steps ‘b through e’ again for subsequent layers of resin and flashing as needed for detailing.

E. **Associated Installation Details**

Notes:

1. The following tables provide recommendations for preparation and priming of substrates and should be used as a guideline for proper adhesion & performance.

2. The primer application rate will vary and should be adjusted depending on the substrate. See Product Data Sheets, SDS, Guide Specifications and Details for complete information regarding the suitability, application and handling of products.

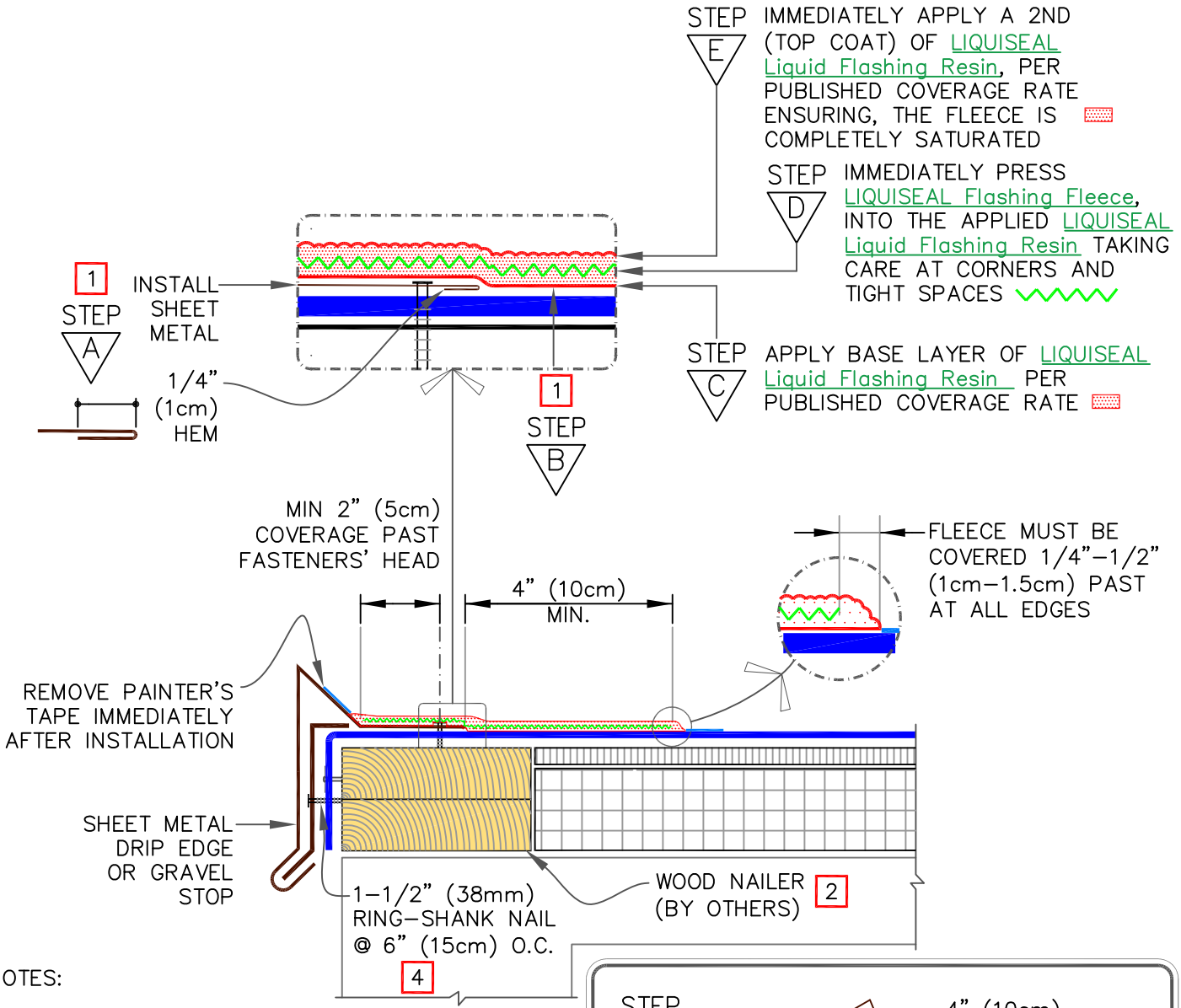
INSPECTION		EPDM	TPO	PVC / KEE HP	METAL SURFACES	MASONRY
A.1	Inspect insulation for wet conditions underneath the roof membrane. Remove & replace wet materials underneath to match in kind.	Y	Y	Y		
A.2	Ensure, membrane or roof assembly is properly secured.	Y	Y	Y		
A.3	Provide additional securement at the base of penetrations, tie–ins or angle changes per details.	Y	Y	Y		
A.4	Ensure, there is no standing water. Remove and dry the work area. Remove dust, debris and wipe the work surfaces clean. Masonry must be completely dry and sound.	Y	Y	Y	Y	Y
A.5	Verify structural integrity of metal objects. Check for broken welds or loose bolts. Verify the thickness of exposed metal after removal of finishes or rust for strength.				Y	
A.6	Ensure, there is no moisture present in the substrate.	Y	Y	Y	Y	Y
A.7	Within the work area, inspect the seams of existing membrane for proper seal.	Y	Y	Y		
A.8	Do not damage structural members, welds or remove any nuts/bolts unless approved by designer.				Y	
CLEANING & SUBSTRATE PREPARATION		EPDM	TPO	PVC / KEE HP	METAL SURFACES	MASONRY
B.1	Use 60 grit sandpaper to rough up the top surface of the membrane.	Y	Y	Y		
B.2	Use abrasive grinding wheel (a diamond cup wheel is suggested) to expose the bare metal (do not use wire brush). Expose metal around nuts & tighten as needed. Wipe the membrane cleaner.				Y	Y
B.3	Remove dust, clean the surfaces with broom & power blower.	Y	Y	Y	Y	Y
B.4	Wipe the surfaces with Carlisle Membrane Cleaner, (Standard or Low VOC)	Y	Y	Y	Y	
B.5	Use painter's tape to contain flashing resin. Tape shall be set 1/4" to 1/2" (1–1.5cm) beyond the fleece edges.	Y	Y	Y	Y	Y
EXISTING BITUMINUOUS ROOFING SUBSTRATES					CONCRETE & MASONRY PRIMER	
C.1	Modified Bitumen Smooth APP Surfaced.	Power wash to remove contaminants.			Y	
C.2	Modified Bitumen Smooth SBS Surfaced.					
C.3	Bituminous Roofing – Granular Surfaced.	Power wash to remove contaminants & loose grannules				
C.4	Following bituminous substrates are not acceptable: Aluminum coating, flood coat & aggregate, coal tar pitch roofing – flood coat & aggregate, hot–melt bituminuous waterproofing & ethylene–faced bituminous (bituthane) roofing.					

METAL SUBSTRATES			METAL PRIMER
D.1	Bare aluminum, lead, copper & zinc.	Grind to remove corrosion, then use membrane cleaner to wipe and clean.	Ⓨ
D.2	Bare steel, galvanized steel.		
D.3	Black pipe, cast iron.	Grind to remove corrosion and coating. Then use membrane cleaner to wipe and clean.	Ⓨ
D.4	Stainless steel.	Grind to achieve rough surface. Then use membrane cleaner to wipe and clean.	Ⓨ
D.5	Kynar finish, ceramic coated, and painted metal.	Grind to remove coating. Then use membrane cleaner to wipe and clean.	Ⓨ
CEMENTITIOUS AND MASONRY SUBSTRATES			MASONRY PRIMER
E.1	Structural & or lightweight structural concrete.	Scarify, shot blast or grind to remove laitance and open up pores	Ⓨ
E.2	Granite, Marble.	Scarify, shot blast, grind to remove polished surface and open up pores	Ⓨ
E.3	Clay brick, terra cotta, tile.	Scarify, shot blast, grind to remove glazed surface and open up pores.	Ⓨ
E.4	Sandstone, limestone, synthetic stone.	Scarify, shot blast, grind to open up pores	Ⓨ
E.5	Porous/air–entrained concrete, concrete masonry block.		
E.6	Repair & leveling mortars.		
GLASS & PLASTIC SUBSTRATES			METAL PRIMER
F.1	Glass.	Sand to abrade surface. Then use membrane cleaner to wipe and clean.	Ⓨ
F.2	Acrylic.		
F.3	Fiberglass.		
F.4	ABS, PVC – Rigid.		

Note: Contact Carlisle SynTec for substrate not listed in these tables.

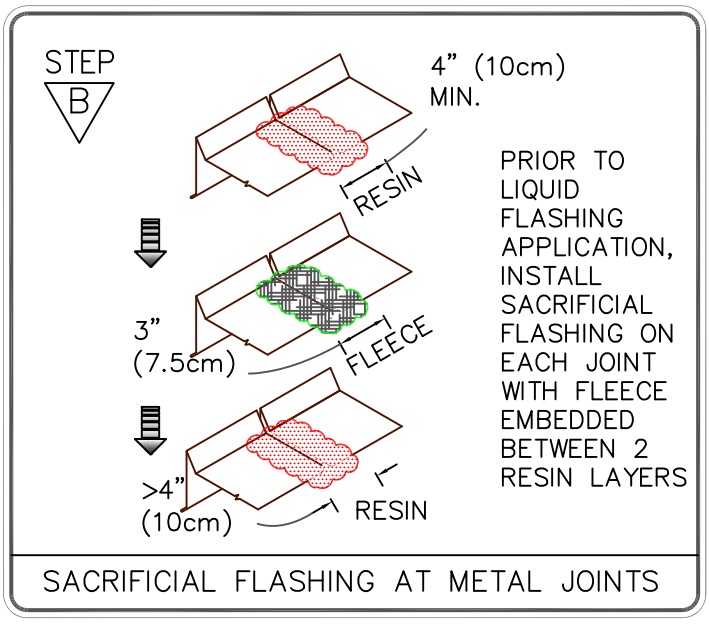
CAUTION:
All substrates must be prepared as necessary prior to the application of primers. Surfaces must be free from irregularities, loose, unsound or foreign materials such as rust, dirt, ice, snow, water, grease, oil, release agents, paint, lacquers, coatings, or any other conditions that would be detrimental to adhesion of the primer and resin.

LIQUISEAL PRIMER & RESIN APPLICATION		EPDM	TPO	PVC / KEE HP	METAL SURFACES	MASONRY
G.1	Ensure all surfaces are ready for application of primer prior to mixing, due to limited pot life.	Y	Y		Y	Y
G.2	Mix primer thoroughly, per specifications.	Y	Y		Y	Y
G.3	Apply LIQUISEAL Metal Primer per specifications.	Y			Y	
G.4	Masonry: Apply LIQUISEAL Concrete & Masonry Primer and surfacing sand per specifications.					Y
G.5	Wait for primer to cure per written instructions.	Y			Y	Y
G.6	Apply Low VOC Primer and allow to flash off completely.		Y			
G.7	Cut & dry–fit all fleece prior to mixing resin. Ensure, the fleece is set back from painter's tape, per B.5.	Y	Y	Y	Y	Y
G.8	Mix LIQUISEAL Flashing Resin thoroughly (with spiral agitator if in pail).	Y	Y	Y	Y	Y
G.9	Apply a base layer of LIQUISEAL Flashing Resin ensuring generous coverage of entire substrate.	Y	Y	Y	Y	Y
G.10	Immediately press LIQUISEAL Flashing Fleece into the applied LIQUISEAL Flashing Resin. taking care at corners and crevices.	Y	Y	Y	Y	Y
G.11	Apply a 2nd (top coat) of LIQUISEAL Flashing Resin ensuring the fleece is completely saturated per published coverage rate.	Y	Y	Y	Y	Y



NOTES:

1. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF SHEET METAL FLANGE.
3. SAME DETAIL APPLIES AT THE TOP OF PARAPET WALL, WHERE FULL COPING IS NOT USED.
4. FASTENERS MUST BE SECURED INTO STRUCTURAL MEMBERS, E.G., CONCRETE, SOLID MASONRY OR WOOD BLOCKING.
5. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.



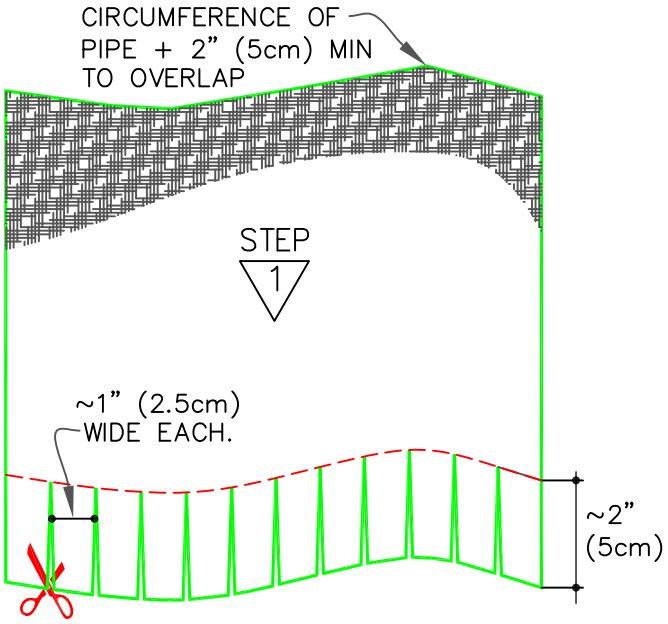
SACRIFICIAL FLASHING AT METAL JOINTS

ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

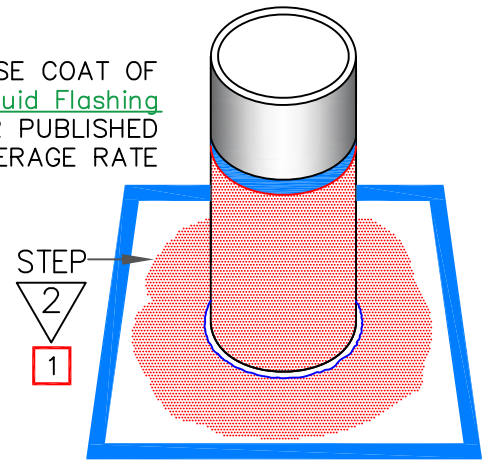
SHEET METAL DRIP EDGE OR GRAVEL STOP FLASHING

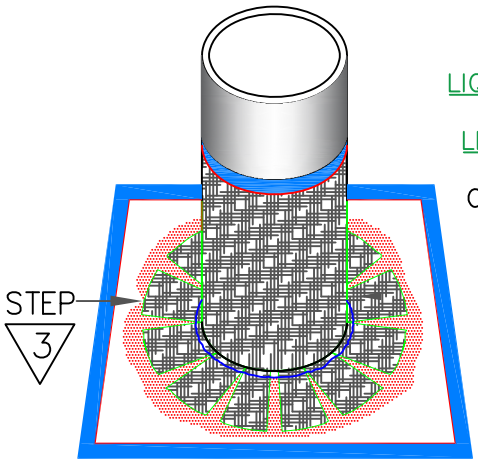
For additional information, refer to Specifications

DETAIL NO.
LF–1.1
LIQUID FLASHING

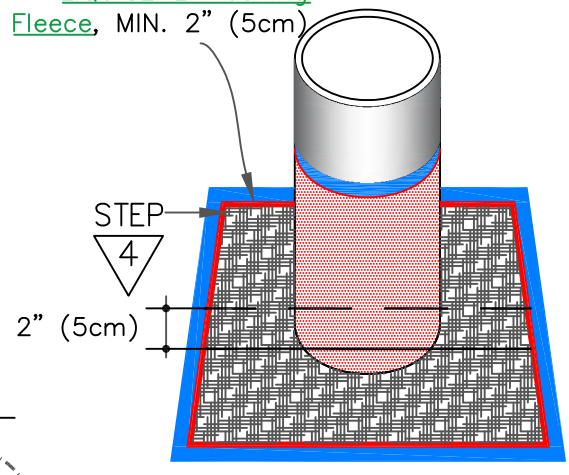


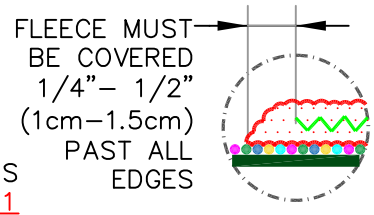
MAKE FINGER CUTS AS DEPICTED, APPROXIMATELY ONE INCH WIDE EACH





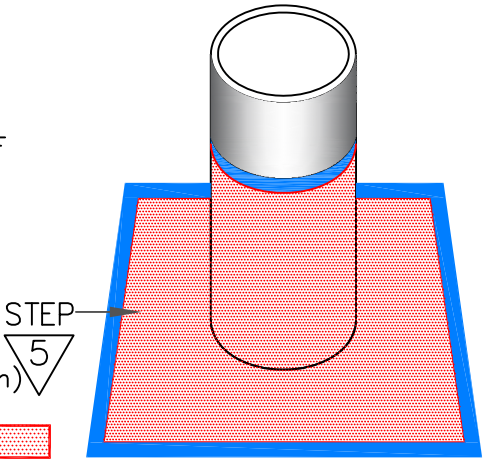
IMMEDIATELY PRESS LIQUISEAL Flashing Fleece, INTO THE APPLIED LIQUISEAL Liquid Flashing Resin. APPLY SECOND COAT OF RESIN. ENSURE ALL ENDS OF FINGERS ARE PROPERLY EMBEDDED.





NOTES:

1. FOR MULTIPLE PIPE PENETRATIONS SEE STEP ZERO ON SHEET LF–8.1 (PAGE 2 OF 2) AND FOLLOW REST OF THE STEPS AS SHOWN FOR SINGLE PIPE FLASHING.
2. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.
3. SEE PAGE 2 OF 2 FOR ADDITIONAL NOTES.

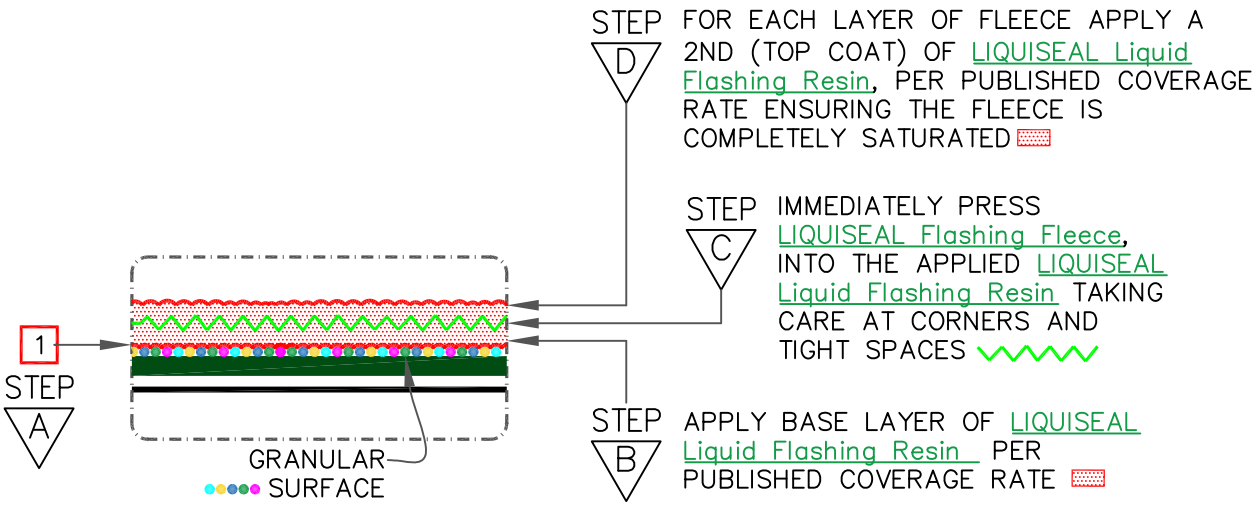


ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

SINGLE OR MULTIPLE PIPE PENETRATIONS (PAGE 1 OF 2)

For additional information, refer to Specifications

DETAIL NO.
LF–8.1
LIQUID FLASHING



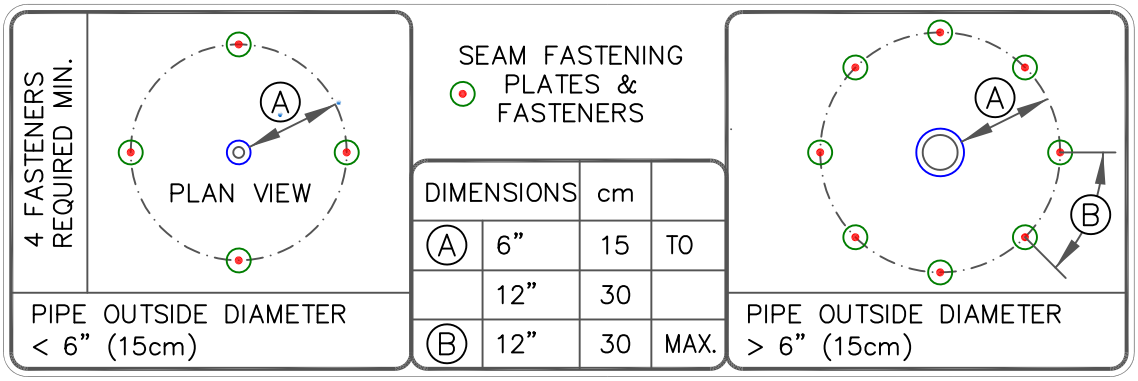


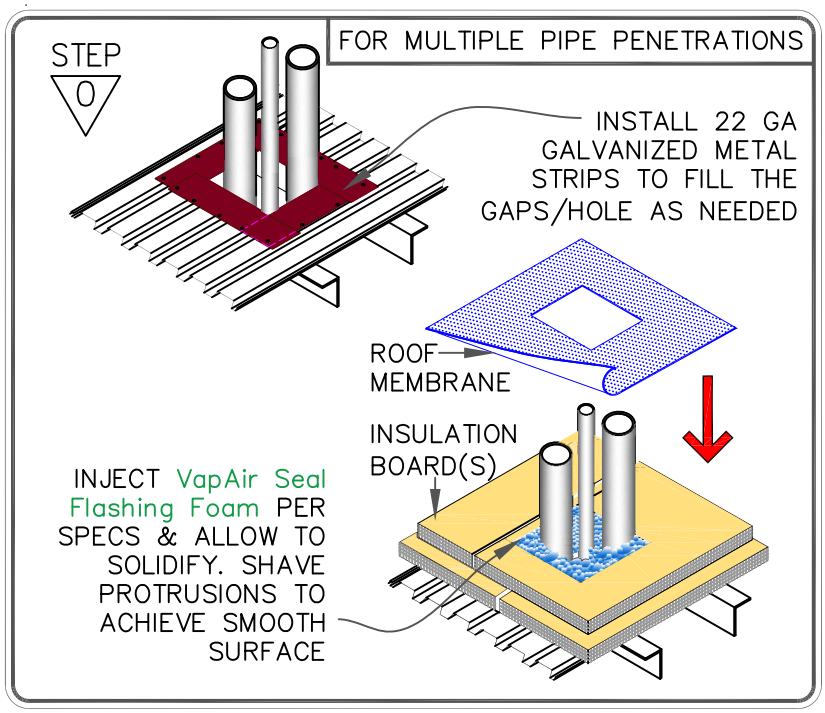
TABLE FOR FASTENER REQUIREMENTS ON MECHANICALLY FASTENED SYSTEMS. REFER TO CARLISLE TYPICAL PENETRATION DETAILS FOR FLASHING OVER FASTENER HEADS.

NOTES CONTINUE FROM LF–8.1 (PAGE 1 OF 2

4. WHEN THERE IS ENOUGH CLEARANCE BETWEEN MULTIPLE PENETRATIONS, INSTALL LIQUID FLASHING USING THIS DETAIL.

5. WHEN INSTALLATION OF LIQUID FLASHING IS NOT FEASIBLE FOR MULTIPLE PIPE PENETRATIONS, THEN USE APPLICABLE STANDARD ROOF MEMBRANE DETAIL (U–16) FOR FIELD MEMBRANE TYPE.

6. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.



ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

SINGLE OR MULTIPLE PIPE PENETRATIONS (PAGE 2 OF 2)

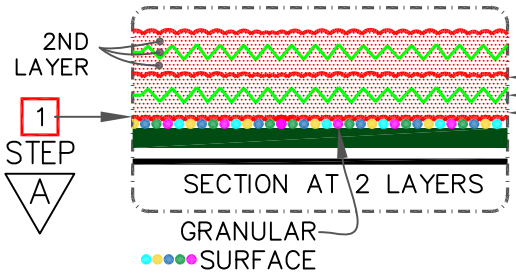
For additional information, refer to Specifications

DETAIL NO.
LF–8.1
LIQUID FLASHING

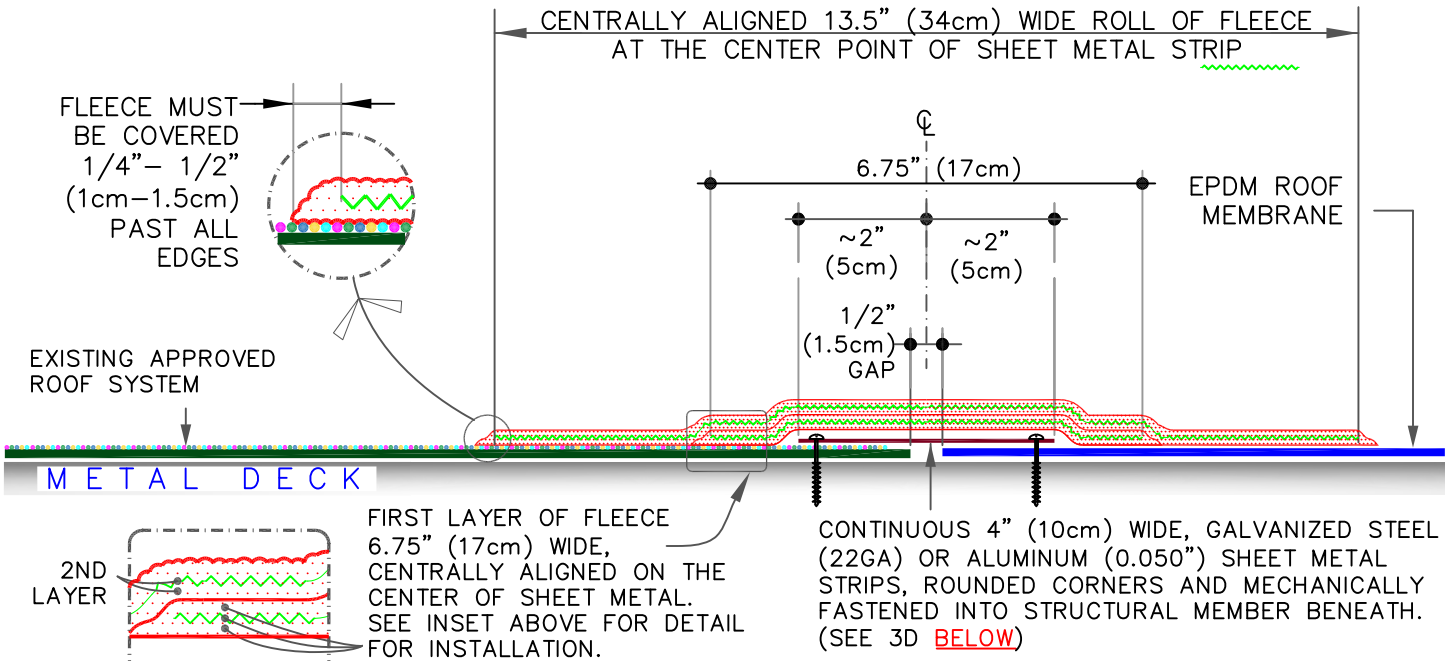
STEP D — FOR EACH LAYER OF FLEECE APPLY A 2ND (TOP COAT) OF LIQUISEAL Liquid Flashing Resin, PER PUBLISHED COVERAGE RATE ENSURING THE FLEECE IS COMPLETELY SATURATED

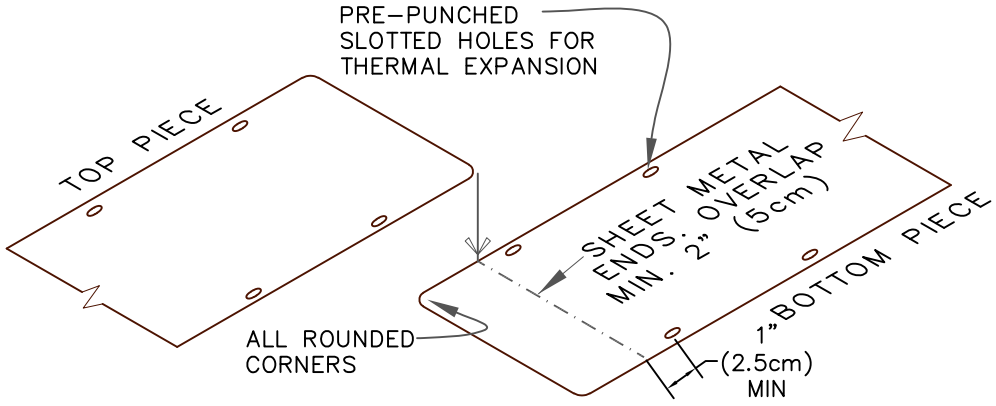
REPEAT STEPS C & D TO APPLY 2ND LAYER

STEP C — IMMEDIATELY PRESS LIQUISEAL Flashing Fleece, INTO THE APPLIED LIQUISEAL Liquid Flashing Resin TAKING CARE AT CORNERS AND TIGHT SPACES



STEP B — APPLY BASE LAYER OF LIQUISEAL Liquid Flashing Resin PER PUBLISHED COVERAGE RATE





NOTES:

1. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.
2. IF FLUTES ARE PERPENDICULAR DRILL A 3/8"(1cm) WEEP HOLE IN THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE TIE IN.
3. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.

ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

EPDM MEMBRANE TIE–IN WITH EXISTING ROOF OVER STEEL DECK

For additional information, refer to Specifications

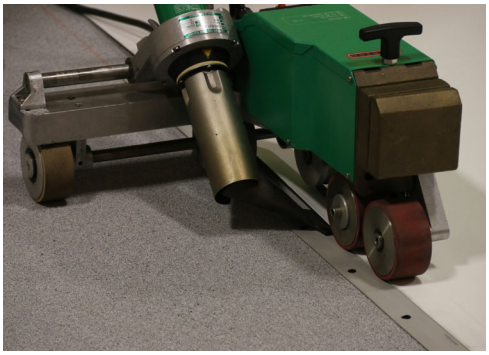
DETAIL NO.
LF–13.1
LIQUID FLASHING

A

INSTALL COATED SHEET METAL STRIPS WITH THREADED FASTENERS. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.

B

PROPERLY CLEAN WITH MEMBRANE CLEANER PRIOR TO WELDING.



C

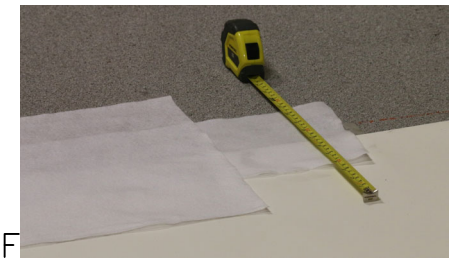
WELD TPO OR PVC MEMBRANE TO COATED METAL STRIP.

D

USE SAND PAPER GRIT # 60 TO ABRADE THE AREAS TO WHICH THE LIQUISEAL LIQUID FLASHING RESIN WILL BE APPLIED.

E

THOROUGHLY CLEAN THE TIE–IN AREA.



F

CUT TWO PIECES OF LIQUISEAL Flashing Fleece, (FOR DIMENSIONS SEE LF–13.2A).

G

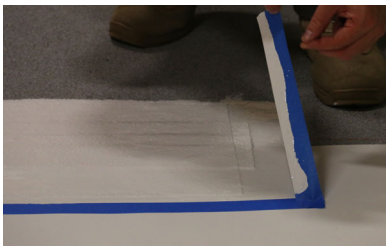
APPLY PAINTER'S TAPE ALONG TIE–IN EDGE.

H

THOROUGHLY MIX THE RESIN, PER PUBLISHED INSTRUCTIONS.

I

INSTALL BOTH LAYERS OF PRE–CUT LIQUISEAL Flashing Fleece, EMBEDDED IN RESIN (SEE LF–13.2A).



J

REMOVE TAPE IMMEDIATELY ENSURING THAT RESIN EXTENDS 1/4" – 1/2" BEYOND EDGE OF FLEECE.

ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

TPO OR PVC MEMBRANE TIE–IN WITH EXISTING ROOF OVER STEEL DECK (PAGE 2 OF 2)

For additional information, refer to Specifications

DETAIL NO.
LF–13.2
LIQUID FLASHING

STEP D FOR EACH LAYER OF FLEECE APPLY A 2ND (TOP COAT) OF LIQUISEAL Liquid Flashing Resin, PER PUBLISHED COVERAGE RATE ENSURING THE FLEECE IS COMPLETELY SATURATED

REPEAT STEPS C & D TO APPLY 2ND LAYER

STEP C IMMEDIATELY PRESS LIQUISEAL Flashing Fleece, INTO THE APPLIED LIQUISEAL Liquid Flashing Resin TAKING CARE AT CORNERS AND TIGHT SPACES

2ND LAYER

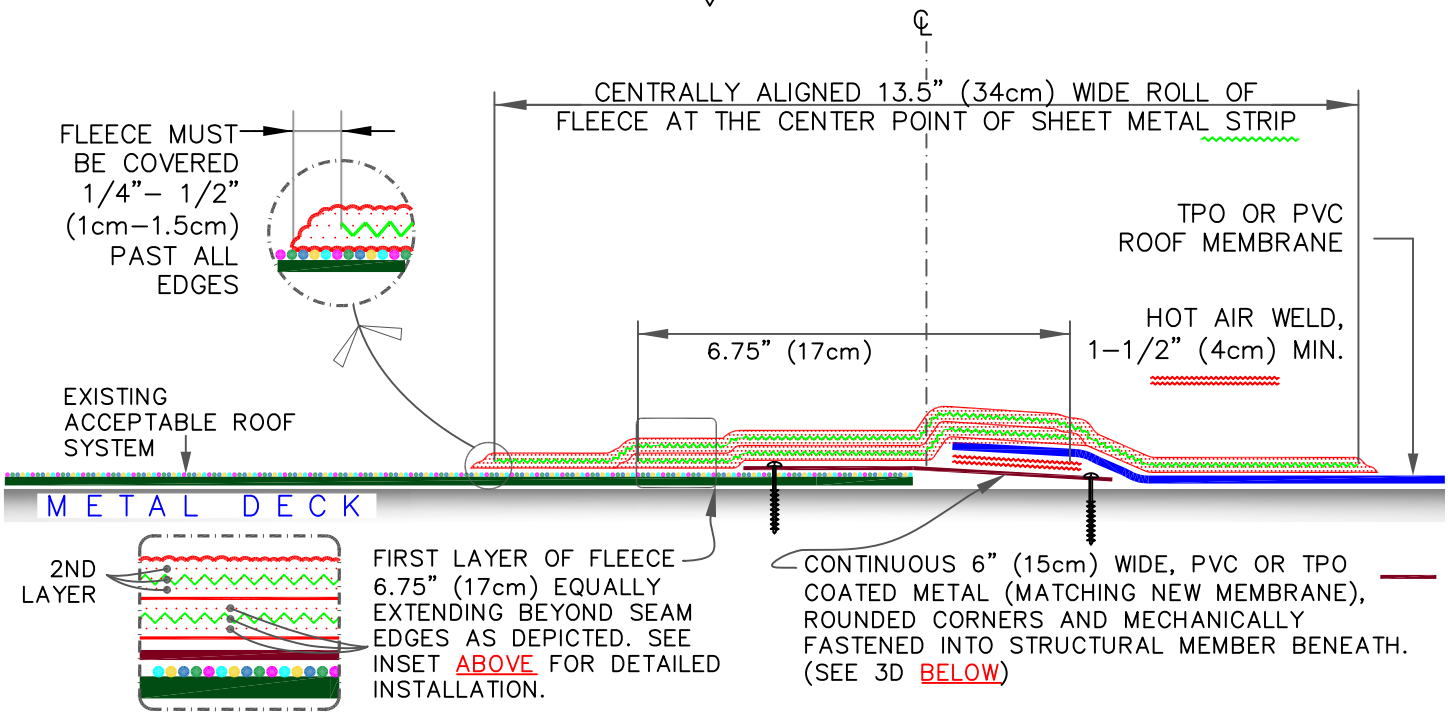
1

STEP A

SECTION AT 2 LAYERS

GRANULAR SURFACE

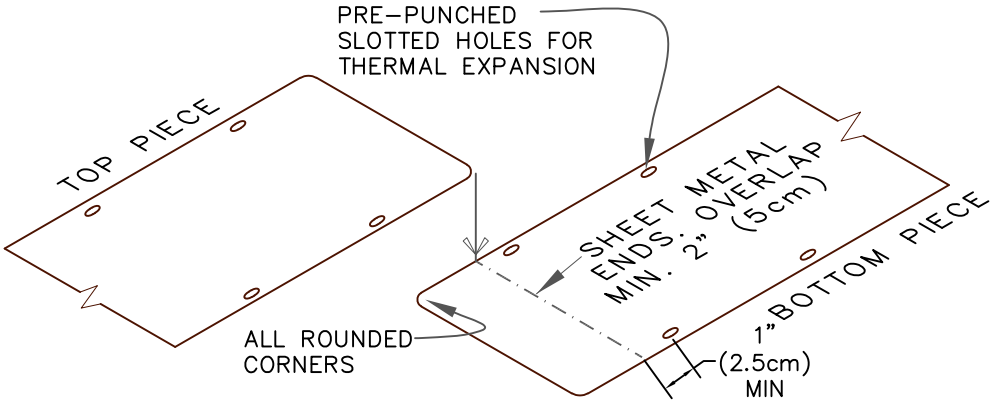
STEP B APPLY BASE LAYER OF LIQUISEAL Liquid Flashing Resin PER PUBLISHED COVERAGE RATE



2ND LAYER

FIRST LAYER OF FLEECE 6.75" (17cm) EQUALLY EXTENDING BEYOND SEAM EDGES AS DEPICTED. SEE INSET ABOVE FOR DETAILED INSTALLATION.

CONTINUOUS 6" (15cm) WIDE, PVC OR TPO COATED METAL (MATCHING NEW MEMBRANE), ROUNDED CORNERS AND MECHANICALLY FASTENED INTO STRUCTURAL MEMBER BENEATH. (SEE 3D BELOW)



NOTES:

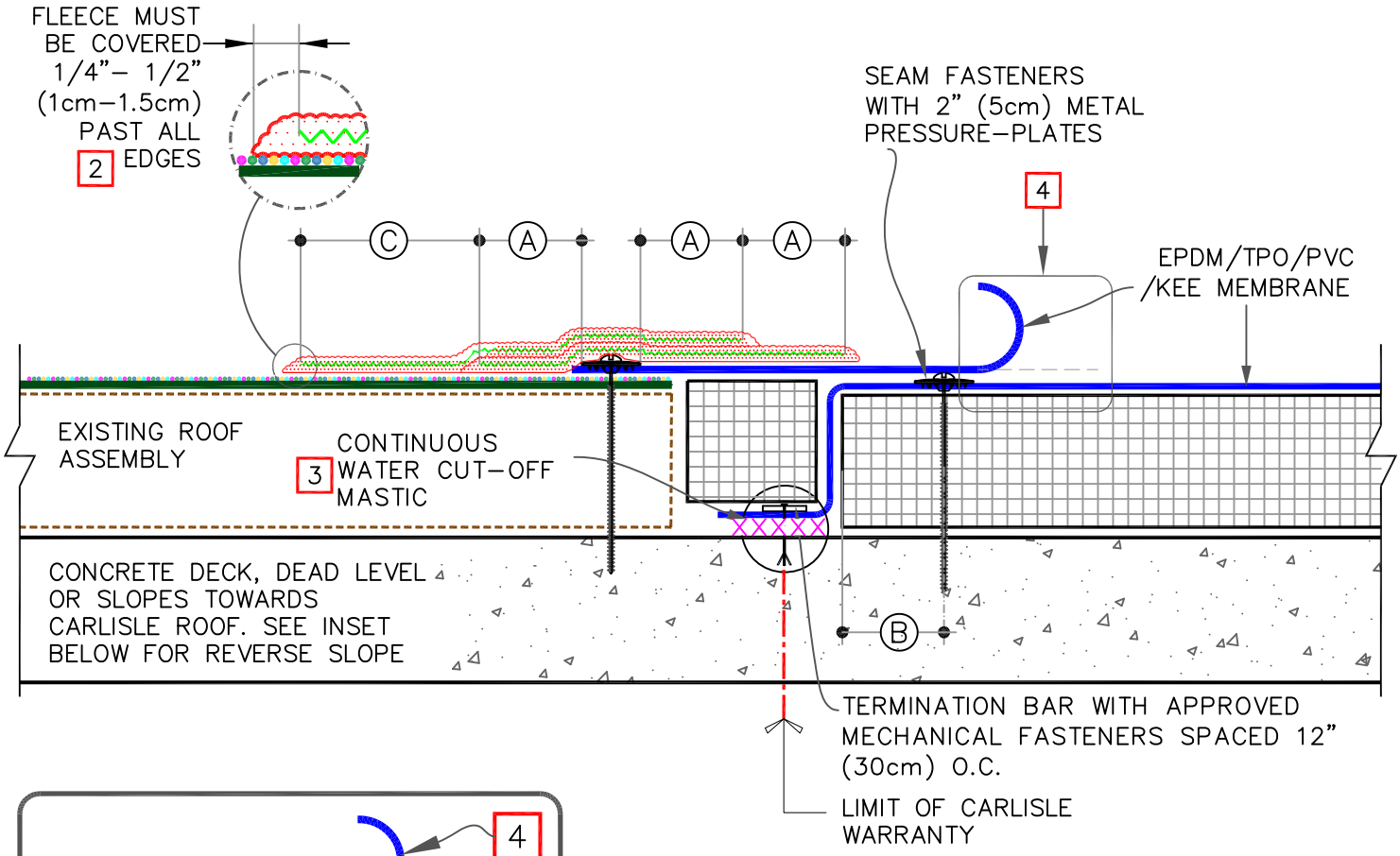
1. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.
2. IF FLUTES ARE PERPENDICULAR DRILL A 3/8" (1cm) WEEP HOLE IN THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE TIE IN.
3. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.

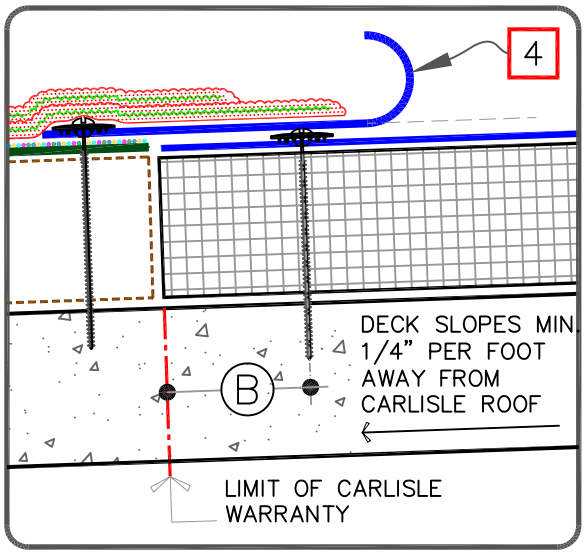
ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

TPO OR PVC MEMBRANE TIE–IN WITH EXISTING ROOF OVER STEEL DECK (PAGE 1 OF 2)

For additional information, refer to Specifications

DETAIL NO.
LF–13.2
LIQUID FLASHING





DIMENSIONS		cm	
A	3"	7.5	MIN.
B	2–3"	5–7.5	MIN.
C	AS REQUIRED DEPENDING ON SUBSTRATE, BUT MIN. 4" (10cm).		

NOTES:

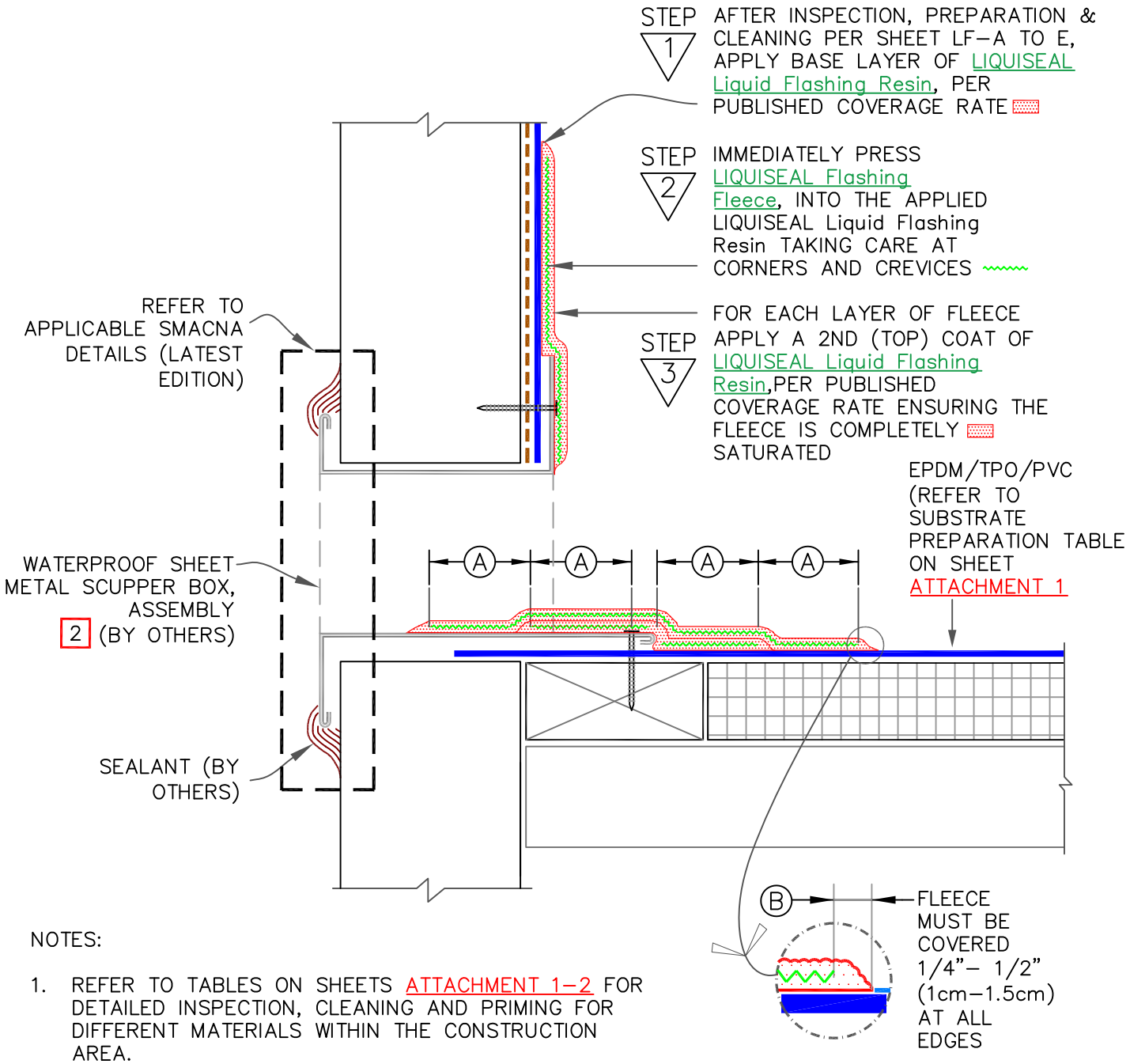
1. REFER TO TABLES ON SHEETS ATTACHMENT 1–2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE FLASHING AREAS.
2. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.
3. PROPERLY FILL THE JOINTS, VOIDS AND CRACKS ENSURING PROPER SEAL AGAINST WATER MIGRATION.
4. APPLICABLE SEAM DETAILS:
   - 4.1. EPDM: U–2A & U–2A.1
   - 4.2. TPO/PVC/KEE: U–2A

ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

MEMBRANE TIE–IN WITH EXISTING ROOF OVER CONCRETE DECK

For additional information, refer to Specifications

DETAIL NO.
LF–13.3
LIQUID FLASHING



NOTES:

1. REFER TO TABLES ON SHEETS ATTACHMENT 1-2 FOR DETAILED INSPECTION, CLEANING AND PRIMING FOR DIFFERENT MATERIALS WITHIN THE CONSTRUCTION AREA.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF SHEET METAL FLANGE.
3. MECHANICAL FASTENERS MUST BE SECURED INTO STRUCTURAL CONCRETE, SOLID MASONRY OR PRESSURE TREATED WOOD BLOCKING.
4. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20-YEARS. UNLESS OTHERWISE SPECIFIED.

DIMENSIONS		cm	
A	3"	7.5	MIN.
B	1/4"	1	TO
	1/2"	1.5	

ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

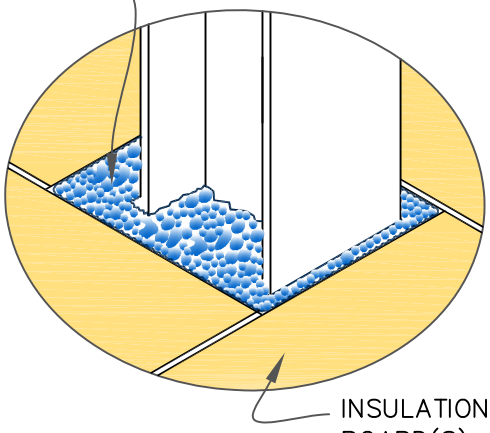
THROUGH-WALL SCUPPER

For additional information, refer to Specifications

DETAIL NO.
LF-18.1
LIQUID FLASHING

INJECT VapAir Seal Flashing Foam PER SPECS & ALLOW TO SOLIDIFY. SHAVE PROTRUSIONS TO ACHIEVE SMOOTH SURFACE

STEP 1



STEP 2

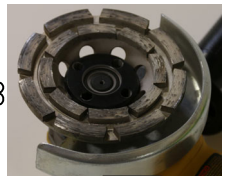
GRIND METAL WITH DIAMOND CUP GRINDING WHEEL

MEMBRANE SECURED WITH PLATES & FASTENERS PER SPECS

A

NOTE:
ENSURE BODY OF PENETRATIONS & WELDS ARE COMPLETELY WATERPROOF.

B



DIAMOND CUP GRINDING WHEEL

STEP 3

C

USE SAND PAPER GRIT# 60 TO ABRADE THE MEMBRANE SURFACE.

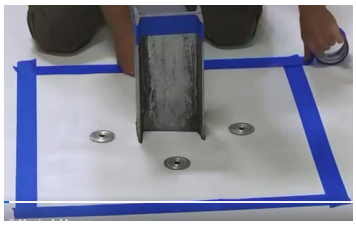
STEP 4

D

REMOVE ALL GRINDING DUST, CLEAN METAL & MEMBRANE WITH CLEAN RAGS & MEMBRANE CLEANER.

STEP 5

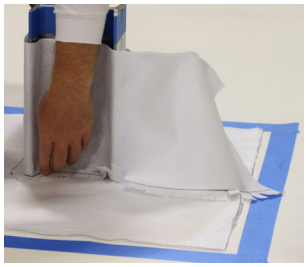
E



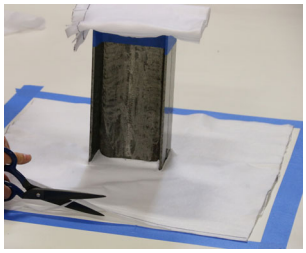
USE PAINTER'S TAPE AND TAPE OFF THE FLASHING AREA.

MEASURING, CUTTING & DRY FITTING TECHNIQUE

F



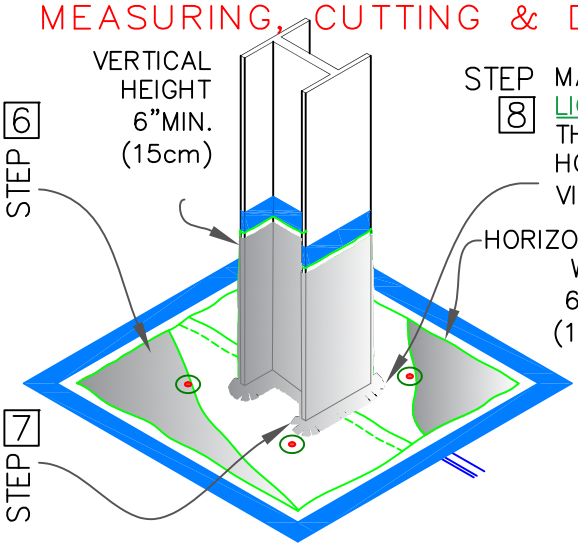
G



STEP 6

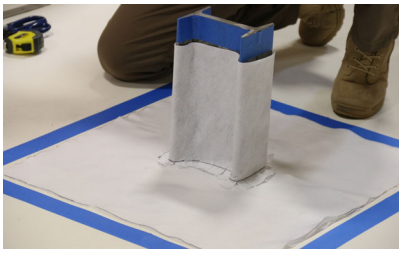
VERTICAL HEIGHT 6"MIN. (15cm)

STEP 7



STEP 8 MAKE FINGER CUTS 2" (5cm) LONG IN LIQUISEAL Flashing Fleece AS SHOWN. THE FINGERS WILL REST ON THE HORIZONTAL SURFACE. SEE ENLARGED VIEW "I" ON PAGE 2 OF 2.

H



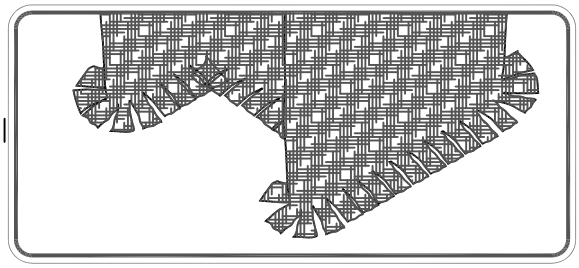
ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

STEEL I-BEAM FLASHING (PAGE 1 OF 2)

For additional information, refer to Specifications

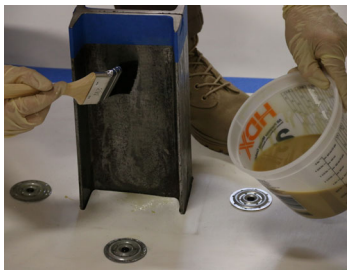
DETAIL NO.
LF-30.1
LIQUID FLASHING

SACHET MIXING AND PRIMER APPLICATION



I

STEP 9



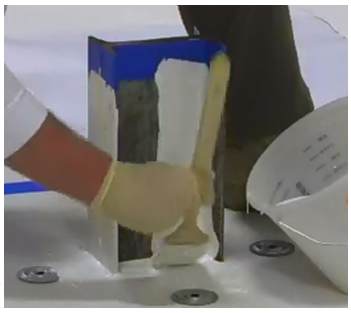
J

PRIME I–BEAM AND METAL PLATES. ENSURE AMBIENT AIR TEMPERATURE IS 40° & RISING. ALLOW PRIMER TO CURE UNTIL TACK–FREE.

FLASHING FINAL INSTALLATION

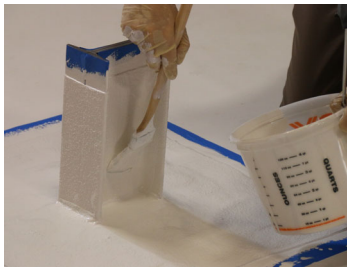
STEP 10

APPLY 1ST COAT OF LIQUISEAL Liquid Flashing Resin & INSTALL LIQUISEAL Flashing Fleece ON VERTICAL SURFACES.



K

STEP 11

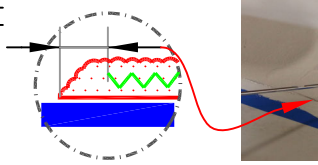


L

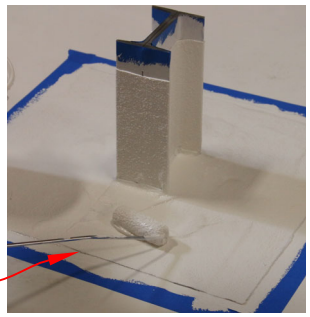
IMMEDIATELY APPLY A 2ND COAT OF LIQUISEAL Liquid Flashing Resin ENSURING THE FLEECE IS COMPLETELY SATURATED.

APPLY 1ST COAT OF RESIN AND INSTALL FLEECE ON HORIZONTAL SURFACES. IMMEDIATELY APPLY A 2ND COAT OF RESIN ENSURING FLEECE IS COMPLETELY SATURATED.

FLEECE MUST BE COVERED 1/4"– 1/2" (1cm– 1.5cm) BEYOND EDGES



STEP 12



M

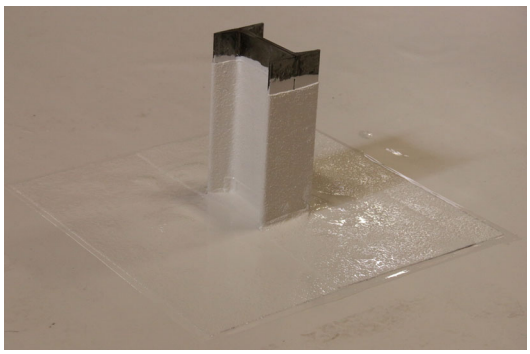
STEP 13

N

TOUCH UP AS NEEDED TO ENSURE ENTIRE FLEECE IS COMPLETELY SATURATED.

COMPLETED FLASHING

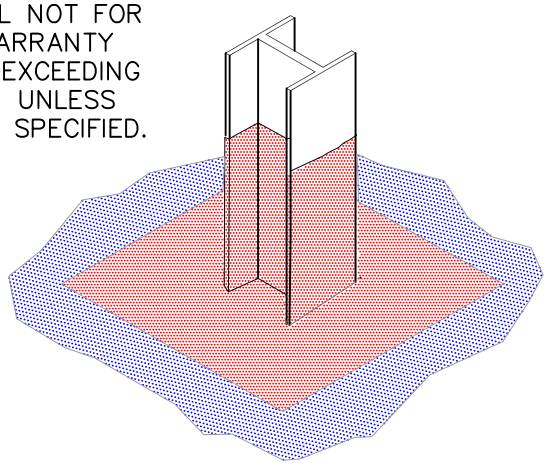
STEP 14



O

REMOVE TAPE IMMEDIATELY ENSURING THAT RESIN EXTENDS 1/4" – 1/2" (1cm – 1.5cm) BEYOND EDGE OF FLEECE

NOTE:
1. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20–YEARS. UNLESS OTHERWISE SPECIFIED.



ROOF MEMBRANE
LIQUISEAL Flashing Fleece
LIQUISEAL Liquid Flashing Resin
0 SEE NOTE(S)

STEEL I–BEAM FLASHING (PAGE 2 OF 2)

For additional information, refer to Specifications

DETAIL NO.
LF–30.1
LIQUID FLASHING

This Spec Supplement represents the applicable information available at the time of its publication. Owners, Specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information that has subsequently been made available.

Review the appropriate Carlisle Warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S
SPEC SUPPLEMENT

G-14

VACUSEAL™
Vent Secured Roofing Systems

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and use of roof vents for a vent secured roofing system. In addition to the information contained herein, attached details are included to provide the Specifiers and Authorized Applicators with quick access to specific information. Specifiers and Authorized Applicators are advised to reference all applicable details included with this spec supplement.

This alternate method with vent securement is for securing Carlisle's Sure-Seal/Sure-White (EPDM), Sure-Tough (EPDM), Sure-Weld (TPO), Sure-Flex (PVC) or Sure-Flex (KEE HP) membrane and is intended to be used with products included within the Carlisle's Thermoset or Thermoplastic Specification and Details.

A. Description

The VacuSeal™ Vent Secured Roofing System incorporates the use of a loose-laid thermoset or thermoplastic membranes in conjunction with a sealed roofing/substrate assembly and VacuSeal Roof Vents. The VacuSeal Vent locations are pre-determined by an engineered drawings processed through Carlisle, based on project location and conditions. Air distribution strips are positioned beneath the membrane linking the VacuSeal Vents and facilitating air movement beneath the membrane. The insulation is loose-laid in a single or multiple layers and overlaid with a 1/2 inch gypsum cover board or Ecostorm VSH board.

NOTE: A continuous air seal is critical for performance of the system, closely follow details at perimeters and penetrations. VacuSeal™ Vent Secured Roofing System is limited to 20 Year Maximum warranty with wind speed coverage up to 90 mph. Specific enhancements will be required along the perimeter for systems requiring warranty wind speed coverage greater than 72 mph. Contact Carlisle for enhancement requirements.

VacuSeal™ Membrane Systems Warranty Options

Years	Thermoset (Sure-Seal/Sure-Tough/Sure-White EPDM) OR Thermoplastic Membranes (Sure-Weld TPO/ Sure-Flex PVC/Sure-Flex KEE HP)		
	Warranty Wind Speed	Minimum Membrane Thickness (1)	Additional Puncture Coverage
	55, 72, 80 or 90 mph		
5, 10, 15 or 20 year	√(2)	60-mil	Not Available

Notes: √= Acceptable

(1) All "T-Joints" must be overlaid with appropriate flashing material.
(2) Perimeter enhancements required for wind speed coverage greater than 72mph. Contact Carlisle for requirements.

B. Quality Assurance

1. This securement method using VacuSeal Vents requires a VacuSeal Project Layout Drawing developed by Carlisle identifying locations of VacuSeal system components, including VacuSeal Vents, air distribution strip, and sealant tape. Prior to installation, approved project layout drawing must be obtained.

2. This roofing assembly must be installed by an authorized applicator who has been trained for the installation of VacuSeal system components in compliance with the approved project layout drawing.

3. Consult Carlisle to ensure proper seal detailing is provided and appropriate Carlisle roofing details are selected.

4. In addition to final inspection by Carlisle, project scheduling must be coordinated with Carlisle for in-progress inspection coordination.

C. Submittals

1. Prior to starting work, the roofing contractor must submit the following:

   a. A completed VacuSeal Job Evaluation Request Form prior to installation. This is required to receive a project layout from Carlisle for the VacuSeal system components. For questions – email VacuSeal@Carlisleccm.com.

2. No deviations will be allowed without prior written approval.

3. Upon completion of the installed work, submit notice of completion to Carlisle to schedule Final Inspection.

D. Products

Products listed in "Part II" of the Carlisle Thermoset/Thermoplastic Roofing System Specifications can be used as part of the VacuSeal Vent Secured Roofing System. In addition, products listed herein are specific to this system:

1. **VacuSeal Vent**: A ridged injection-molded PVC plastic roof vent with integrated plastic flange base.

2. **Air Distribution Strip:** A 10" wide, orange polypropylene mesh used to distribute air underneath the membrane and VacuSeal vent. Available in rolls of 10" wide by 500' long.

3. **Sealant Tape:** An elastomeric butyl rubber sealant, extruded on silicone coated paper, used in conjunction with a termination bar to secure and seal compression type flashing terminations.

4. **Carlisle VapAir Seal 725TR Air and Vapor Barrier** - A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to a 5-mil UV resistant poly film with an anti-skid.

5. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks.

6. **VapAir Seal Flashing Foam –** a low pressure foam system that utilizes a non-flammable blowing agent. The foam is used to seal penetrations and reduce air leakage, especially at roof perimeters.

7. **Sure-Seal/Sure-White Pressure-Sensitive Elastoform® Flashing:** A 6" X 100' and 9" or 12" wide by 50' long, 60-mil thick Sure-Seal **uncured** EPDM Flashing laminated to a 30-mil Pressure-Sensitive SecurTAPE used in conjunction with EPDM Primer. Sure-Seal/Sure-White uncured Pressure-Sensitive Elastoform Flashing is used to flash inside and outside corners, pipes, scuppers, and field-fabricated pourable sealer pockets when the use of Carlisle pre-fabricated flashing accessories is not feasible.

E. Design Criteria

Follow current Carlisle specifications for installing roof membranes and seaming per specific membrane. [Sure-Seal/Sure-White/Sure-Tough (EPDM), Sure-Weld (TPO), Sure-Flex (PVC) or Sure-Flex (KEE HP)].

1. **General**

   a. The use of a sealed air barrier for this roofing system is required and is critical to the performance and function of this system. Follow all details at perimeters and penetrations.

   b. For this air equalization attachment method, night seal must be completed by the end of each day, perimeter seals must be completed along with the required number of vents in a specific area.

2. **Re-Roof (Recover, No Tear-Off)**

a. To maintain continuous air seal, utilize existing roof membrane and replace or re-seal any flashings which are loose or damaged. Direct Overlays (no newly installed insulation or coverboard) may be acceptable depending on the existing waterproofing layer and newly installed membrane. Reference Substrate Criteria for VacuSeal Reroof (Recover, No Tear-Off) chart for details.

SUBSTRATE CRITERIA FOR VACUSEAL REROOF (RECOVER, NO TEAR-OFF)(1)

Acceptable Roof Deck / Substrate (1)	TPO Membrane	PVC / KEE HP PVC Membrane	EPDM Membrane
Existing Smooth Surface BUR (7) or Mineral Surface Cap Sheet	Direct Application (8) (9)	½" min. approved coverboard	Direct Application (2) (9)
Gravel Surfaced BUR (3) or Coal Tar Pitch (3) (4)	½" min. approved coverboard	½" min. approved coverboard	½" min. approved coverboard
Modified Bitumen (9)	Direct Application (6) (8)	½" min. approved coverboard	Direct Application (6) (8)
Existing Single-Ply (5)(9)	Direct Application	Direct Application	Direct Application
Sprayed-in-place Urethane	½" min. approved coverboard	½" min. approved coverboard	½" min. approved coverboard

Notes:

(1) Existing roof system must be securely attached.

(2) Sure-Seal (black) may be applied directly to the substrate provided asphalt on existing smooth surfaced built-up roof has a softening point above 185°F (85°C). Sure-White (White-on-black) Roofing Systems are not recommended for direct application over smooth BUR or granule surface BUR or in in conjunction with HP mat. Make sure substrate is clean and free of roofing cement and fresh asphalt to avoid sheet contamination and staining of white color membrane.

(3) Loose gravel must be removed to avoid entrapment of moisture.

(4) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.

(5) Not Approved over existing ballasted single-ply systems (even if ballast removed). An approved underlayment is required over existing roofing systems of any type.

(6) Direct application permitted over smooth surfaced modified bitumen. Membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where splices intersect modified bitumen field seams, 6" wide Sure-Weld or Sure-Flex Flashing must be heat welded over intersections. For Sure-Seal, 6" wide Elastoform or Pressure Sensitive Flashing must be applied over intersections.

(7) Existing Type III or IV smooth asphalt BUR only.

(8) Possible staining/discoloration of light-colored membrane may result when installing this system directly over existing smooth surfaced BUR or modified bitumen. If aesthetics is critical, an approved insulation should be specified beneath the membrane.

(9) Maximum warranty available 20 YR with 55 MPH peak gust wind speed coverage. Carlisle may be contacted for other warranty options.

3. **Re-Roof (Partial Tear Off, Deck Not Exposed)**

a. Partial tear-off does not allow a continuous air seal below the membrane and these projects are not recommended for use with Vented Roof Systems, without verification of an existing air barrier.

4. **New Construction / Re-Roof (Complete Tear-Off, Deck Exposed)**

a. All deck types (Steel, Concrete, Wood, Cementitious Wood Fiber, or Gypsum) require a continuous air seal which can be achieved utilizing an air barrier at the deck level.

F. Installation

1. Daily Seal

a. On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water and air infiltration.

b. Temporarily seal any loose membrane edge down slope using Sure-Seal Two Part Pourable Sealer (EPDM only), Flexible FAST Adhesive, hot asphalt, or a similar product so that the membrane edge will not buck water. Caution

must be exercised to ensure positive draining during installation, temporary seal locations should be designated so that drainage is not restricted during construction by partially installed roof sections.

1) When applying Flexible FAST Adhesive or other sprayed urethane foam, prime the surface of the membrane with Carlisle Primer to ensure proper adhesion.

2) Sure-Seal Pourable Sealer, when utilized, shall be applied as follows:

   a) The two Pourable Sealer components must be mixed in accordance with the instructions on the container labels.
   b) Apply the Pourable Sealer along the loose edge of the EPDM membrane. If necessary, use a trowel to spread Pourable Sealer to achieve complete coverage.

c. When tie-in to existing built-up roofs, remove the gravel. The surface must be clean and dry.

d. After embedding membrane in daily seal material, CHECK FOR CONTINUOUS CONTACT. Provide continuous pressure over the length of the temporary seal. Provide weight evenly distributed along the length of the daily seal to reduce the wind effect on the continuous temporary seal.

   NOTE: The use of rigid wood nailers is not recommended due to warping. Constant compression cannot be achieved on an uneven substrate.

e. When work is resumed, pull the imbedded membrane free; trim and remove daily seal material from membrane before continuing installation of adjoining sections.

2. Follow guidelines above for the installation and air sealing of roof deck perimeters and penetrations.

3. Layout the vents and air distribution strips per project layout drawing provided by Carlisle. Mark placement of vents on substrate with chalk or marker.

4. Loose lay roofing membrane over the air distribution strips and air vent locations. Allow the membrane to relax.

5. Place the VacuSeal Vents on previous marks and cut out membrane as needed for installation of vent, follow details for specific requirements for each vent.

6. Flash VacuSeal Vent per requirements outlined in detail.

7. Repeat installation for additional vents.

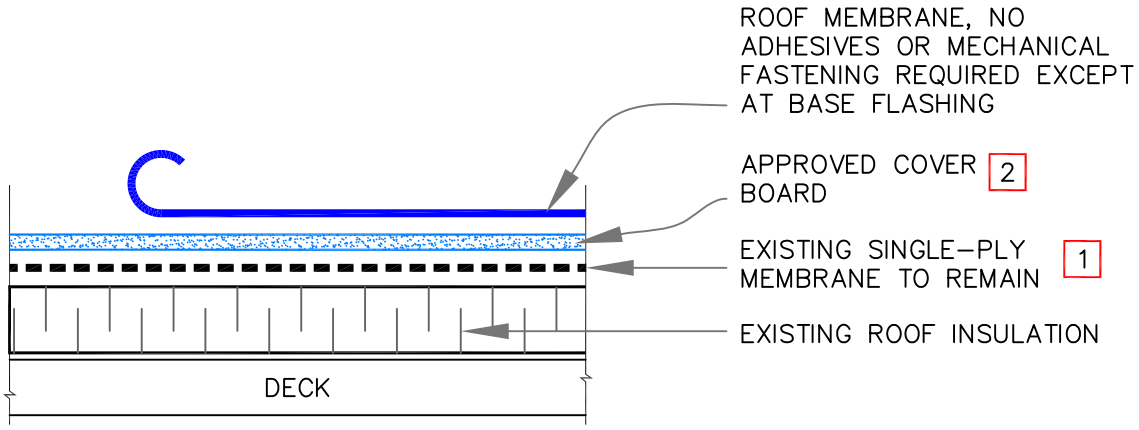
G. Field Quality Control

1. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

H. Associated Installation Details

End of Section

ROOF ASSEMBLY WITHOUT NEW INSULATION

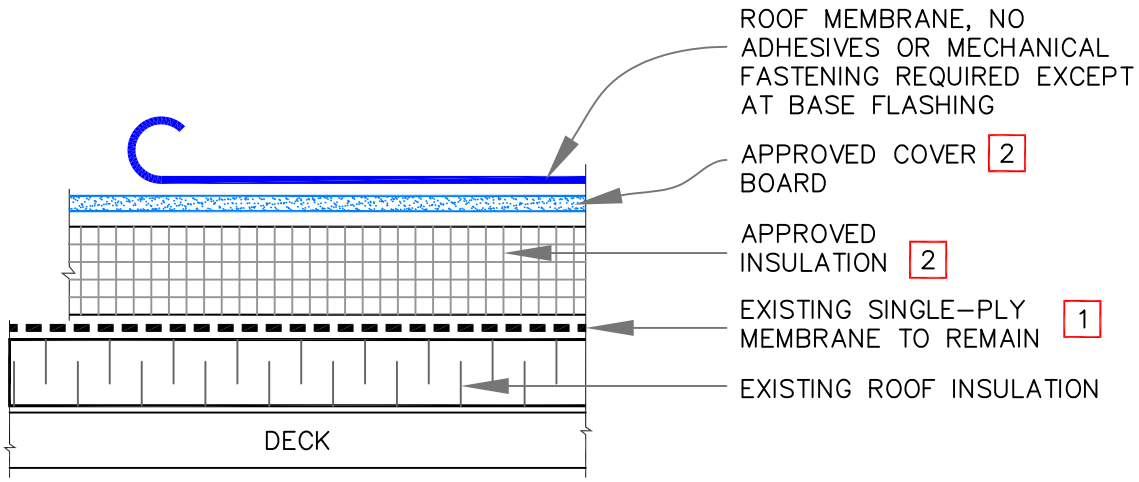


NOTE:

1. EXISTING ROOF MEMBRANE MAY BE USED AS AN AIR BARRIER. IT WILL REQUIRE THOROUGH INSPECTION FOR BREACHES, DAMAGES, AND AIR TIGHTNESS OF EXISTING FLASHING. SEAL ALL DEFICIENT CONDITIONS TO ACHIEVE AN AIRTIGHT AIR BARRIER.

2. DIRECT OVERLAYS (NO NEWLY INSTALLED INSULATION OR COVERBOARD) MAY BE ACCEPTABLE DEPENDING ON THE EXISTING WATERPROOFING LAYER AND NEWLY INSTALLED MEMBRANE. REFERENCE SUBSTRATE CRITERIA FOR VACUSEAL REROOF (RECOVER, NO TEAR-OFF) CHART FOR DETAILS.

ROOF ASSEMBLY WITH NEW INSULATION

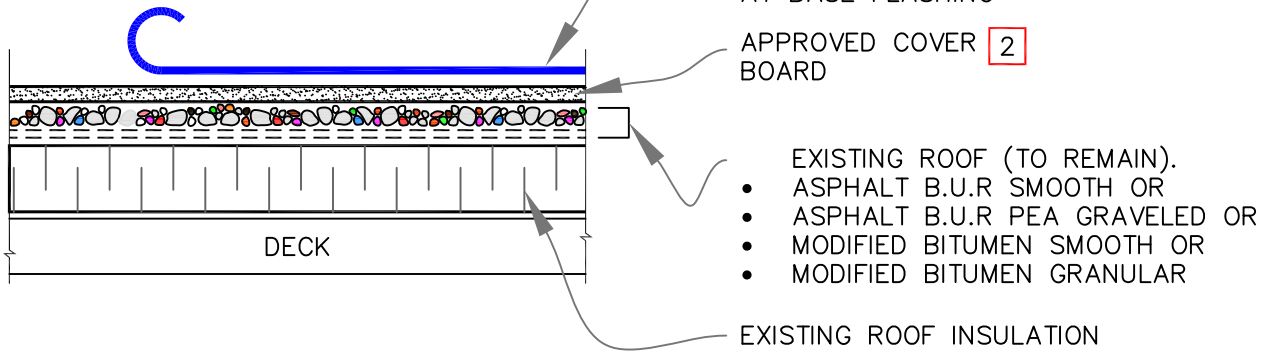


CARLISLE SYNTEC SYSTEMS

ROOF ASSEMBLY OVER EXISTING SINGLE-PLY ROOF

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-0.1



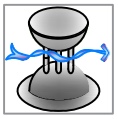
NOTES:

1. EXISTING ROOF MEMBRANE MAY BE USED AS AN AIR BARRIER. IT WILL REQUIRE THOROUGH INSPECTION FOR BREACHES, DAMAGES, BLISTERS, WRINKLES AND AIR TIGHTNESS OF EXISTING FLASHING. SEAL ALL DEFICIENT CONDITIONS TO ACHIEVE AN AIRTIGHT AIR BARRIER.

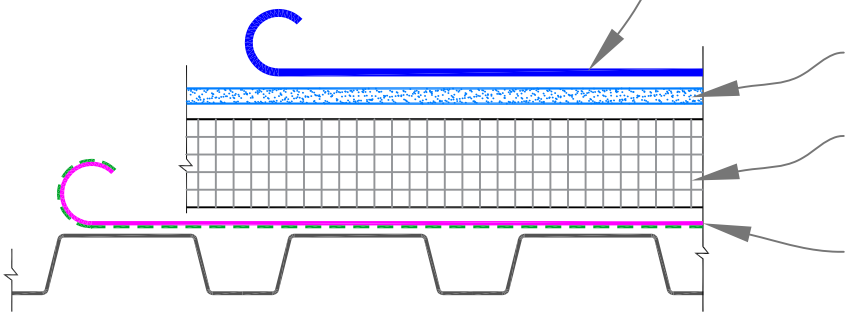
2. DIRECT OVERLAYS (NO NEWLY INSTALLED INSULATION OR COVERBOARD) MAY BE ACCEPTABLE DEPENDING ON THE EXISTING WATERPROOFING LAYER AND NEWLY INSTALLED MEMBRANE. REFERENCE SUBSTRATE CRITERIA FOR VACUSEAL REROOF (RECOVER, NO TEAR-OFF) CHART FOR DETAILS.

3. FOR NEW ASSEMBLY OVER COAL TAR PITCHED ROOF, CONTACT CARLISLE SYNTEC.

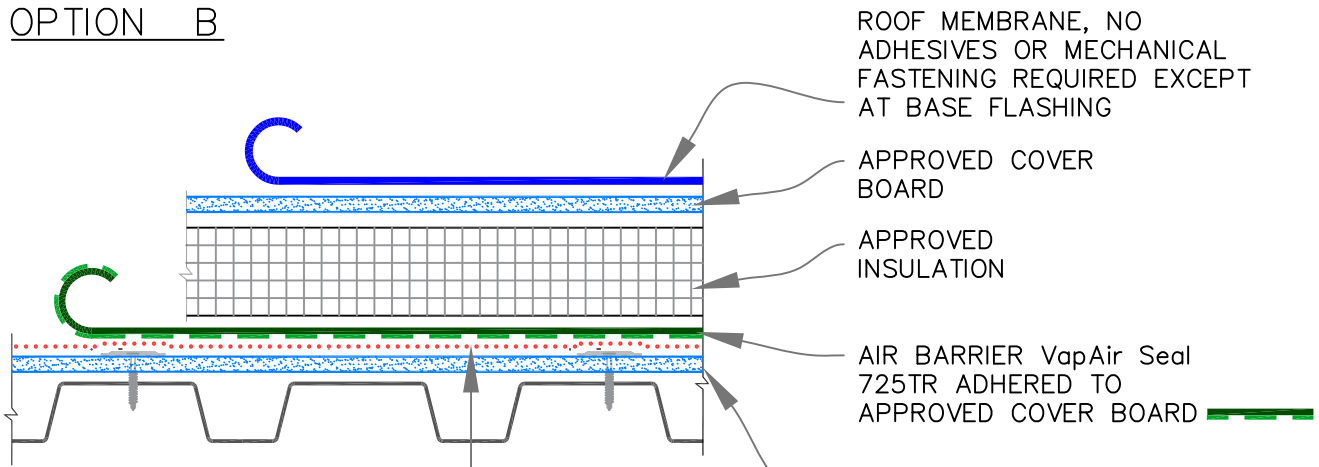
4. LOOSE GRAVEL OR GRANULES MUST BE REMOVED AND THE SURFACE SHALL BE LEVELED.

CARLISLE SYNTEC SYSTEMS	ROOF ASSEMBLY OVER EXISTING ASPHALTIC ROOF		DETAIL NO. V-0.2
	MAXIMUM WARRANTY: 20 YEARS		

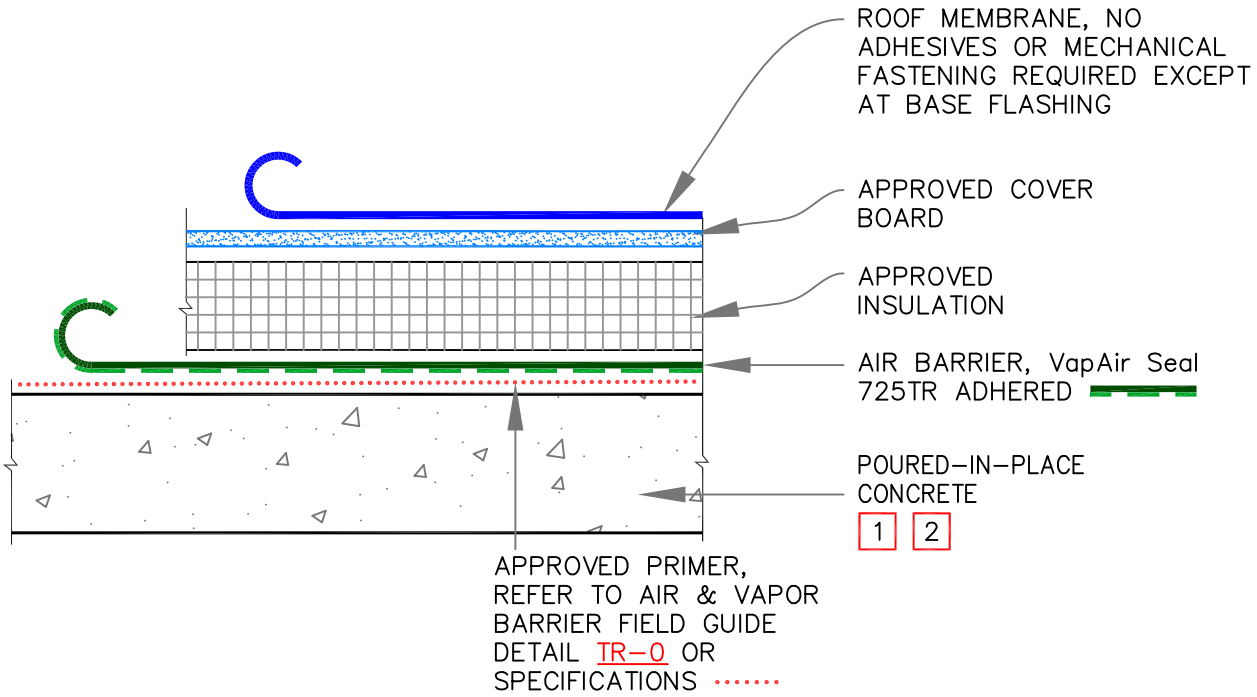
OPTION A



OPTION B



CARLISLE SYNTEC SYSTEMS	ROOF ASSEMBLY OVER STEEL DECK MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. V-0.3



NOTES:

1. THE SUBSTRATE MAY NOT REQUIRE AN ADDITIONAL LAYER OF AIR BARRIER. TO ENSURE THAT A CONTINUOUS AIR-SEAL IS PROVIDED, THE SUBSTRATE MUST BE INSPECTED FOR BREACHES FOR AIR INFILTRATION AT CRACKS, JOINTS, PENETRATIONS, ROOF EDGES, PARAPET WALLS, AND SIMILAR CONDITIONS.

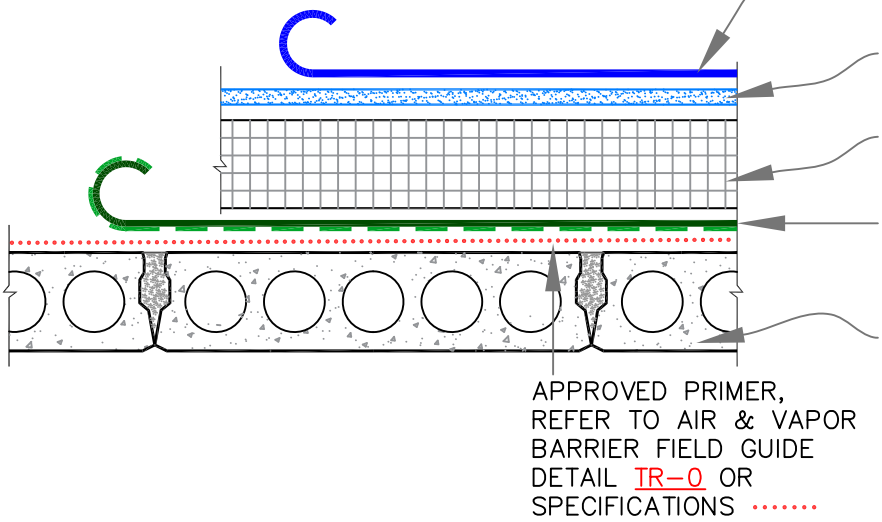
CARLISLE SYNTEC SYSTEMS

ROOF ASSEMBLY OVER POURED-IN-PLACE CONCRETE DECK

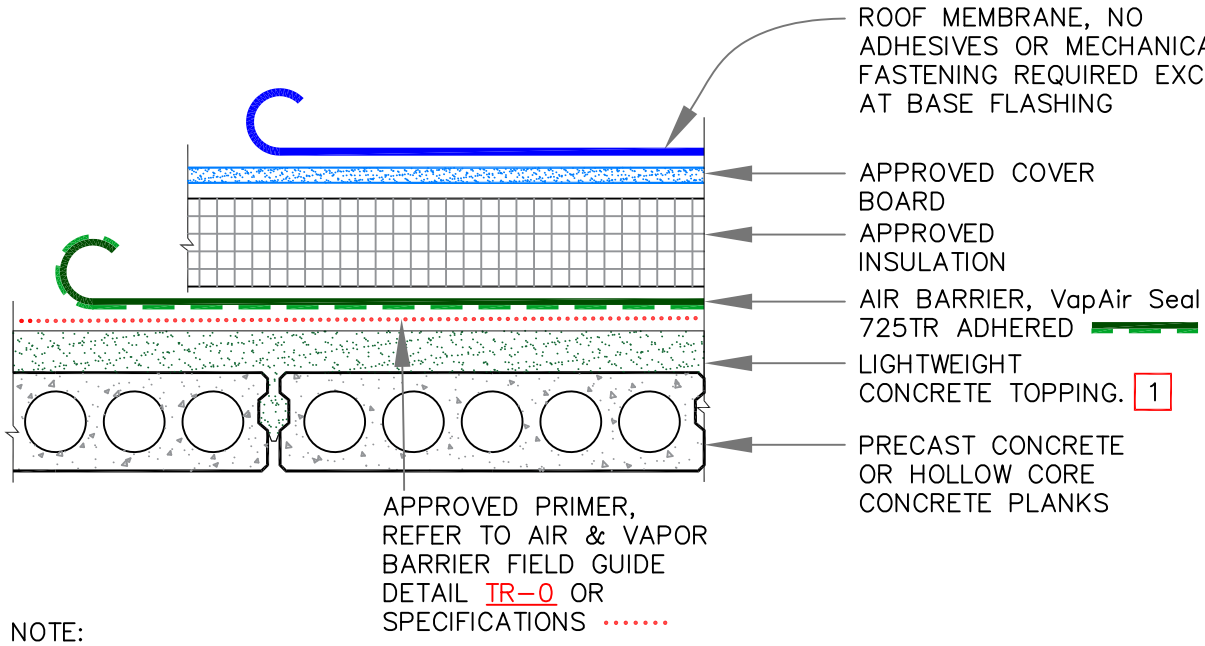
MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-0.4

HOLLOW CORE CONCRETE PLANKS

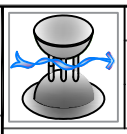


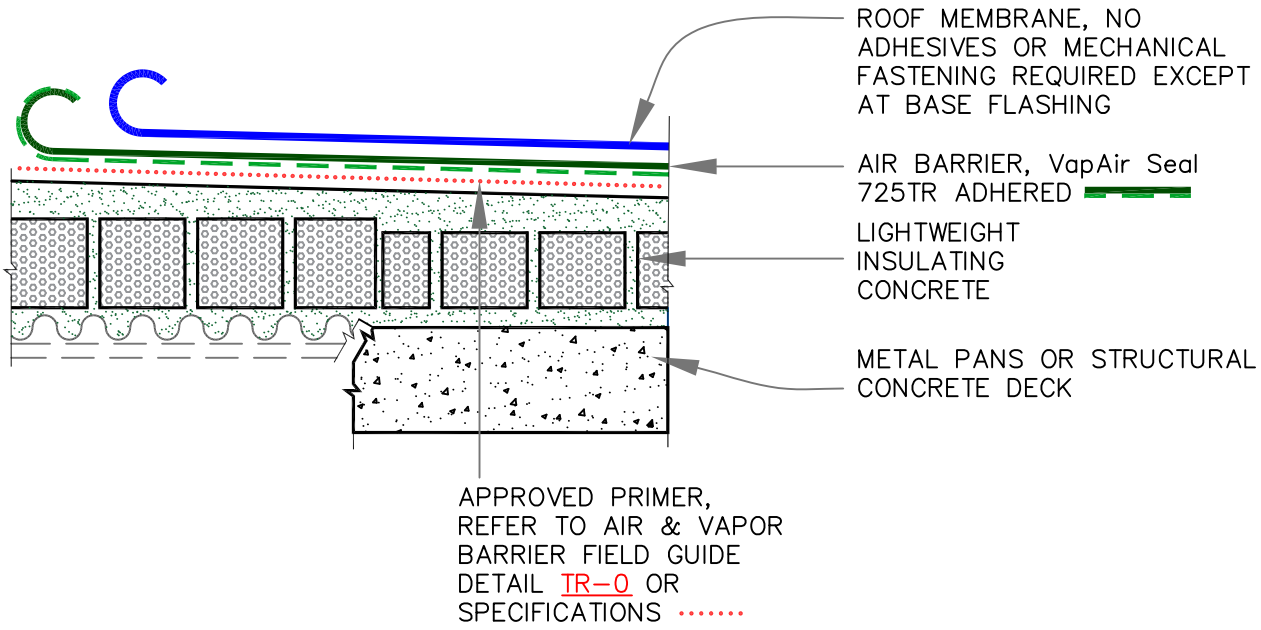
HOLLOW CORE CONCRETE PLANKS WITH TOPPING



NOTE:

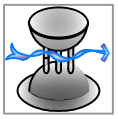
1. THE SUBSTRATE MAY NOT REQUIRE AN ADDITIONAL LAYER OF AIR BARRIER WHEN CONCRETE TOPPING EXISTS. TO ENSURE THAT A CONTINUOUS AIR-SEAL IS PROVIDED, THE SUBSTRATE MUST BE INSPECTED FOR BREACHES FOR AIR INFILTRATION AT CRACKS, JOINTS, PENETRATIONS, ROOF EDGES, PARAPET WALLS, AND SIMILAR CONDITIONS & PROPER REPAIRS MUST BE PERFORMED.

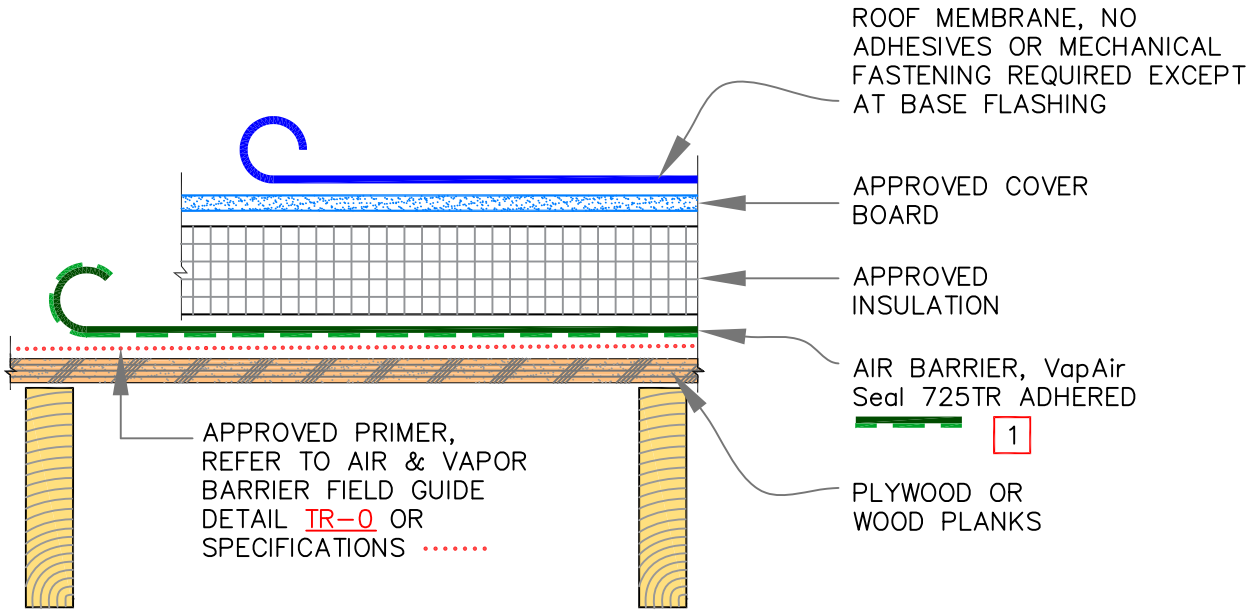
CARLISLE SYNTEC SYSTEMS	ROOF ASSEMBLY OVER CONCRETE PLANKS MAXIMUM WARRANTY: 20 YEARS		DETAIL NO. V-0.5



NOTE:

1. THE SUBSTRATE MAY NOT REQUIRE AN ADDITIONAL LAYER OF AIR BARRIER WHEN CONCRETE TOPPING EXISTS. TO ENSURE THAT CONCRETE SUBSTRATE PROVIDES A CONTINUOUS AIR-SEAL, THE SUBSTRATE MUST BE INSPECTED FOR AIR INFILTRATION. INSPECT FOR BREACHES CRACKS, JOINTS, PENETRATIONS, ROOF EDGES, PARAPET WALLS JUNCTIONS, AND SIMILAR CONDITIONS. PROPER REPAIRS MUST BE PERFORMED TO CREATE AN AIR BARRIER.

CARLISLE SYNTEC SYSTEMS	ROOF ASSEMBLY OVER LIGHTWEIGHT CONCRETE DECK		DETAIL NO. V-0.6
	MAXIMUM WARRANTY: 20 YEARS		

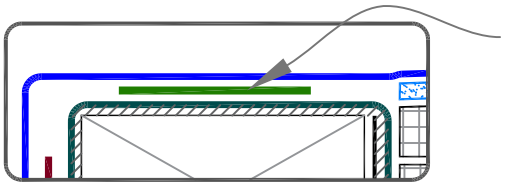


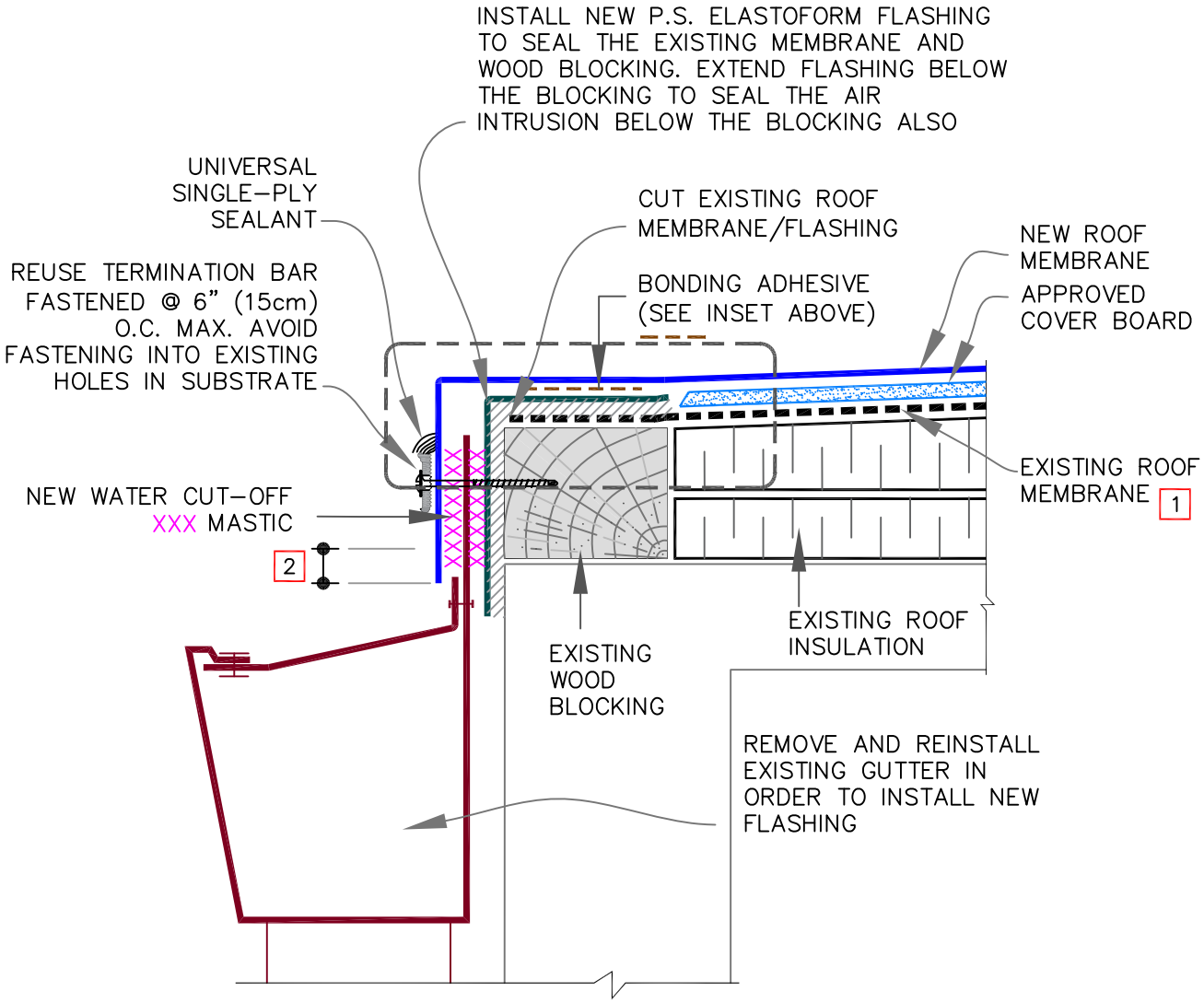
NOTES:

1. TO AVOID POTENTIAL DAMAGE TO AIR AND VAPOR BARRIER, PROTRUDING NAILS/FASTENERS SHALL BE REMOVED AND REPLACED WITH HEAVY GAUGE THREADED FASTENERS.

2. AS AN OPTION, THE AIR AND VAPOR BARRIER MAY BE ADHERED TO MECHANICALLY FASTENED SECUROCK OR DensDeck PRIME COVER BOARD.

CARLISLE SYNTEC SYSTEMS	ROOF ASSEMBLY OVER WOOD DECK		DETAIL NO. V-0.7
	MAXIMUM WARRANTY: 20 YEARS		



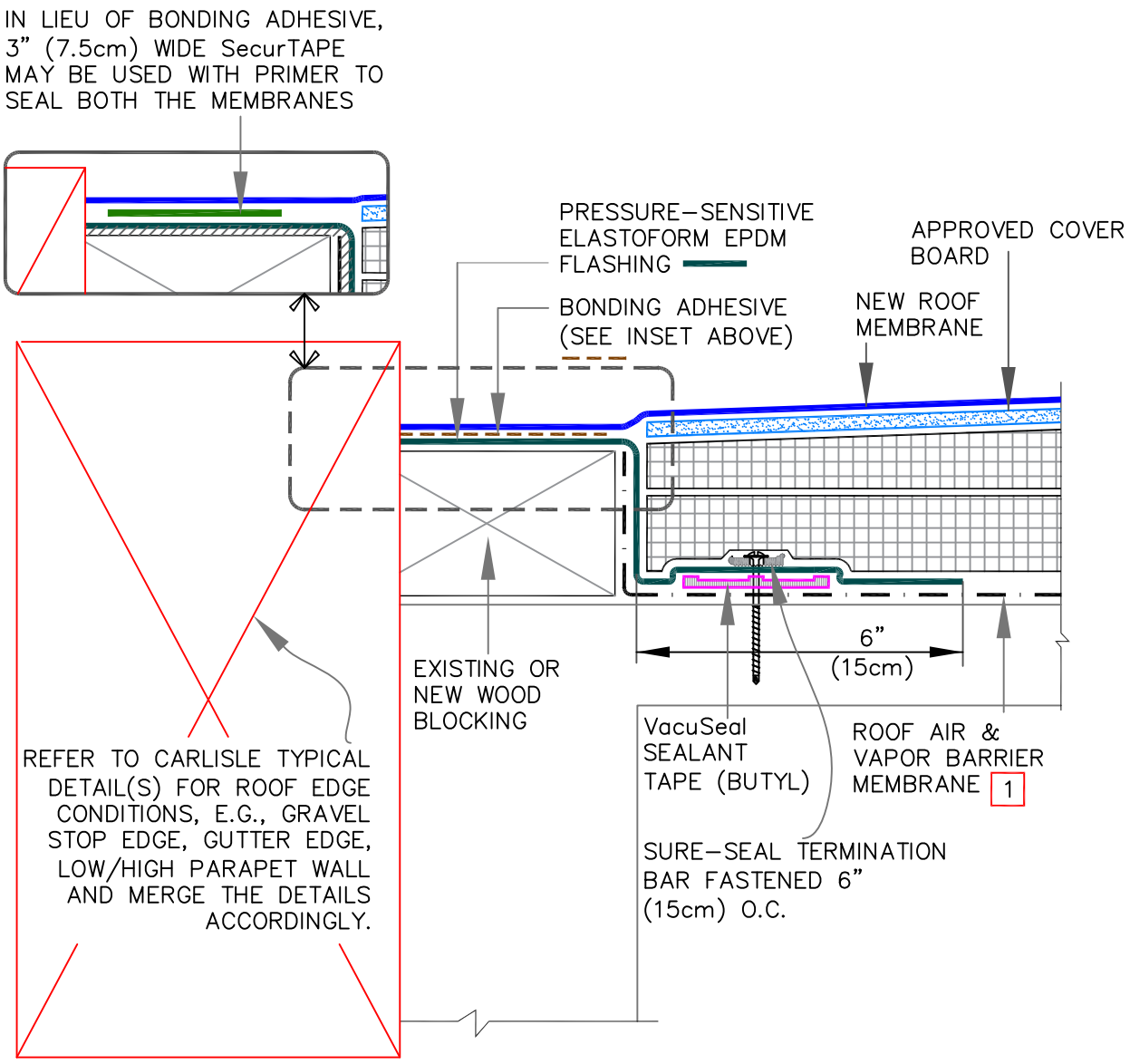


NOTES:

1. EXISTING ROOF MEMBRANE MAY BE USED AS AN AIR BARRIER. IT WILL REQUIRE THOROUGH INSPECTION FOR BREACHES, DAMAGES, AND AIR TIGHTNESS OF EXISTING FLASHING. SEAL ALL DEFICIENT CONDITIONS TO ACHIEVE AN AIRTIGHT AIR BARRIER.

2. ALLOW MEMBRANE SHEET TO EXTEND 1/2" (1.5cm) MINIMUM BELOW THE METAL TERMINATION BAR.

CARLISLE SYNTEC SYSTEMS	ROOF EDGE: ROOF RECOVER		DETAIL NO. V-1.1
	MAXIMUM WARRANTY: 20 YEARS		

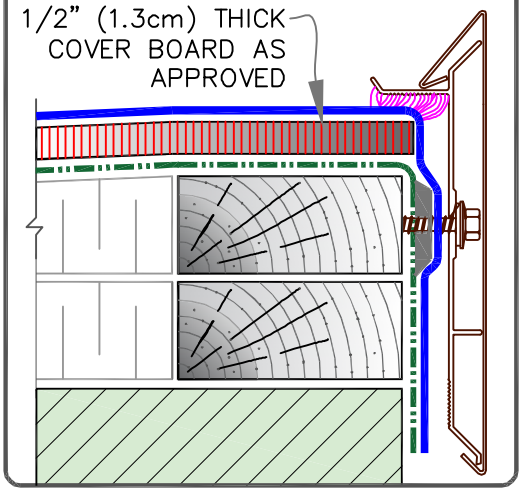


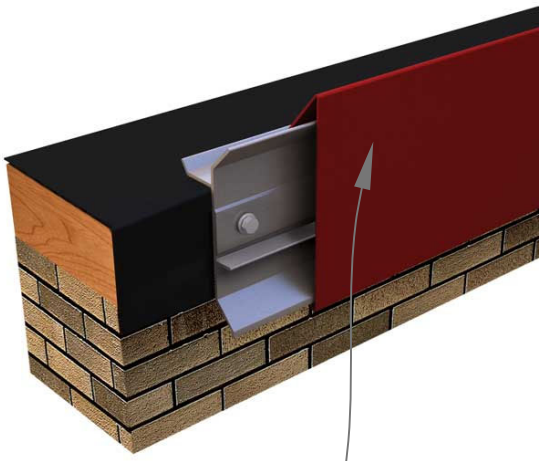
NOTES:

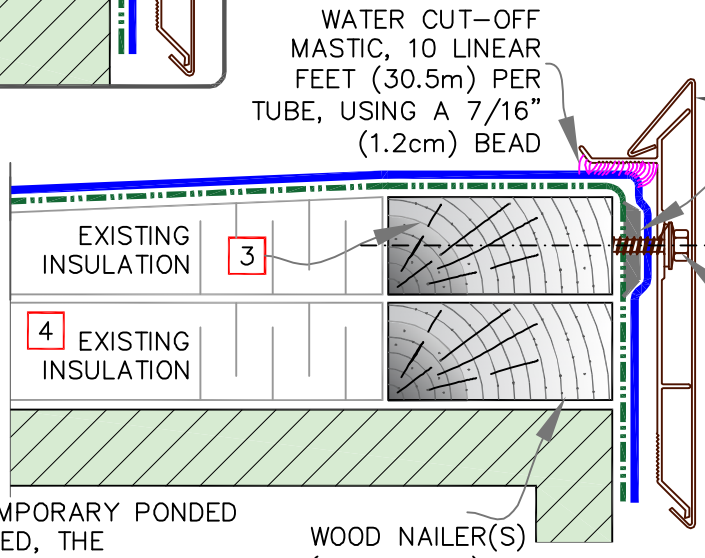
1. USE VapAir Seal 725TR AIR AND VAPOR BARRIER ON CONCRETE DECKS.
2. IN CASE OF METAL DECK, COORDINATE WITH CARLISLE.

CARLISLE SYNTEC SYSTEMS	ROOF EDGE: TEAR-OFF & REROOFING	DETAIL NO. V-1.2
	MAXIMUM WARRANTY: 20 YEARS	

OPTION WITH COVER BOARD

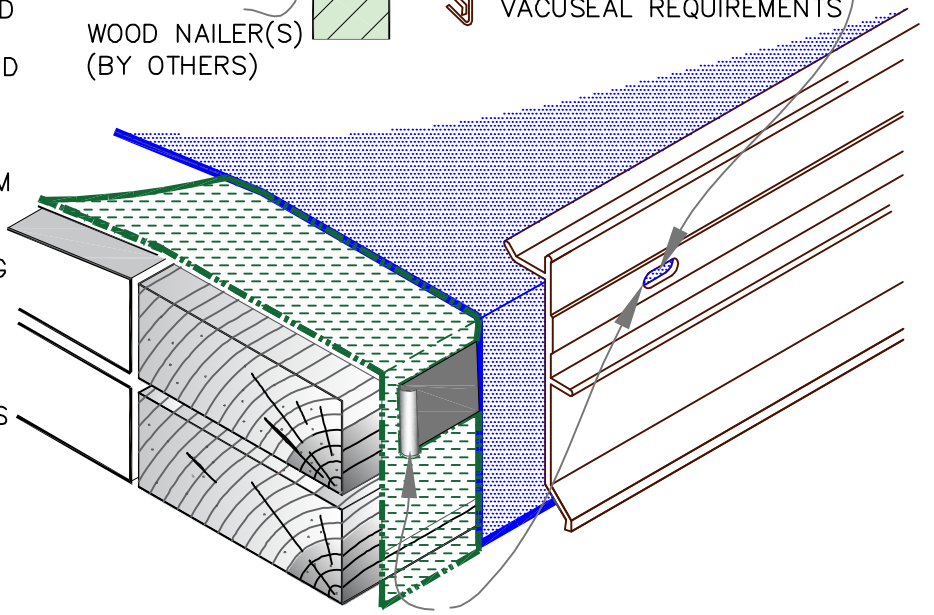






NOTES:

1. IF INCIDENTAL/TEMPORARY PONDED WATER IS EXPECTED, THE SecurEdge MUST BE ELEVATED AND SCUPPERS PROVIDED FOR DRAINAGE.
2. ENSURE ROOF SLOPES AWAY FROM SecurEDGE.
3. ENSURE, EXISTING WOOD BLOCKING IS PROPERLY SECURED. FIELD VERIFY AND REINFORCE/REPLACE AS NEEDED.
4. FIELD VERIFY THE DRY CONDITIONS OF EXISTING INSULATION WITH DELMHURST MOISTURE METER FOR DRY CONDITIONS.



	NEW ROOF MEMBRANE (EPDM, TPO OR PVC)
	EXISTING ROOF MEMBRANE OR APPROVED AIR BARRIER

VacuSeal SEALANT TAPE IS CENTRALLY ALIGNED AT FASTENERS' PENETRATION POINTS TO ACHIEVE CONSTANT COMPRESSION

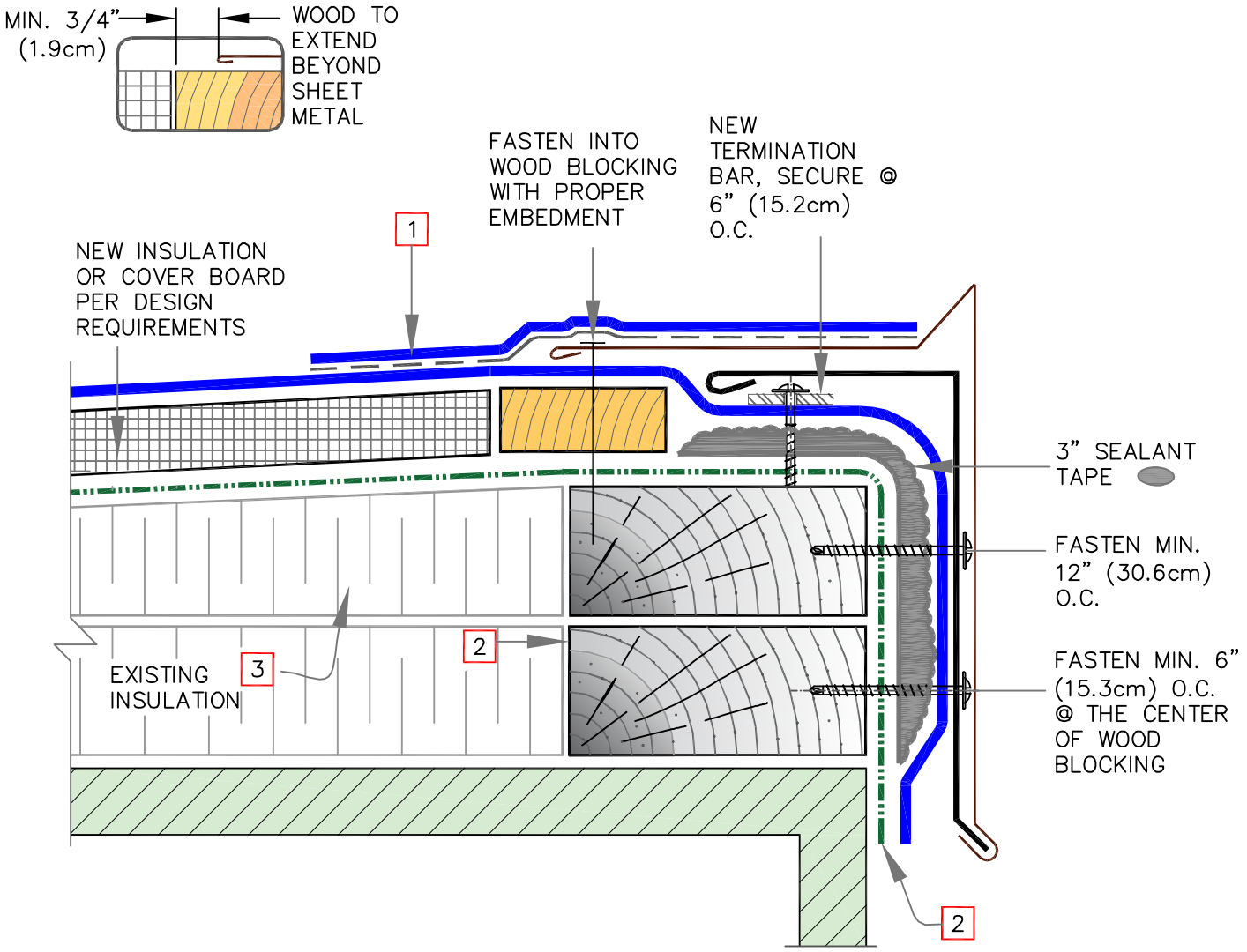
MATERIALS VARY

CARLISLE SYNTEC SYSTEMS

CARLISLE SecurEdge 2000

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-1D



NOTES:

1. ROOF FLASHINGS ARE SUBJECT TO THE TYPE OF ROOF MEMBRANE ASSEMBLY. REFER TO CARLISLE TYPICAL DETAILS FOR EACH MEMBRANE TYPE.

2. ROOF EDGES:

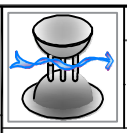
   2.1. ENSURE EXISTING WOOD BLOCKING IS PROPERLY SECURED. FIELD VERIFY AND REINFORCE OR REPLACE AS NEEDED.

   2.2. AFTER REMOVAL OF EXISTING EDGE METAL & IT'S NAILS, INSPECT FOR BREACHES IN THE MEMBRANE, IT'S SEAMS AND SEAL THEM ACCORDINGLY TO CREATE AN AIR BARRIER.

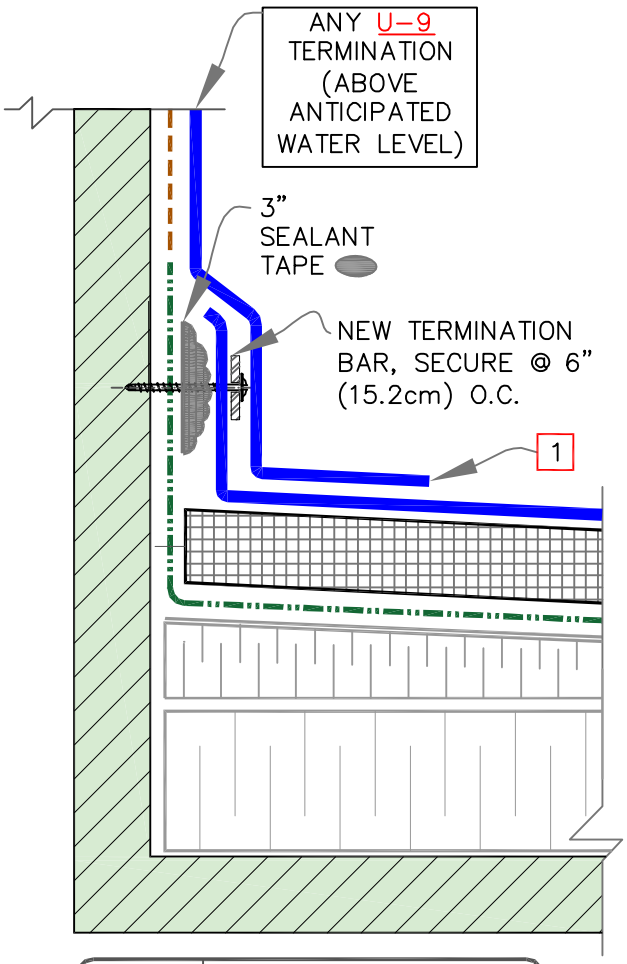
3. FIELD VERIFY THE DRY CONDITIONS OF EXISTING INSULATION WITH DELMHURST MOISTURE METER FOR DRY CONDITIONS.

	NEW ROOF MEMBRANE (EPDM, TPO OR PVC)
	EXISTING ROOF MEMBRANE OR APPROVED AIR BARRIER

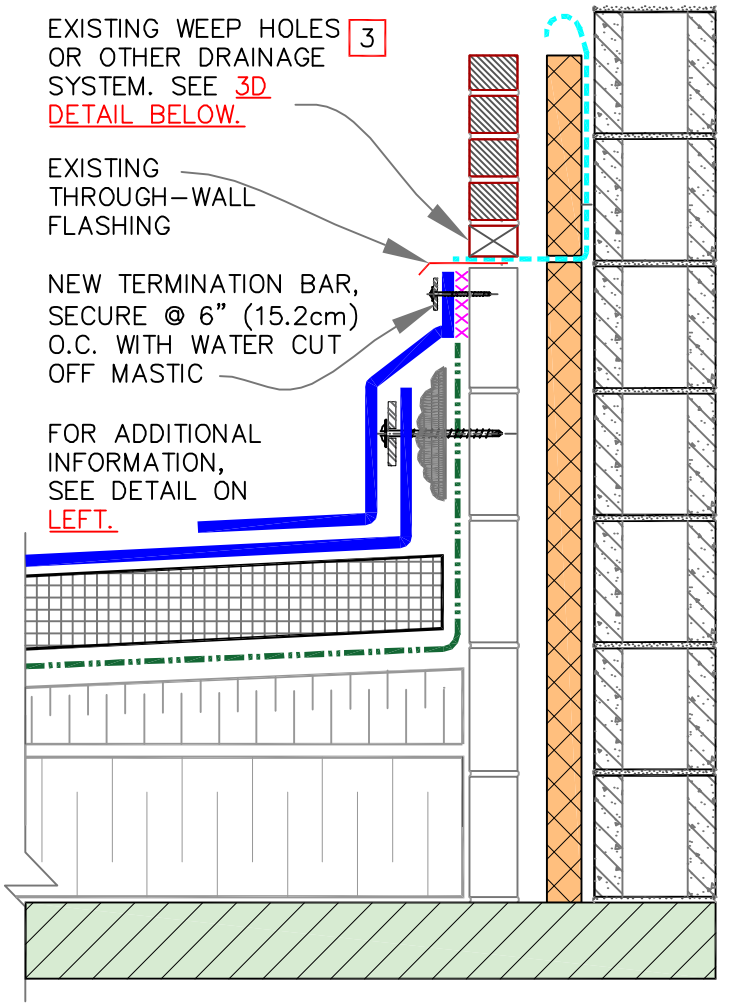
MATERIALS VARY

	GRAVEL STOP EDGE		DETAIL NO. V-1E
	MAXIMUM WARRANTY: 20 YEARS		

WALL WITHOUT DRAINAGE SYSTEM

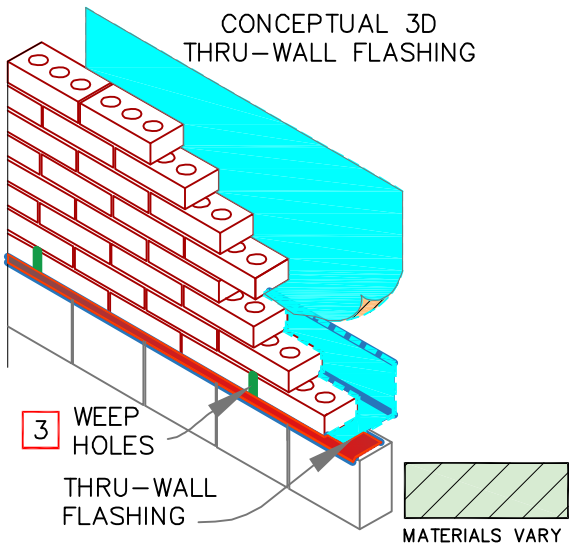


WALL WITH DRAINAGE SYSTEM



	NEW ROOF MEMBRANE (EPDM, TPO OR PVC)
	EXISTING ROOF MEMBRANE OR APPROVED AIR BARRIER

CONCEPTUAL 3D THRU-WALL FLASHING



NOTES:

1. ROOF FLASHINGS ARE SUBJECT TO THE TYPE OF ROOF MEMBRANE ASSEMBLY. REFER TO CARLISLE TYPICAL DETAILS FOR EACH MEMBRANE TYPE.
2. FIELD VERIFY THE DRY CONDITIONS OF EXISTING INSULATION WITH DELMHURST MOISTURE METER FOR DRY CONDITIONS.
3. IT IS CRITICAL THAT WEEP HOLES OR ANY OTHER WALL DRAINAGE SYSTEM IS NOT COVERED WITH NEW FLASHING. STOP THE FLASHING BELOW THE THROUGH-WALL FLASHING. CONTACT CARLISLE FOR REVIEW.

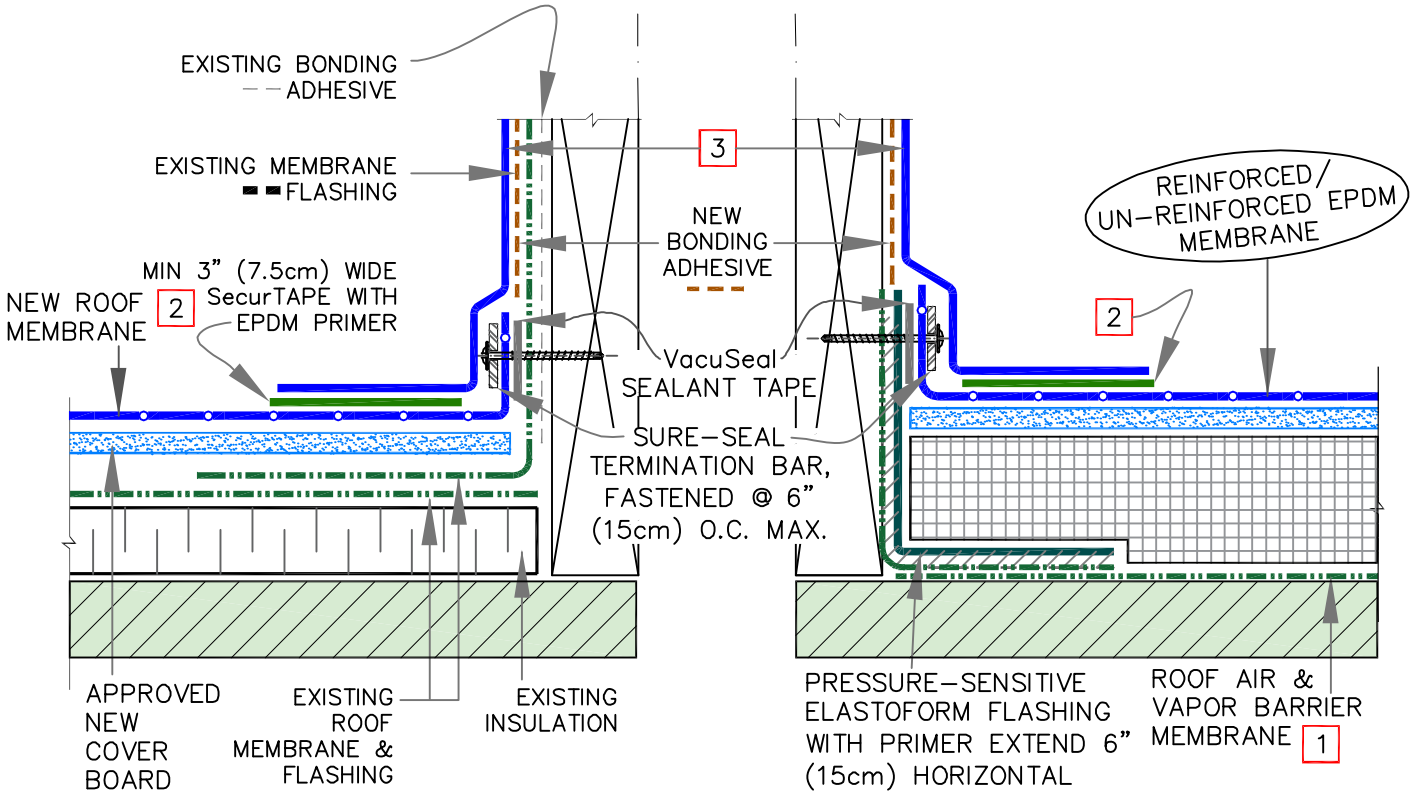
	ROOF TO WALL FLASHING	DETAIL NO. V-1F
	MAXIMUM WARRANTY: 20 YEARS	

RECOVER EXISTING ROOF OR RE-ROOF THE EXISTING ROOF, AFTER COMPLETE TEAR-OFF

(DRAWING DEPICTS RECOVER)

NEW CONSTRUCTION OR RE-ROOF THE EXISTING ROOF, AFTER COMPLETE TEAR-OFF

(DRAWING DEPICTS NEW ROOF)

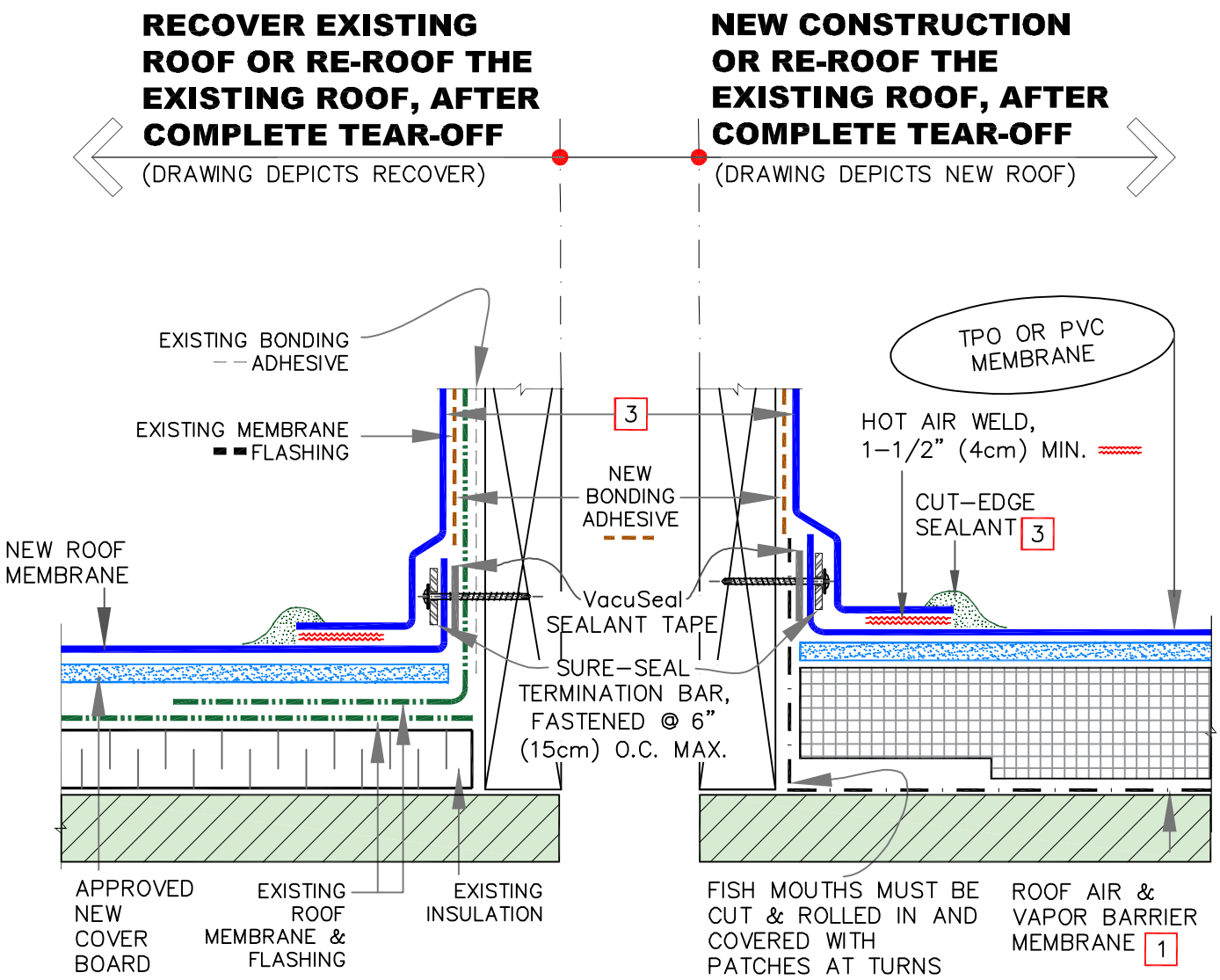


NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.
2. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOSET DETAIL U-5A FOR EPDM AND THERMOPLASTIC DETAIL U-5A FOR TPO/PVC.
3. SELF-ADHERING EPDM CURB WRAP MAY BE SUBSTITUED AS FLASHING ON EPDM ROOFS.

MATERIALS VARY

CARLISLE SYNTEC SYSTEMS	CURB BASE FLASHING – NEW CONSTRUCTION AND RE-ROOF (RECOVER) MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. V-5.1



NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.
2. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOPLASTIC DETAIL U-5A FOR TPO/PVC.
3. CUT EDGE SEALANT IS NOT REQUIRED ON PVC MEMBRANES.

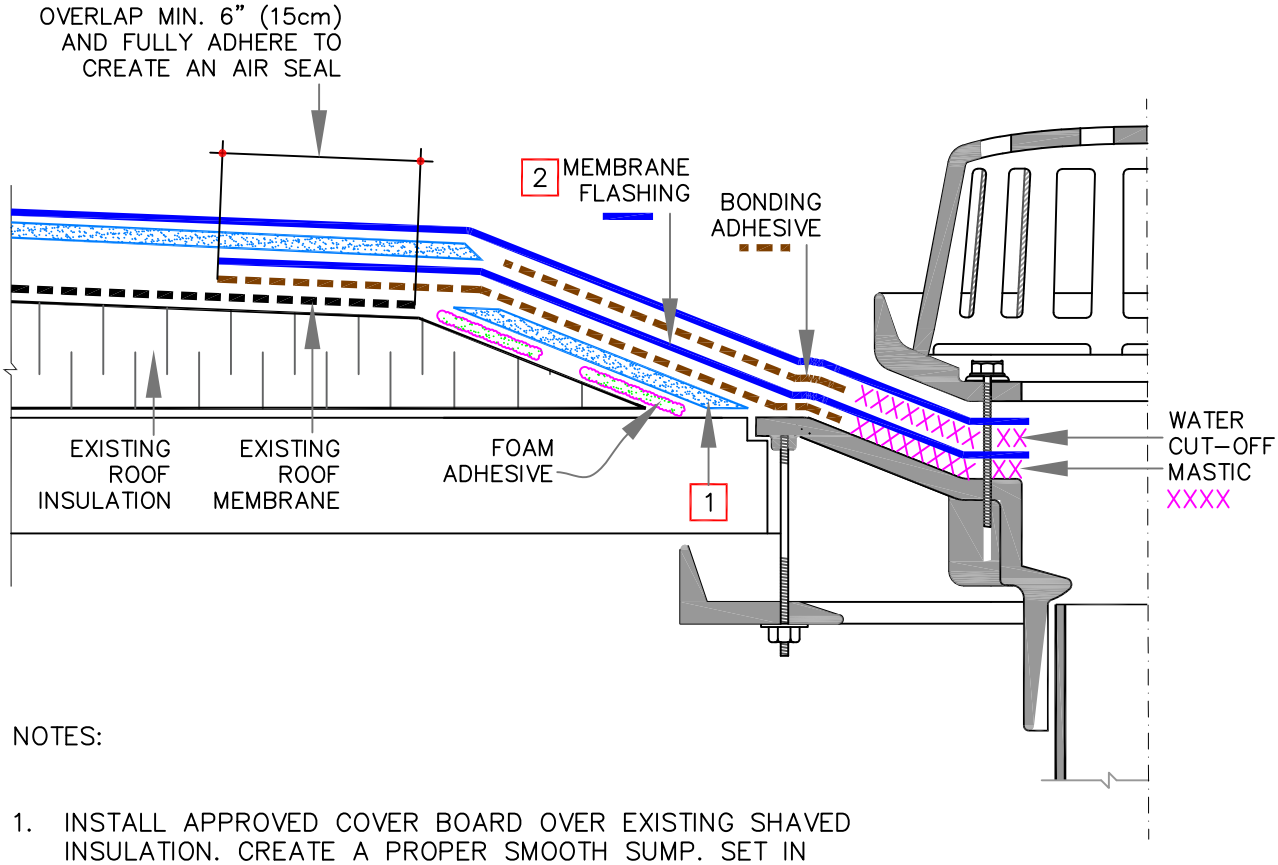
MATERIALS VARY

CARLISLE SYNTEC SYSTEMS

CURB BASE FLASHING – NEW CONSTRUCTION AND RE-ROOF (RECOVER)

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-5.2



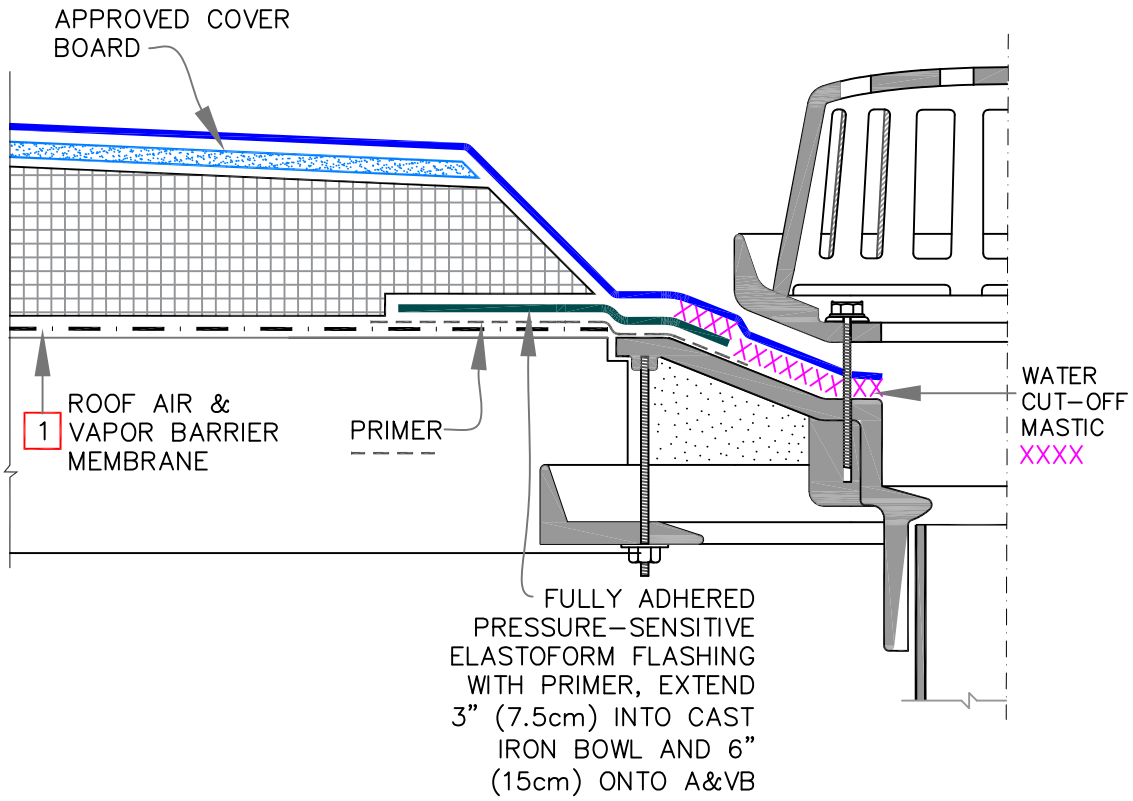
NOTES:

1. INSTALL APPROVED COVER BOARD OVER EXISTING SHAVED INSULATION. CREATE A PROPER SMOOTH SUMP. SET IN FOAM ADHESIVE.

2. FULLY ADHERE MEMBRANE FLASHING TO ACHIEVE AIRTIGHT CONDITION BETWEEN DRAIN AND EXISTING ROOF MEMBRANE. WHERE, THERE IS EXISTING ROOF VAPOR BARRIER, CUT IT BACK, IN ORDER TO PROPERLY AIR SEAL.

3. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOSET DETAIL U-6 FOR EPDM AND THERMOPLASTIC DETAIL U-6 FOR TPO/PVC.

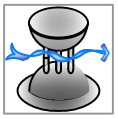
CARLISLE SYNTEC SYSTEMS	ROOF DRAIN: RE-ROOF (RECOVER)		DETAIL NO. V-6.1
	MAXIMUM WARRANTY: 20 YEARS		

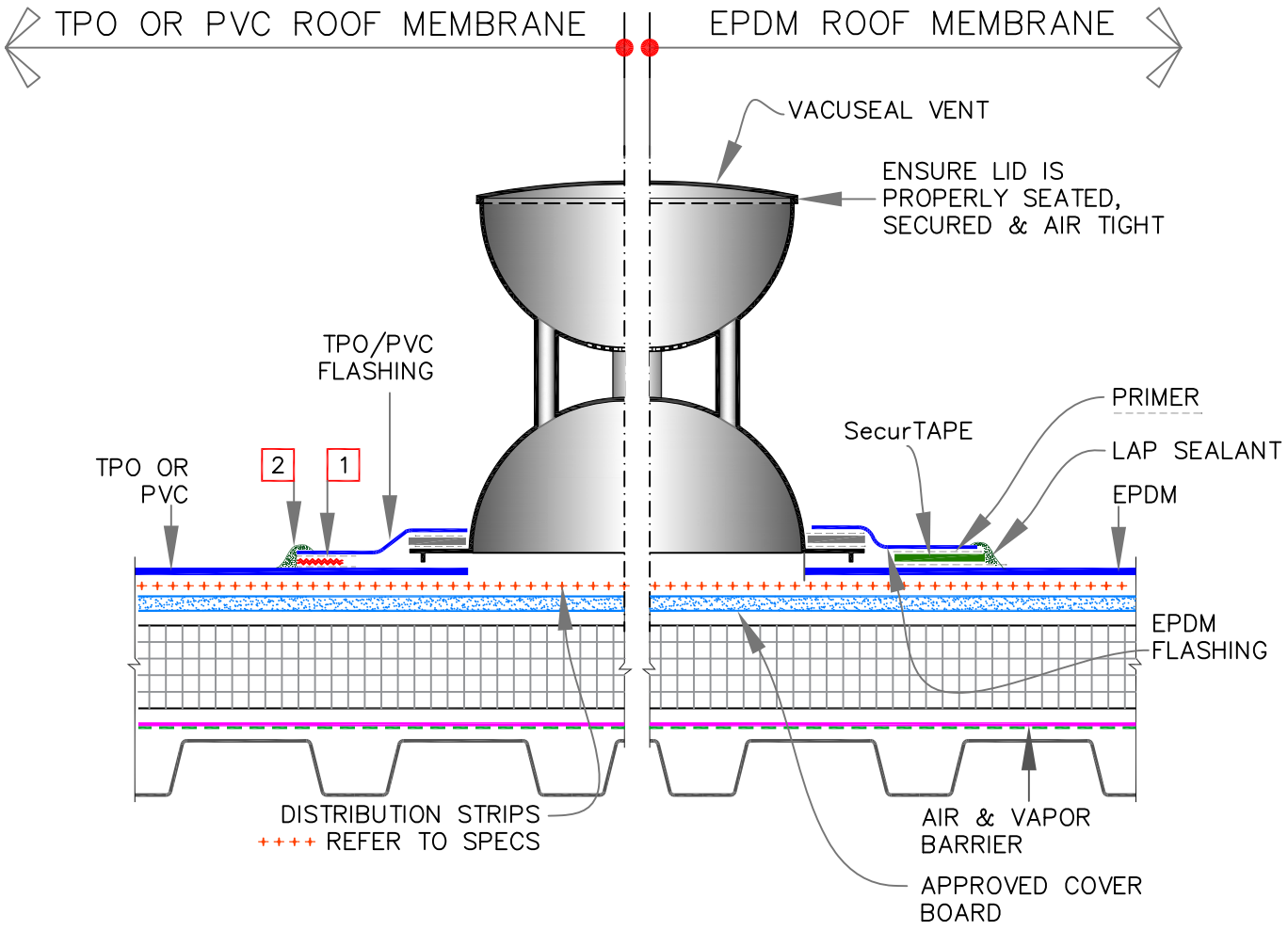


NOTES:

1. PROJECTS WITH STEEL DECKS, DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE, WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.

2. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOSET DETAIL U-6 FOR EPDM AND THERMOPLASTIC DETAIL U-6 FOR TPO/PVC.

CARLISLE SYNTEC SYSTEMS	ROOF DRAIN: NEW CONSTRUCTION		DETAIL NO. V-6.2
	MAXIMUM WARRANTY: 20 YEARS		



NOTES:

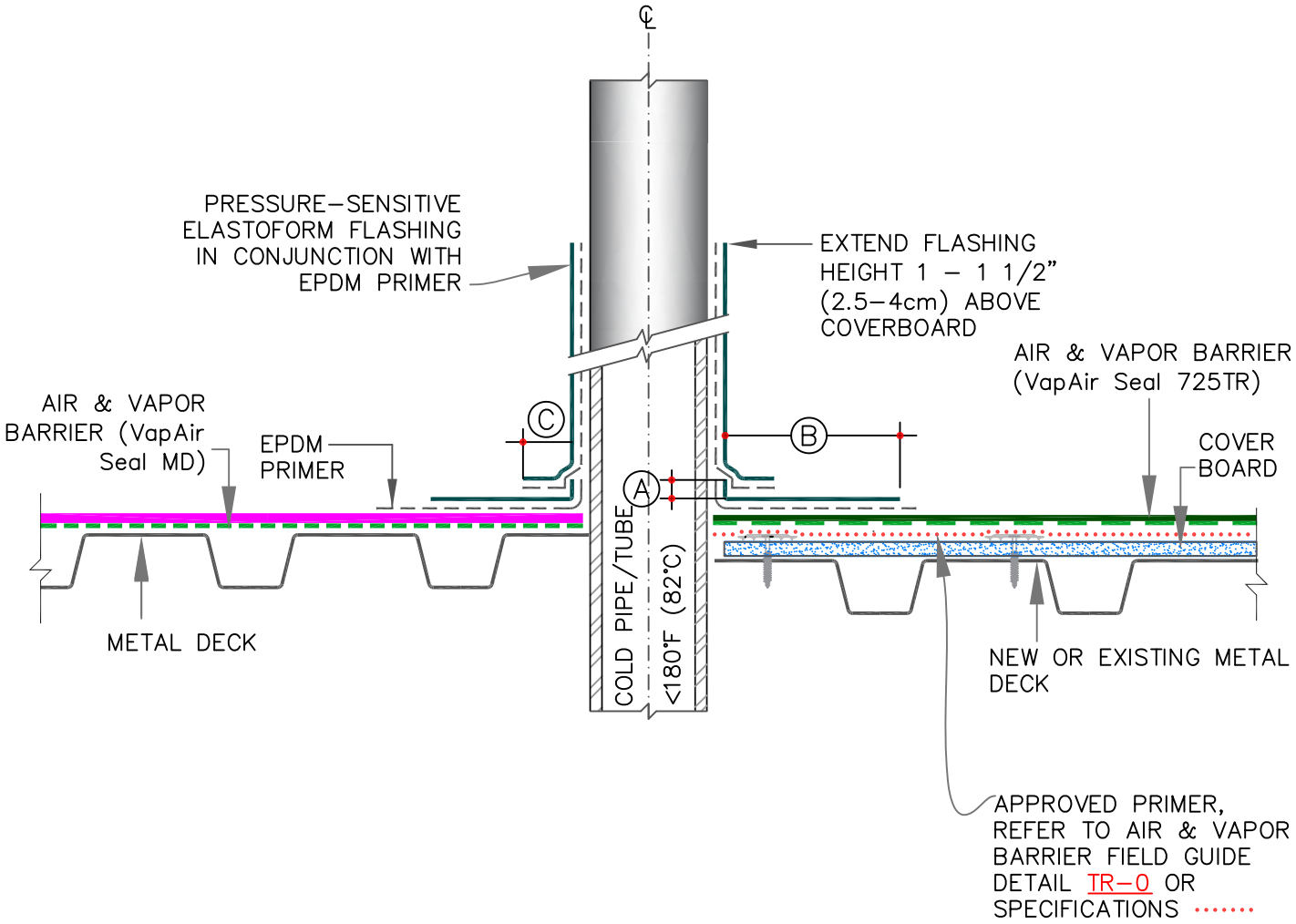
1. HOT AIR WELD, MIN. 1–1/2" (4cm).
2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

VACUSEAL VENT WITH PRE–APPLIED SKIRT FLASHING

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
V–8.0



NOTE:

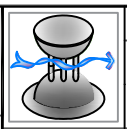
1. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE THERMOSET DETAIL U–8B.

DIMENSIONS		cm	
Ⓐ	1/2"	1.5	MIN.
Ⓑ	5.5"	14	MIN.
Ⓒ	1"	2.5	MIN.

CARLISLE SYNTEC SYSTEMS

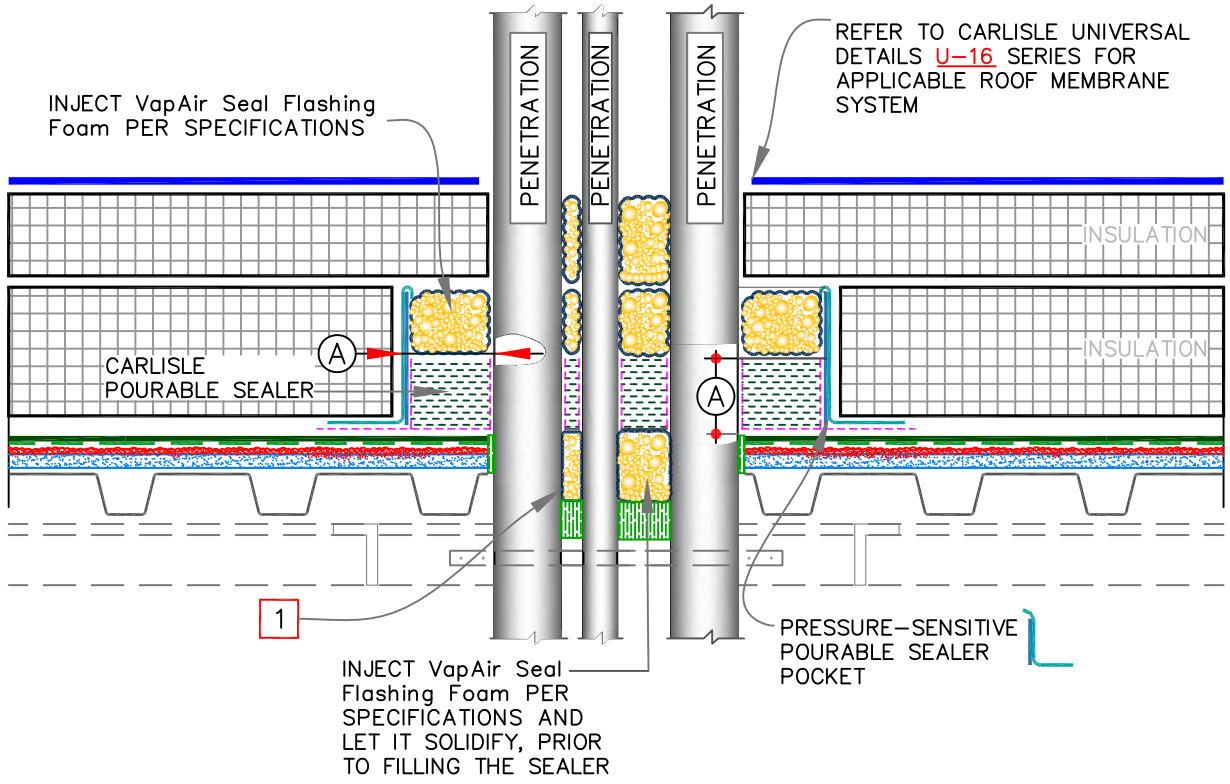
PIPE/STRUCTURAL STEEL TUBE THROUGH METAL DECK

MAXIMUM WARRANTY: 20 YEARS



DETAIL NO.

V–8.1



DIMENSIONS		cm	
Ⓐ	1/2"	1.5	TO
	1"	2.5	

NOTES:

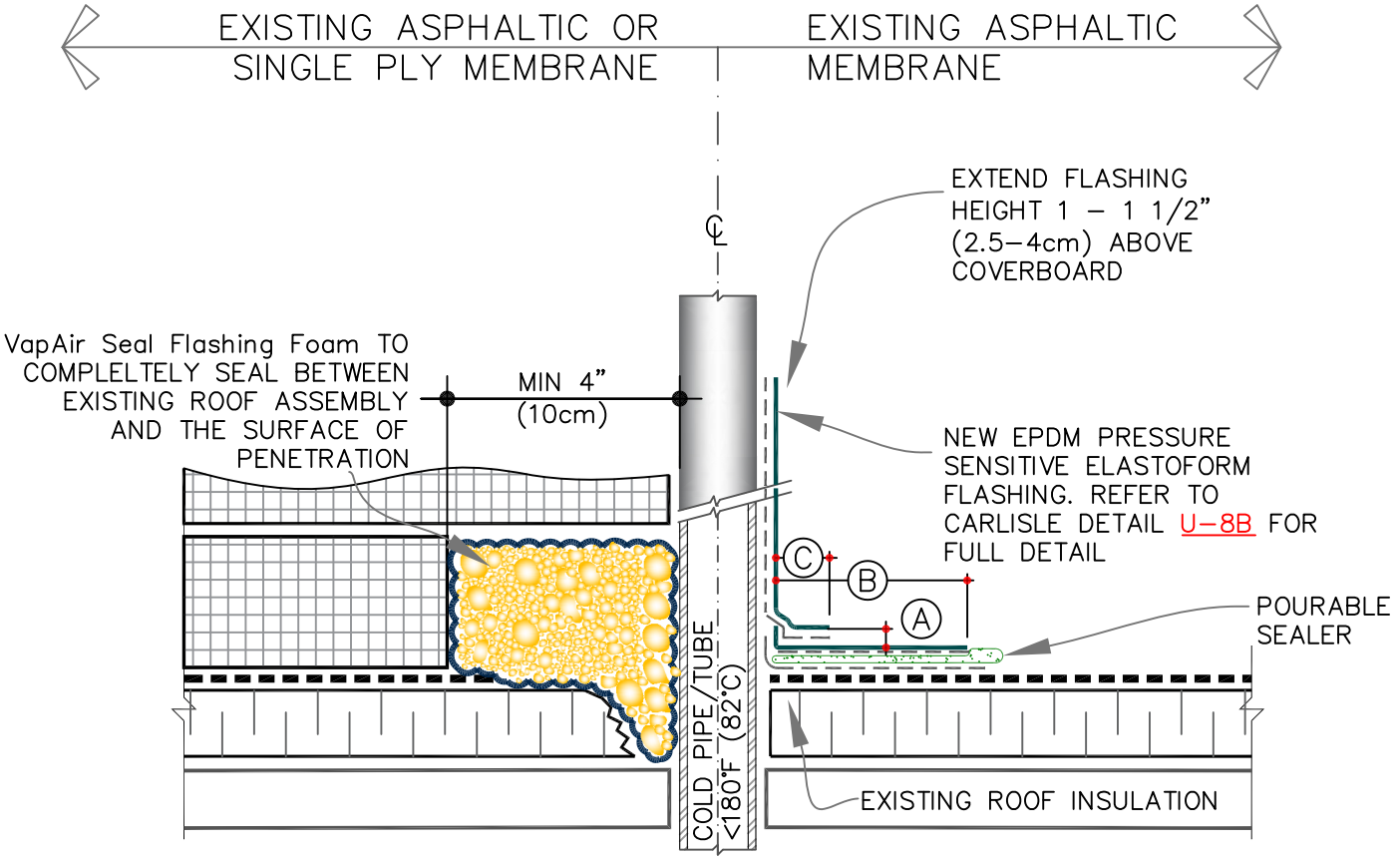
1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180° F (82° C).
2. PENETRATIONS, AIR & VAPOR BARRIER, FLASHING AND METAL (INSIDE POCKET) MUST BE PRIMED WITH EPDM PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
3. POURABLE SEALER MUST CONTACT PRIMED PRESSURE-SENSITIVE ELASTOFORM FLASHING AND AIR & VAPOR BARRIER.
4. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.

CARLISLE SYNTEC SYSTEMS

MULTIPLE PENETRATIONS THROUGH STEEL DECK – NEW CONSTRUCTION

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-8.2

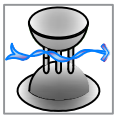


DIMENSIONS		cm	
A	1/2"	1.5	MIN.
B	5.5"	14	MIN.
C	1"	2.5	MIN.

CARLISLE SYNTEC SYSTEMS

SINGLE PENETRATION THROUGH EXISTING ROOF ASSEMBLY

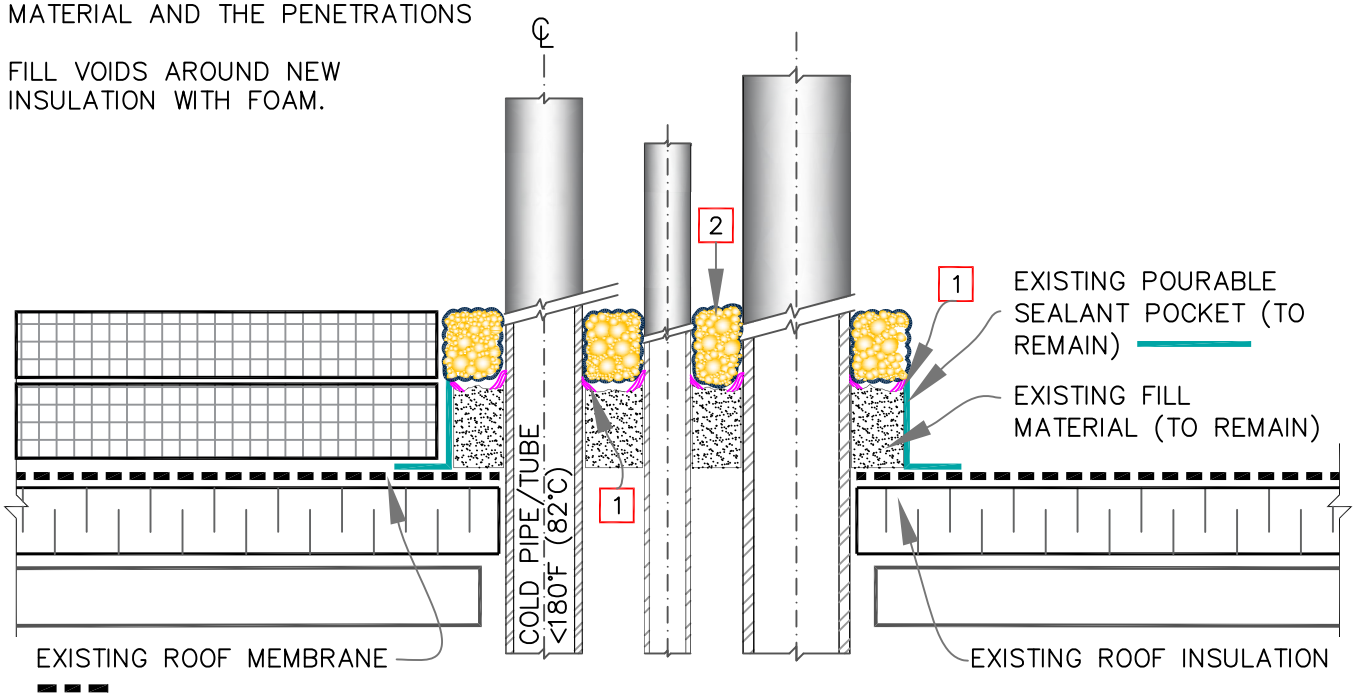
MAXIMUM WARRANTY: 20 YEARS



DETAIL NO. V–8.3

NOTES:

1. APPLY NEW SEALANT AT ALL CRACKED AND BREACHED AREAS OF POURABLE SEALERS. ENSURE A PROPER BOND BETWEEN EXISTING MATERIAL AND THE PENETRATIONS
2. FILL VOIDS AROUND NEW INSULATION WITH FOAM.

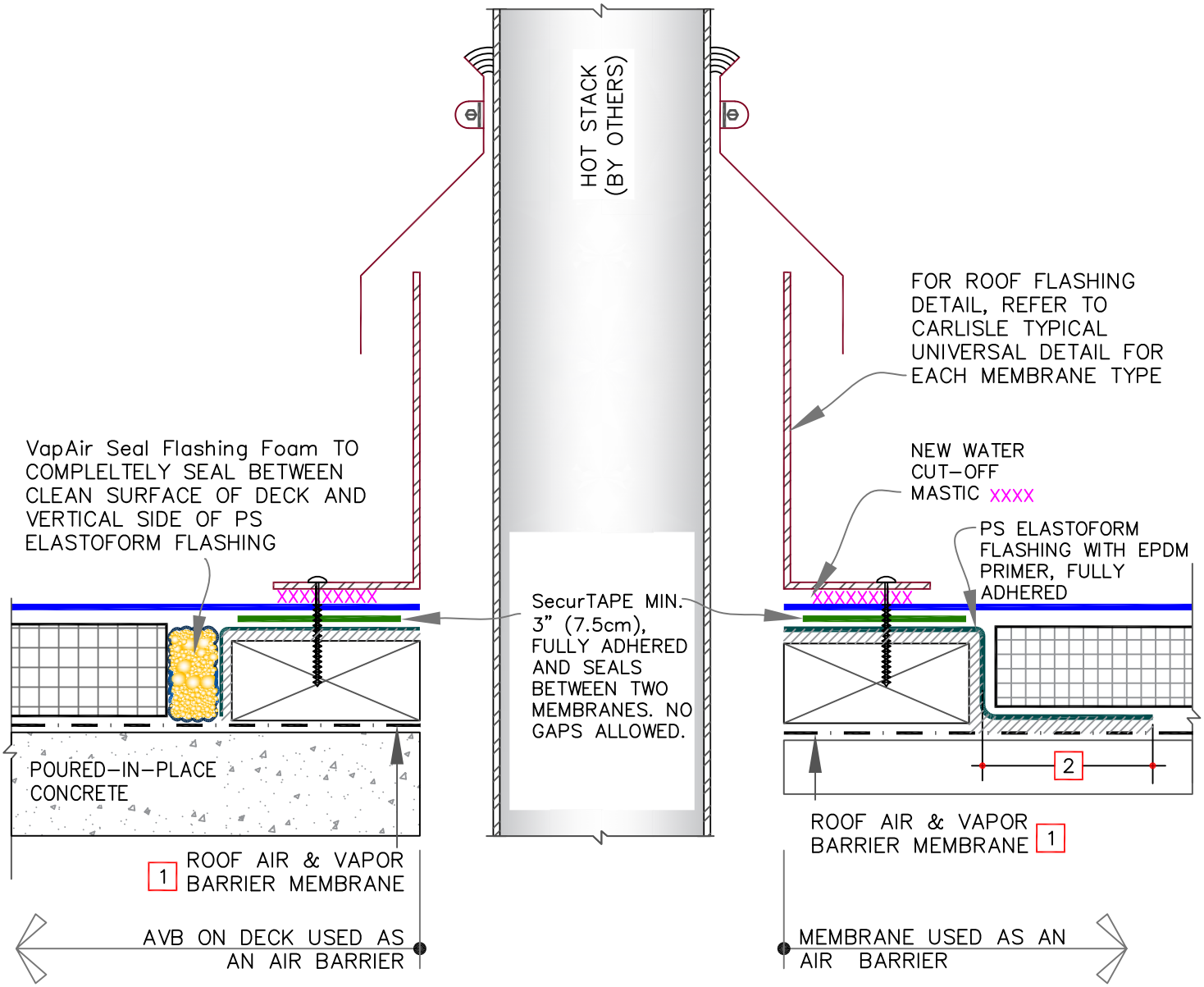


CARLISLE SYNTEC SYSTEMS

CLUSTER OF PENETRATIONS THROUGH EXISTING ROOF ASSEMBLY

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V-8.4

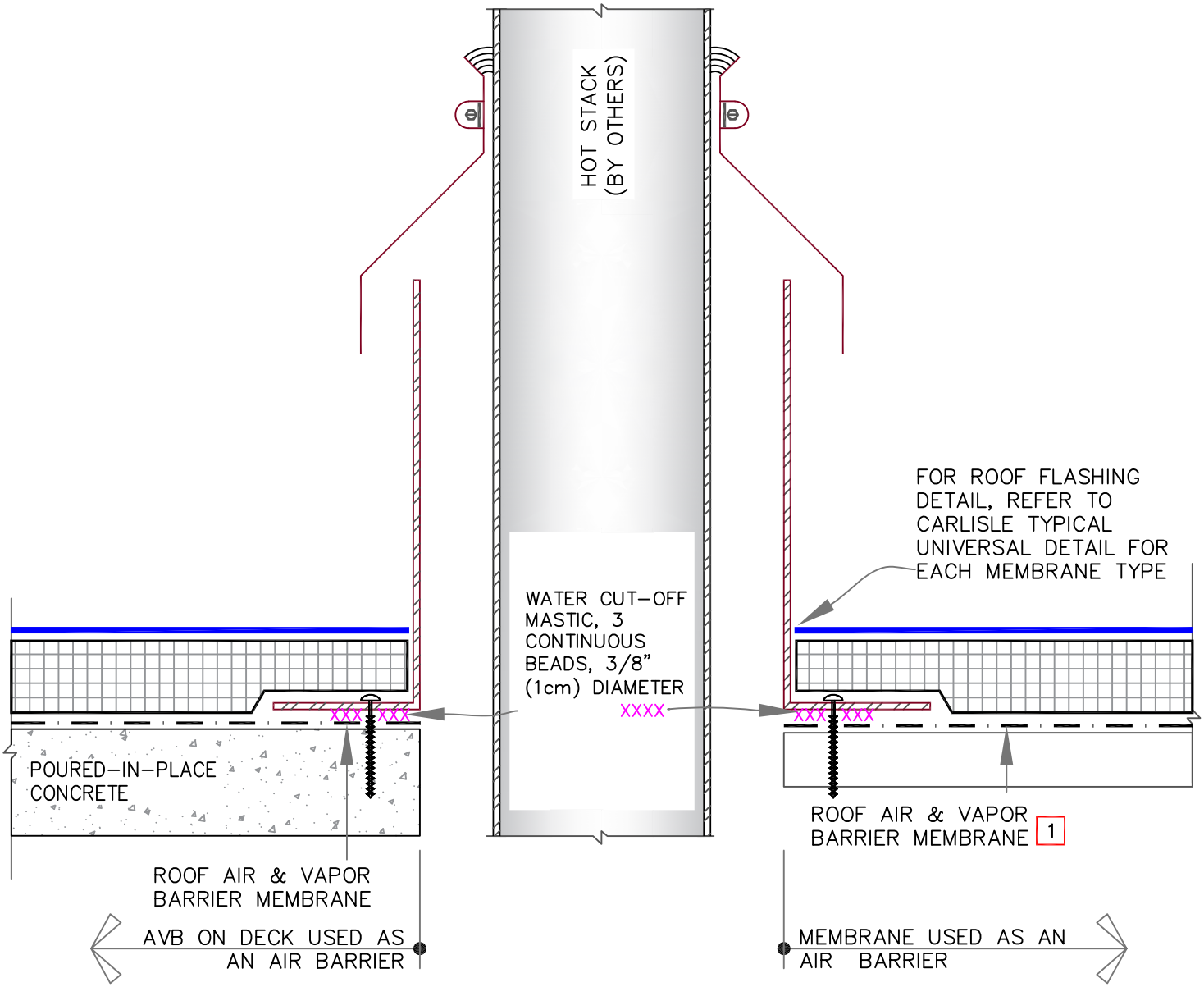


NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.

2. OVERLAP MIN. 6" (15cm) AND FULLY ADHERE TO CREATE AN AIR SEAL.

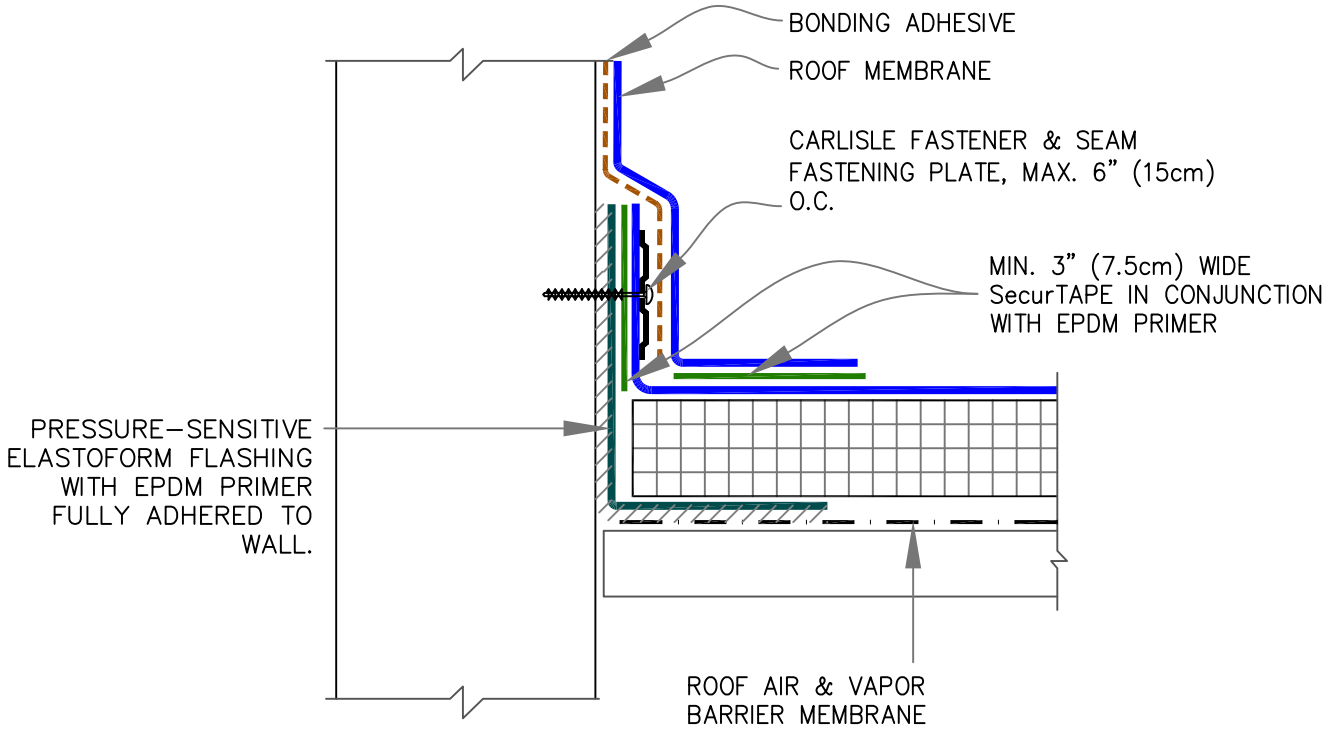
CARLISLE SYNTEC SYSTEMS	HOT STACK AIR FLASHING – OPTION A MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. V-8.5A

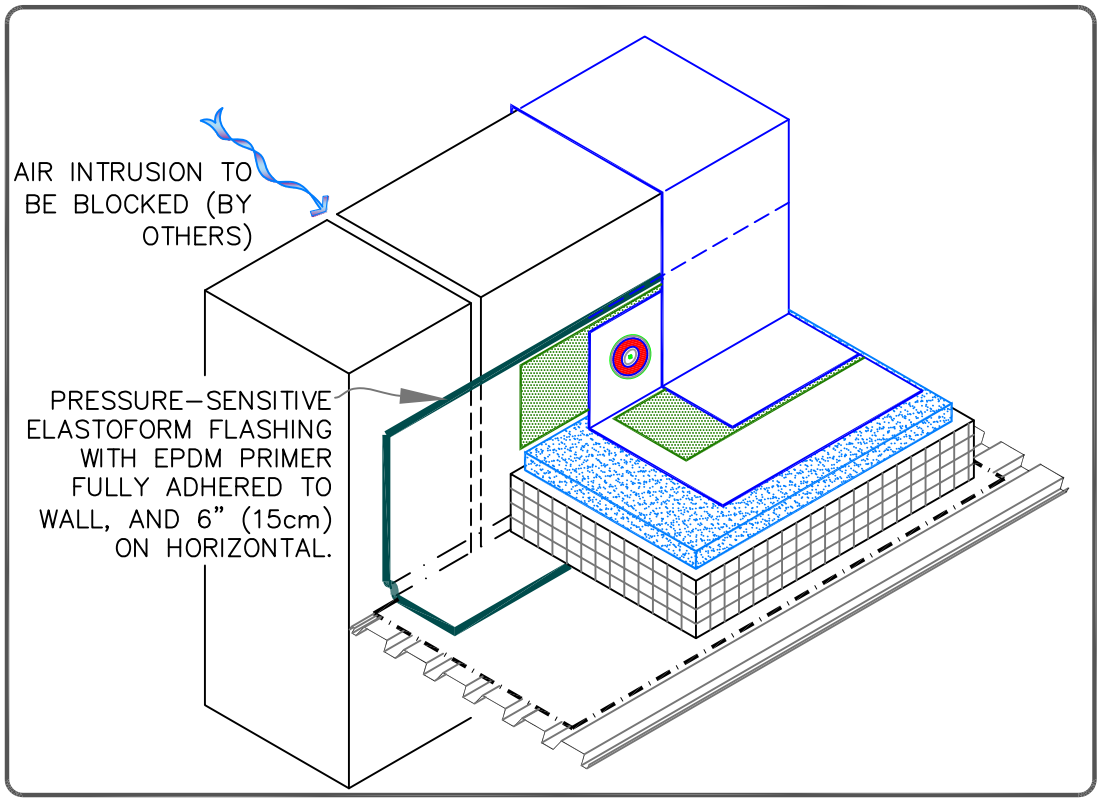


NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.

CARLISLE SYNTEC SYSTEMS	HOT STACK AIR FLASHING – OPTION B	DETAIL NO. V-8.5B
	MAXIMUM WARRANTY: 20 YEARS	



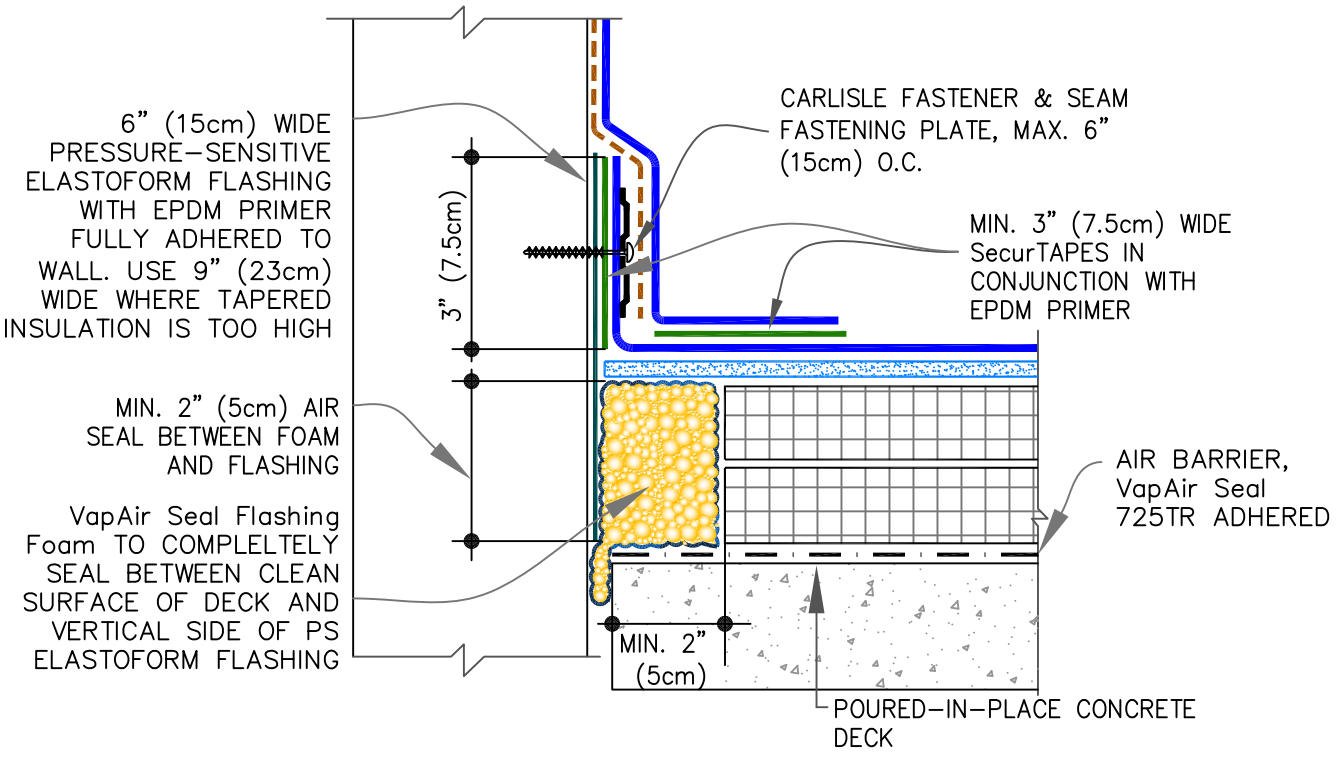


CARLISLE SYNTEC SYSTEMS

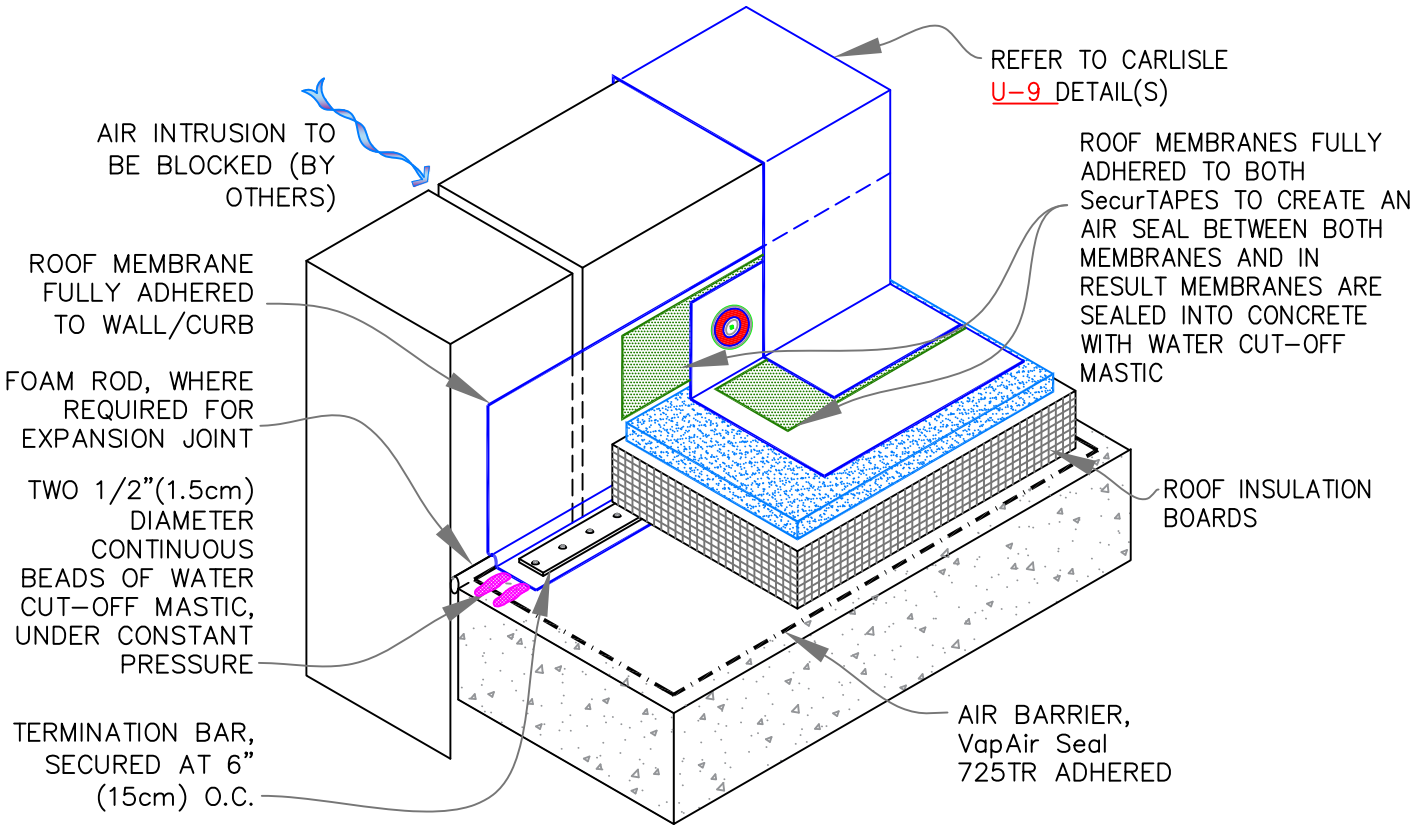
PARAPET WITH MEMBRANE AIR BARRIER

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
V-12.1



A OPTION: AIR SEALING WITH FOAM



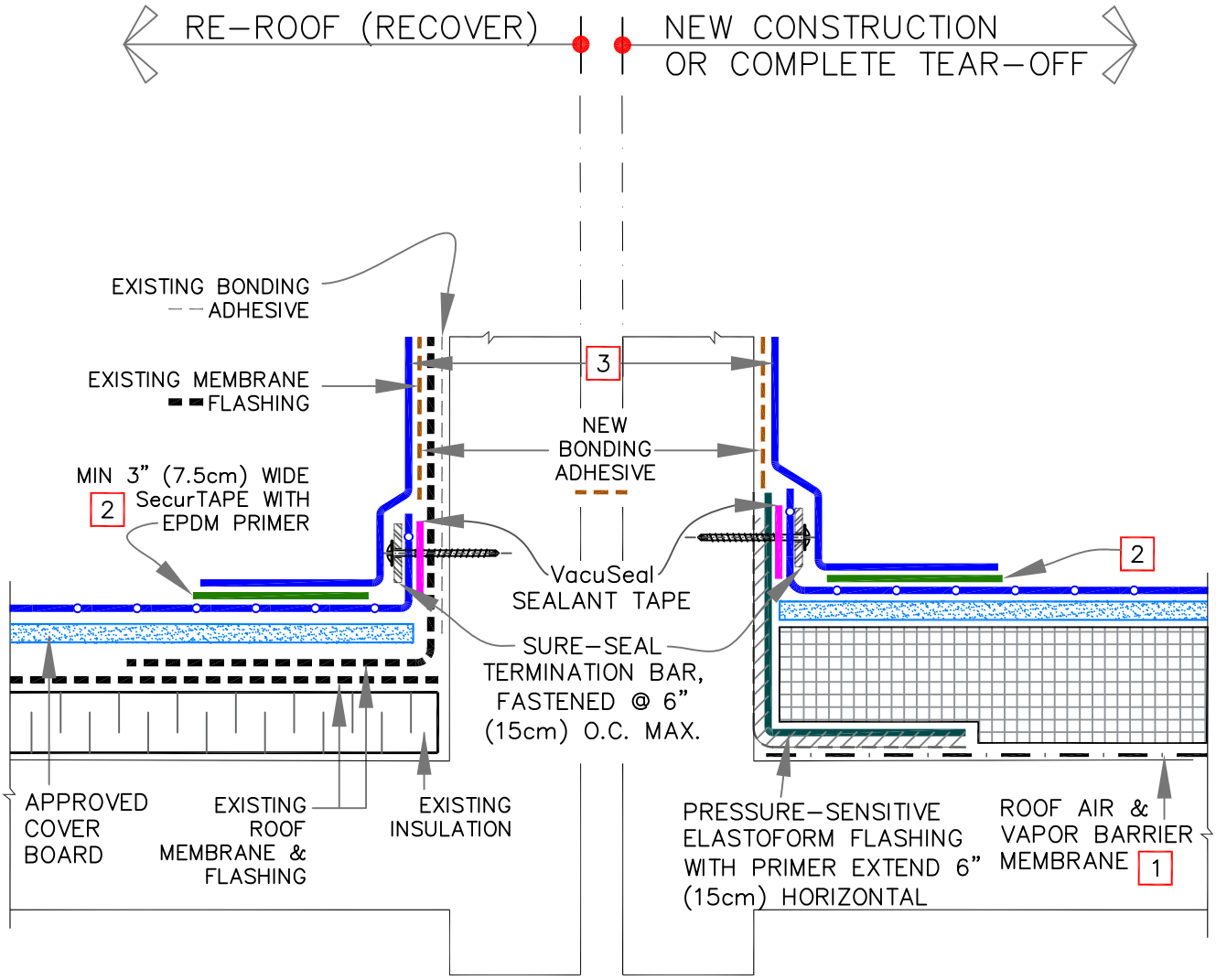
B OPTION: AIR SEALING WITH MEMBRANE FLASHING

CARLISLE SYNTEC SYSTEMS

PARAPET / CURB:
CONCRETE/LIGHTWEIGHT CONCRETE WITH DECK LEVEL AIR/VAPOR BARRIER

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
V-12.2

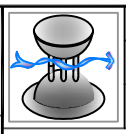


NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.

2. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOSET DETAIL U-5A FOR EPDM AND THERMOPLASTIC DETAIL U-5A FOR TPO/PVC.

3. SELF-ADHERING EPDM CURB WRAP MAY BE SUBSTITUED AS FLASHING ON EPDM ROOFS.

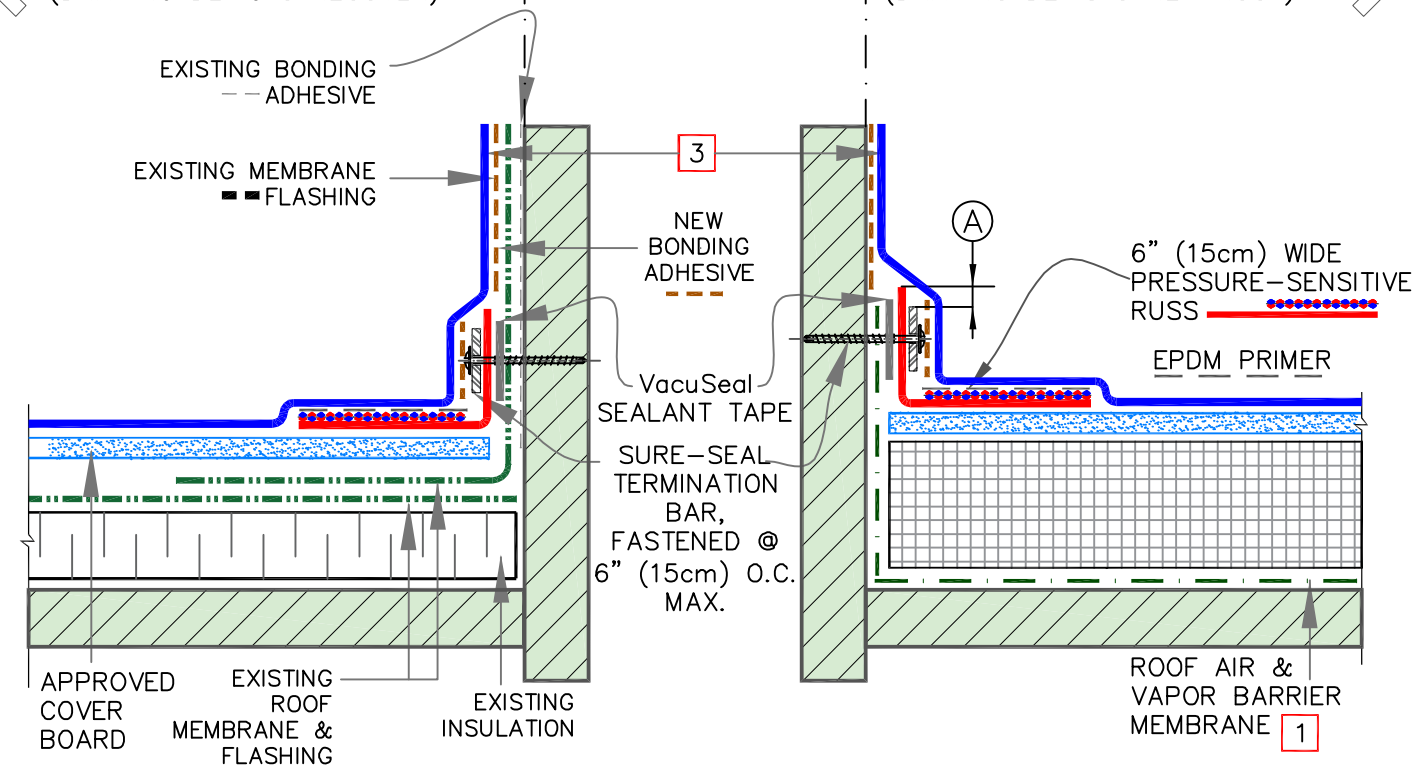
CARLISLE SYNTEC SYSTEMS	PARAPET OR WALL – NEW CONSTRUCTION AND RE-ROOF (RECOVER)		DETAIL NO. V-12.3
	MAXIMUM WARRANTY: 20 YEARS		

RECOVER EXISTING ROOF OR RE-ROOF THE EXISTING ROOF, AFTER COMPLETE TEAR-OFF

(DRAWING DEPICTS RECOVER)

NEW CONSTRUCTION OR RE-ROOF THE EXISTING ROOF, AFTER COMPLETE TEAR-OFF

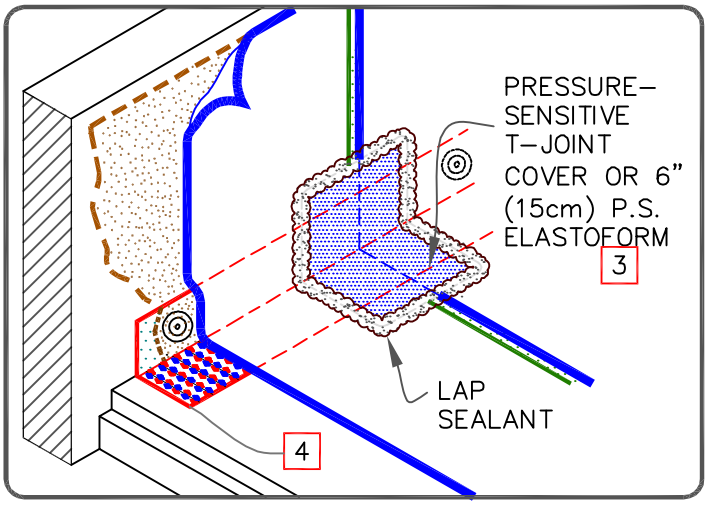
(DRAWING DEPICTS NEW ROOF)



DIMENSION		cm
A	1/8"–1"	0.5–2.5

NOTES:

1. ON STEEL DECKS DIRECTLY ADHERE VapAir Seal MD. USE VapAir Seal 725TR ON CONCRETE & WOOD DECKS OR DECKS WITH APPROVED COVER BOARDS.
2. FOR ADDITIONAL INFORMATION, REFER TO CARLISLE'S THERMOSET DETAIL U–5A FOR EPDM AND THERMOPLASTIC DETAIL U–5A FOR TPO/PVC.
3. SELF–ADHERING EPDM CURB WRAP MAY BE SUBSTITUED AS FLASHING ON EPDM ROOFS.



MATERIALS VARY

CARLISLE SYNTEC SYSTEMS

PARAPET OR WALL – NEW CONSTRUCTION AND RE–ROOF (RECOVER)

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO. V–12A

CARLISLE'S SPEC SUPPLEMENT

G-15

ChannelDry® EPS Insulation

ChannelDry Roof Assembly for Lightweight Structural Concrete Decks

Adhered, Ballasted or Induction Welding Attachment Method

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and use of ChannelDry EPS and roof vents for roofing assembly installations over newly poured lightweight structural concrete decks (after achievement of full structural strength) or for retro-fitting (with tear off) over existing structural concrete deck. In addition to the information contained herein, attached details are included to provide the Specifiers and Authorized Applicators with quick access to specific information. Specifiers and Authorized Applicators are advised to reference all applicable details included with this spec supplement.

The assembly described herein includes ChannelDry EPS and Carlisle SecurShield Polyiso or SecurShield HD Polyiso, one-way and two-way roof vents, in addition to any of the Carlisle Single-ply membranes (EPDM, TPO or PVC) **(60-mil thick minimum)**.

A. Description

The roofing assembly incorporates the ChannelDry EPS insulation directly over lightweight structural concrete deck with the subsequent layer(s) of SecurShield Polyiso Insulation or SecurShield HD Polyiso Cover Board.

With any of the membranes listed below, one-way roof vents are required at the rate of 1 per 2,000 SF and shall be positioned closer to the perimeter and two-way roof vents in the field of the roof at the rate of 1 per 8,000 SF. For projects with individual roof sections less than 2,000 SF, Contact Carlisle for vent number recommendations, also refer to appropriate detail for recommended locations.

Regardless of the membrane attachment method, Adhered, Induction Welded or Ballasted, a continuous air seal must be provided by sealing any gaps or joints at walls, around penetrations, roof projections and around roof drains. Refer to appropriate detail at the end of this document.

1. Adhered Assemblies – Using EPDM, TPO or PVC, the ChannelDry EPS Insulation may be fastened directly to the structural deck at a rate of 1 fastener and plate per 4 SF or adhered with Carlisle's Flexible FAST Adhesive. With subsequent layers of insulation or coverboard set in Flexible FAST bead adhesive at 6" O.C. The membrane shall be fully adhered using the appropriate bonding adhesive per Carlisle's Thermoset or Thermoplastic Specification.

NOTE: In lieu of fastening and adhering individual layers of insulation, fasteners may be secured through all layers of insulation directly to concrete deck.

2. Induction Welded Assemblies – Using TPO or PVC, the ChannelDry EPS Insulation is overlaid with SecurShield Polyiso or SecurShield HD Polyiso, Carlisle's CD-10 or HD-14-10 fastener and TPO or PVC Induction Welding Plates are used to secure both layers to the structural deck. The fastening density of the plates and fasteners shall be in compliance the Induction Welding Attachment (Attachment I) of the Thermoplastic Specification.

3. Ballasted Assemblies – This option which is only available with Sure-Seal EPDM. Loose-lay the ChannelDry EPS and the SecurShield Polyiso, directly over the concrete deck. If insulation securement is specified (not required for Carlisle warranty) it must be accomplished by mechanically fastening the ChannelDry EPS and adhering the subsequent layer(s) of SecurShield Insulation. Consult the Carlisle published Specification for Ballasted Roof

Assemblies, for additional requirements not listed herein.

Any of the assemblies described herein, using 60-mil membrane, are eligible for a 5, 10, 15 or 20 Year Membrane System Warranty and Warranty wind speed up to 72 mph. For higher wind speed coverage, project may be submitted to Carlisle for Approval.

NOTE: This system is not for use on Cold Storage/Freezer Buildings. Such projects may be submitted to Carlisle for other design options.

B. Quality Assurance

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

2. Do not install this assembly before the concrete deck has reached its' initial structural strength. Project Engineer must be consulted prior to job start-up.

C. Submittals

1. 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.

2. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

D. Products

Products listed in "Part II" of the Carlisle Thermoset/Thermoplastic Roofing System Specification can be used as part of the ChannelDry Roofing System.

1. **ChannelDry EPS**: A 4' x 4' x 2" thick, closed cell, expanded polystyrene (Type IX - 1.8 pcf (min.) nominal density) board with 5/8" wide channels routed, bi-directionally, on the bottom facer. The 2" thick board has an R-Value of 7.1.

2. **One- and Two-Way Pressure Relief Vent**: Heavy-gauge spun aluminum vent are engineered to reduce moisture within the roofing system and release trapped air pressure within the building. Base diameter 11", Stack diameter at base of 5" and overall height of 8". For identification purposes, One-Way Pressure Relief vent is marked with a single dimple on the top (cap) versus two dimples for the two-way pressure relief vents.

3. **VacuSeal Vent:** Wind ballasted roof system vent manufactured from rigid PVC compound designed to eliminate differential pressure and secure single-ply roof membranes.

4. **Flexible FAST Adhesive:** A bead-applied, two-component polyurethane, construction grade, low-rise expanding foam adhesive used for attaching approved insulations to other approved insulations and coverboards. Also may be used to fill voids between deck to wall junctions and around pipe penetrations.

5. **VapAir Seal Flashing Foam –** a low pressure foam system that utilizes a non-flammable blowing agent. The foam is used to seal penetrations and reduce air leakage, especially at roof perimeters.

6. **Sure-Seal (black)/Sure-White (white) Pressure-Sensitive Elastoform® Flashing:** A 6" X 100' and 9" or 12" wide by 50' long, 60-mil thick Sure-Seal or Sure-White **uncured** EPDM Flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with EPDM/TPO/PVC Primer.

   Sure-Seal/Sure-White uncured Pressure-Sensitive Elastoform Flashing is used to flash one-way and two-way roof vents.

7. **Sure-Flex PVC non-reinforced Flashing** is 80-mil thick (white on gray) and available in rolls **12" and 24" wide by 50' long**. Flashing is used for field fabricated flashings for one-way and two-way roof vents.

8. **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-X Fasteners to attach the roofing assembly and is activated using the RhinoBond or Isoweld Induction Welding Tool.

9. **Sure-Seal or Sure-White SecurTAPE:** A 3" or 6" wide by 100' long splice tape used for attaching the one-way and two-way roof vents to the membrane before flashing the vent.

10. For other products needed to complete roof assembly, SecurShield Polyiso and SecurShield HD Polyiso, refer to listings in Part II of the Thermoset and Thermoplastic Specification.

E. Execution

Follow current specifications for installing roof membranes and seaming per specific membrane. [Sure-Seal (EPDM), Sure-Weld (TPO) or Sure-Flex (PVC)].

1. **General**

   a. 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 minimize construction traffic on completed sections. This will include completion of all flashings and terminations.

2. **Roof Deck Criteria and Preparation**

   a. Roofing Assembly described herein intended for use on newly poured structural concrete decks (normal and lightweight) once they have reached their designed structural strength.

   b. Surface imperfections, fins or cracks, must be documented and reported to the specifier, general contractor and building owner for assessment. The Carlisle Authorized Roofing Applicator shall not proceed unless the defects are corrected.

   c. The substrate must be free of debris, foreign materials and must be free of accumulated water, ice, snow or frost.

   d. Cracks or voids in the substrate greater than 1/4" must be filled with Flexible FAST Adhesive, VapAir Seal Flashing Foam or urethane sealant (by others).

   e. For Deck-to-Wall Junctions and roof penetrations, fill gap with foam backer rod and Flexible FAST Adhesive, VapAir Seal Flashing Foam or urethane sealant (by others). Refer to **Detail MM-2.**

F. Installation

1. Follow guidelines above for the installation and air sealing of roof deck perimeters and penetrations.

2. Proceed with installation roofing system as described in this section and in accordance with Carlisle published Specifications for the specific membrane type.

3. After installation of the roofing membrane, mark locations for one-way and two-way roof vents. And cut a 5” diameter core through membrane and insulating material down to the concrete deck. Remove excess material.

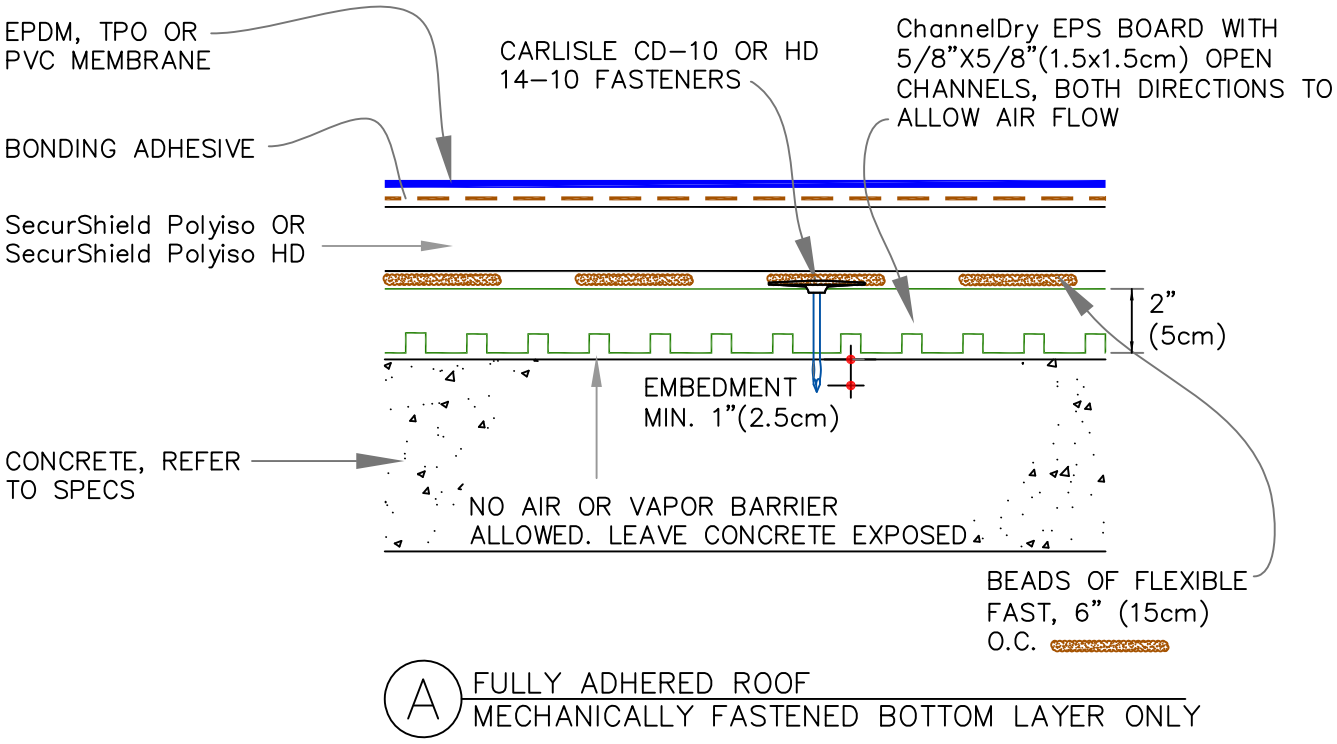
4. Place the One-Way and Two-Way Roof Vents or VacuSeal Vent centered over void. Follow applicable details depending on type of membrane used. Flash One-Way and Two-Way Roof Vent or VacuSeal Vent per requirements outlined in the detail.

5. Repeat procedure at each vent location to comply with the required number of vents needed.

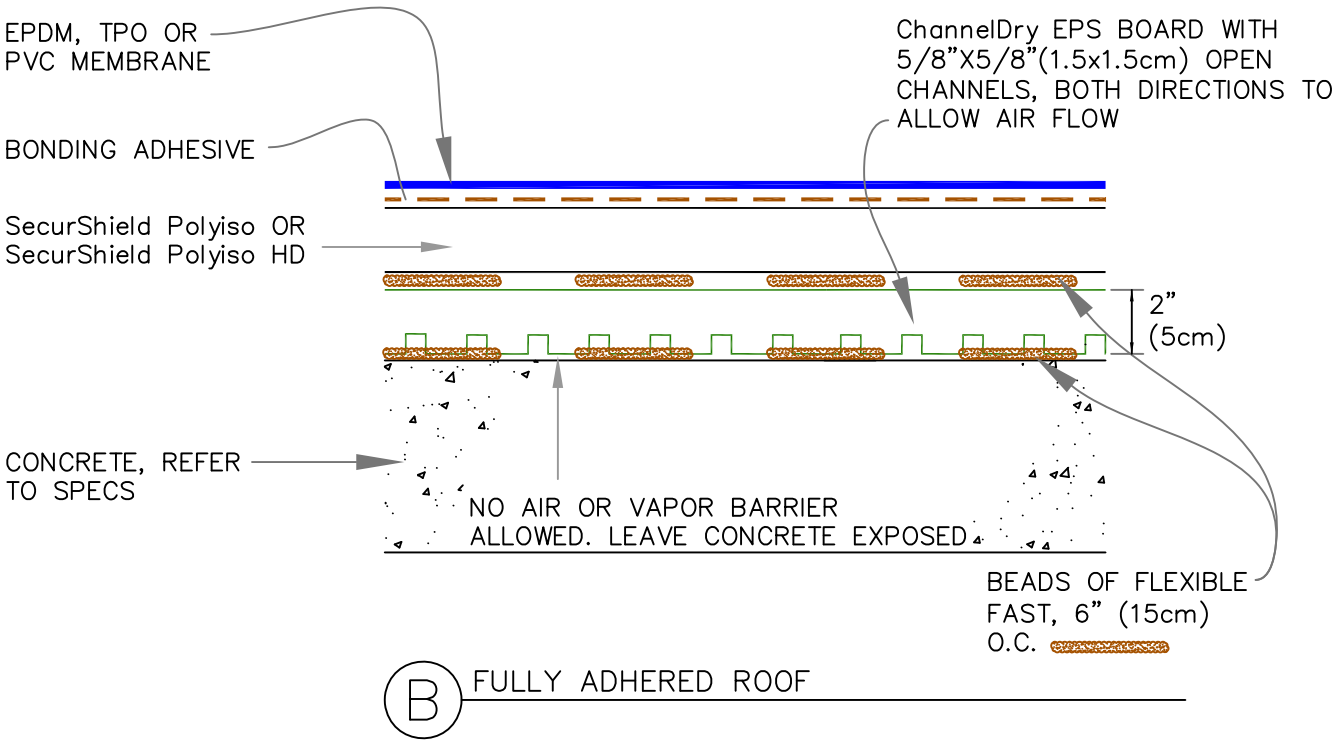
6. Complete all other flashing details per specification for membrane type used, refer to Carlisle published specifications.

G. Associated Installation Details

End of Section



A FULLY ADHERED ROOF
MECHANICALLY FASTENED BOTTOM LAYER ONLY



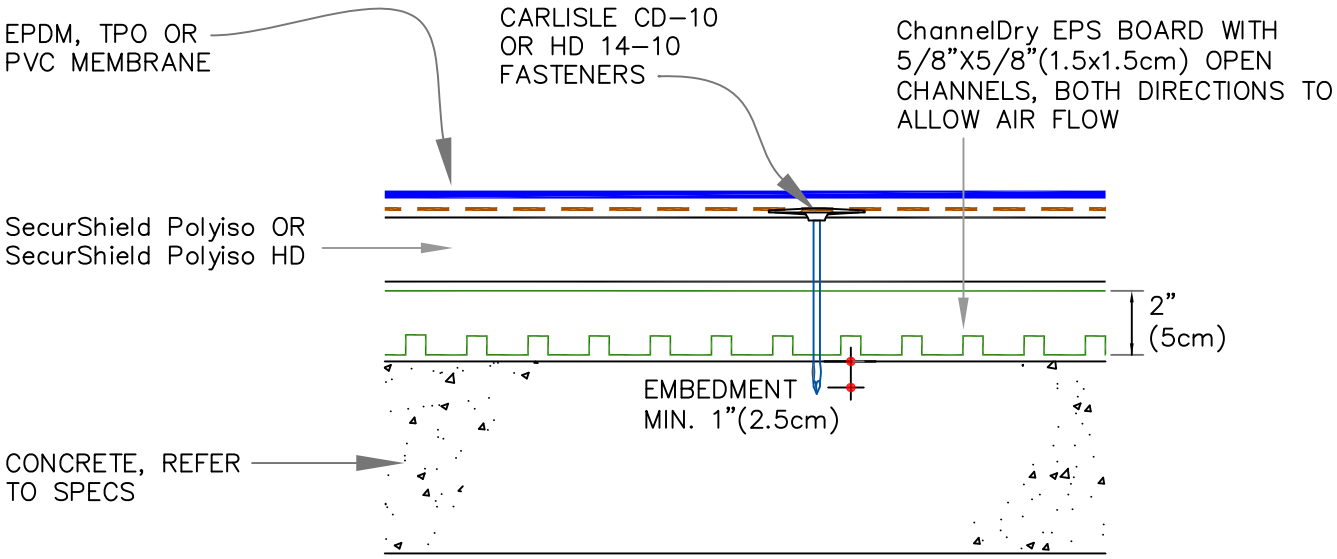
B FULLY ADHERED ROOF

CARLISLE SYNTEC SYSTEMS

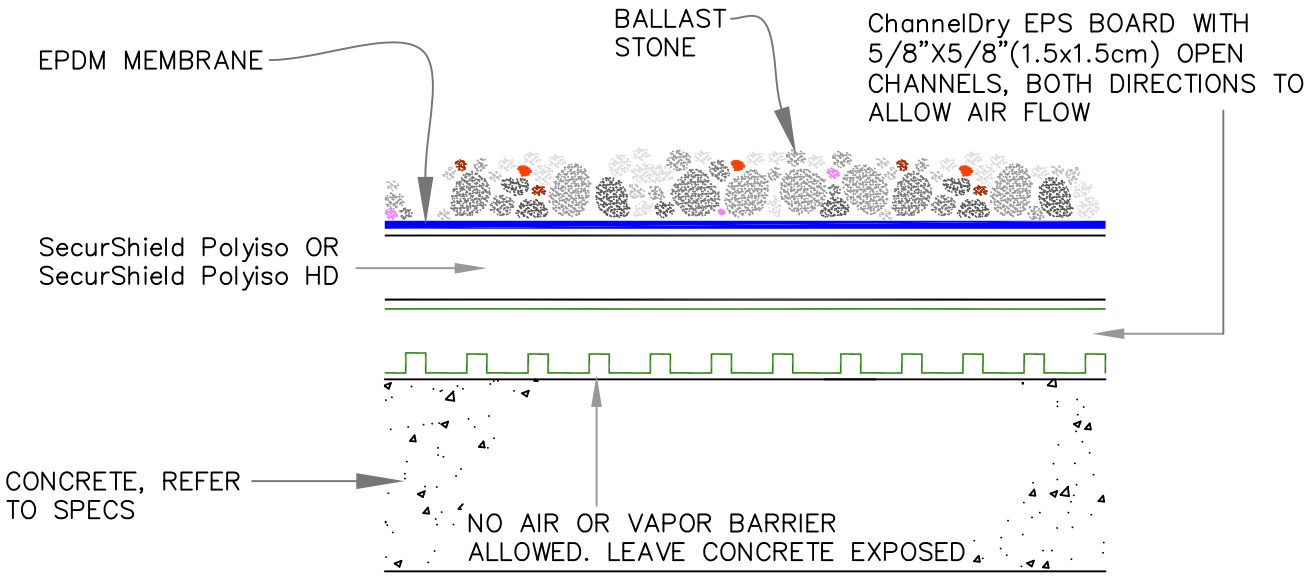
ROOF ASSEMBLIES PAGE 1

MAXIMUM WARRANTY: 20 YEARS

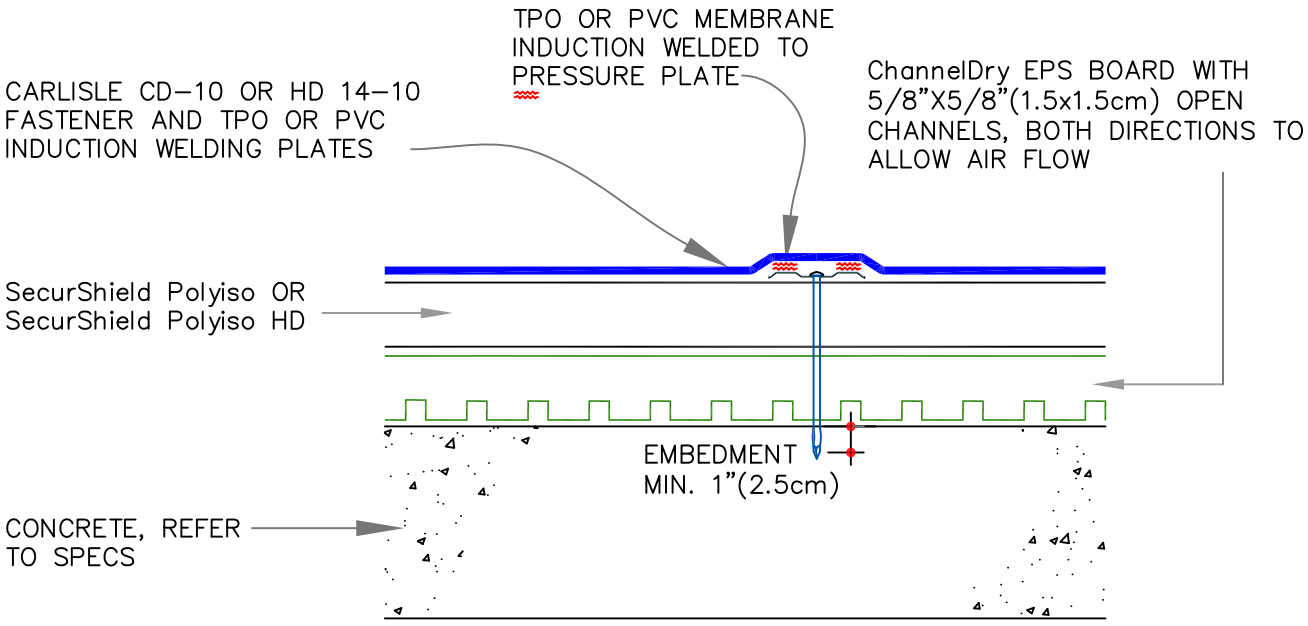
DETAIL NO.
MM–1
MM (MOISTURE MITIGATION)



C FULLY ADHERED ROOF
MECHANICALLY FASTENED ALL LAYERS



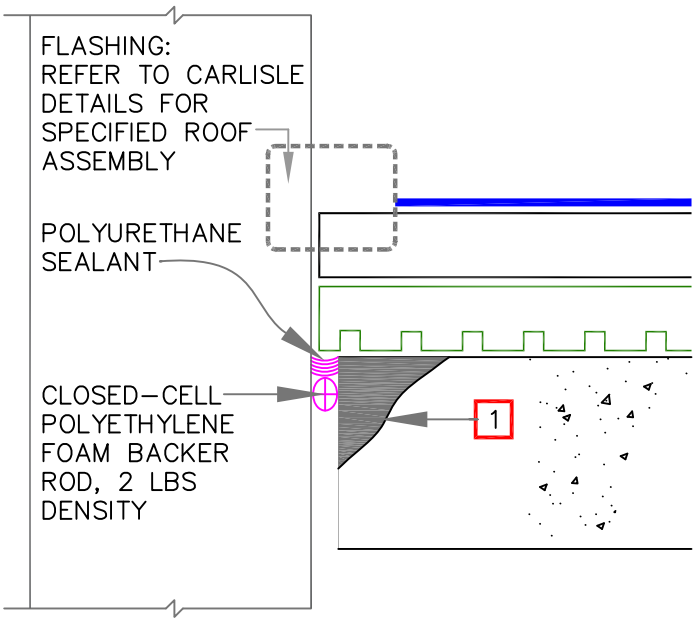
D BALLASTED EPDM ASSEMBLY



E TPO OR PVC INDUCTION WELDED ASSEMBLY

NOTE:

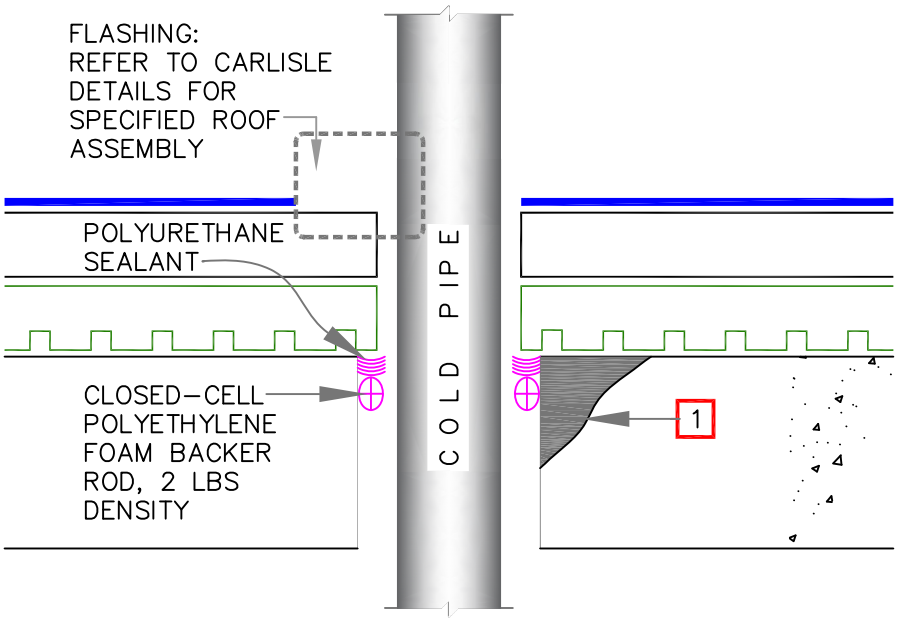
1. ENSURE CONCRETE EDGES ARE DRY, PRIOR TO SEALANT INSTALLATION.



A AIR SEAL : ROOF–TO–WALL

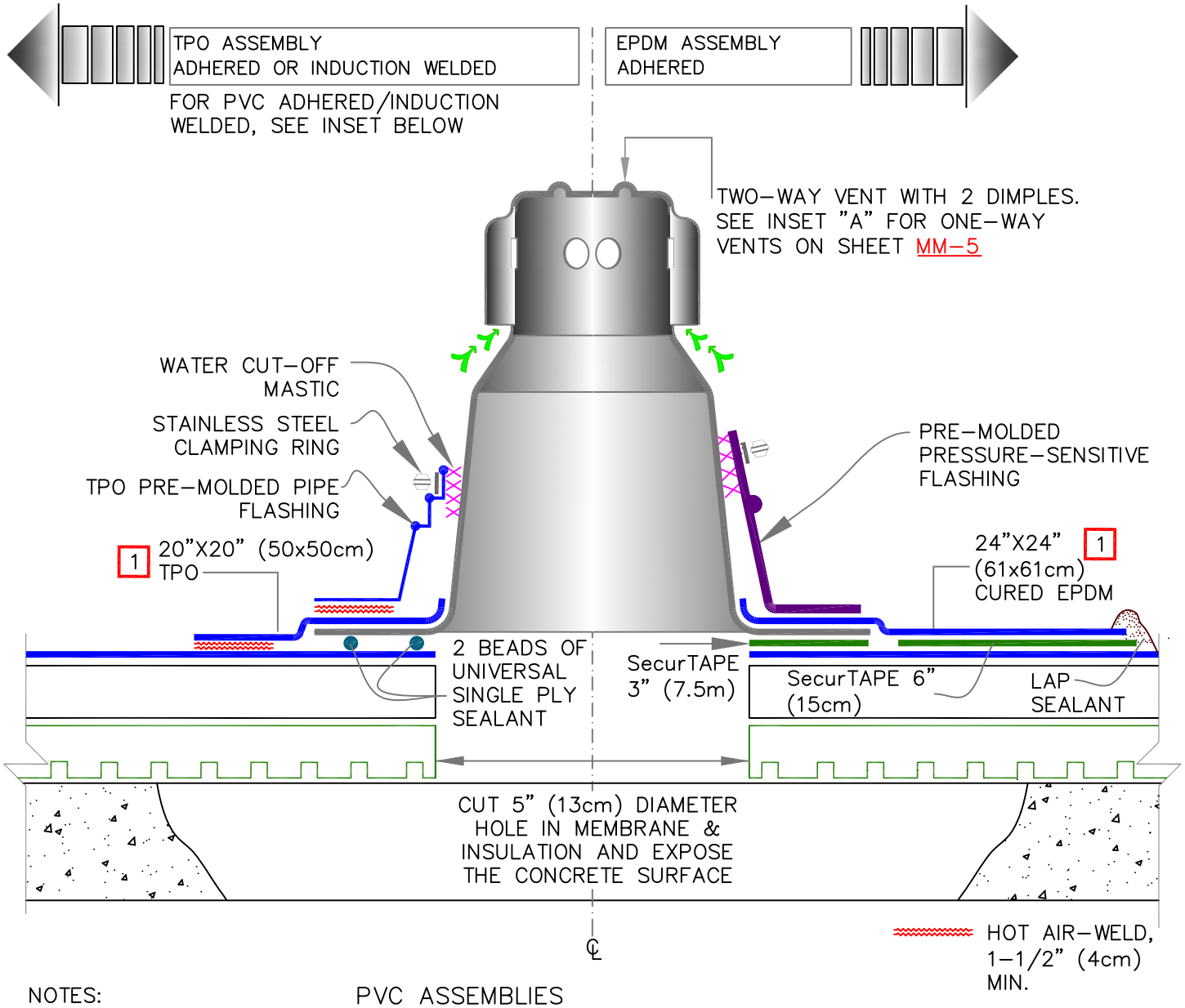
NOTE:

1. ENSURE CONCRETE EDGES ARE DRY, PRIOR TO SEALANT INSTALLATION.



B AIR SEAL : PIPE PENETRATION

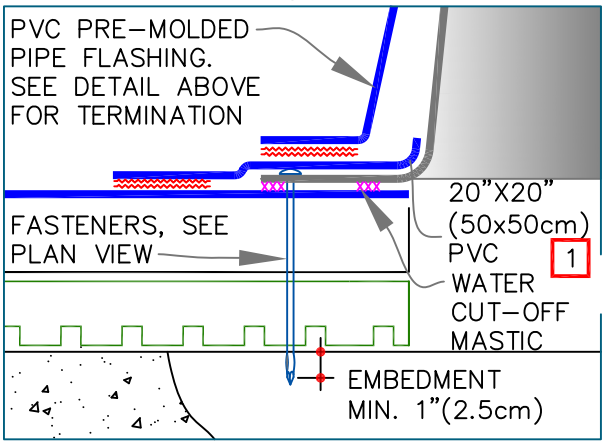
CARLISLE SYNTEC SYSTEMS	AIR–SEAL DETAIL: ROOF–TO–WALL & PIPE PENETRATION MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. MM–4 MM (MOISTURE MITIGATION)

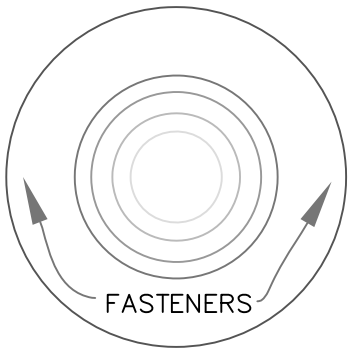


NOTES:

1. CUT SQUARE PIECE, TRIM ROUNDED EDGES, DRAW CENTER LINES AND CUT A 5–1/2" (14cm) DIAMETER HOLE AT THE CENTER OF PIECE. SLIDE THE PIECE THROUGH THE VENT.
2. PRIMER MUST BE APPLIED ON ALL SURFACES PRIOR TO ADHESION OF PRESSURE–SENSITIVE FLASHING.

PVC ASSEMBLIES
ADHERED OR INDUCTION WELDED





PLAN VIEW

CARLISLE SYNTEC SYSTEMS

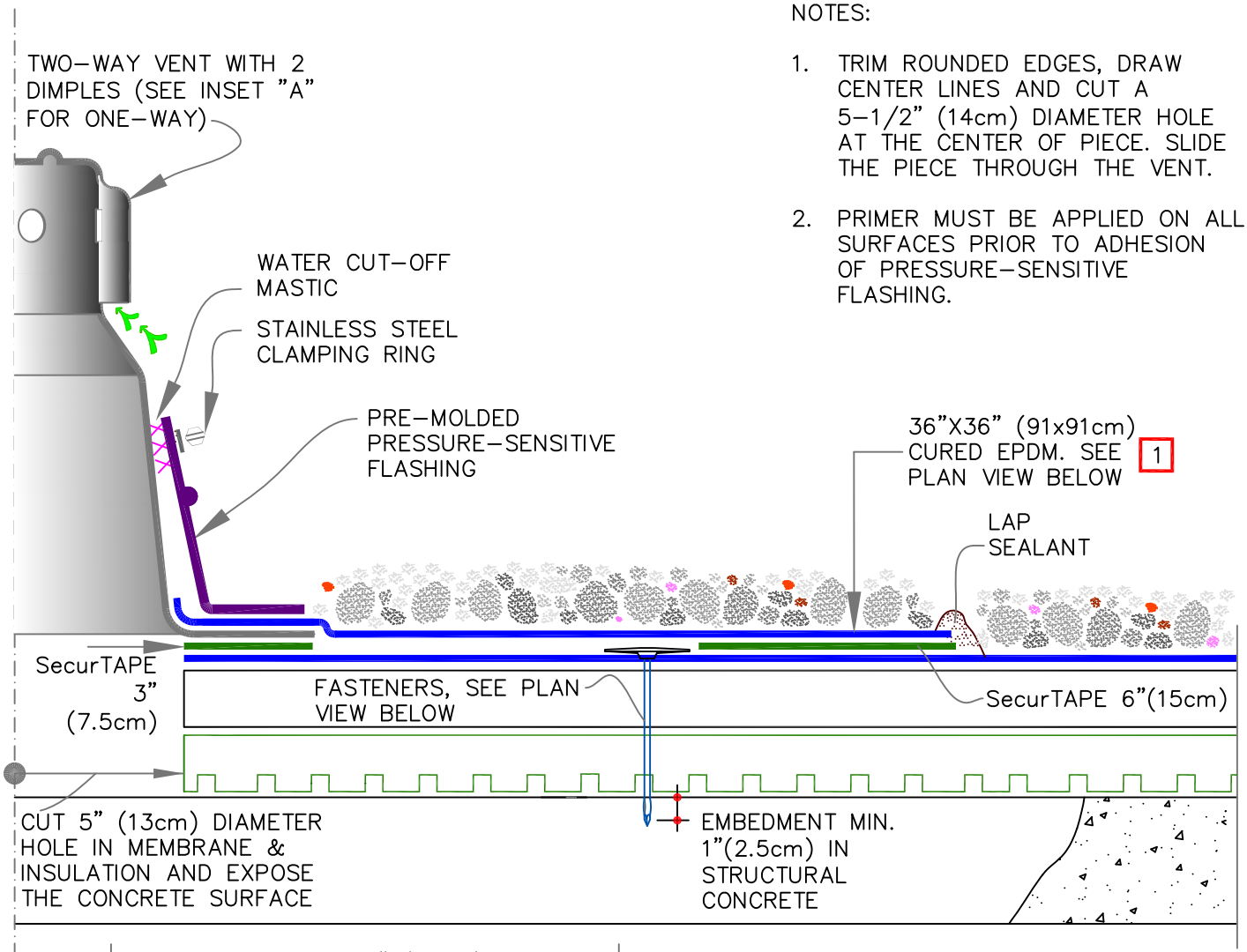
VENT FLASHING ADHERED OR INDUCTION WELDED ASSEMBLIES

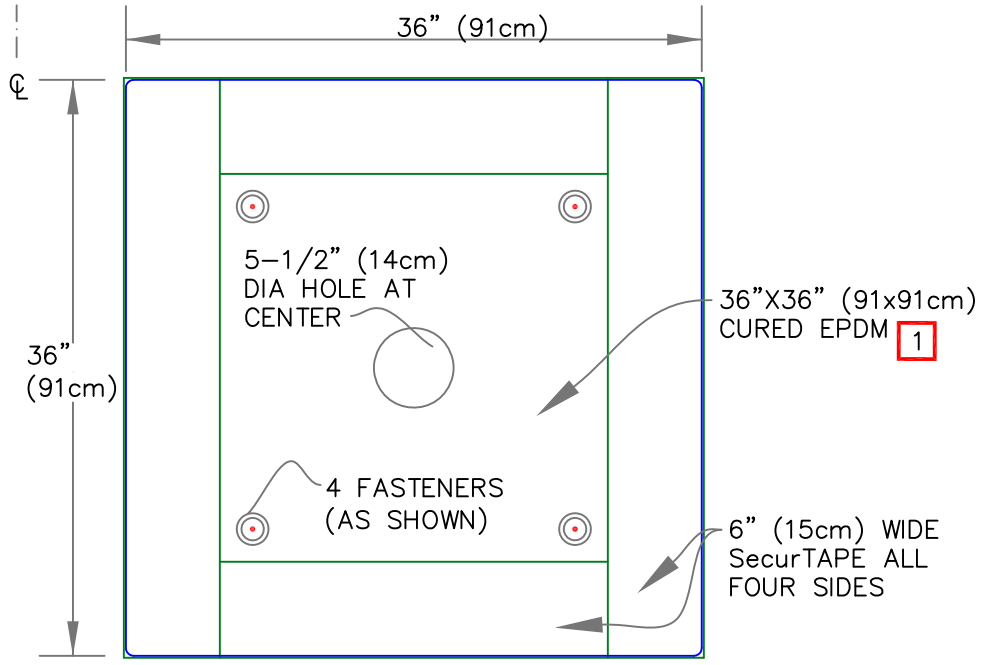
MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
MM–5
MM (MOISTURE MITIGATION)

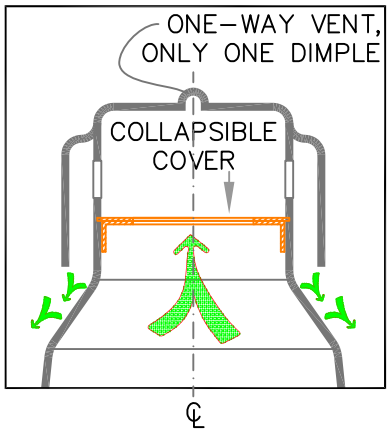
NOTES:

1. TRIM ROUNDED EDGES, DRAW CENTER LINES AND CUT A 5–1/2" (14cm) DIAMETER HOLE AT THE CENTER OF PIECE. SLIDE THE PIECE THROUGH THE VENT.
2. PRIMER MUST BE APPLIED ON ALL SURFACES PRIOR TO ADHESION OF PRESSURE–SENSITIVE FLASHING.

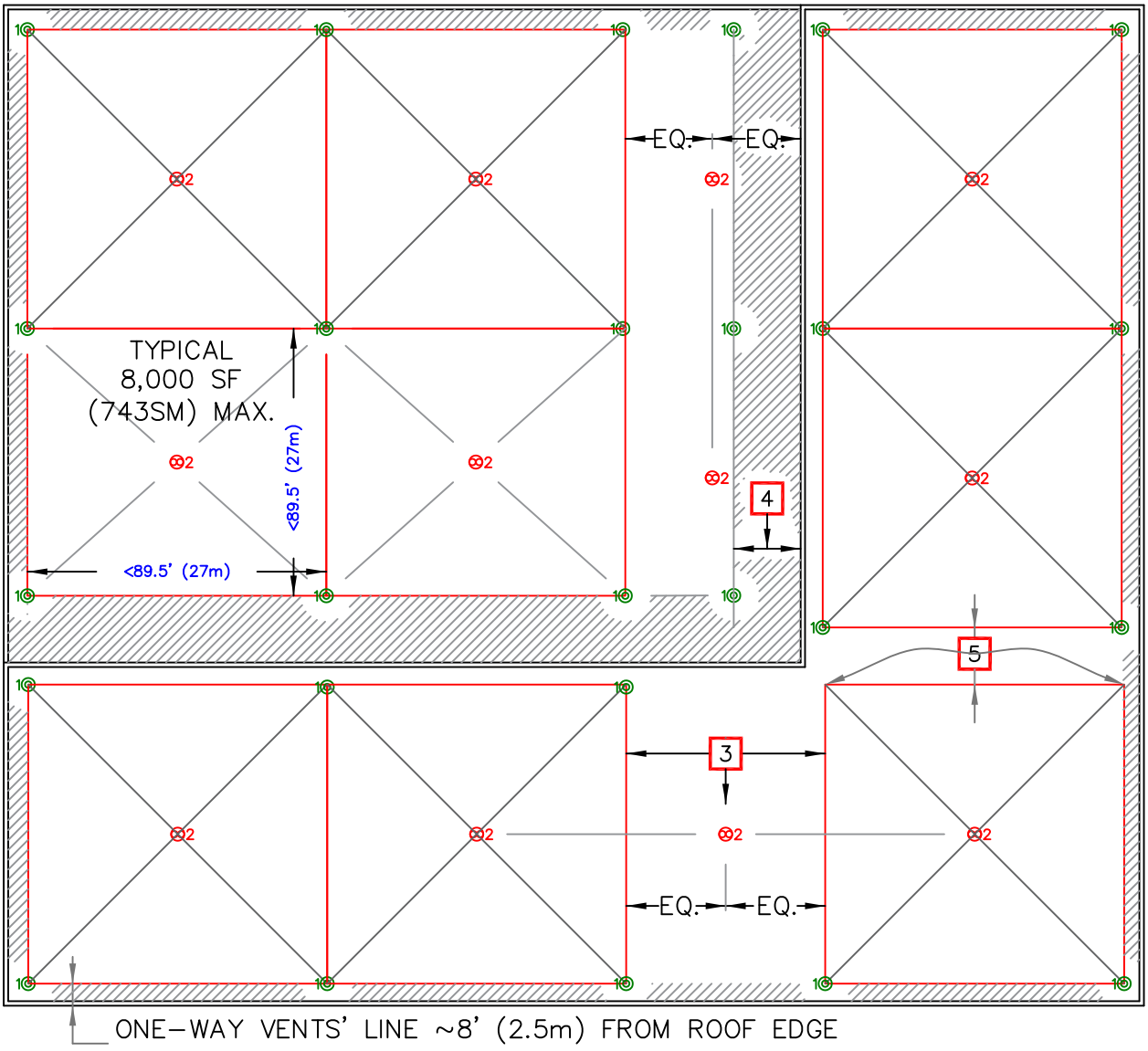




INSET A



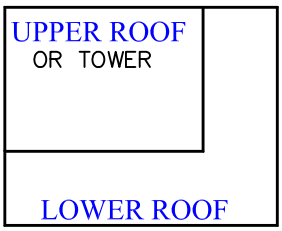
CARLISLE SYNTEC SYSTEMS	VENT FLASHING FOR BALLASTED EPDM ASSEMBLY MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. MM–6 MM (MOISTURE MITIGATION)



NOTES:

1. ONE–WAY VENTS: ONE EACH FOR 2,000 S.F. (186 S.M) MAX.
2. TWO–WAY VENTS: ONE EACH FOR 8,000 S.F. (743 S.M.) MAX.
3. ADD TWO–WAY VENT UNLESS THIS DIMENSION IS LESS THAN 8' (2.5m)
4. WHEN THERE IS A TALL WALL OR HIGHER BUILDING (SEE KEY PLAN), THEN THE ONE–WAY VENTS' LINE SHOULD BE POSITIONED ~16' (4.9m) FROM HIGH WALL
5. SKIP VENT(S), IF LESS THAN 8' (2.5m)

ONE–WAY VENT
TWO–WAY VENT
CENTER LINE
DISTANCE FROM EDGE
EQ. EQUAL



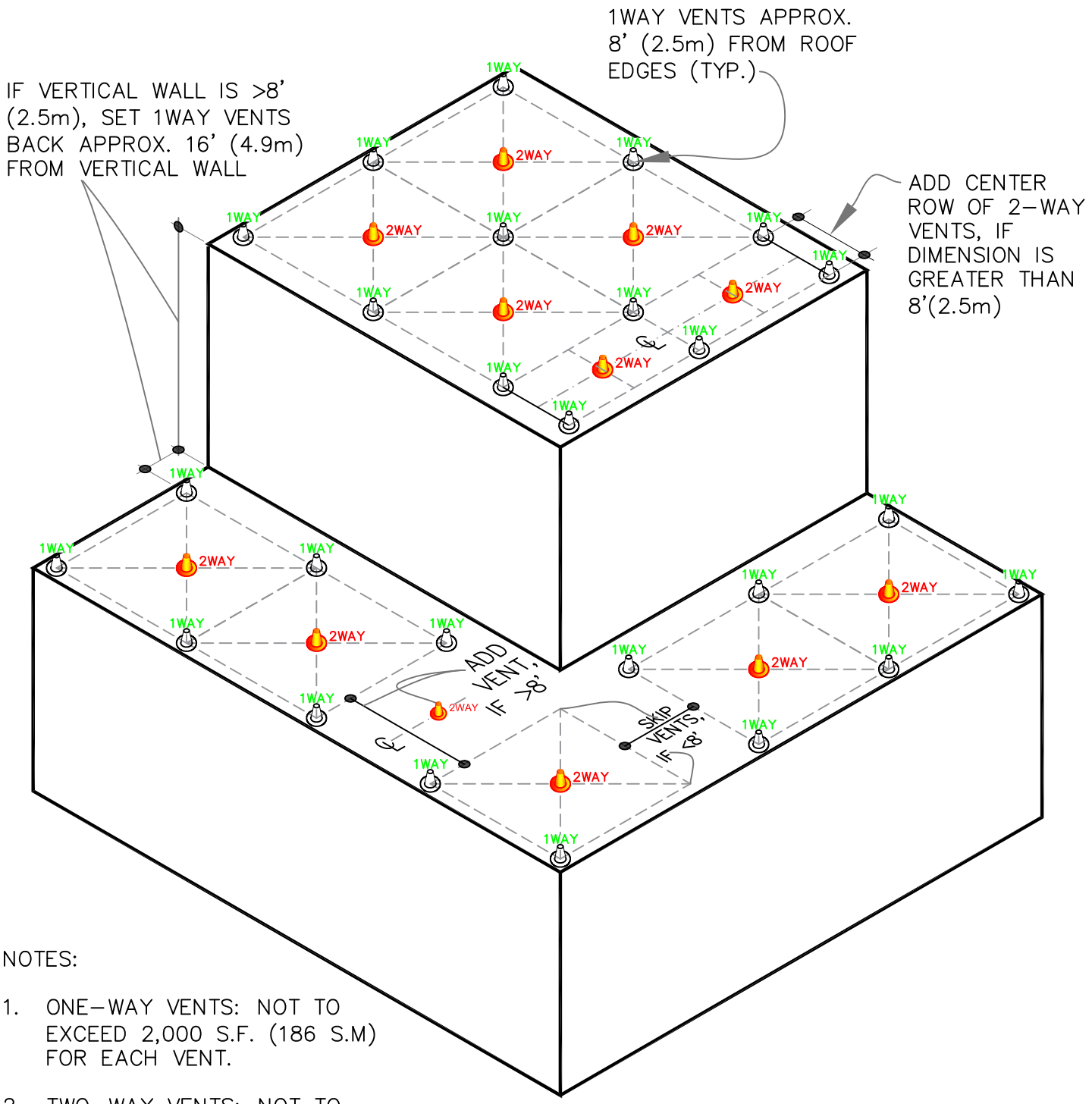
BUILDING KEY PLAN

CARLISLE SYNTEC SYSTEMS

ROOF PLAN – TYPICAL LAYOUT OF VENTS

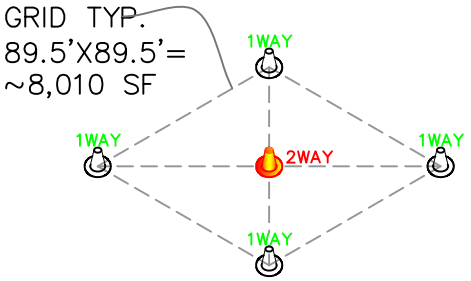
MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.
MM–7
MM (MOISTURE MITIGATION)



NOTES:

1. ONE–WAY VENTS: NOT TO EXCEED 2,000 S.F. (186 S.M) FOR EACH VENT.
2. TWO–WAY VENTS: NOT TO EXCEED 8,000 S.F. (743 S.M.) FOR EACH VENT
3. COORDINATE WITH CARLISLE FOR IRREGULAR ROOF SHAPES OR WHERE DECK SLOPE EXCEEDS 2":12". SUBMIT CAD ROOF PLAN.



CARLISLE SYNTEC SYSTEMS

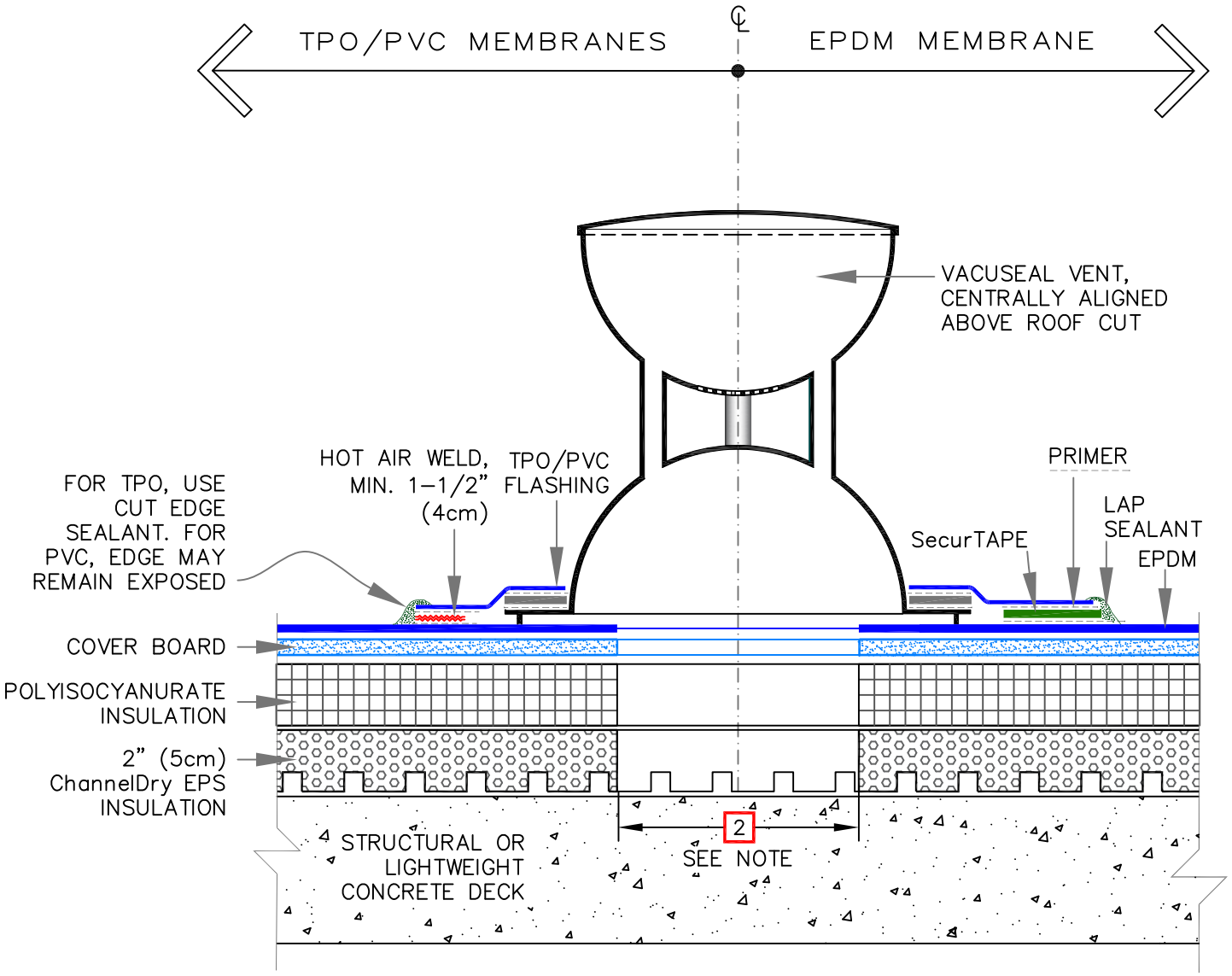
3D ROOF PLAN – TYPICAL LAYOUT OF VENTS

MAXIMUM WARRANTY: 20 YEARS

DETAIL NO.

MM–8

MM (MOISTURE MITIGATION)



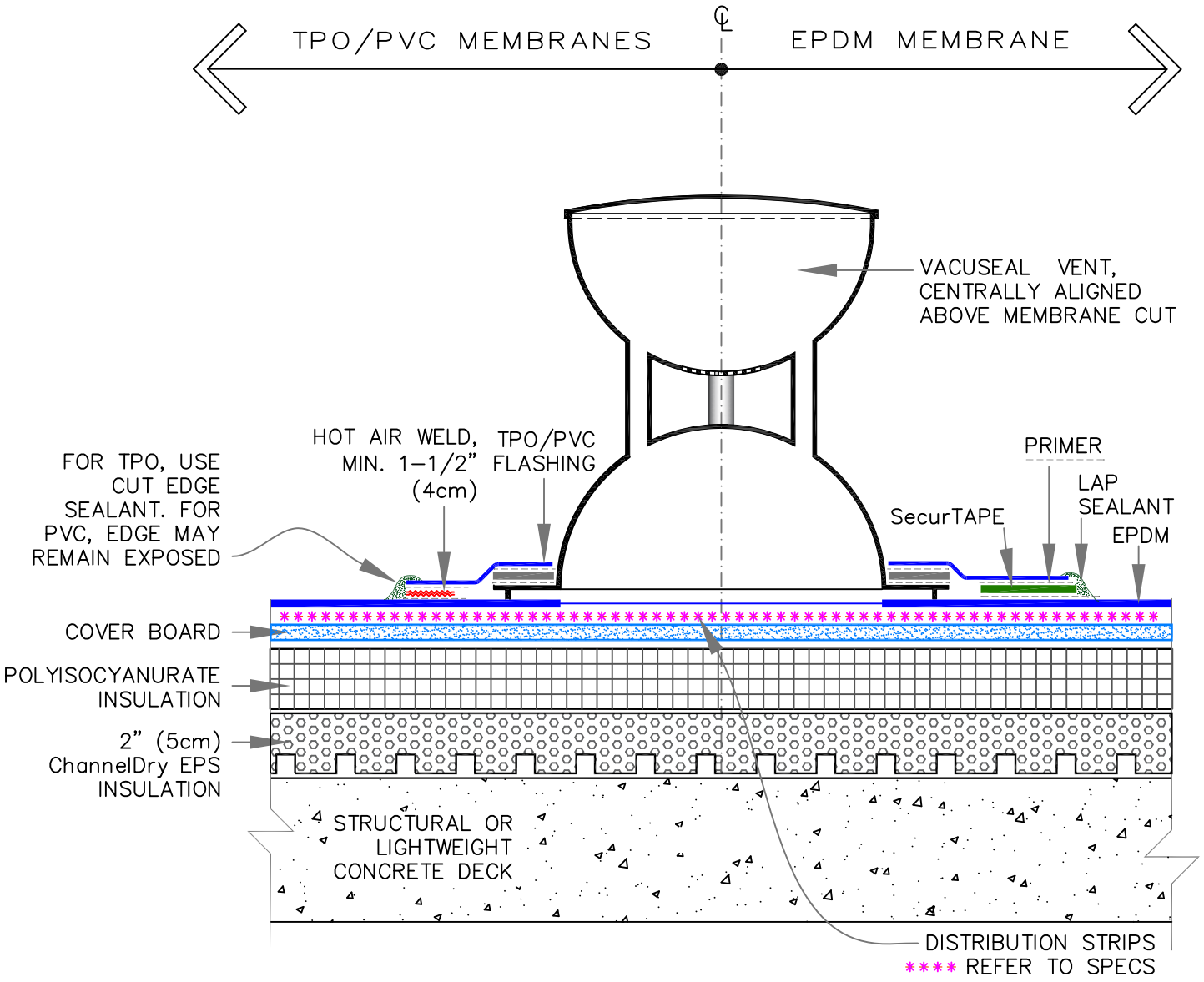
NOTES:

1. SUBMIT A COPY OF ROOF PLAN IN CAD TO CARLISLE TO LOCATE VENTS SHOWING ALL PENETRATIONS, HVAC UNITS, HEIGHT OF PARAPET WALLS AND HEIGHT OF ROOF FROM GROUND. EACH VENT WILL COVER APPROXIMATELY 1,200 SQ. FEET (112 SQ. METERS).

2. CORE A 7" (18cm) DIAMETER OR (7"X7"(18x18cm)) HOLE THROUGH THE ROOF ASSEMBLY DOWN TO CONCRETE DECK. EXPOSE THE CONCRETE DECK SURFACE. REMOVE ALL LOOSE DEBRIS COMPLETELY. VACUUM ALL PARTICLES TO ENSURE THAT VENT TUBES & SCREEN WILL NOT BE CLOGGED.

3. THE ROOF ASSEMBLY SHALL BE AIR TIGHT. CONCRETE DECK MUST BE SEALED AROUND ALL PENETRATIONS AND AT ALL DECK TO WALLS/CURBS JUNCTIONS.

CARLISLE SYNTEC SYSTEMS	PRIMARY VENT (VACUSEAL VENT – CONCRETE LEVEL) MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. MM–9 MM (MOISTURE MITIGATION)



NOTE:

1. TOTAL NUMBER OF VENTS AND LOCATIONS ON THE ROOF WILL BE DETERMINED BY CARLISLE. SUBMIT A COPY OF ROOF PLAN IN CAD TO CARLISLE TO LOCATE VENTS. DESIGNER MUST SHOW ALL PENETRATIONS, HVAC UNITS, HEIGHT OF PARAPET WALLS AND HEIGHT OF ROOF FROM GROUND.

CARLISLE SYNTEC SYSTEMS	SECONDARY VENT (VACUSEAL VENT – MEMBRANE LEVEL) MAXIMUM WARRANTY: 20 YEARS	DETAIL NO. MM–10 MM (MOISTURE MITIGATION)

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle Authorized Roofing Applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information, which has subsequently been made available.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S SPEC SUPPLEMENT

G-16

Plaza Paver Systems

Adhered, Mechanically Fastened or Induction Welding Attachment Method

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and use of Plaza Pavers for roofing assembly installations. In addition to the information contained herein, attached details are included to provide the Specifiers and Authorized Applicators with quick access to specific information. Specifiers and Authorized Applicators are advised to reference all applicable details included with this spec supplement.

A. Description

The roofing assembly incorporates Carlisle supplied Concrete, Porcelain, Rubber or Wood Pavers in conjunction with a Carlisle Roofing membrane (EPDM, TPO, PVC, KEE HP) system installed in accordance with the appropriate Carlisle Roof Membrane Specification.

1. **Membrane Roof Systems**

   The concrete, porcelain or wood pavers are installed over a slip sheet of HP Protective Mat or 300 HV Protection Fabric in conjunction with an approved Paver Pedestal System over the roof membrane (EPDM, TPO, PVC or KEE HP). The Rubber Pavers are installed directly over the roof membrane (EPDM) or over a slip sheet of 300HV Protection Fabric (TPO, PVC or KEE HP).

   a. **Adhered Assemblies** – Using EPDM, TPO, PVC or KEE HP, insulation may be installed either mechanically (fastened directly to the deck) or set in Flexible FAST bead adhesive to the structural deck. Subsequent layers of insulation or coverboard may be mechanically fastened through all layers or set in Flexible FAST bead adhesive. The membrane shall be fully adhered using the appropriate bonding adhesive following Carlisle's Thermoset (EPDM), Thermoplastic (TPO, PVC, and KEE HP), FleeceBACK (EPDM, TPO, PVC or KEE HP) or FleeceBACK AFX (EPDM or TPO) membrane Specifications.

   b. **Induction Welded Assemblies** – Using TPO or PVC, insulation is mechanically fastened using appropriate Carlisle Fasteners and TPO or PVC Induction Welding Plates which are used to secure both layers to the structural deck. The fastening density of the plates and fasteners shall be in compliance with the Induction Welding Attachment (Attachment I) of the Thermoplastic Specification.

   c. **Mechanically Fastened Assemblies** – Using EPDM, TPO, PVC or KEE HP, membranes are mechanically fastened over insulation/underlayment to the deck with the appropriate Carlisle Fasteners and Fastening Plates. The fastening density of the plates and fasteners shall be in installed per Carlisle's Thermoset (EPDM), Thermoplastic (TPO, PVC, and KEE HP) membrane Specification.

2. **Inverted Roof Membrane Assembly (IRMA) Systems**

   A layer of drainage board/mat is loose-laid over the membrane. Layers of insulation are also loose-laid directly on the drainage board/mat. The concrete, porcelain and wood pavers are installed over a slip sheet of HP Protective Mat or 300HV Protection Fabric in conjunction with an approved Paver Pedestal System over the insulation. The rubber pavers are installed over a slip sheet of HP Protective Mat over the insulation. NOTE: Porcelain, Rubber and Wood Pavers are lightweight, weighing 9 lb/sf (porcelain) and 6 lb/sf (rubber and wood) respectively. Check current building code requirements for building height, parapet height and project location to ensure that these overburden options are suitable in IRMA Assemblies.

   a. **Adhered Assemblies** – Using EPDM, TPO, PVC or KEE HP, the membrane is applied to the structural deck with

an appropriate bonding adhesive.

b. **Induction Welded Assemblies** – Using TPO or PVC, insulation is mechanically fastened using appropriate Carlisle Fasteners and TPO or PVC Induction Welding Plates are used to secure both layers to the structural deck. The fastening density of the plates and fasteners shall be in compliance with the Induction Welding Attachment (Attachment I) of the Thermoplastic Specification.

c. **Mechanically Fastened Assemblies** – Using EPDM, TPO, PVC or KEE HP, membranes are mechanically fastened over insulation/underlayment to the deck with the appropriate Carlisle Fasteners and Fastening Plates. The fastening density of the plates and fasteners shall be in installed per Carlisle's Thermoset (EPDM), Thermoplastic (TPO, PVC, and KEE HP) membrane Specification.

Any of the assemblies described herein, using a minimum 60-mil membrane, are eligible for a 5, 10, 15, or 20 Year Membrane System Warranty with a Warranty wind speed up to 72 mph. For higher wind speed coverage, project may be submitted to Carlisle for Approval. An Overburden Removal and Replacement Warranty is available with all Carlisle supplied Plaza Paver Systems (Concrete, Porcelain, Rubber and Wood) with 10, 15, or 20 Year Durations for an additional fee.

B. Quality Assurance

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

2. Roof system must be inspected and approved by a Carlisle Field Service Representative prior to Plaza Paver System installation.

3. Do not install this assembly before the concrete deck has reached its' initial structural strength. Project Engineer must be consulted prior to job start-up.

C. Submittals

1. 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.

2. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

D. Products

In addition to the products listed below, products listed in "Part II" of the Carlisle Thermoset/Thermoplastic Roofing System Specification can be used as part of the Plaza Paver System.

1. **Hanover® Pavers**

   a. **Prest Pavers:** Hanover Roof and Plaza Pavers provide durability, protection and performance for the roof system from harsh weather conditions. A textured Tudor® finish provides slip resistant properties making Hanover Pavers safer than gravel ballast for pedestrians. By elevating the pavers, water is channeled away from the surface. Roof Pavers allow easy access to the roof and waterproofing system for repairs or standard maintenance procedures. Available in Tudor Finish, 8 standard colors (custom available), in a standard size of 23.5" x 23.5" x 2" (other sizes available upon request) and weighs 25 lb/sf. The use of Hanover Pavers requires the use of one of the pedestals below to maintain material warranty.

      1. **High Tab Pedestals** – are 5/8" high and are stackable to increase the height.

      2. **EPDM Pedestal and Leveling Shims** – are 3/8" fixed height but are not stackable.

      3. **Elevator Pedestal** – consisting of a base and top plate which can be combined with various size couplers to increase height.

   b. **Pedestal Pavers:** For use as an alternative to standard concrete pavers and polyethylene or EPDM pedestal systems, Hanover Pedestal Pavers are produced with integrated concrete feet providing a 1/2" elevation clearance for water drainage. Available in Tudor Finish (for aesthetics) or Diamond (for walkways), 8 standard colors (custom available), in a standard size of 23.5" x 23.5" x 2.25" and weighs 22 lb/sf. As the paver is produced with integral,

pedestal feet, additional pedestal systems are not recommended or required. The use of 300HV Protection Fabric is required with this paver.

c. **Guardian Pavers:** The Hanover Guardian® Paver System is specially designed to create a monolithic paver surface which provides high wind uplift resistance. Guardian is made up of a unique 3-piece Guardian Pedestal and a specially shaped Guardian Paver that, together, “lock down” and unitize the entire roof paver surface, preventing horizontal and vertical movement. The Guardian Pedestal has a square top that allows its bolt to pass through to a base beneath, fitting into a recessed GROoved portion of the Guardian Paver. Available in multiple finishes, 10 standard colors (custom available), in standard sizes of 17.625” x 35.375” x 2” or 3”, 23.5” x 23.5” x 2” or 3”, 23.5” x 35.375” x 2” or 3”, OR 29.75” x 29.75” x 2” and weighs 25 lb/sf for 2” thicknesses and 38 lb/sf for 3” thicknesses. Guardian pavers must be used with specialized pedestals consisting of a standard elevator pedestal base combined with a patented locking top cap (available in 8 colors). The system achieved -81.1 psf uplift resistance according to Florida’s TAS (Testing Application Standard) 108 test.

d. **Porcelain Pavers:** Hanover® Porcelain Pavers are a premium alternative to concrete pavers. They are hard-wearing, anti-slip, weather resistant and capable of withstanding heavy loads without comprising aesthetics. Porcelain Pavers are resistant to acid, chemicals, mold and salt. They will not stain and do not require sealing. Porcelain Pavers are installed over standard Hanover elevator pedestal bases combined with Hanover’s low-tab pedestal tops specially designed for the porcelain pavers, providing an 1/8” joint for water drainage. Porcelain Pavers only weigh approximately 9 pounds per square foot and do not satisfy typical ballast uplift requirements. To increase wind uplift performance, combine with Hanover's ballasted GridLoc structural support system. Available in multiple finishes, 17 colors/designs, in standard sizes of 12” x 48” x 2” or 3/4”, 16” x 32” x 3/4”, 16” x 48” x 3/4”, 24” x 24” x 3/4” OR 24” x 48” x 3/4” and weighs approximately 9 lb/sf.

e. **GridLoc System:** Hanover's GridLoc© System creates a lightweight, elevated structural support for various overburden systems including concrete pavers, porcelain pavers, bricks, and roof garden trays. When paired with Hanover’s adjustable pedestals with special GridLoc pedestal tops, the GridLoc System creates a level, elevated, and fully supported continuous base for systems previously unsuitable for pedestal support. GridLoc must be used for porcelain paver installations above 6" in height above the membrane. For lightweight overburden products, such as porcelain pavers, installed over GridLoc, GridLoc Weights can be added to the grids and the overburden adhered to the grids to enhance wind resistance.

a**. GridLoc Grid:** Hanover GridLoc Grids are specially designed, lightweight, structural support panels that create a continuous, fully supported, base for elevated overburden installations. GridLoc Grids are installed over adjustable pedestals to allow for height and slope adjustment. The GridLoc Grids are nominally sized at 16" x 24" x 1.5", cover approximately 2.66 square feet, and weigh 6 pounds each. Grids feature three hexigonal-shaped holes to accept GridLoc Weights or Plugs.

b. **GridLoc Weight:** GridLoc Weights are specially designed to fit snuggly into the hexigonal shaped holes in the GridLoc Grids to provide additional wind resistance. Each GridLoc Weight is wrapped in thermoplastic material for long-term durability. Weighing 5.31 pounds each, the GridLoc weights can add 5.31 pounds, 10.62 pounds, or 15.93 pounds of additional weight when adding one, two, or three Weights, respectfully.

c. **GridLoc Plug:** GridLoc Plugs are designed to fill the hexigonal-shaped holes in the Grids when GridLoc Weights are not used.

d. **GridLoc Pedestal Top:** GridLoc Pedestal Tops are used in conjunction with standard Hanover Elevator pedestal bases to provide elevation for the GridLoc system. GridLoc Pedestal Tops feature specially designed pegs that snap into holes located on the bottom of the GridLoc Grids, for proper spacing and securement.

2. **Sunny Brook Pavers**

a. **Pressed Concrete Pavers:** Sunny Brook pressed concrete pavers are available in a wide variety of sizes, colors, patterns and textures to accent any building, decor and landscaping. The standard Quarry Stone texture combines aesthetic appeal of decorative aggregates with the strength of concrete to create pavers that are strong, durable and beautiful. Available in Quarry Stone Texture (standard, with 5 additional finishes available), 21 standard colors, in a standard size of 23.5” x 23.5” x 2” (additional sizes available upon request) and weighs 24 lb/sf. Sunny Brook Pavers use MRP Support pedestals as supplied by Carlisle.

3. **Westile Pavers**

   a. **Western Plaza Pavers:** Westile Western Plaza Pavers are made of a high-density concrete and are well-suited for use in plaza decks, providing a durable, elegant surface while protecting the roof membrane and increasing amenity space. Westile Western Plaza Pavers are to be used in conjunction with high-density polypropylene pedestals that facilitate proper spacing and drainage and provide the ability to create a dead level surface. Available exclusively for projects in the western United States and Canada including the following states and provinces: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, British Columbia, Alberta, Saskatchewan. Available in Shot Blast Texture (standard, with matte finish available as a special order), 7 standard colors, in a standard size of 24" x 24" x 1.8125" (additional sizes available upon request) and weighs 23 lb/sf. Westile Western Plaza Pavers use Bison or MRP Support pedestals as supplied by Carlisle.

4. **Carlisle Rubber Pavers**

   a. **Plus Series Rubber Pavers:** Made of recycled rubber, the Plus Series pavers are an economical solution intended for use in low traffic areas as well as walkways to rooftop mechanical units. Available in 6 standard colors, in a standard size of 24" x 24" x 2" and weighs 6 lb/sf. Special adhesive must be applied to all paver-to-paver joints using a special adhesive application tip, once all pavers are in place. Adhesive helps keep pavers from separating during expansion and contraction due to temperature fluctuations. Pavers are installed directly over EPDM roofing membranes or over 300HV Protection Fabric for TPO, PVC and KEE HP roofing membranes.

   b. **Premium Rubber Pavers:** Premium Series Rubber Pavers feature a top wearing surface of SBR recycled rubber as well as varying percentages of EPDM virgin rubber for superior durability, as well as, wear and fade resistance. This makes the Premium Series pavers ideal for high traffic and plaza areas, and a great alternative to concrete paver systems. The Premium Series also features a broader range of color options that can aide in artistic rooftop design. Available in 10 standard colors, in a standard size of 24" x 24" x 2" and weighs 6 lb/sf. Special adhesive must be applied to all paver-to-paver joints using a special adhesive application tip, once all pavers are in place. Adhesive helps keep pavers from separating during expansion and contraction due to temperature fluctuations. Pavers are installed directly over EPDM roofing membranes or over 300HV Protection Fabric for TPO, PVC and KEE HP roofing membranes.

5. **Bison Wood Pavers: C**ommercial grade, hardwood, weather-resistant unitized pavers. Modular 2' x 2', 4' x 2', Slope compensators are available. Custom sizes are available.

   a. **Bison Ipe Wood Tiles:** ASTM E108 Class A Flame Spread; ANSI A137.1 Slip Resistance; ASCE 7 certified. Available in 2' x 2' (23.875" x 23.875" x 1.69"), 4' x 2' (47.9375" x 23.875" x 1.69"), 6 psf and 7.5 psf. Available with Smooth or Ribbed surface.

   b. **Bison Cumaru Wood Tiles:** ASTM E108 Class A Flame Spread; ANSI A137.1 Slip Resistance; ASCE 7 certified. Available in 2' x 2' (23.875" x 23.875" x 1.69"), 4' x 2' (47.9375" x 23.875" x 1.69"), 6 psf. Available with Smooth surface only.

6. **Carlisle Supplied Accessories:**
   a. **HP Protection Mat:** a nominal 6 oz. per square yard, UV-resistant, polypropylene, needle-punched fabric. HP Protective Mat is installed as a slip sheet for some paver applications.

   b. **300HV Protection Fabric:** a (16 oz/ sq yd) extremely tough non-woven polypropylene fabric designed for use as a protection course over Carlisle's roofing membranes providing cushion for heavy overburden materials. 300HV Protection Fabric is non-biodegradable and stabilized to resist soil, chemicals and mildew, as well as acids and alkalis.

E. Execution

Follow current specifications for installing roof membranes and seaming per specific membrane. [Sure-Seal (EPDM), Sure-Weld (TPO) or Sure-Flex (PVC/KEE HP)].

General

Exercise care in placing pavers and pedestals over roofing or waterproofing so protection materials are not displaced and roofing or waterproofing is not punctured or otherwise damaged. Carefully replace protection materials that become displaced and arrange for repair of damaged roofing or waterproofing before covering with paver system.

F. Installation

1. Proceed with installing roofing system as described in this section and in accordance with Carlisle published Specifications for the specific membrane type.

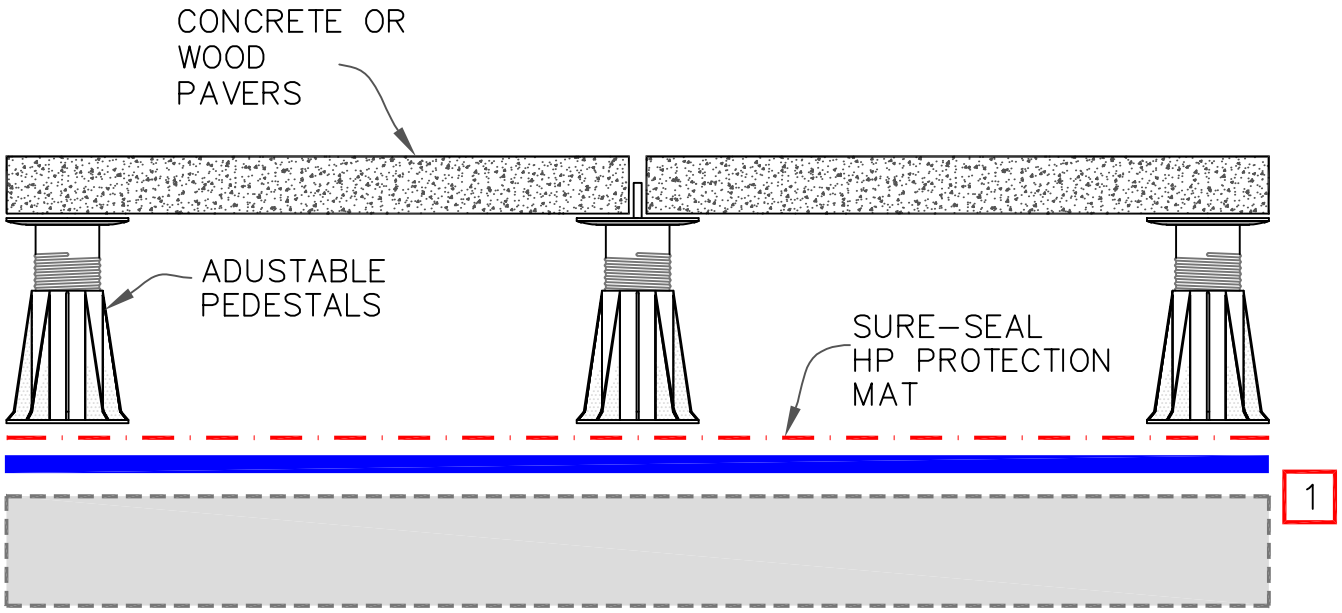
2. After installation of the roofing membrane, install slip sheet of HP Mat or 300HV Protective Fabric, as required by paver system, as outlined above.

3. Install appropriate paver pedestal as outlined by the plaza paver system selected.

4. Install Plaza Paver according to manufacturer's written instructions.

G. Associated Installation Details

End of Section



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS

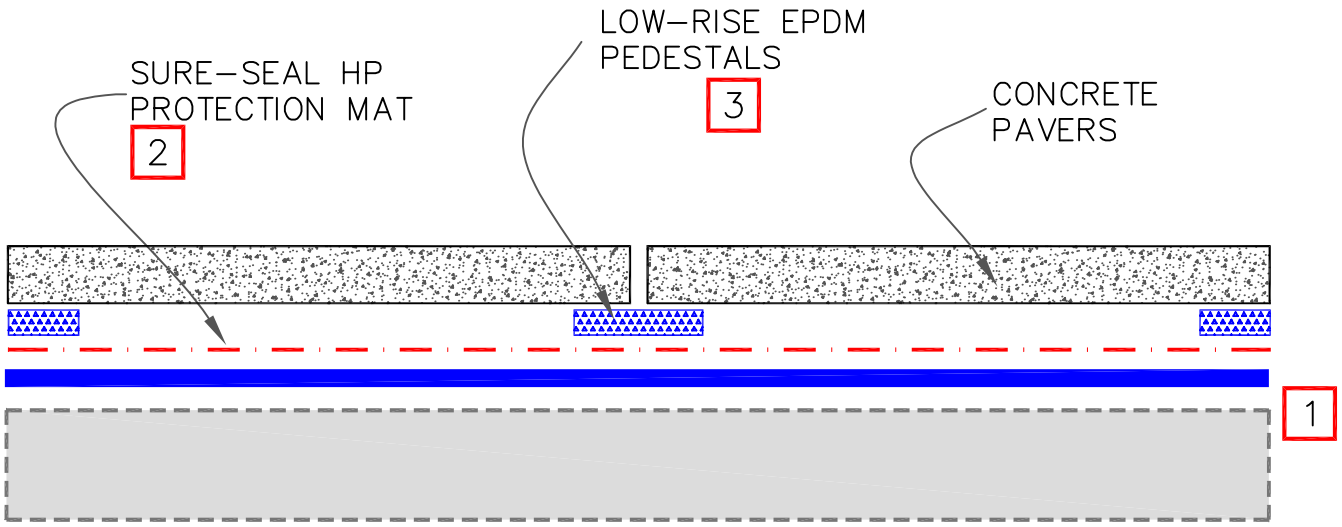
CARLISLE SYNTEC SYSTEMS

EPDM/TPO/PVC
CONCRETE
0 SEE NOTE(S)
SURE-SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

CONCRETE / WOOD PAVERS ON PEDESTALS

2024 PAVER DETAILS

DETAIL NO. PD1 A



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS
2. SURE-SEAL HP MAT IS NOT REQUIRED WHEN USING EPDM PEDESTALS OVER EPDM OR TPO MEMBRANES
3. AS AN ALTERNATIVE TO LOW-RISE EPDM PEDESTALS, FIXED-HEIGHT PLASTIC PEDESTALS, LEVELING SHIMS AND SLOPE COMPENSATORS CAN ALSO BE USED

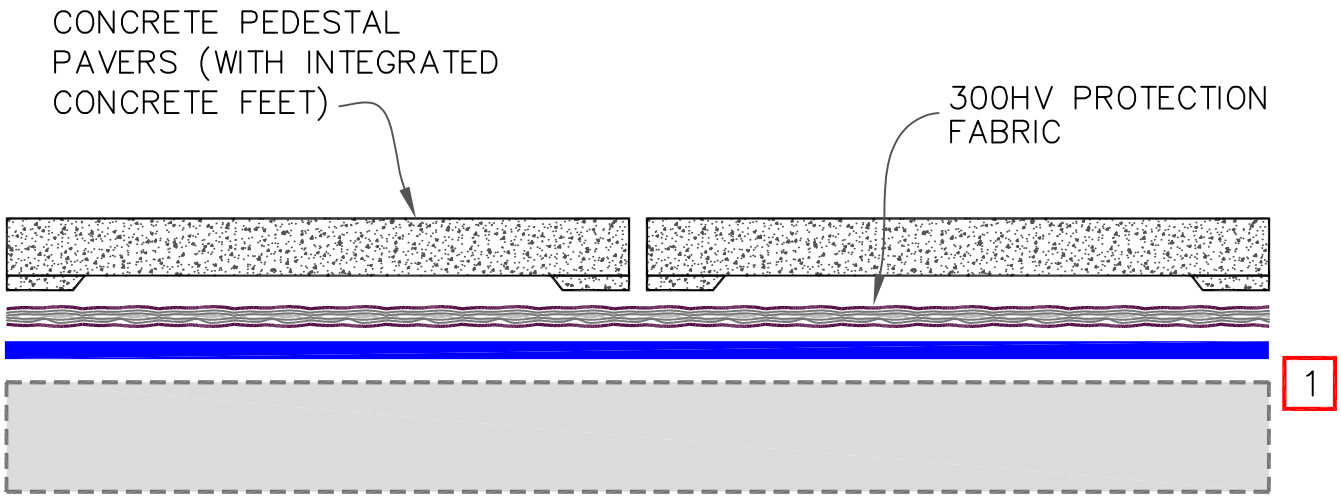
CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

CONCRETE PAVERS ON LOW-RISE OR FIXED HEIGHT PEDESTALS

2024 PAVER DETAILS

DETAIL NO. PD1 B



NOTE:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS

CARLISLE SYNTEC SYSTEMS

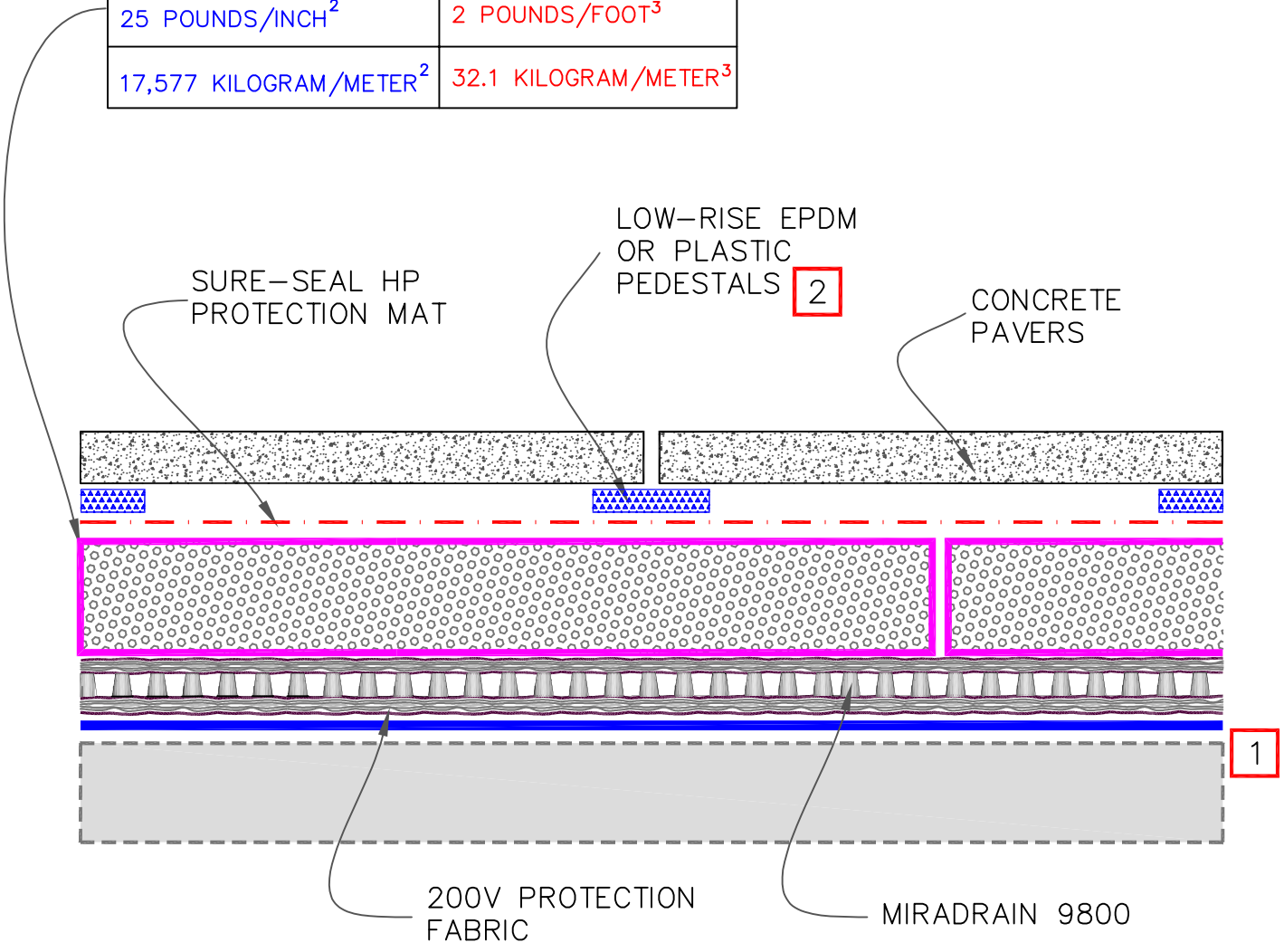
- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

CONCRETE PEDESTAL PAVERS

2024 PAVER DETAILS

DETAIL NO. PD1 C

POLYSTYRENE INSULATION	
COMPRESSIVE STRENGTH	DENSITY
25 POUNDS/INCH^2	2 POUNDS/FOOT^3
17,577 KILOGRAM/METER^2	32.1 KILOGRAM/METER^3



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS.
2. ADJUSTABLE SCREW-JACK PEDESTALS OR PEDESTAL PAVERS MAY ALSO BE USED.

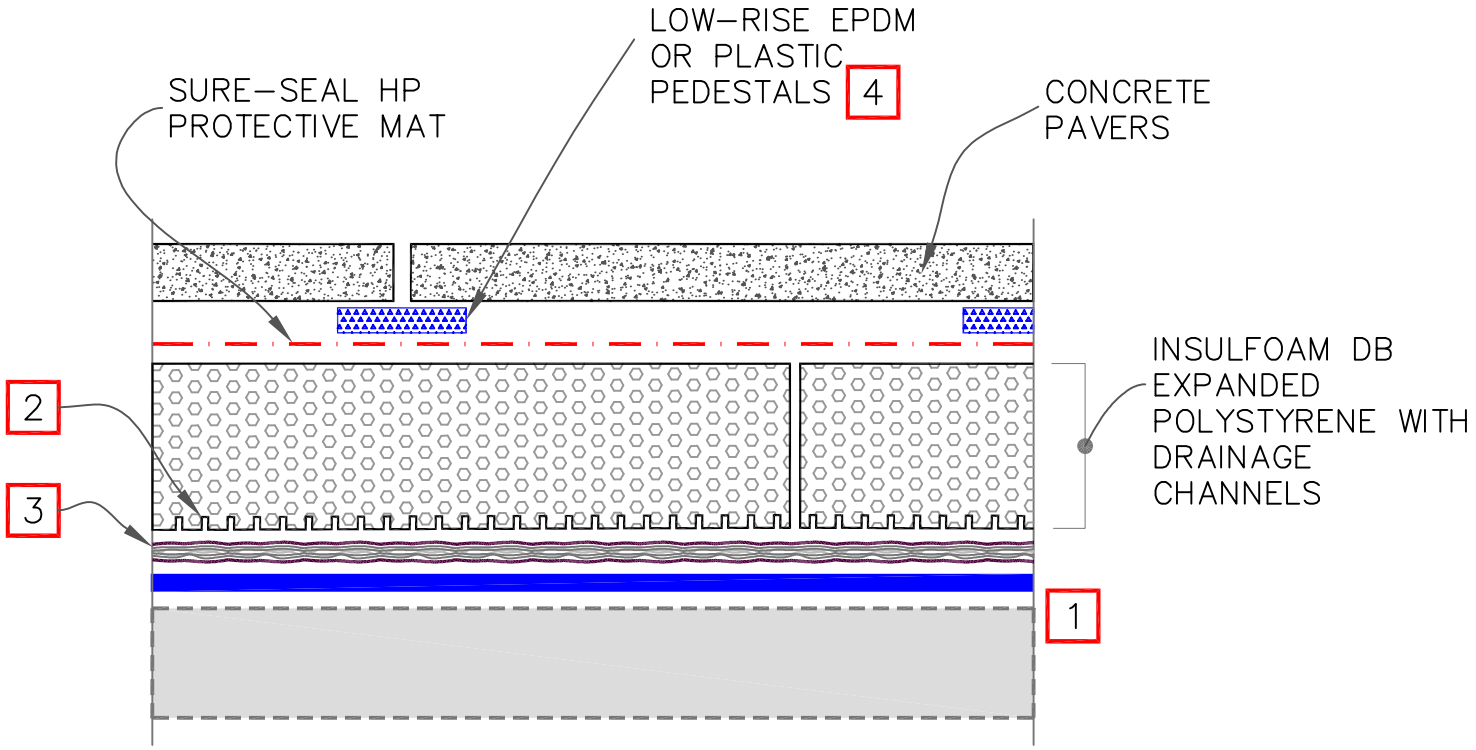
CARLISLE SYNTEC SYSTEMS

EPDM/TPO/PVC
CONCRETE
0 SEE NOTE(S)
SURE-SEAL HP PROTECTIVE MAT

IRMA CONCRETE PAVER ASSEMBLY – OPTION 1

2022 PAVER DETAILS

DETAIL NO. PD1 D



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS.
2. DRAINAGE CHANNELS TO BE ORIENTED IN THE DIRECTION OF ROOF DRAINS
3. IF POLYSTYRENE INSULATION IS USED IN CONJUNCTION WITH PVC MEMBRANE, 300HV PROTECTION FABRIC IS NEEDED BETWEEN EPS AND PVC.
4. ADJUSTABLE SCREW–JACK PEDESTALS OR PEDESTAL PAVERS MAY ALSO BE USED.

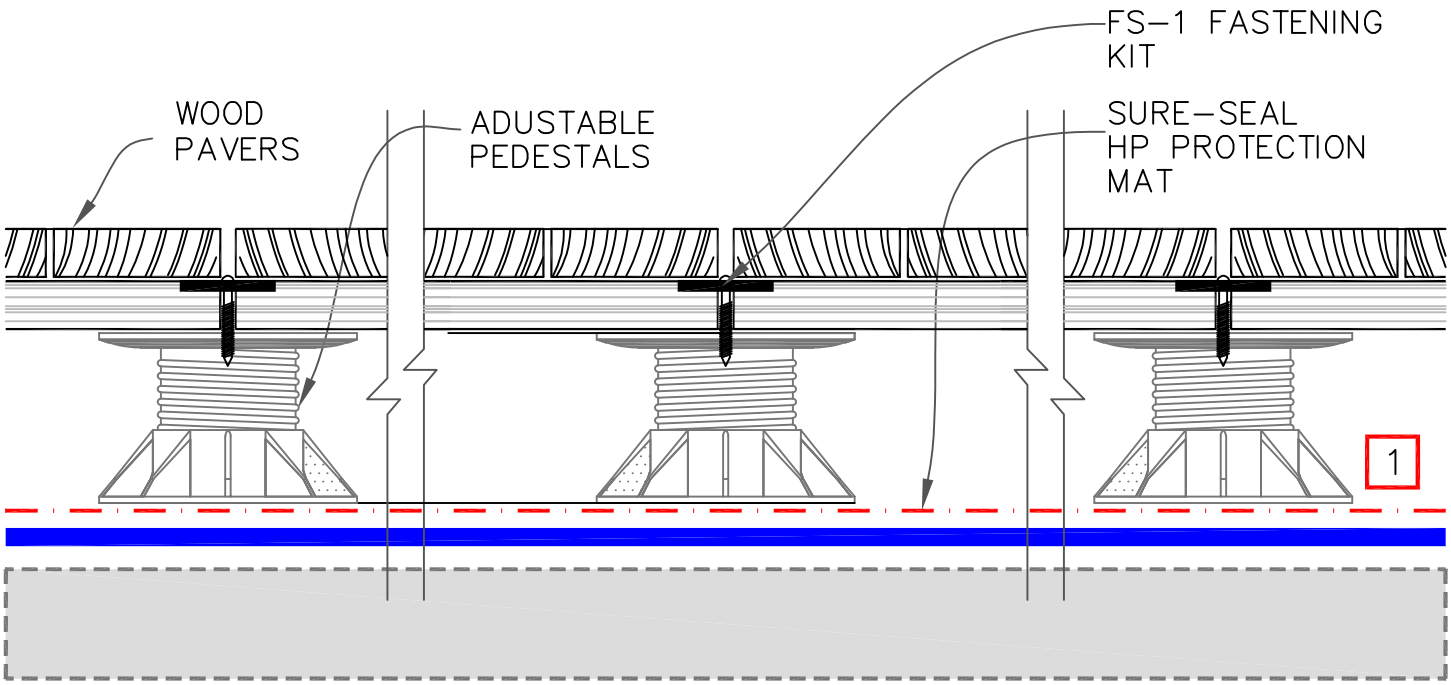
CARLISLE SYNTEC SYSTEMS

EPDM/TPO/PVC
CONCRETE
0 SEE NOTE(S)
SURE–SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

IRMA CONCRETE PAVER ASSEMBLY – OPTION 2

2024 PAVER DETAILS

DETAIL NO. PDI E



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS
2. WOOD PAVERS SECURED TO PEDESTALS USING FS–1 FASTENING KIT.

CARLISLE SYNTEC SYSTEMS

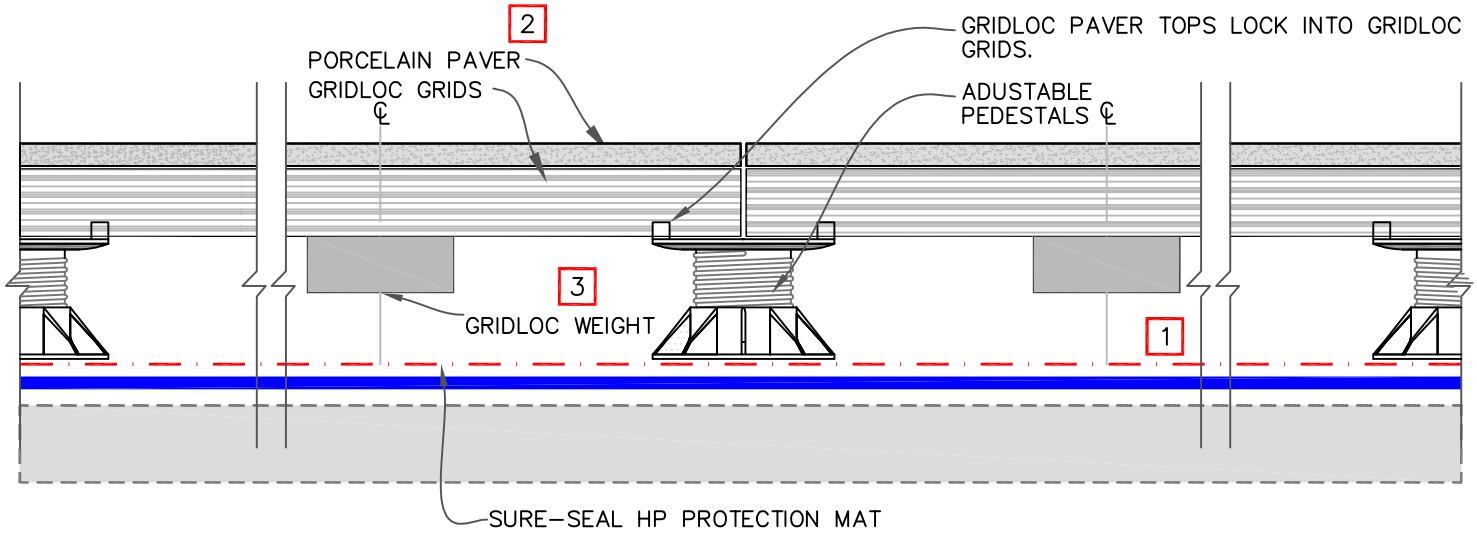
- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE–SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

WOOD PAVER ON ADJUSTABLE PEDESTAL

2024 PAVER DETAILS

DETAIL NO. PD1 F

PAGE ORDER



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS.
2. ADDITIONAL OVERBURDEN OPTIONS ACCEPTABLE. CONTACT CARLISLE FOR OPTIONS.
3. GRIDLOC WEIGHTS FOR ADDITIONAL WIND UPLIFT RESISTANCE WHEN REQUIRED. PLUGS AVAILABLE WHEN WEIGHTS ARE NOT REQUIRED.

CARLISLE SYNTEC SYSTEMS

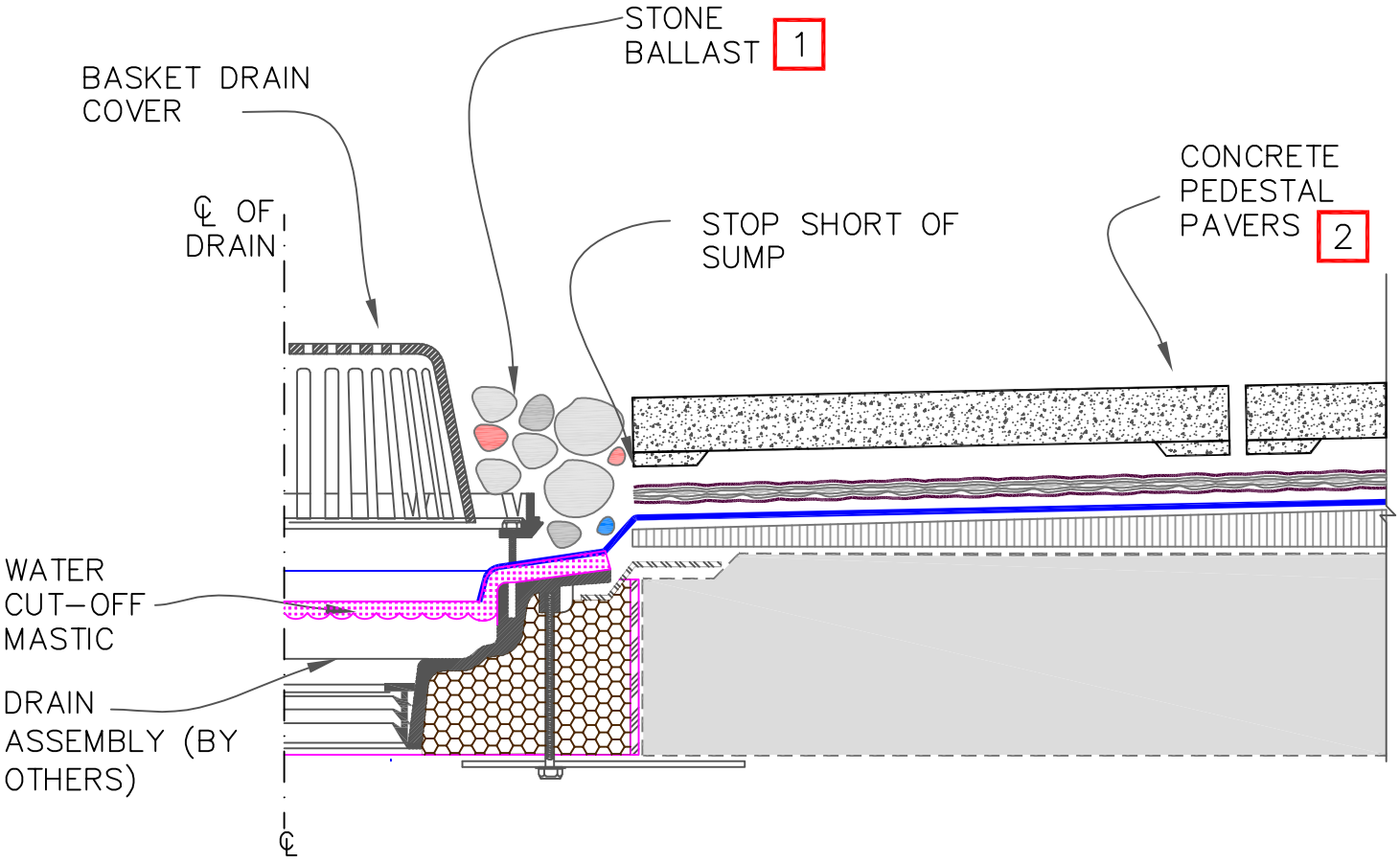
- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

GRIDLOC PAVER ON PEDESTALS

2024 PAVER DETAILS

DETAIL NO. PD1 G

PAGE ORDER



NOTES:

1. STONE BALLAST IS OPTIONAL TO PROVIDE AESTHETICS.
2. AS AN ALTERNATE TO CONCRETE PEDESTAL PAVERS, STANDARD CONCRETE PAVERS ON FIXED HEIGHT PEDESTALS CAN ALSO BE USED. REFER TO DETAIL PD B FOR ASSEMBLY INFORMATION.

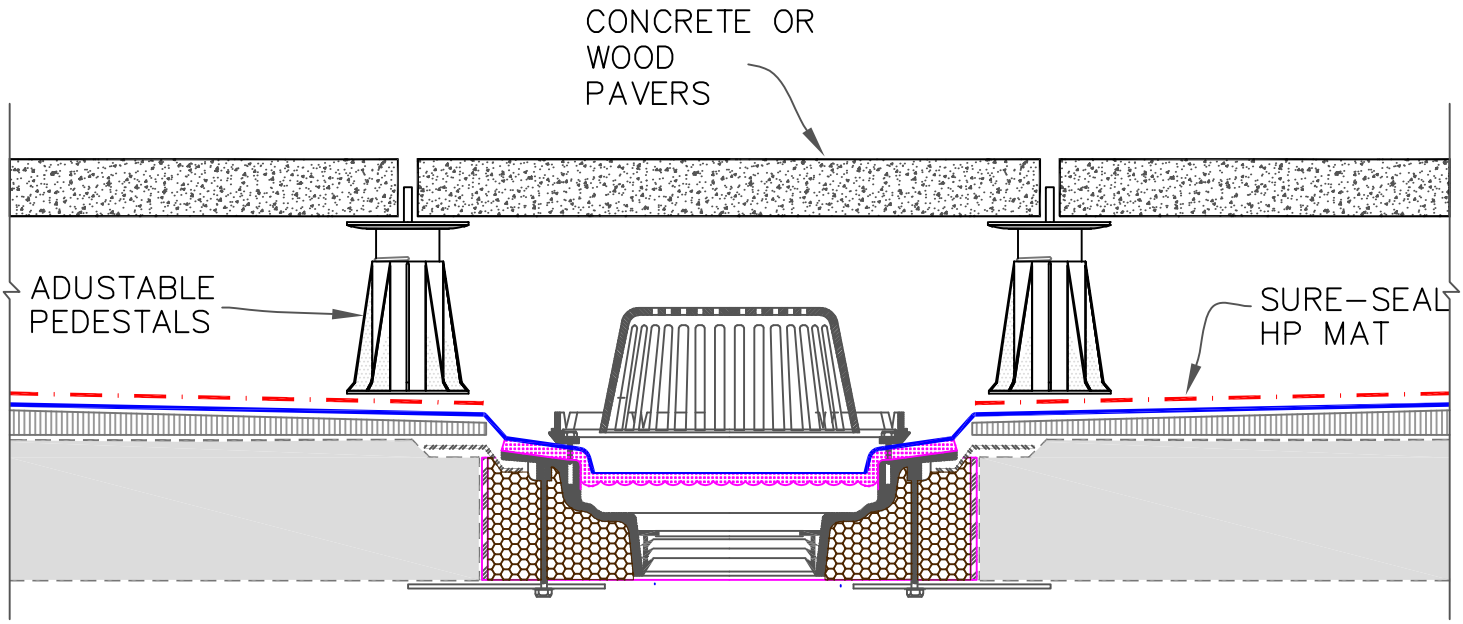
CARLISLE SYNTEC SYSTEMS

EPDM/TPO/PVC
CONCRETE
0 SEE NOTE(S)
SURE–SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

DRAIN DETAIL – LOW–RISE, FIXED HEIGHT PEDESTAL OR PEDESTAL PAVER ASSEMBLIES

2024 PAVER DETAILS

DETAIL NO. PDI 6.1



NOTE:

1. THIS OPTION IS ONLY APPLICABLE TO PAVERS ON ADJUSTABLE PEDESTALS WHEN THERE IS ENOUGH HEIGHT ADJUSTMENT TO CLEAR DRAIN BASKETS

CARLISLE SYNTEC SYSTEMS

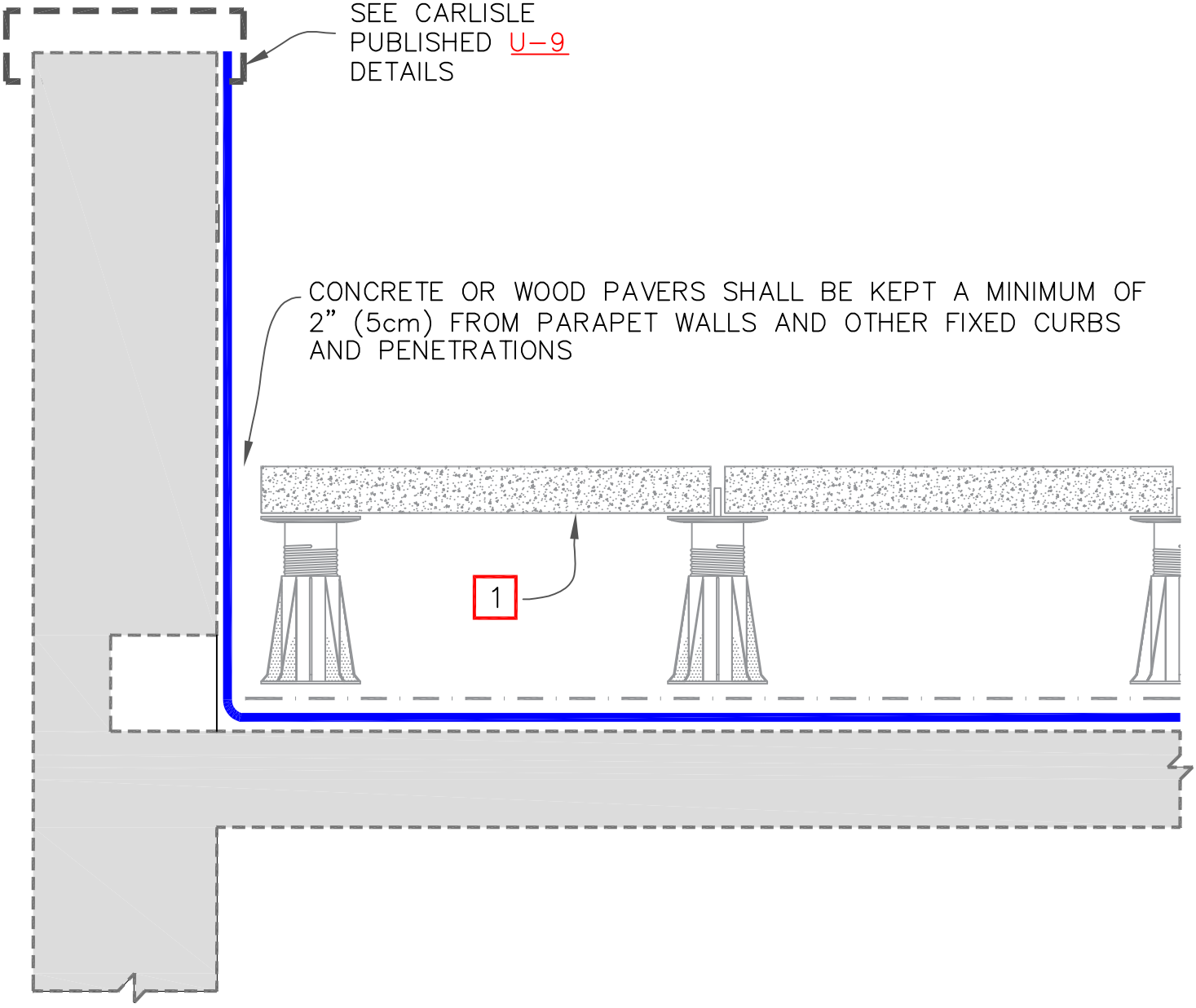
- EPDM/TPO/PVC
- CONCRETE
- 0 — SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

DRAIN DETAIL – ADJUSTABLE HEIGHT PAVER PEDESTAL ASSEMBLY

2024 PAVER DETAILS

DETAIL NO. PDI 6.2

CAUTION
PAVERS MUST NOT BE USED AS WALKWAYS NEAR THE ROOF EDGES, PARAPET WALLS AND UNPROTECTED AREAS WITHOUT FALL PROTECTION.



NOTE:
1. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, E, F & G FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

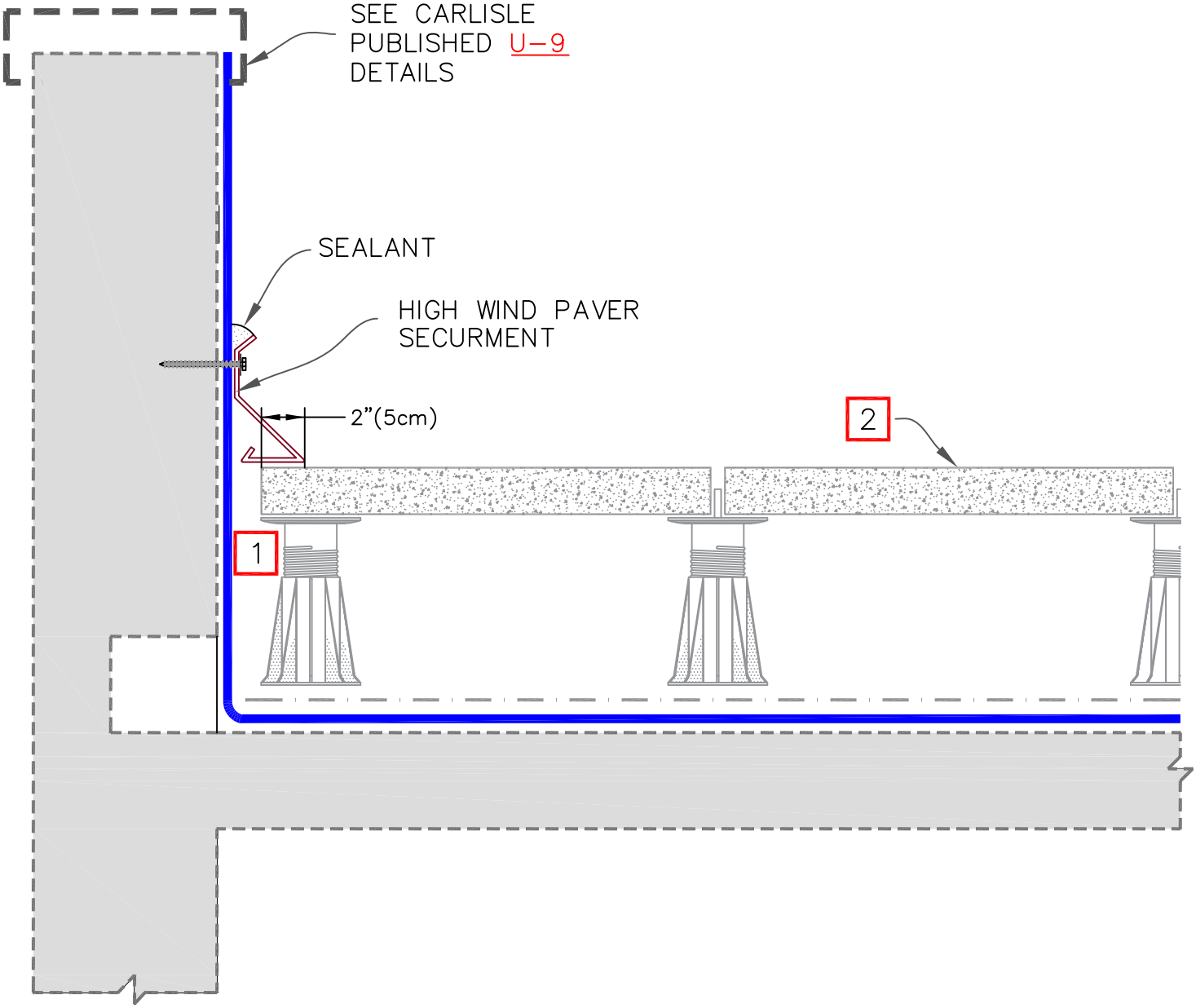
ALL ASSEMBLIES

VERTICAL TERMINATION

2024 PAVER DETAILS

DETAIL NO. PDI 12.1

CAUTION
CONCRETE PAVERS MUST NOT BE USED AS WALKWAYS NEAR THE ROOF EDGES, PARAPET WALLS AND UNPROTECTED AREAS WITHOUT FALL PROTECTION.



NOTES:
1. PAVERS SHALL BE KEPT A MINIMUM OF 2" (5cm) FROM PARAPET WALL.

2. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, AND E FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

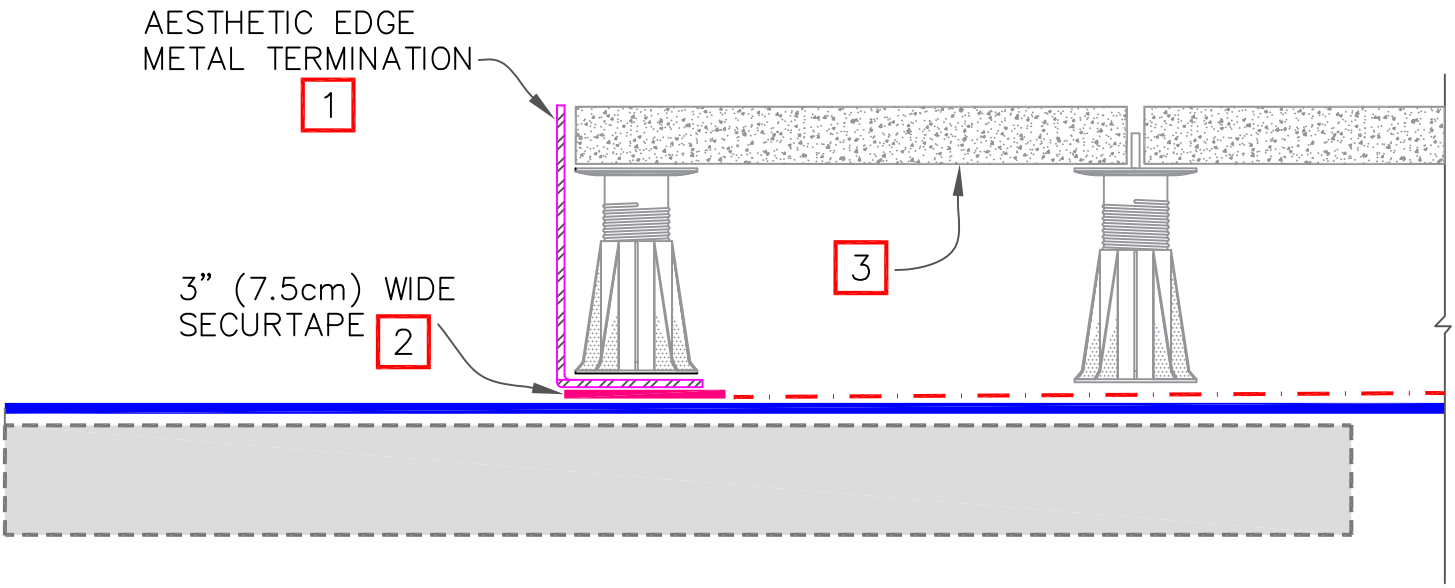
ALL ASSEMBLIES

VERTICAL TERMINATION HIGH-WIND OPTION

2022 PAVER DETAILS

DETAIL NO. PDI 12.2

*CAUTION
CONCRETE PAVERS AS A WALKWAY MUST BE LOCATED MIN. 6'–0" (183cm) AWAY FROM THE NEAREST UNPROTECTED ROOF EDGES OR AS REQUIRED PER APPLICABLE LOCAL CODES/OSHA REQUIREMENTS.



NOTES:

1. METAL EDGE TREATMENT IS USED FOR AESTHETICS AND NOT NEEDED FOR WARRANTY COMPLIANCE

2. SECURTAPE SHALL EXTEND 1/4" (1cm) BEYOND EDGE OF METAL EDGE TO PROTECT ROOF MEMBRANE FROM METAL BURRS & CORNERS

3. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, AND E FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

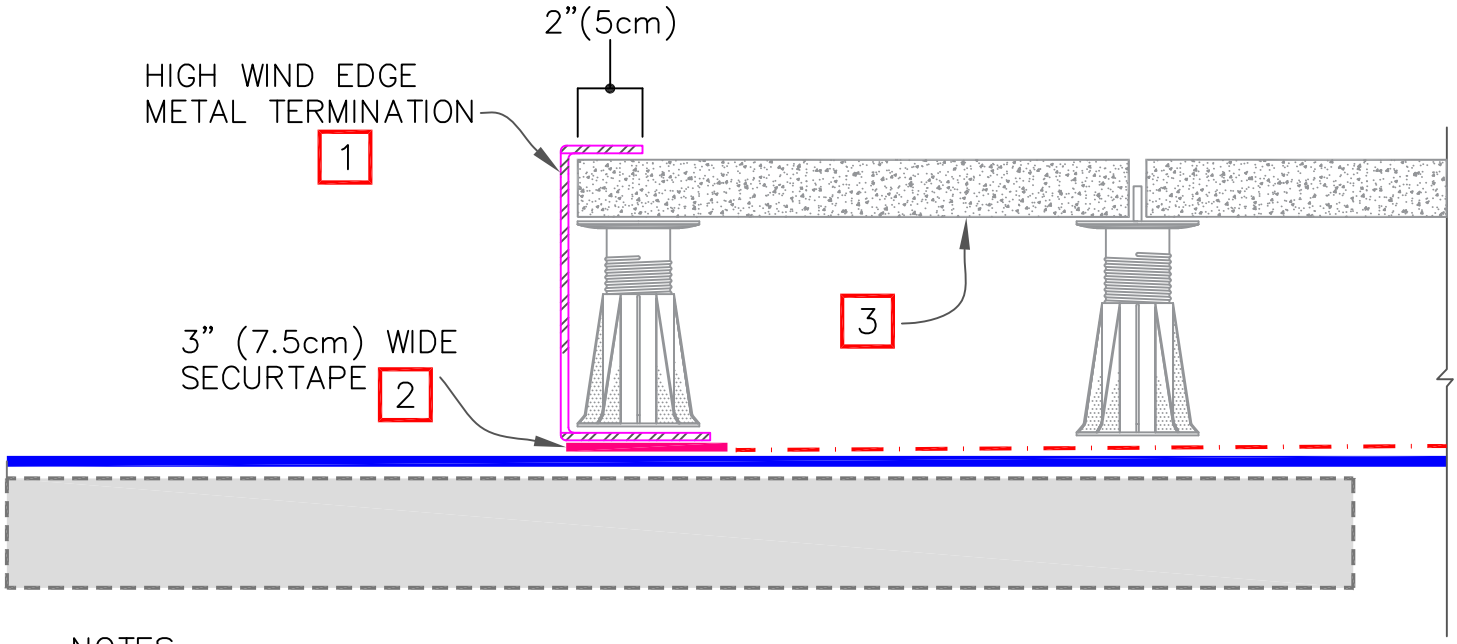
ALL ASSEMBLIES

HORIZONTAL TERMINATION AESTHETIC OPTION

2022 PAVER DETAILS

DETAIL NO. PDI 12.3

*CAUTION
CONCRETE PAVERS AS A WALKWAY MUST BE LOCATED MIN. 6'–0" (183cm) AWAY FROM THE NEAREST UNPROTECTED ROOF EDGES OR AS REQUIRED PER APPLICABLE LOCAL CODES/OSHA REQUIREMENTS.



NOTES:

1. HIGH WIND METAL EDGE TREATMENT SHOULD BE USED IN HIGHER WIND APPLICATIONS TO HELP SECURE THE EXPOSED PERIMETER PAVERS. NOT REQUIRED FOR WARRANTY COMPLIANCE.

2. SECURTAPE SHALL EXTEND 1/4" (1cm) BEYOND EDGE OF METAL EDGE TO PROTECT ROOF MEMBRANE FROM METAL BURRS & CORNERS

3. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, AND E FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

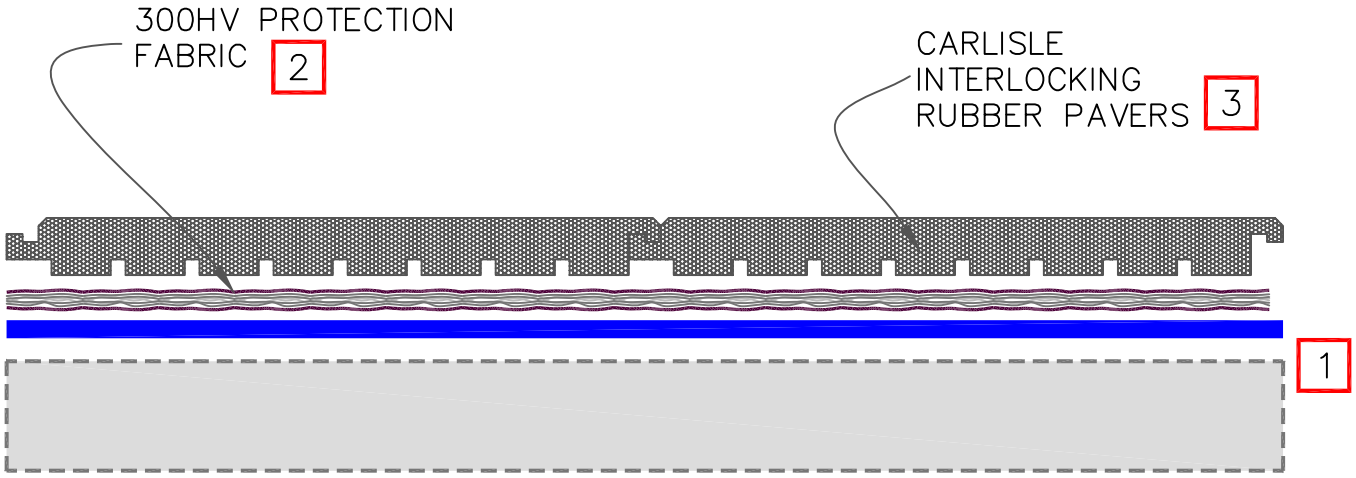
- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

ALL ASSEMBLIES

HORIZONTAL TERMINATION HIGH-WIND OPTION

2022 PAVER DETAILS

DETAIL NO. PDI 12.4



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS
2. 300HV PROTECTION FABRIC IS NOT REQUIRED WHEN PLACING RUBBER PAVERS OVER EPDM MEMBRANE
3. RUBBER PAVERS MUST BE INSTALLED UNDER COMPRESSION. REFER TO CARLISLE'S RUBBER PAVER INSTALLATION GUIDE FOR MORE INFORMATION.

CARLISLE SYNTEC SYSTEMS

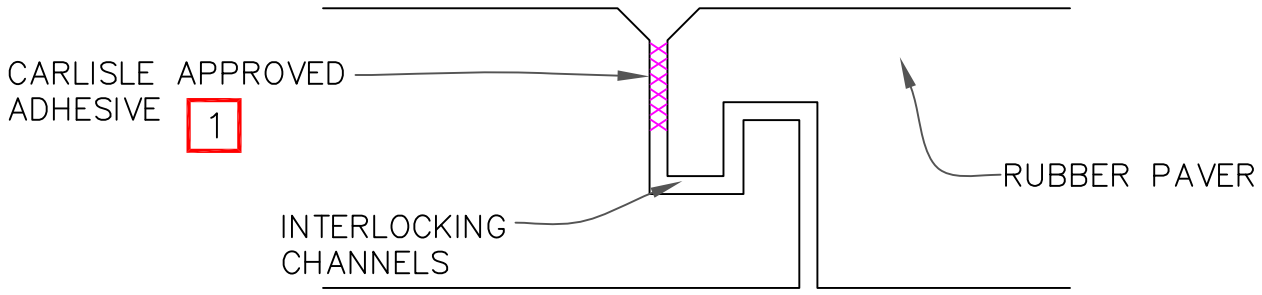
EPDM/TPO/PVC
0 SEE NOTE(S)
SURE-SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

RUBBER INTERLOCKING PAVERS

2022 PAVER DETAILS

DETAIL NO.
PDI RA

AFTER ALL PAVERS ARE INSTALLED, CARLISLE RUBBER PAVER ADHESIVE SHALL BE APPLIED IN ALL PAVER TO PAVER JOINTS USING CARLISLE'S SPECIALIZED RUBBER PAVER ADHESIVE APPLICATION TIP

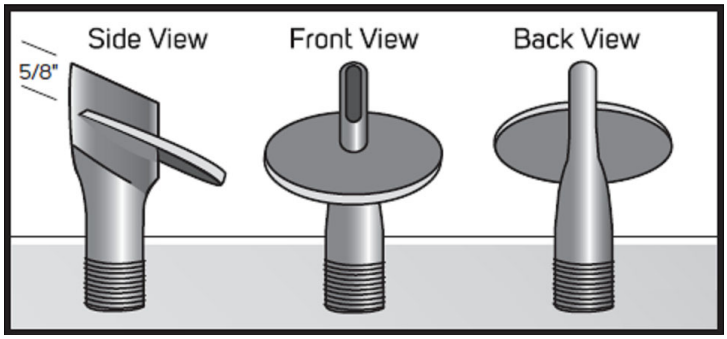


NOTES:

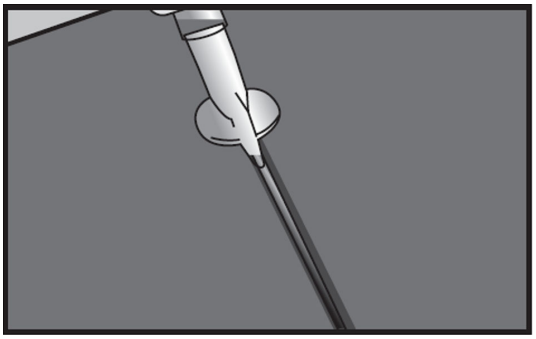
1. ADHESIVE SHALL BE APPLIED BETWEEN THE VERTICAL WALLS OF THE INTERLOCKING JOINT AND NOT ON THE BOTTOM OF THE CHANNEL

2. SEE CARLISLE'S RUBBER PAVER INSTALLATION GUIDE FOR MORE INFORMATION

ADHESIVE APPLICATION TIP



PROPER ADHESIVE APPLICATION

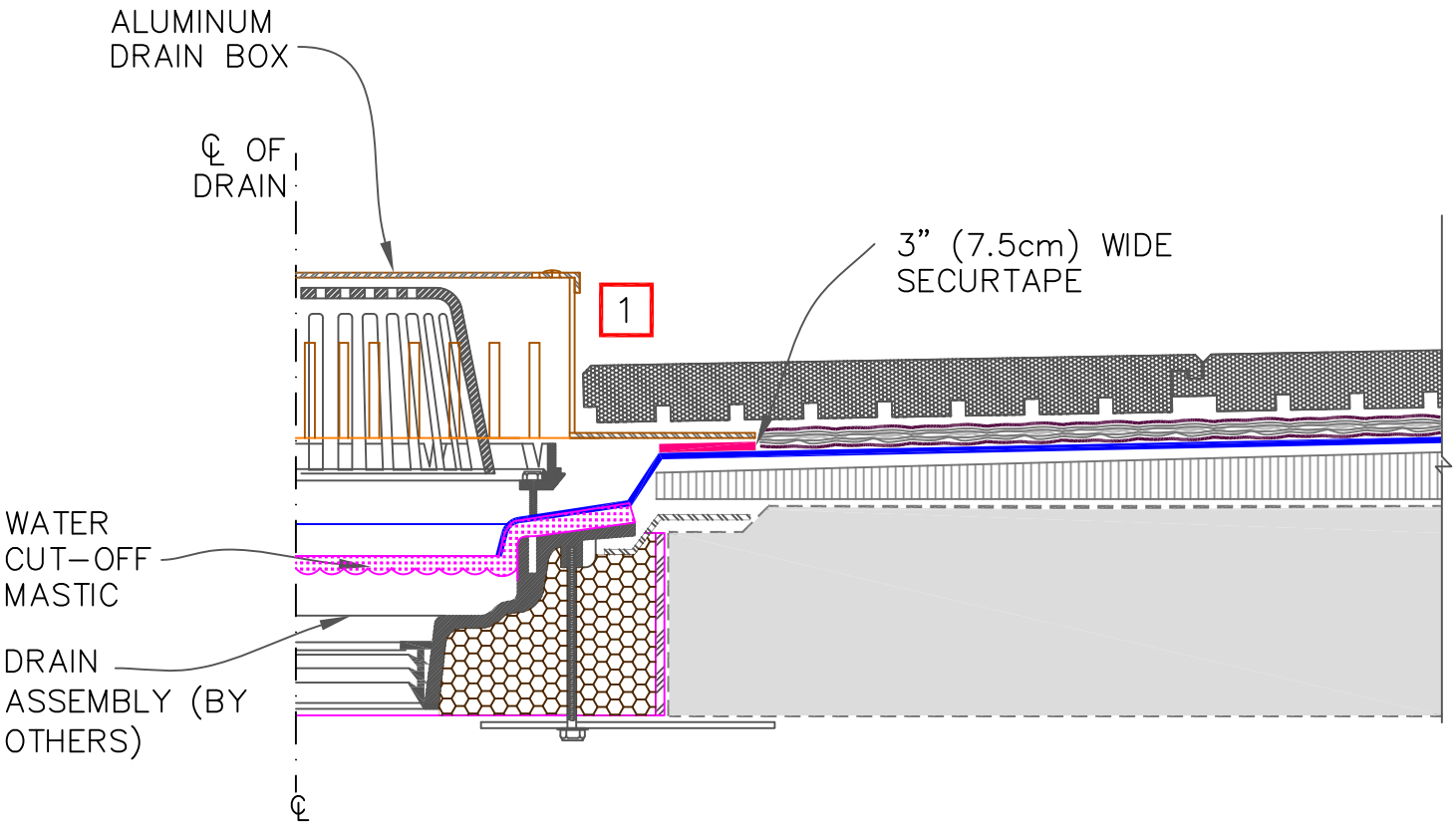


EPDM/TPO/PVC
0 SEE NOTE(S)
SURE-SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

RUBBER PAVER JOINT ADHESIVE APPLICATION

2022 PAVER DETAILS

DETAIL NO. PDI R4.1



NOTE:

1. RUBBER PAVERS SHOULD BUTT TIGHTLY TO DRAIN BOXES TO MAINTAIN COMPRESSION.

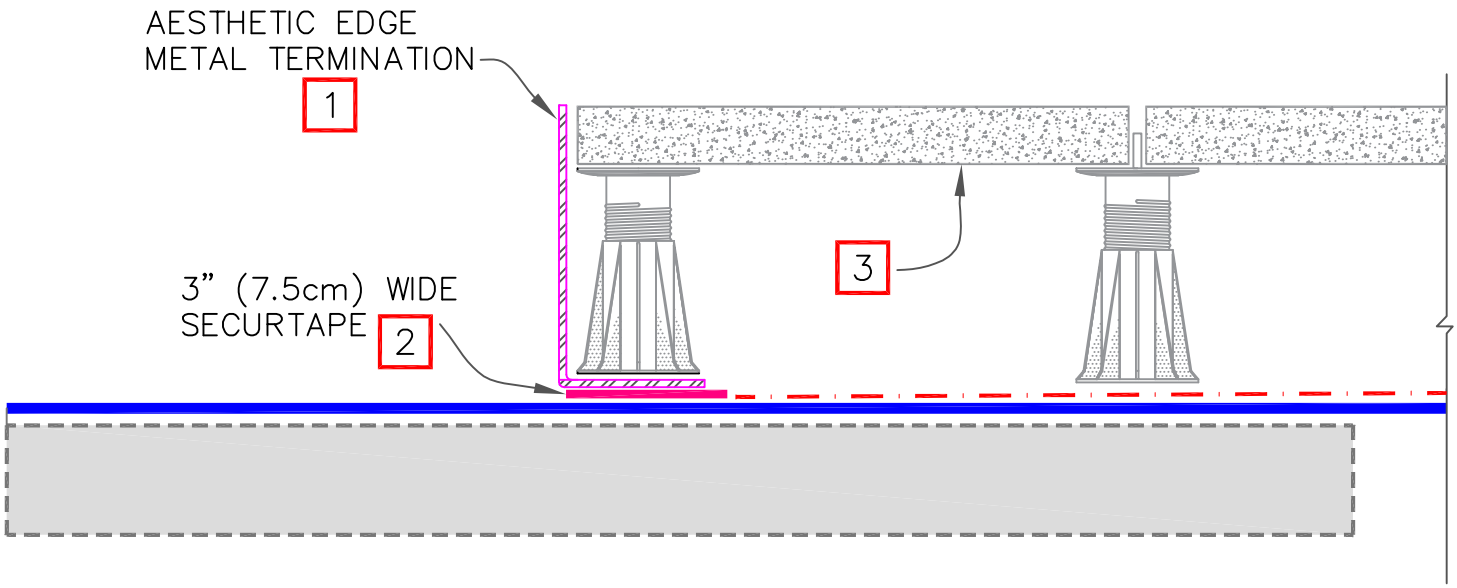
EPDM/TPO/PVC
0 SEE NOTE(S)
SURE–SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

DRAIN DETAIL RUBBER PAVER

2022 PAVER DETAILS

DETAIL NO.
PDI R6.1

*CAUTION
PAVERS AS A WALKWAY MUST BE LOCATED MIN. 6'–0" (183cm) AWAY FROM THE NEAREST UNPROTECTED ROOF EDGES OR AS REQUIRED PER APPLICABLE LOCAL CODES/OSHA REQUIREMENTS.



NOTES:

1. METAL EDGE TREATMENT IS USED FOR AESTHETICS AND NOT NEEDED FOR WARRANTY COMPLIANCE

2. SECURTAPE SHALL EXTEND 1/4" (1cm) BEYOND EDGE OF METAL EDGE TO PROTECT ROOF MEMBRANE FROM METAL BURRS & CORNERS

3. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, E, F, & G FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

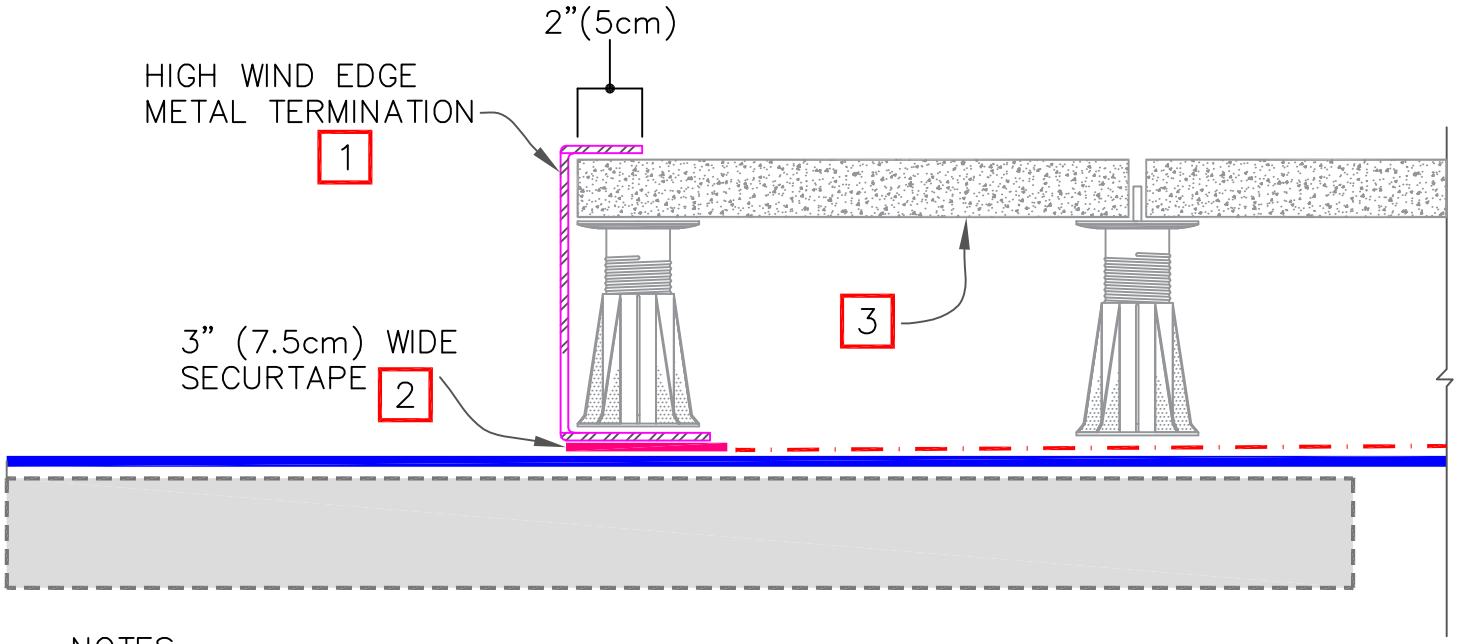
ALL ASSEMBLIES

HORIZONTAL TERMINATION AESTHETIC OPTION

2024 PAVER DETAILS

DETAIL NO. PDI 12.3

*CAUTION
PAVERS AS A WALKWAY MUST BE LOCATED MIN. 6'–0" (183cm) AWAY FROM THE NEAREST UNPROTECTED ROOF EDGES OR AS REQUIRED PER APPLICABLE LOCAL CODES/OSHA REQUIREMENTS.



NOTES:

1. HIGH WIND METAL EDGE TREATMENT SHOULD BE USED IN HIGHER WIND APPLICATIONS TO HELP SECURE THE EXPOSED PERIMETER PAVERS. NOT REQUIRED FOR WARRANTY COMPLIANCE.

2. SECURTAPE SHALL EXTEND 1/4" (1cm) BEYOND EDGE OF METAL EDGE TO PROTECT ROOF MEMBRANE FROM METAL BURRS & CORNERS

3. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, E, F & G FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

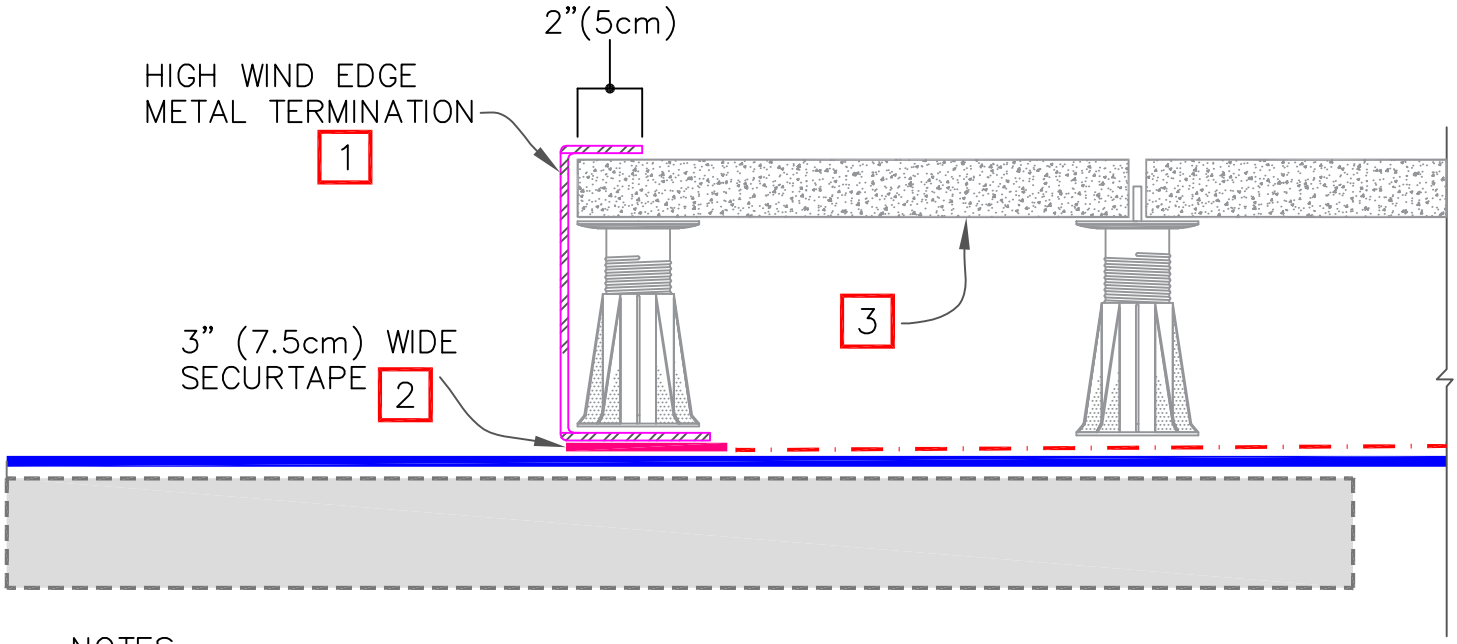
ALL ASSEMBLIES

HORIZONTAL TERMINATION HIGH-WIND OPTION

2024 PAVER DETAILS

DETAIL NO. PDI 12.4

*CAUTION
PAVERS AS A WALKWAY MUST BE LOCATED MIN. 6'–0" (183cm) AWAY FROM THE NEAREST UNPROTECTED ROOF EDGES OR AS REQUIRED PER APPLICABLE LOCAL CODES/OSHA REQUIREMENTS.



NOTES:

1. HIGH WIND METAL EDGE TREATMENT SHOULD BE USED IN HIGHER WIND APPLICATIONS TO HELP SECURE THE EXPOSED PERIMETER PAVERS. NOT REQUIRED FOR WARRANTY COMPLIANCE.

2. SECURTAPE SHALL EXTEND 1/4" (1cm) BEYOND EDGE OF METAL EDGE TO PROTECT ROOF MEMBRANE FROM METAL BURRS & CORNERS

3. CONCRETE PAVERS ON ADJUSTABLE PEDESTALS SHOWN. REFER TO PD DETAIL B, C, D, E, F & G FOR ACCEPTABLE ALTERNATIVE ASSEMBLIES.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- CONCRETE
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

ALL ASSEMBLIES

HORIZONTAL TERMINATION HIGH-WIND OPTION

2024 PAVER DETAILS

DETAIL NO. PDI 12.4

End of Section

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle Authorized Roofing Applicators should consult Carlisle or their Carlisle Manufacturer's Representative for any information, which has subsequently been made available.
Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S SPEC SUPPLEMENT

G-17

Electronic Leak Detection (ELD) Systems

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems. In addition to the information contained herein, refer to individual Roofing Membrane Specification sections and Details which are included with each specification to provide the Specifiers and Authorized Applicators with quick access to specific information.

A. Introduction

Verifying the watertightness of roofing is important, especially if it is to be covered with pavers, ballast, or a vegetated roof assembly. This verification is a field quality-control measure beyond the scope of visual inspections for issuance of a warranty. A common practice used is flood testing the roof using ASTM D5957 as a standard guide. However, using the flood test method can introduce large amounts of water to a new roof assembly if there is a serious leak. Electronic Leak Detection uses a small amount of water, or no water at all, depending on the method used, so the introduction of large amounts of water is not an issue. The advantages of low-voltage electrical conductance testing over traditional flood testing are its capability of providing leak detection throughout the life of the roofing, precisely locating leaks, and with some testing methods, the ability to test sloped roofs and vertical walls. Thereby making it a Quality Assurance test, at time of installation and an Evaluation or Forensic Tool for investigating leaks or breaches in the roof membrane throughout its service life, when the membrane is exposed.

Electronic Leak Detection (ELD) - A non-destructive test that uses a brush, broom, roller, platform, or probes, along with low- or high-voltage electrical current, to find breaches, holes, and seam voids in the roof membrane or flashings by completing a circuit with the electrical charge. In low-voltage ELD testing, a breach-free membrane will block any water and therefore, any electrical current. If a leak is present, the water will make its way through the membrane and must touch an electrically grounded conductive substrate directly below the membrane. This allows an electrical circuit to be completed and the testing equipment and technician to accurately pinpoint the membrane breach, limiting the repairs needed to the areas where damage has been identified instead of replacing or repairing the entire roof.

Electronic leak-testing methods are outlined in **ASTM Guide D7877-14 "Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproofing Membranes"** which lists the four different ELD test methods. Those four test methods are: **Low-Voltage Scanning Platform, Low-Voltage Vertical Roller, Low-Voltage Electronic Field Vector Mapping, and High-Voltage Spark or Holiday Testing**. All four of the ELD test methods require the same basic requirements: A conductive substrate must be present directly below the membrane. A valid ground connection must be provided. The membrane must be exposed. The roof system must have a continuous, unbroken electrical path from the top of the membrane to the conductive substrate below.

1. **Low-Voltage Scanning Platform Testing** is a specific system which uses a small scanning platform, called IntegriScan™, a proprietary system by Detec Systems. This system is described in ASTM D7877 as well as in ASTM D8231 “Standard Practice for the Use of a Low Voltage Electronic Scanning System for Detecting and Locating Breaches in Roofing and Waterproofing Membranes”. The platform is approximately 18 by 24 inches (457 by 609 mm) and incorporates a perimeter wire loop of chains that hang from the platform and make contact with water on the roof surface, and a separate line of chains located in the center of the platform. Both series of

chains are connected to a low-voltage power source. The platform is moved along the surface of the roof membrane to detect breaches in the roof membrane.

When utilized with a conductive primer directly below the membrane, this system works with electrically conductive roof materials such as black EPDM, which contains carbon black, or with roof membranes that have aluminized protective coatings, commonly used on modified bituminous membranes.

2. **Low-Voltage Vertical Roller Testing** is a specific system which uses a Vertical Scanning Unit (VSU Roller) as part of IntegriScan™, a proprietary system by Detec Systems. This system is described in ASTM D7877 as well as in ASTM D8231 “Standard Practice for the Use of a Low Voltage Electronic Scanning System for Detecting and Locating Breaches in Roofing and Waterproofing Membranes”. The VSU Roller utilizes a 3/8” nap by 9” roller. The VSU Roller is moved along the vertical surface of the roof membrane or flashings to detect breaches in the roof membrane or flashings.

3. **Low-Voltage Electronic Field Vector Mapping (EFVM) testing** works by grounding a conductive roof deck, such as steel, beneath a nonconductive roof membrane and locating places where the electric field goes through the roof. This process is accomplished by dampening, the roof and placing an uninsulated wire loop around the perimeter of the area to be tested and around any grounded objects to isolate the testing area. The wire loop is connected to a low-voltage pulsating generator that emits a one second 40-V charge every three seconds, creating a momentary electric field between the wire loop and the grounded roof deck. The roof membrane acts as an insulator between the electrified wire loop and the roof deck. Electrical charges over the moist membrane surface will be random unless there is a discontinuity or "leak" in the membrane. If there is a leak, a directional current is created that can be followed to the leak using a potentiometer that is connected to two probes that make contact with the roof surface. For conventional and nonconductive roof decks, such as wood, a conductive medium must be built into the roof assembly. Common mediums include welded stainless steel mesh for adhered roof systems, a conductive primer for adhered systems, aluminum screen for loosely laid roof systems, and a conductive fabric for use with loosely laid and mechanically fastened roof systems.

   Additionally, this testing method will not work with an electrically conductive roof material such as black EPDM, which contains carbon black, or with roof membranes that have aluminized protective coatings, commonly used on modified bituminous membranes. Continuous water contact must be maintained with the perimeter wire, the testing probes and through the breach in the roof membrane to the conductive material (metal roof deck or conductive medium), or the breach will not be detected.

4. **High-Voltage Spark or Holiday testing** uses 1000- to 30,000-Volts od DC power and does not require a wet membrane or perimeter wire loop. The system uses an electrically charged metal "broom" connected to the power source, which is grounded to a conductive roof deck or a conductive medium. When the metal broom passes over a discontinuity in the dry roof membrane, the electrical circuit is completed, and an audible sound and a visible spark is generated by the testing equipment.

   Additionally, this testing method will not work with an electrically conductive roof material such as black EPDM, which contains carbon black, or with roof membranes that have aluminized protective coatings, commonly used on modified bituminous membranes. The roof membrane must be completely dry for this testing method to work. Due to the higher voltage used, more false positives have been reported and there is a greater injury risk associated with testing. Additionally, concern has been expressed with the concept of dragging a wire broom across roof membranes and effect this friction may have on the membrane.

B. Description

The focus of this Spec Supplement is for Electronic Leak Detection with the use of Detec Systems' TruGround Conductive Primer. Carlisle SynTec Systems has collaborated with Detec Systems to offer many Factory Mutual (FM) rated and warrantable roof assemblies that include Detec's TruGround Conductive Primer. Detec Systems' patented TruGround Conductive Primer is an easy to apply conductive medium that is needed to effectively test conventional roofing assemblies for breaches, holes, and seam voids using electronic leak detection (ELD) methods. ELD has become the preferred option for ensuring a watertight membrane on overburden installations and other critical building projects.

Detec's TruGround Conductive Primer is brush- or roller-applied to the substrate prior to adhesive and membrane application. Once the TruGround Conductive Primer has dried (typically 30 minutes), the bonding adhesive can be applied, and the membrane installed like any other roof system.

For leak detection to be accurate, the conductive medium must be installed directly below the roofing membrane. Alternative conductive mediums often raise concerns regarding membrane adhesion when placed directly below the membrane as required per ASTM D7877. These concerns often lead to improper placement of the conductive medium below a coverboard or insulation which invalidates the ELD testing.

Carlisle has conducted testing with FM as well as other 3rd party testing agencies to vet roof system performance when TruGround primer is added to the assembly.

The following roof assemblies have been tested and approved by FM with the addition of TruGround. These assemblies are eligible for the same FM rating as they would without TruGround. Contact Carlisle for associated RoofNav numbers.

FM Approvals		
Membrane Type	Adhesive	Substrates
EPDM	CAV-GRIP III	Carlisle SecurShield Polyiso Carlisle SecurShield HD Polyiso Carlisle SecurShield HD Plus Polyiso Dens Deck Prime SECUROCK
TPO	CAV-GRIP III	Carlisle SecurShield Polyiso Carlisle SecurShield HD Polyiso Carlisle SecurShield HD Plus Polyiso Dens Deck Prime SECUROCK
PVC	Low-VOC PVC Bonding Adhesive	Carlisle InsulBase Polyiso Carlisle SecurShield Polyiso Carlisle SecurShield HD Polyiso Carlisle SecurShield HD Plus Polyiso

The following roof assemblies have been tested and approved by FM with the addition of TruGround but are limited to an FM 1-90 rating. Contact Carlisle for associated RoofNav numbers.

FM Approvals		
Membrane Type	Adhesive	Substrates
FleeceBACK	Flexible FAST (applied in splatter method)	Carlisle InsulBase Polyiso Carlisle SecurShield Polyiso Carlisle SecurShield HD Plus Polyiso DensDeck Prime SECUROCK EcoStorm VSH
SureFlex PVC	HydroBond Bonding Adhesive	Carlisle InsulBase Polyiso Carlisle SecurShield Polyiso Carlisle SecurShield HD Plus Polyiso Dens Deck Prime SECUROCK EcoStorm VSH

For projects that are not FM insured, Carlisle approves and warrants the use of Detec TruGround in all current roof assemblies. Carlisle warrants that the use of TruGround within the roof assembly will not detrimentally affect the performance of the roof assembly. Roof assemblies using TruGround can achieve the same uplift and warranty terms as the same assembly that would be eligible for roof assemblies without TruGround.

C. Quality Assurance

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

2. Roof system must be inspected and approved by a Carlisle Field Service Representative prior to Overburden System (Roof Garden, Pavers or Ballast) installation.

3. Do not install this assembly before the concrete deck has reached its' initial structural strength. Project Engineer must be consulted prior to job start-up.

D. Submittals

1. 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.

2. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

E. Products

1. In addition to the products listed below, products listed in "Part II" of the Carlisle Thermoset/Thermoplastic/FleeceBACK Roofing System Specification can be used as part of the Overburden System (Roof Garden, Pavers or Ballast) installation.

    a. Detec TruGround Conductive Primer - is a water-based, liquid-applied, electrically conductive primer that enables effective electronic leak detection (ELD) testing of conventional roof assemblies. Detec TruGround is brush- or roller-applied in a single-sided application to any properly prepared, non-conductive horizontal or vertical surface such as plywood, insulation, or gypsum cover boards. TruGround is compatible with high-

and low-voltage ELD testing methods listed in ASTM Standard Guide D7877 and complies with ASTM Standard Practice D8231. TruGround is UL Listed and FM Approved in several Carlisle roofing assemblies.

F. Execution

Follow current specifications for installing roof membranes and seaming per specific membrane. [Sure-Seal (EPDM), Sure-Weld (TPO) or Sure-Flex (PVC/KEE HP)].

G. Installation

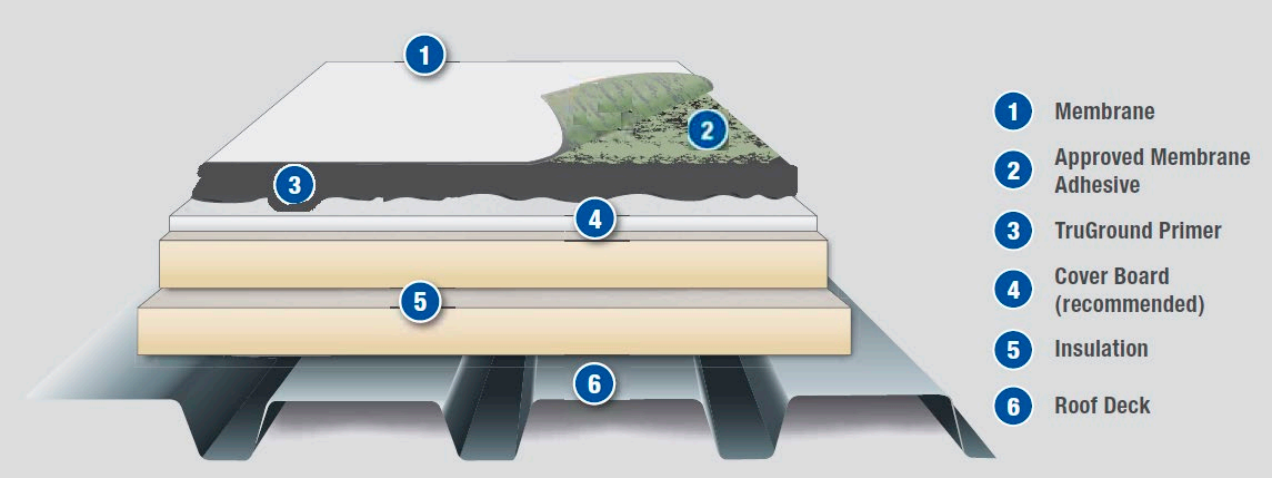
1. Start by liberally applying TruGround to the substrate T-Joints using a paint brush, this ensures electrical continuity between boards. If large gaps, those exceeding 1/8", are present between boards, apply seam tape to the T-Joints to act as a bridge, connecting the boards together. Then, when applying TruGround to the substrate boards (see step 2) ensure that it is also applied over the seam tape connecting the boards. Seam tape may need to be applied at vertical penetrations as well, if the gaps are to large to bridge with TruGround.

2. Apply a thin coat of TruGround over the entire project area using a 3/8" nap roller. If the surface is black, TruGround has been applied at the acceptable thickness. Coverage rate is typically 1250 square feet for most non-porous substrates.

3. Continue TruGround up and onto all metal/grounded penetrations a minimum of 1", not to exceed the height of the flashing. Testing equipment will be connected to these penetrations while conducting the ELD tests.

4. Once TruGround is dry to the touch (typically 30 minutes), proceed with installing the roofing system as outlined in the assembly tables within this Spec Supplement and in accordance with Carlisle published Specifications for the specific membrane type.

H. Associated System Diagram



Typical Roof Assembly with Conductive Primer

End of Section

CARLISLE'S SPEC SUPPLEMENT

G-18

Rooftop Recycling Program

Reroof or Recover of Existing Ballasted, Mechanically Fastened or Induction Welding Attachment Method

July 2024

The information contained in this supplement serves as a criterion for Specifiers and Authorized Applicators regarding the removal, collection, palletizing and recycling of existing Carlisle Roofing Systems including ISO, XPS, EPS Rigid Foam Insulation, EPDM, TPO and PVC Membrane and Concrete Pavers.

A. Description

The rooftop recycling program includes removal of all existing ballast, pavers, debris and all mechanical fasteners in conjunction with removal of all roof assembly components including roof membrane (EPDM, TPO, PVC), roof insulation, cover board and vapor retarder.

NOTE: Fasteners, plates, adhesives, termination bars and membrane with adhesive are not to be included with roofing material intended to be recycled.

1. **General - Single-ply Membrane Roof Systems:**

   a. **Ballasted Assemblies –** Removal of existing ballast and pavers, single-ply roofing membrane, loose laid cover board, underlayment, insulation and vapor retarder.

   b. **Mechanically Fastened Assemblies** – Removal of existing pavers, debris, all mechanical fasteners, roofing membrane, cover board, underlayment, insulation and vapor retarder.

   c. **Induction Welded Assemblies** – Removal of existing pavers, debris, all mechanical fasteners, roofing membrane, cover board, underlayment, insulation and vapor retarder.

   d. **Adhered Assemblies** are not acceptable for rooftop recycling.

   e. **Built up roof systems** are not acceptable for rooftop recycling.

B. Quality Assurance

1. The roofing system specified to be recycled must be removed in its entirety and transferred or disposed of according to the instructions herein.

2. Unless otherwise indicated, demolition and construction waste become the property of Contractor.

3. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of the Owner.

   a. Carefully salvage in a manner to prevent damage and promptly return to Owner.

C. Submittals

1. Waste Management Plan: Submit plan within 30 days of date established for the Commencement of Work.

2. Waste Reduction Reports: Concurrent with each Application for Payment, submit report including the following:

a. Generation points of waste.

b. Total quantity of waste in tons

c. Quantity of waste recycled in tons and by percentage.

d. Recycling and processing records: Indicate receipt and acceptance of recyclable waste by recycling and processing facility licensed to accept the material. Include manifests, weight tickets, receipts and invoices.

D. Resources

1. Management of Construction and Demolition Materials: https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials

2. Best Practices for Construction and Demolition Recycling: https://www.epa.gov/smm/best-practices-reducing-reusing-and-recycling-construction-and-demolition-materials#deconstruct

3. Search by Location and Recycled Materials to find a recycler near you: https://www.cdrecycling.org/index.php?option=com_mcdirectorysearch&view=search&id=2004786#/

4. Construction and demolition salvaged material outlets, recyclers, and service providers: https://www.dep.pa.gov/Business/Land/Waste/SolidWaste/MunicipalWaste/Construction-Demolition-Waste/Pages/C_DSalvagedMaterialOutlets.aspx

E. Execution

1. Regulatory Requirements:

   a. Comply with all transportation and disposal requirements of the authorities having jurisdiction.

   b. Conduct Waste Management Conferences at the jobsite to review methods and procedures related to waste management including but not limited to the following:
      i) Review and discuss Waste Management Plan including responsibilities of each contractor and waste management coordinator.
      ii) Review requirements for documenting quantities of each type of waste and its disposition.
      iii) Review requirements for specific single-ply roof membrane removal procedures and determine applicability of recycling or disposal.
      iv) Review and finalize procedures for materials separation and verify availability of pallets, containers or bins needed to avoid delays.
      v) Review procedures and determine a schedule for periodic waste collection, loading and transportation to recycling and disposal facilities. Coordinate and schedule transportation of recovered material to avoid delays in construction schedule.

2. Waste Management Plan:

   a. Develop a Waste Management Plan according to the requirements of this section. Plan shall include waste identification, waste separation procedures, and procedures for measuring and quantifying materials that are recycled and materials that are disposed of.

   b. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.

   c. Distinguish quantities of recycled materials from demolition waste and construction waste. Indicate quantities by weight using uniform units of measure throughout Waste Management Plan.

   d. Recycled Materials:
      i) Facilitate recovery and recycling of roof membrane and rigid board insulation.
      ii) Construction waste including paper, cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, wood pallets and plastic pails shall also be considered for recycling.

   e. Include list of local receivers and types of recycled material each will receive. Include name, address and phone number.

   f. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste

including size of containers, labeling, and designated location where separation, collection and temporary storage will occur.

g. Implement approved Waste Management Plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement Waste Management Plan during the entire duration of the Contract.

h. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged or recycled.

i. Preparation of waste: Prepare and maintain recyclable waste materials according to recycling receiver or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious of the recycling process.

3. Procedures: Separate recyclable waste from other waste materials, trash and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved Waste Management Plan.

   a. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container or bin.

   b. Inspect containers and bins for contamination and remove contaminated materials if found.

   c. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust accumulation.

   d. Stockpile materials away from the construction area. Do not store within drip line of remaining trees.

   e. Store components off the ground and protect from weather.

   f. Coordinate the removal of recyclable waste from the Owner’s property and facilitate transportation to recycling receiver or processor as often as required to prevent overfilling of bins.

4. Deconstruction for recycling: Deconstruction is the process of carefully dismantling buildings to salvage components for reuse and recycling.

a. Rigid Foam Insulation: EPS, XPS, ISO
   i) Rigid foam insulation shall be removed in full sheets to the greatest extent possible.
   ii) All wet, broken and/or molded foam board pieces shall be discarded and placed in a site disposal dumpster.
   iii) Full, dry foam board sheets are to be stacked 4’ high with a band of stretch wrap around each stack end.
   iv) Trailers provided by recycling processor shall be loaded by demolition contractor.
   v) Recycling receiver shall be contacted to coordinate pick up and transportation to a processing facility.

Foam board insulation is removed, stacked and loaded on a trailer.

b. Roof Membrane: EPDM, TPO, PVC
   i) Membrane seam overlaps shall be cut out and removed along with all metal objects, fasteners, walkways, tarred or patched materials. These items shall be placed in a site disposal dumpster.
   ii) TPO / PVC membranes shall be rolled and secured on a wooden pallet of appropriate size.
   iii) EPDM membrane shall be folded or rolled so it fits squarely on standard wooden pallet.
   iv) Membranes shall be stacked to 3' high and secured to the pallet.
   v) Two days advance notice shall be provided when calling Recycling Receiver to schedule a pickup.

Membrane is prepared and palletized, secured and loaded on a trailer.

c. Concrete Roof Pavers:
   i) Roof pavers shall be removed from roof for reuse on roof and / or reuse on site.
   ii) Roof pavers shall be checked for integrity. Separate any deteriorated, spalled, cracked, chipped, and otherwise unsound pavers and set aside.
   iii) Palletize roof pavers.
   iv) Coordinate pick up of roof pavers with recycling receiver.

d. Vapor Retarder:
   i) Remove existing vapor retarder down to roof deck and discard.

e. Packaging:
   i) Carboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
   ii) Polystyrene Packaging: Separate and bag materials.
   iii) Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces.
   iv) Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

5. Certification:

   a. The Contractor shall submit a certificate of recycling issued by recycling receiver stating total weight of membrane (pounds) and / or volume of foam board insulation (cubic yards) reclaimed by the project.

6. Recycling Receivers and Processors:

   a. Subject to compliance with requirements, available recycling receivers include but are not limited to the following: (Name, address, phone number of local recycling receivers and processors.)

      Nationwide Foam, Inc.
      NationwideFoamRecycling.com
      Info@NationwideFoamRecycling.com
      Phone: 888-820-2760
      Fax: 508-879-9760

End of Section

CARLISLE'S SPEC SUPPLEMENT

G-19

Synthetic Turf System

Adhered, Mechanically Fastened or Induction Welding Attachment Method

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and use of Synthetic Turf Systems for roofing assembly installations. In addition to the information contained herein, attached details are included to provide the Specifiers and Authorized Applicators with quick access to specific information. Specifiers and Authorized Applicators are advised to reference all applicable details included with this spec supplement.

A. Description

The roofing assembly incorporates a Carlisle supplied Synthetic Turf System, including a protective mat, mounting pedestals, fiberglass grate and synthetic turf, installed in conjunction with a Carlisle Roofing membrane (EPDM, TPO, PVC, KEE HP) system installed in accordance with the appropriate Carlisle Roof Membrane Specification.

1. **Membrane Roof Systems**

   The artificial turf system is installed over a slip sheet of HP Protective Mat or 300 HV Protection Fabric in conjunction with an approved Pedestal System over the roof membrane (EPDM, TPO, PVC or KEE HP).

   a. **Adhered Assemblies** – Using EPDM, TPO, PVC or KEE HP, insulation may be installed either mechanically (fastened directly to the deck) or set in Flexible FAST bead adhesive to the structural deck. Subsequent layers of insulation or coverboard may be mechanically fastened through all layers or set in Flexible FAST bead adhesive. The membrane shall be fully adhered using the appropriate bonding adhesive following Carlisle's Thermoset (EPDM), Thermoplastic (TPO, PVC, and KEE HP), FleeceBACK (EPDM, TPO, PVC or KEE HP) or FleeceBACK AFX (EPDM or TPO) membrane Specifications.

   b. **Induction Welded Assemblies** – Using TPO or PVC, insulation is mechanically fastened using appropriate Carlisle Fasteners and TPO or PVC Induction Welding Plates which are used to secure both layers to the structural deck. The fastening density of the plates and fasteners shall be in compliance with the Induction Welding Attachment (Attachment I) of the Thermoplastic Specification.

   c. **Mechanically Fastened Assemblies** – Using EPDM, TPO, PVC or KEE HP, membranes are mechanically fastened over insulation/underlayment to the deck with the appropriate Carlisle Fasteners and Fastening Plates. The fastening density of the plates and fasteners shall be in installed per Carlisle's Thermoset (EPDM), Thermoplastic (TPO, PVC, and KEE HP) membrane Specification.

Using a minimum 60-mil membrane, the assemblies described herein are eligible for a 5, 10, 15, or 20 Year Membrane System Warranty with a Warranty wind speed up to 72 mph; overburden materials are limited to 55 mph. A project may be submitted to Carlisle for Approval for higher wind speed coverage. An Overburden Removal and Replacement Warranty is available with all Carlisle supplied Synthetic Turf Systems with 10, 15, or 20 Year Durations for an additional fee.

B. Quality Assurance

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

3. Roof system must be inspected and approved by a Carlisle Field Service Representative prior to Synthetic Turf System installation.

4. With roofing assemblies covered with an overburden system, such as the Carlisle Synthetic Turf System, Carlisle

Recommends the use of Electronic Leak Detection testing prior to the installation of the overburden system. Refer to Spec Supplement G-17 “Electronic Leak Detection (ELD) Systems”. Testing should take place after the membrane and flashings have been in place a minimum of 24 hours.

5. Do not install this assembly before the concrete deck has reached its’ initial structural strength. The Project Engineer must be consulted prior to job start-up.

C. Submittals

1. 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.

2. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

D. Products

In addition to the products listed below, products listed in "Part II” of the Carlisle Thermoset/Thermoplastic Roofing System Specification can be used as part of the Synthetic Turf System.

1. **Carlisle GRO Synthetic Turf System:** Carlisle’s GRO Synthetic Turf system provides a hassle-free, environmentally safe roof garden alternative for crafting a natural looking play or leisure area on the roof. The system is installed in an elevated fashion, allowing it to sit above the roof membrane secured to structural grates supported on adjustable pedestals. The materials needed for installation include HP protection mat, GRO adjustable pedestals (available in different heights), GRO Structural Grate, Grate Fastening Kit, GRO Turf, and 1/2” to 3/4” self-tapping, flat head, stainless steel screws (sold by others). When seaming multiple pieces of turf together, GRO Seaming Fabric and Turf Seaming Adhesive is also required.

   a. **GRO Synthetic Turf:** ASTM D2859; ADA accessible; Qualifies for LEED certification. A weatherproof, impact absorbing, mold and fade resistant, artificial turf, manufactured from a Polypropylene thermoplastic (PP) blend with Polyethylene (PE) thatching, designed for foot traffic. For use on rooftop amenity spaces, playgrounds, pet areas, sports fields, putting greens, balconies, decks, and lawns. Available in six varieties:

      a. **Plush Spring:** 2-inch pile height, 80 oz./yd^2 Face weight. 106 oz/yd^2 Total weight; available with (6) colors and (2) fibers for a lush landscape appearance.
         Color: Field, Apple, Emerald, Tan.
         Thatching: Green, Tan.

      b. **Plush Fall:** 2-inch pile height, 80 oz./yd2 Face weight. 106 oz/yd2 Total weight; available with (6) colors and (3) fibers for a realistic feel.
         Color: Field, Olive, Emerald, Tan.
         Thatching: Green, Tan.

      c. **All Play:** 1.125-inch pile height, 55 oz./yd2 Face weight. 81 oz/yd2 Total weight; U-shaped fibers for playgrounds and heavy traffic.
         Color: Field, Apple.
         Thatching: Green, Tan.

      d. **Classic Pro:** 1.625-inch pile height, 90 oz./yd2 Face weight. 116 oz/yd2 Total weight; “W” shaped fibers for a natural manicured look.
         Color: Field, Emerald.
         Thatching: Green, Tan.

      e. **Putting Turf:** 0.625-inch pile height, 46 oz./yd2 Face weight. 60 oz/yd2 Total weight; Used for Putting greens, bocce courts, and sports applications.
         Color: Two-tone green.

      f. **Pet Turf:** 1.125-inch pile height, 55 oz./yd2 Face weight. 71 oz/yd2 Total weight; Vibrant greenery for pets with maximum permeability and odor minimizers.
         Color: Field, Apple.
         Thatching: Green, Tan.

b. **Turf Seaming Fabric:** 12”-wide, non-woven fabric designed to be the carrier for the seaming adhesive when bonding two pieces of turf together. It is loose laid, centered under the paver joint so that 6” of fabric extends under each piece of turf to be seamed.

c. **Turf Seaming Adhesive**: Turf Seaming Adhesive is supplied as XGS Synthetic Turf adhesive and is a single-part, moisture cure, urethane adhesive designed specifically for bonding the backing of synthetic turf when seaming is required. Turf Seaming Adhesive is non-toxic, non-hazardous, and requires no mixing.

d. **GRO Adjustable Pedestals:** Heavy duty polypropylene and rubber, adjustable height pedestals to provide support and alignment for Gro Turf Structural Grates. 8” base diameter provides stability and spreads the structural load. Provided with Height Extension Collars allowing a height range of 1” to 39” with 3,000 psi compressive strength. Fully recyclable.

e. **GRO Turf Structural Grate:** 23.5” x 23.5” x 1.15”; 5.2 lbs. per grate. Nylon and fiberglass grate for use in artificial turf system installations, providing a secure foundation on pedestals for artificial turf systems. Engineered to attach to Gro Fixed Head Pedestals, providing stability and wind uplift resistance. ASCE 7 approved.

f. **GRO Turf Grate Fastening Kit:** Includes fastening hardware to lock-down each grate to the pedestal below. Provides a secure connection between pedestals and the Artificial Turf on the finished deck surface, creating a monolithic system to hold the system in place and mitigating against wind uplift. The fastening method allow for one centrally located grate to be easily removed for repairs and maintenance.

2. **Carlisle Supplied System Accessories:**

g. **HP Protection Mat:** a nominal 6 oz. per square yard, UV-resistant, polypropylene, needle-punched fabric. HP Protective Mat is installed as a slip sheet.

h. **300HV Protection Fabric:** a (16 oz/ sq yd) extremely tough non-woven polypropylene fabric designed for use as a protection course over Carlisle’s roofing membranes providing cushion for heavy overburden materials. 300HV Protection Fabric is non-biodegradable and stabilized to resist soil, chemicals and mildew, as well as acids and alkalis.

E. Execution

Follow current specifications for installing roof membranes and seaming per specific membrane. [Sure-Seal (EPDM), Sure-Weld (TPO) or Sure-Flex (PVC/KEE HP)].

General

Exercise care in placing pedestals and artificial turf over roofing or waterproofing so protection materials are not displaced and roofing or waterproofing is not punctured or otherwise damaged. Carefully replace protection materials that become displaced and arrange for repair of damaged roofing or waterproofing before covering with synthetic turf system.

F. Installation

1. Proceed with installing roofing system as described in this section and in accordance with Carlisle published Specifications for the specific membrane type.

2. After installation of the roofing membrane, install slip sheet of HP Mat or 300HV Protective Fabric, as required by paver system, as outlined above.

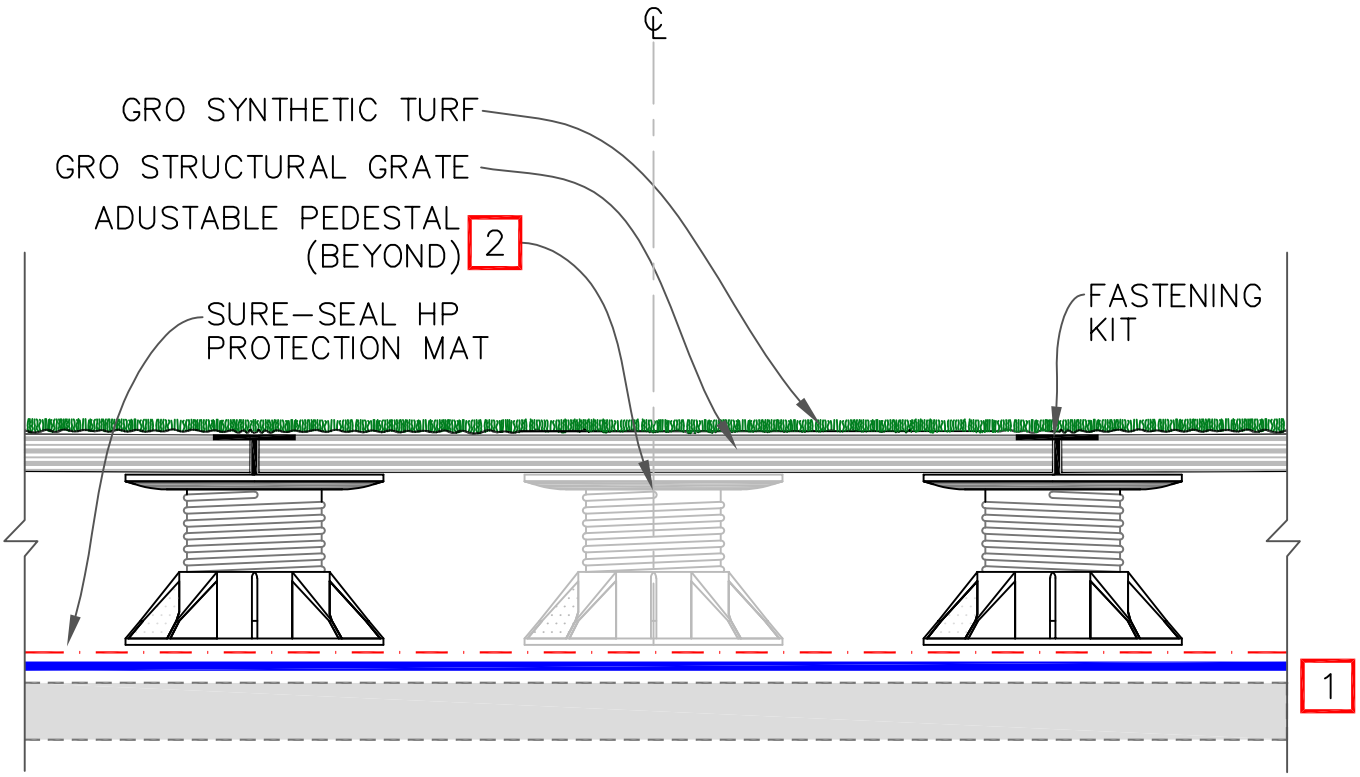
3. Prior to installation of pedestal grate and turf, verify that the roof system, the back of the artificial turf, the structural grate, and pedestals are dry and free from oils and debris.

4. Install appropriate pedestals as outlined by the synthetic turf system selected.

5. Install the GRO Turf System according to Carlisle’s published GRO Synthetic Turf System installation instructions.

G. Associated Installation Details

End of Section



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS.
2. PEDESTALS REQUIRED UNDER CORNERS AND IN CENTER OF EACH TURF TRAY.

PRECAUTIONS:
GRO SYNTHETIC TURF SYSTEMS SHALL BE INSTALLED WITH A PERIMETER OF CONCRETE PAVERS SHARING THE PERIMETER GRO TURF PEDESTALS. THE WEIGHT OF THE PAVERS WILL PROVIDE BALLAST FOR THE TURF SYSTEM, ENSURING ADDITIONAL WIND RESISTANCE. IF THE SYSTEM BUTTS TO A VERTICAL CURB OR WALL, USE A METAL COUNTERFLASHING FASTENED TO THE VERTICAL CONDITION THAT EXTENDS OVER THE TURF SYSTEM A MINIMUM OF 2" (5 CM) TO PREVENT UPLIFT IN THE PERIMETERS. (SEE DETAIL ST–05)

CARLISLE SYNTEC SYSTEMS

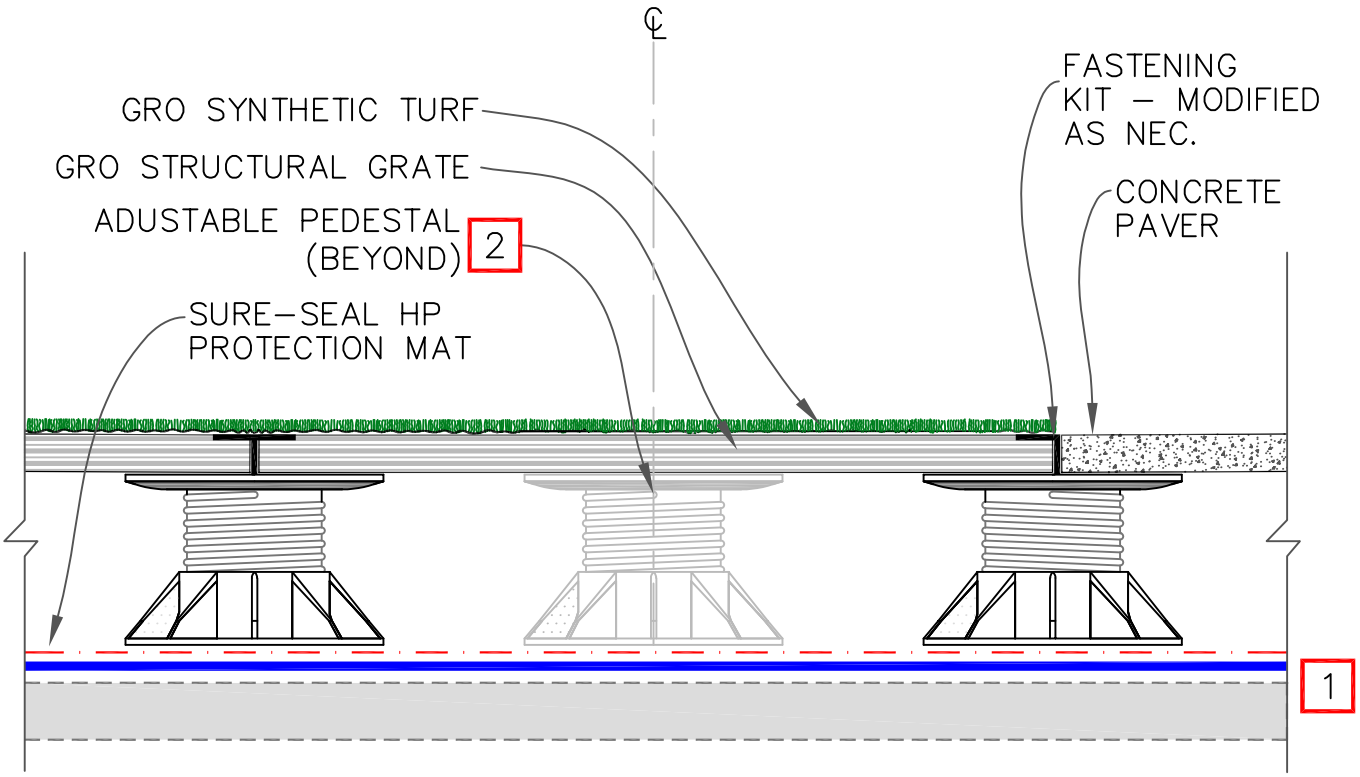
- EPDM/TPO/PVC
- 0 SEE NOTE(S)
- SURE–SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

SYNTHETIC TURF – SECTION

2024 PAVER DETAILS

DETAIL NO. ST 01

PAGE ORDER



NOTES:

1. APPROVED ROOF ASSEMBLY. REFER TO SPECIFICATIONS.
2. PEDESTALS REQUIRED UNDER CORNERS AND IN CENTER OF EACH TURF TRAY.

PRECAUTIONS:
GRO SYNTHETIC TURF SYSTEMS SHALL BE INSTALLED WITH A PERIMETER OF CONCRETE PAVERS SHARING THE PERIMETER GRO TURF PEDESTALS. THE WEIGHT OF THE PAVERS WILL PROVIDE BALLAST FOR THE TURF SYSTEM, ENSURING ADDITIONAL WIND RESISTANCE. IF THE SYSTEM BUTTS TO A VERTICAL CURB OR WALL, USE A METAL COUNTERFLASHING FASTENED TO THE VERTICAL CONDITION THAT EXTENDS OVER THE TURF SYSTEM A MINIMUM OF 2" (5 CM) TO PREVENT UPLIFT IN THE PERIMETERS. (SEE DETAIL ST–05)

CARLISLE SYNTEC SYSTEMS

EPDM/TPO/PVC
0 SEE NOTE(S)
SURE–SEAL HP PROTECTIVE MAT
300HV PROTECTION FABRIC

SYNTHETIC TURF – SECTION @ TYPICAL EDGE CONDITION

2024 PAVER DETAILS

DETAIL NO. ST| 02

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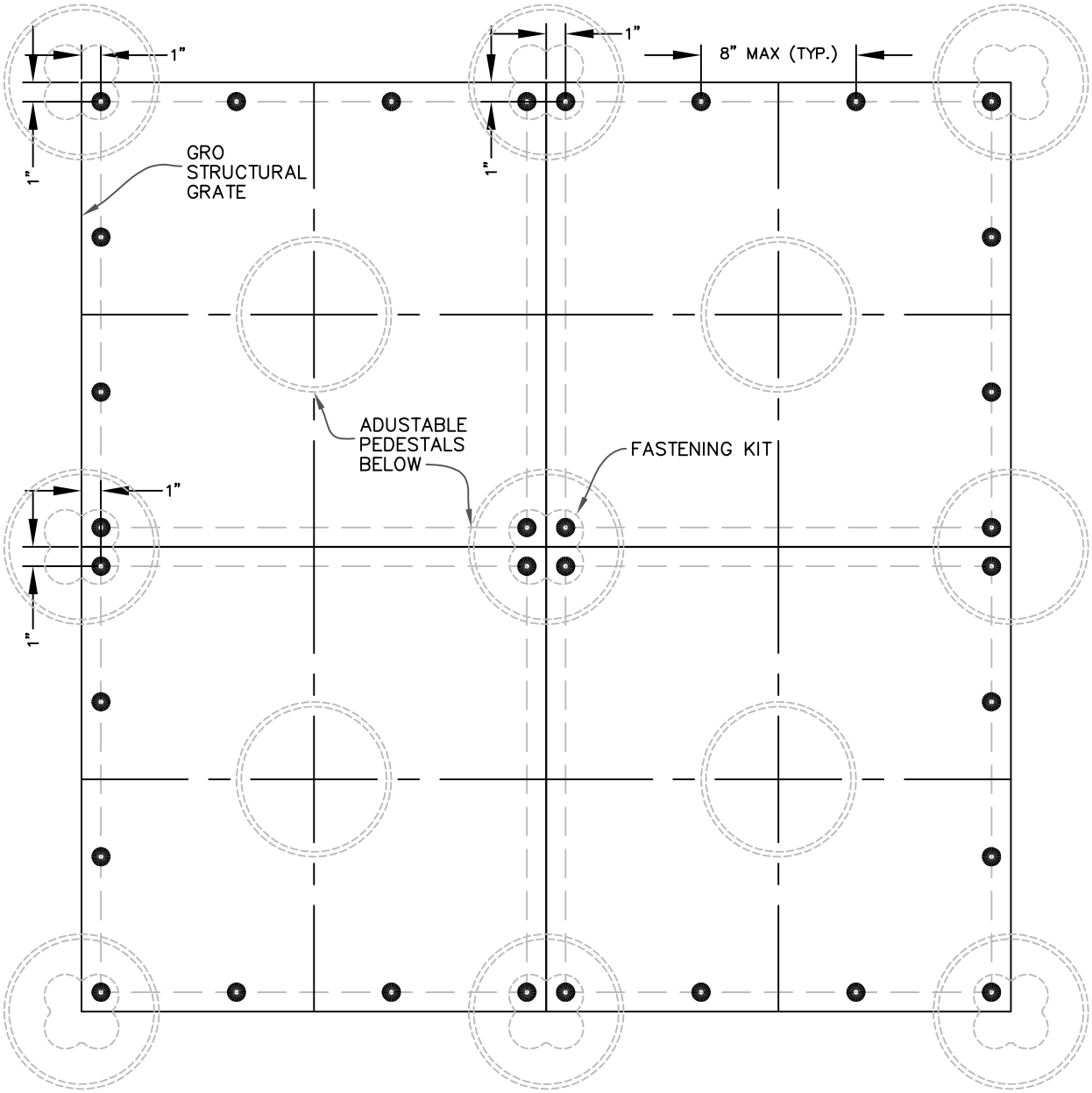


NOTES:

1. USING $\frac{1}{2}$" TO $\frac{3}{4}$" FLAT HEAD, SELF-TAPPING, STAINLESS STEEL SCREWS, FASTEN THE TURF TO THE GRATES AROUND THE ENTIRE PERIMETER OF THE TURF SYSTEM.
2. DO NOT OVERDRIVE THE SCREWS COMPLETELY THROUGH THE TURF.
3. ENSURE SCREW HEADS ARE DRIVEN DEEP ENOUGH TO CONCEAL SCREW HEAD.
4. SPACE FASTENERS MAXIMUM OF 8" APART AND 1" FROM EDGE OF STRUCTURAL GRATE.
5. IN THE FIELD, SCREWS SHALL BE LOCATED AT THE CORNER OF EACH GRATE.
6. PEDESTALS REQUIRED UNDER CORNERS AND IN CENTER OF EACH TURF TRAY.

NOTE: IF SEAMING IS REQUIRED, SCREWS SHALL NOT BE LOCATED WITHIN THREE FEET OF THE SEAM AREA TO ALLOW TURF PIECES TO BE FOLDED BACK TO PERFORM THE SEAMING PROCESS. ONCE SEAMING IS COMPLETE, FASTENERS CAN BE INSTALLED IN SEAM AREA.

CARLISLE SYNTEC SYSTEMS

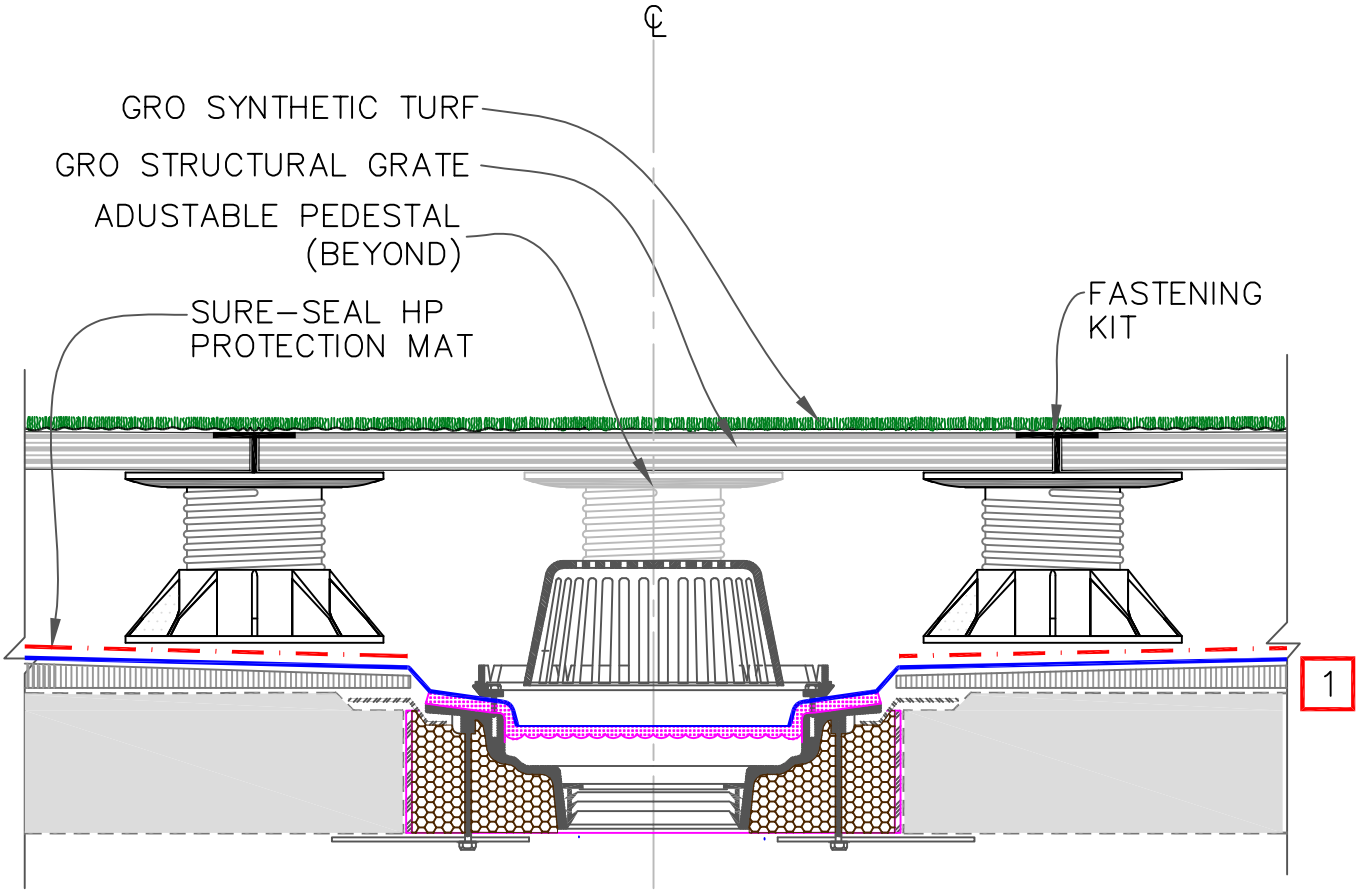
- EPDM/TPO/PVC
- 0 — SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

SYNTHETIC TURF – FASTENER LAYOUT

2024 PAVER DETAILS

DETAIL NO. STI 03

PAGE ORDER



NOTE:

1. THIS OPTION IS ONLY APPLICABLE TO SYNTHETIC TURF INSTALLED ON STRUCTURAL GRATES ON ADJUSTABLE PEDESTALS WHEN THERE IS ENOUGH HEIGHT ADJUSTMENT TO CLEAR DRAIN BASKETS
2. CONSIDER DRAIN LOCATIONS WHEN DETERMINING PAVER LAYOUT.

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

SYNTHETIC TURF – ROOF DRAIN

2024 PAVER DETAILS

DETAIL NO. STI 04

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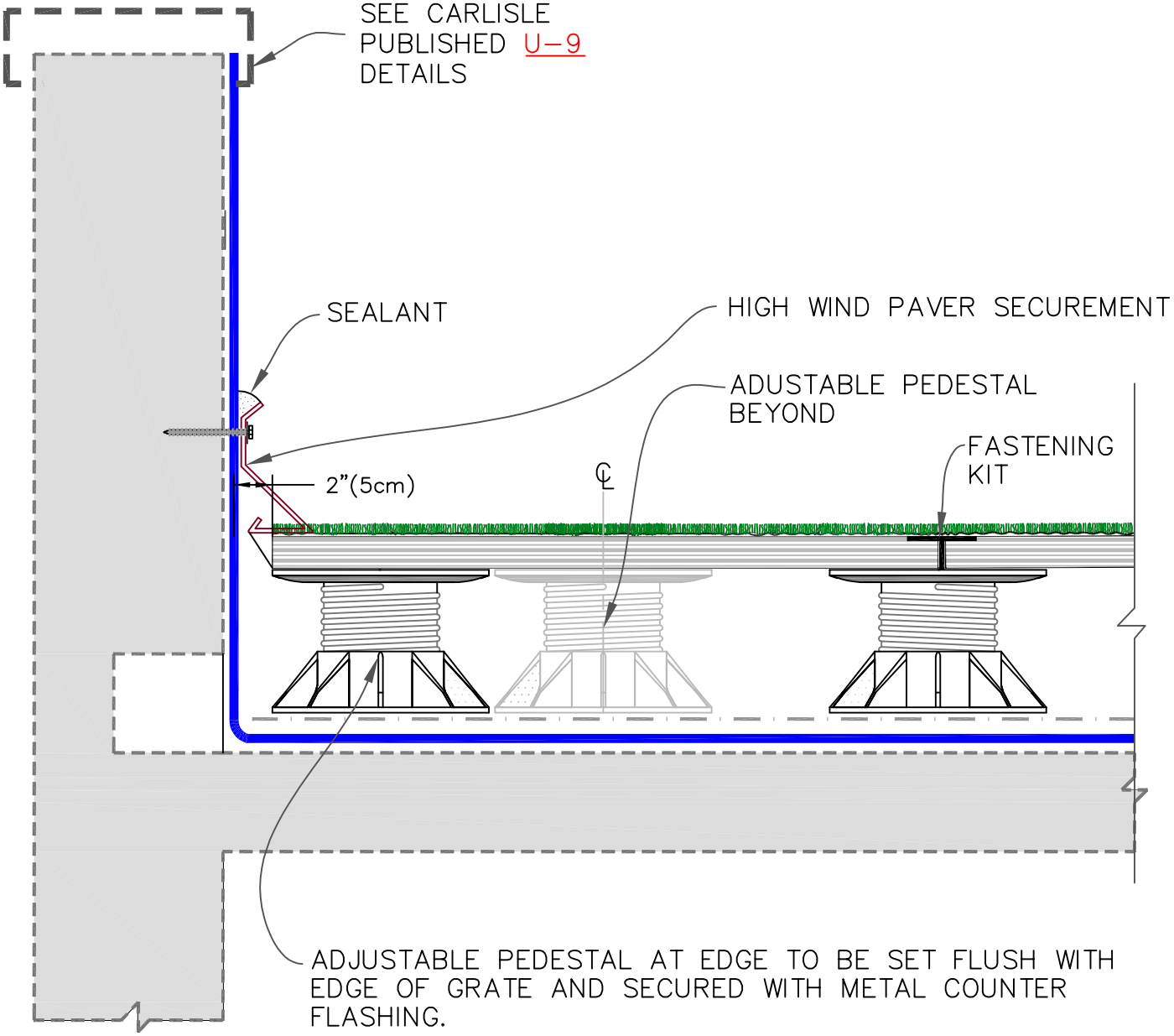
CAUTION
GRO SYNTHETIC TURF SYSTEMS MUST NOT BE USED NEAR THE ROOF EDGES, PARAPET WALLS AND UNPROTECTED AREAS WITHOUT FALL PROTECTION.



NOTE:
GRO STRUCTURAL GRATES SHALL BE KEPT A MINIMUM OF 2" (5cm) FROM PARAPET WALLS AND OTHER FIXED CURBS AND PENETRATIONS

CARLISLE SYNTEC SYSTEMS

- EPDM/TPO/PVC
- 0 SEE NOTE(S)
- SURE-SEAL HP PROTECTIVE MAT
- 300HV PROTECTION FABRIC

SYNTHETIC TURF – VERTICAL TRANSITION

2024 PAVER DETAILS

DETAIL NO. STI 05

PAGE ORDER

CARLISLE'S
SPEC SUPPLEMENT

P-01
Related Carlisle Products

July 2024

In addition to products included in the various roofing specification sections, Products listed herein is available from Carlisle and when used as part of the roofing system, they will be covered by the Carlisle warranty. Additional information concerning these products can also be found on individual product data sheet or the Carlisle website.

A. **Edges and Terminations**

Products listed below can be used with any of the available Carlisle Roofing Systems. Refer to the applicable Carlisle details and installation instruction manuals for specific installation criteria.

1. **SecurEdge 200 Fascia**: A snap-on edge system consisting of a 24 gauge galvanized metal water dam and 40, 50 or 63-mil thick aluminum Kynar 500, clear and colored anodized finish or 22 or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 12-1/2". Custom fascias and colors are available upon request. ANSI/SPRI/FM-4435 ES-1 certified.

2. **SecurEdge 300 Fascia System**: A snap-on edge system consisting of a 24 gauge galvanized metal spring clip water dam and 50 or 63-mil thick aluminum Kynar 500, colored anodized finish or 24 gauge steel, Kynar 500 finish. The fascia is available in a variety of colors and heights varying from 5" to 10". Custom fascias and colors are available upon request. ANSI/SPRI/FM-4435 ES-1 certified.

3. **SecurEdge 2000 Fascia System:** An anchor bar roof edge fascia system consisting of heavy .100" thick extruded aluminum bar, corrosion resistant stainless steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. Refer to installation instructions for various sizes, colors and accessories ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 2000 Extended Fascia** (Up to 13" Face Height) and **SecurEdge 2000 Canted Fascia**.

4. **SecurEdge 3000 Roof Edge System**: A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 32, 40, 50 or 63-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 3000XT Roof Edge System** (Up to 13" Face Height) with an extruded aluminum retainer bar for added performance.

5. **SecurEdge 4000 HP Fascia:** A metal anchor bar fascia system consisting of a 20 gauge steel retainer bar, corrosion resistant fasteners and a 40-mil thick aluminum or 24 gauge steel snap-on fascia cover. It is for use in Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI/FM-4435 ES-1 certified (up to 8" face height).

6. **SecurEdge One Fascia System:** A snap-on edge system consisting of a 20 gauge steel or 50-mil aluminum retainer bar, corrosion resistant fasteners and a 24 gauge or 40, 50 or 63-mil aluminum Kynar finished fascia cover. Available in face sizes up to 8". ANSI/SPRI/FM-4435 ES-1 certified.

7. **SecurEdge 200 Coping:** A snap-on coping system that incorporates 20 gauge anchor cleats with pre-slotted holes, a concealed joint cover and 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish aluminum or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 200 Gold Coping** with 16 gauge anchor cleats for added performance and **SecurEdge 200 Cantilever Coping** for parapet walls with a non-structural exterior building facade.

8. **SecurEdge 300 Coping:** A snap-on coping system that incorporates 20 gauge anchor cleats with pre-slotted holes, a concealed joint cover and 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick Kynar 500, clear and colored anodized finish aluminum or 24 gauge steel, Kynar 500 finish. The coping cap is available in a variety of colors and widths. Custom pieces such as tees, crosses, radius copings, etc., are also available. ANSI/SPRI/FM-4435 ES-1 certified. Also available in **SecurEdge 300 Plus Coping** with 16 gauge anchor cleats for added performance.

9. **SecurEdge 400 Coping:** two-piece assembly that consists of a continuous cleat and a decorative snap-on coping cover. This product features two cleat options: a 22-gauge (G90) pre-punched continuous cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched continuous cleat with fasteners spaced at 12" on center. SecurEdge 400 Coping is offered in 10' cleat and coping cover lengths.

10. **SecurEdge 400 Spring-Tite Gravel Stop:** is a three-piece assembly that consists of a continuous cleat, spring-stop, and decorative snap-on Gravel Stop cover. This product is available in 10' standard lengths, and features a 22-gauge (G90) continuous cleat with pre-punched slotted holes for fasteners at 12" on center. Concealed splice plates and fasteners are included with purchase.

11. **SecurEdge 400 Snap Lock Gravel Stop**: is a two-piece assembly that consists of a continuous cleat and a decorative snap-on Gravel Stop cover. This product features two cleat options: a 22-gauge (G90) pre-punched cleat with fasteners spaced at 12" on center, or a 24-gauge (AZ50) pre-punched cleat with fasteners spaced at 12" on center. SecurEdge 400 Snap Lock Gravel Stop is offered in 10' standard cleat and coping cover lengths.

12. **SecurEdge One Coping:** A mechanically fastened coping system consisting of a 22 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Available for wall thicknesses up to 12”. ANSI/SPRI ES-1 Certified.

13. **SecurSeal 200/300/400 Drip Edge:** Designed for use on Adhered and Mechanically Fastened Roofing Systems. Includes a 22 gauge continuous pre-punched 90-degree angle cleat and 10’ or 12' long fascia sections. Incorporates concealed joint covers and strong 1-1/4" ring shank nails to provide long-term holding power. A selection of colors in 24 gauge steel, Kynar® 500 and 32 or 40-mil aluminum finish or Kynar 500 is available. ANSI/SPRI ES-1 Certified.

14. **SecurWeld™ Heat-Weldable Drip Edge:** Pre-fabricated PVC or TPO-coated metal edging. Heat-weld membrane directly to edge. Available in sizes up to 8” fascia height and in colors: white, gray or tan. Also available with factory-applied TPO or PVC flashing.

15. **Termination Bar:** A 1" wide and 98-mil thick extruded aluminum bar pre-punched 6" on center which incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

16. **SecurEdge Term Bar Fascia:** A 1.75” wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. The decorative cover is available in 0.040” aluminum or 24-gauge galvanized steel. SecurEdge Term Bar Fascia is manufactured in 12’ lengths for fewer joints/seams, fewer sections to handle and faster installation.

B. **Carlisle Vapor Retarder and accessories**

1. **Carlisle 725TR Air and Vapor Barrier -** A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface which is fully compatible with Flexible FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 100' long (325 square feet).

Technical Data – Carlisle VapAir Seal 725TR Air and Vapor Barrier		
Property	**ASTM**	**Results**
Thickness	D-1970	40 mils
Tensile Strength	D-412	250 psi
Elongation (1)	D-412	250%
Peel Adhesion	D-903	5 lbs./in.
Puncture Resistance	E-154	60 lbs.
Permeability	D-1970(2)	0.015 perms
Air Permeance	E-2178	0.000L/s*m2 @ 75 Pa
(1) Rubberized asphalt compound only. (2) D1970 is tested to E96 standards for permeability.		

2. **Carlisle VapAir Seal MD Air and Vapor Barrier** – a reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks. Available in rolls 42.5" wide by 131.23’ long (460 square feet).

Technical Data – Carlisle VapAir Seal MD Air and Vapor Barrier		
Property	**ASTM**	**Results**
Thickness	D-5147	15 mils
Tensile Strength	D-412	250 psi
Elongation	D-1970	330%
Peel Adhesion	D-903	14 lbs./in.
Puncture Resistance	D-5602	54.6 lbs.
Permeability	D-1970(1)	0.03 perms
Air Permeance	E-2178	0.000L/s*m2 @ 75 Pa
(1) D1970 is tested to E96 standards for permeability.		

3. **CCW-702 or 702LV (Low-VOC) Primer** - A single component, solvent based, high tack primer used to provide maximum adhesion between Carlisle 725TR Air and Vapor Barrier and an approved substrate. Applied by spray or long nap roller with a coverage rating ranging from approximately 300 to 350 square feet per gallon on smooth finishes (i.e., concrete) to 75 square feet per gallon on porous surfaces (i.e., Dens-Deck Prime gypsum board). Available in 5-gallon containers. CCW-702LV Primer contains less than 250g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds. Available in 5-gallon containers.

Technical Data – Carlisle-702 Primer		**702 LV Primer**
Property	**Results**	**Results**
Weight Per Gallon (lbs)	7.7	7.5
Solids Content (% by weight)	46%	46%
VOC Content	450 g/l	Less than 250 g/l
Color	Blue	Plum Red
Flash Point	-4° F	-4° F
Adhesion to Concrete (1b/lin. In.)	11	11

4. **CCW-702WB –** a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, Dens-Deck Prime and Securock). Applied by roller, brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702 WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

5. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a Low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding Sure-Weld membrane to various surfaces, priming unexposed asphalt prior to applying Flexible FAST Adhesive and for adhering Sure-Seal/Sure-Weld/Sure-Flex FleeceBACK and Sure-Seal EPDM or Sure-Weld TPO membrane to vertical walls and horizontally, for the field of the roof. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application; 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per #40 cylinder and 2,000 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.

6. **VapAir Seal Flashing Foam:** a low-pressure foam system that utilizes a non-flammable blowing agent. VapAir Seal Flashing Foam has been specifically formulated for flame retardancy and conforms to the requirements of ASTM E84 as a “Class 2(B)” system (flame spread of 75 or less, smoke development of 450 or less). The foam is used to seal penetrations and helps to lower heating and cooling costs by reducing air leakage.

VapAir Seal Flashing Foam Packaging and Yields		
Size	41 lbs packaging	115 lbs packaging
Board Feet	205 (19m²)	605 (56.2m²)
Linear Feet - 1" Bead	3,132	9,236
Linear Feet - 2" Bead	783	2,309
Note: Yields are based on cured material.		

C. **Daylighting Products and Accessories**

1. **Skylights**

a. **SunPath:** A tubular daylighting system, consisting of roof dome, reflective tube, and diffuser assembly that meet the following specifications and whose configuration will be indicated as per drawings:

1) Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing supporting dome and top of tube.

a) Outer Dome Glazing: 0.177 inch (4.5 mm) minimum thickness impact resistant acrylic classified as CC2 material. Visible light transmission minimum 92 percent.

b) Flashing Base: One piece, seamless, leak-proof flashing functioning as base support dome and top of tube.

c) Base Material: Aluminum, .80 thickness, 9 inches (229 mm) high.

2) Reflective Extension Tube: Aluminum sheet, thickness 0.02 inch (0.508 mm).

a) Interior Finish: high reflectance specular finish on exposed reflective surface. Visible spectrum greater than 97 percent.

.

3) Dual Glazed Diffuser Assembly:

a) Upper glazing: Acrylic plastic classified as CC2 material. The nominal thickness is 0.060 inches.

b) Lower glazing: Acrylic plastic classified as CC2 material. The nominal thickness is 0.090 inches (2.29 mm).

4) The skylight dome is vacuum formed from 100% modified impact acrylic that is seal locked onto an aluminum dome ring. Accessories include electric dimmer systems, lighting inserts, and security grills. Available in 5 diameter sizes: 10”, 13”, 18”, 21”, 24” and 32”.

b. **SunWeld:** A factory assembled conventional skylight consisting of plastic glazing welded in place by a 6063-T5 extruded aluminum retaining angle and resting on an extruded

aluminum inner frame. This product can be manufactured to any specified size or to fit existing curbs based on field dimensions and offers several glazing options including acrylic, polycarbonate, copolyester, fiberglass & prismatic acrylic. These units can be integrally attached to an insulated self-flashed metal curb and can be incorporated into the Carlisle Total Roof System warranty when a Carlisle system is being installed.

Size of Rough Opening	Size of Outside Curb Dimension
48” x 48”	51.50” x 51.50”
48” x 60”	51.50” x 63.50”
48” x 72”	51.50” x 75.50”
48” x 84”	51.50” x 87.50”
48” x 90”	51.50” x 93.50”
48” x 96”	51.50” x 99.50”
60” x 72”	33.50” x 75.50”

c. SunWeld Plus Dynamic Dome: Available in 18 standard sizes, the Dynamic Dome is an innovative product that balances the structural demands of industry professionals with an architecturally progressive design. Engineered to closely match the angles of the sun during low-light periods to harvest more sunlight to transfer indoors, the Dynamic Dome offers uncompromising strength and a visually stunning design. These units can be integrally attached to an insulated self-flashed metal curb and can be incorporated into the Carlisle Total Roof System warranty when a Carlisle system is being installed.

2. **SunWeld Heat/Smoke Vents:** Two types are available as follows: the ***Drop-Out*** option is glazed with a special heat sensing material that when activated, softens the glazing material and releases it from the retainer frame, venting smoke and gas. The ***Mechanical*** smoke vent is a fusible link-activated, spring loaded assembly that initiates the venting process with activation temperatures that range from 165° up to 500°. Either can be made in various sizes (both self-flashed and curb mount).

3. **Pre-Fabricated Metal Curbs:** Shall be assembled, self-flashing units with all corners mitered and welded; 1” thick polyiso insulation shall be sandwiched between the outer shell and inner liner and a wood nailer shall be provided at the top of each side. Standard curbs shall be 12.00" tall with a 3.00" wide horizontal flashing flange at the bottom and are also available in custom sizes/configurations. Standard curbs shall be metal and offered as three types:

    a. Galvanized Steel – 18 gauge outer shell and 20 gauge inner liner.
    b. Structural Galvanized Steel - 14 gauge outer and 20 gauge inner liner.
    c. Mill Finish Aluminum – .050 outer shell and .025 inner liner.

4. **Skylight Accessories**

    a. **Flashing Boots (Sleeves):** For roof curbs, this flashing accessory is manufactured from the applicable membrane material (PVC/TPO), and can accommodate all curb types.

b. **Pressure-Sensitive EPDM Curb Flashing:** Available for use with EPDM roof membrane installations.

c. **Security Grills/Fall Protection Screens:** Available for use with the skylights as deterrents to break-ins as well as to help meet OSHA safety requirements.

d. **Metal Deck Support Kit:** An installation accessory that provides skylight structural support and facilitates the metal deck retrofit installation process.

e. **Curb Adapter:** Serves as a structural transition piece that can either reduce or extend existing curb dimensions in order to accommodate the installation of standard skylight sizes on existing curbs and still allow the skylights to be included under the Carlisle Total Roof System Warranty. Curb adapters are manufactured from minimum 18 gauge Mill Finish Aluminum and shall be assembled with all corners mitered and welded. Adapters are insulated with 1.00" thick high density fiberglass insulation with a white plastic waterproof facer attached.

D. **Other Products**

1. **Carlisle GreenGuard PB6 Fanfold Roof Recover Board:** high-density 3-lb density extruded polystyrene (XPS) foam core with 3-ply film facers on both sides for use as a recover board. Available 3/8" thick and 4' x 50' (2 squares) and weights 20 lbs per unit.

2. **Carlisle Type VI Felt:** A heavyweight fiberglass mat containing heat-cured resinous binders saturated with type IV asphalt. The type VI felt is heavier weight than a Type IV giving the felt additional breaking strength and dimensional stability. The Type IV felt can be mopped or cold applied over a nailed base sheet or two plies mopped over a concrete or approved surface achieving a vapor/air retarder. Available in rolls 36" wide and 180' long (540 square feet). Meets ASTM D2178 and UL-G1.

3. **Carlisle Type IV Felt:** A heavyweight fiberglass mat containing heat-cured resinous binders saturated with type IV asphalt, giving the felt excellent breaking strength as well as dimensional stability. The Type IV felt can be mopped or cold applied over a nailed base sheet or two plies mopped over a concrete or approved surface achieving a vapor/air retarder. Available in rolls 36" wide and 180' long (540 square feet). Meets ASTM D2178 and UL-G2.

4. **FR Base Sheet 1S:** A non-asphaltic fiberglass-based underlayment that meets or exceeds ASTM D226 or D4869 Type I or II performance. In conjunction with Hot Mopped Systems, the FR Base Sheet can be incorporated to provide a suitable substrate for deck types requiring a fastened base. Available 4' x 250' roll (1000 square foot) weighing 0.09 lbs per square foot.

5. **SureMB G2 Base Sheet:** A non-porous 28 pound base sheet uniquely designed and constructed to be strong while remaining wrinkle resistant. Carlisle's SureMB G2 Base sheet is typically mechanically fastened (using Carlisle approved fasteners) to the light concrete, gypsum or tectum substrate as the first ply and subsequent layers of G2 base sheet, Type IV or Type VI Glass felt are mopped or cold applied to the base-ply to achieve a vapor/air barrier. Available in rolls 36" wide and 108' long (324 square feet). Meets ASTM D4601 Type II and UL-G2.

6. **SureMB Vented Base:** A heavyweight venting base sheet constructed from a fiberglass mat coated with weathering-grade asphalt which meets ASTM D4897 Type II and UL-G2. Typically used as a venting base sheet over lightweight insulating concrete or gypsum decks, used in conjunction with Carlisle Dual Prong Base Sheet Fastener. Available in rolls 39-3/8” wide and 33’ long (100 square feet) and weighing 0.86 lbs per square foot.

7. **SureMB 70 SA Base Ply:** 70-mil smooth surface, self-adhered base ply. Reinforced with a fiberglass mat that is saturated and coated with asphaltic bitumen and SBS elastomer and meets ASTM D6163 Type 1, Grade S. 70 SA is designed to be used as a base ply or interplay in Carlisle’s multiple-ply system and can be used as an air and vapor barrier or temporary (up to 60 days) roof.

8. **SureMB 90TG Base:** 94-mil smooth-surfaced, SBS, torch-applied membrane. Reinforced with a fiberglass mat that is saturated and coated with asphaltic bitumen and SBS elastomers which meets ASTM D6163 Type I, Grade S. SureMB 90TG is designed for use as a base-ply or inter-ply in Carlisle’s multiple-ply system and can be used as an air barrier, vapor barrier or temporary (Up to 60 days) roof. Available in rolls 39-3/8” wide and 49’-1” long (164 square feet) and weighing 0.57 lbs per square foot.

9. **SureMB 90 Base Ply:** 90-mil Glass fiber, reinforced, SBS-modified asphalt, base sheet that meets ASTM D 6163 Type I, Grade S for SBS-modified bituminous sheet materials. May be used as an air barrier, vapor barrier and temporary (Up to 60 days) roof. Available in 39-3/8" wide and 49’-1” long (161 square feet) weighing 0.58 lbs per **square foot.**

10. **SureMB 120TG Base:** 120-mil smooth-surfaced, torch-grade SBS base ply, reinforced with a non-woven polyester mat that is saturated and coated with asphaltic bitumen and SBS elastomers that meets ASTM D6163 Type I, Grade S for SBS-modified bituminous sheet materials. Designed for use as a base-ply or inter-ply in Carlisle’s multiple-ply system and may be used as an air barrier, vapor barrier or temporary (Up to 60 days) roof. Available in 39-3/8" wide and 32’-9” long (107 square feet) weighing 0.79 lbs per square foot.

11. **Carlisle Dual-Prong Fastener:** A factory pre-assembled, 1.8" long fastener consisting of a precision tube formed from galvanized (G-90) coated steel, a 2.7" diameter disk formed from Galvalume (AX-55) coated steel, and a locking staple of high tensile steel wire. Used to secure base sheets to cementitious wood fiber, lightweight concrete, and gypsum providing 70 lbs. of pullout resistance is achieved (40 lbs. Min.).

12. **Lite Deck Fastener:** An oversized diameter fastener and associated 3" Lite-Deck Metal Plate for use on Adhered Roofing Systems to attach insulation to gypsum decks.

13. **Expansion Joint Supports:** A high quality foamed EPDM expansion joint support for use with all Sure-Seal/Sure-White Roofing Systems; available in two profiles for use at expansion joints within the field of the roof and along parapet walls.

14. **HP Splice Wipes:** Used in conjunction with Splice Cleaners or EPDM Primer to clean membrane prior to splicing or applying Lap Sealant.

15. **Sure-Seal Rubber Pavers (Sure-Seal Rubber Pavers):** A 2' x 2' x 2" thick rubber paver weighing 6 pounds per square foot manufactured from 90% pre-consumer recycled content, which provides a resilient, shock absorbing, weather resistant surface. Designed primarily for use as a walkway or on terrace areas offering a unique, environmentally sound advantage over concrete pavers. Features include freeze/thaw stability, bi-directional drainage and no breakage concerns. Available in two series, Plus and Premium, and in a variety of standard and custom colors.

16. **Hanover Pedestal Pavers:** Concrete pavers available in various sizes and weights. The most common size is a 2” thick paver with a nominal 2’ x 2’ dimension weighing 25 pounds per square foot. Pavers are manufactured with a minimum 8,500 psi compressive strength and are available in 8 standard colors, with an optional 3,000 additional colors.

    For other Concrete Pavers Available refer to “Attachment I” at the end of EPDM Roofing Systems Specification.

17. **SpeedTite Drains:** Retrofit roof drain with a one-piece seamless body and extra-large flange (17”) for positive attachment to roof flashing. Built-in Vortex breaker technology which id designed to provide improved flow performance. Available in 3” and 4” sizes.

18. **Carlisle Hercules Insert Drains:** Retrofit roof drain with a one-piece spun aluminum body and heavy-duty cast aluminum strainer dome and clamping ring. Designed for use in EPDM, TPO, and PVC**.** Available in 3”, 4”, 5” and 6” sizes with a 12” long drain stem.

19. **Olympic Pipe Support System:** A non-penetrating support system designed to carry piping, conduit, ductwork and elevated walkways across the roof or to support equipment such as air conditioners on the roof.

20. **X-Tenda Coat:** A water-based color coating used with EPDM membrane. Available in standard colors of white and gray.

21. **SecurTaper:** An ergonomic equipment innovation designed to provide a means for tape seam application that is efficiently driven, user friendly and quality enhancing.

22. **6” PS Flashing Applicator:** Similar in concept to the SecurTaper only used to apply Pressure-Sensitive Flashing.

23. **Stand Up Seam Roller:** A 6" wide by 2" diameter roller and 62" long handle with a 45° bend. Allows splices to be rolled in an ergonomic stand-up position.

24. **APEEL Cover Tape Applicator:** A 6" wide by 2" diameter roller and 62" long handle with a 45° bend. Allows splices to be rolled in an ergonomic stand-up position.

25. **Other Accessories Available:**

    a. **Expansion Joint Supports:** A high quality extruded EPDM expansion joint support for use with all Sure-Seal/Sure-White EPDM, Sure-Weld TPO, Sure-Flex PVC and KEE HP Roofing Systems; available in two profiles for use at expansion joints within the field of the roof and along parapet walls.

    b. **Other Accessories Available:** 6" blade heavy-duty scissors and 2" wide steel hand rollers.

26. **Insulation Adhesive**

    a. **Flexible FAST Adhesive:**A spray (full coverage) or bead-applied, two-component polyurethane, construction grade, low-rise expanding foam adhesive used for attaching FleeceBACK Membranes or approved insulations to compatible roof decks (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or existing smooth or gravel surfaced BUR, modified bitumen or cap sheets.

    b. **Flexible FAST in Dual Cartridge, Dual Tank and 5-Gallon Jug Adhesive:** A two

component (Part A and B), extrusion applied, low rise adhesive for attaching approved insulation to compatible roof decks.

c. **OlyBond 500 BA and Spot Shot:** A two-component, polyurethane construction grade, low-rising expanding adhesive designed for bonding insulation to various substrates. Applied in 1/2" to 3/4" beads or ribbons using a portable 1:1 applicator (oversized, dual-cartridge caulking gun). Refer to the Technical Data Bulletin for bead spacing with reference to building height.

27. **Accessory Vents**

a. **Sure-Weld TPO T-Top Vent:** Constructed using 60-mil TPO Detail Membrane, which provides enhanced flexibility and allows for the elimination of T-Joint Covers at three-way membrane intersections. White in color and manufactured in standard sizes of 4", 6", and 8". Additional sizes and colors are available on a special-order basis.

b. **Sure-Flex™ PVC T-Top Vent**: Constructed using 60-mil PVC KEE HP Membrane, which provides excellent long-term weathering protection. White in color and manufactured in standard sizes of 4", 6", and 8". Additional sizes and colors are available on a special-order basis.

c. **Sure-Weld TPO Square Top Vent:** Constructed using 60-mil TPO Detail Membrane, which provides enhanced flexibility and allows for the elimination of T-Joint Covers at three-way membrane intersections. White in color and available in a nominal size of 8". Additional colors are offered on a special-order basis. Custom sizes of Square Top Vents are not available.

d. **Sure-Flex PVC Square Top Vent**: Constructed using 60-mil PVC KEE HP Membrane, which provides excellent long-term weathering protection. White in color and available in a nominal size of 8". Additional colors are offered on a special-order basis.

e. **Non-Weldable One- and Two-Way Pressure Relief Breather Vent:** 8” tall, spun aluminum vent with a base diameter of 11” and stack diameter of 5”. Engineered to allow moisture and air to escape from within the roofing system. May be used in conjunction with Carlisle’s ChannelDry EPS Insulation for a roof assembly over Lightweight Structural Concrete (See Spec Supplement G-15-19) or in conjunction with FleeceBACK AFX (EPDM and TPO) membranes over Lightweight Insulating Concrete (See Spec Supplement G-04-19).

f. **Weldable One- and Two-Way Pressure Relief Breather Vent:** 5.5” tall, stainless steel vent with a 60-mil weldable flange, a base diameter of 14” and stack diameter of 4”. Engineered to allow moisture and air to escape from within the roofing system. May be used in conjunction with Carlisle’s ChannelDry EPS Insulation for a roof assembly over Lightweight Structural Concrete (See Spec Supplement G-15-19) or in conjunction with FleeceBACK AFX (EPDM and TPO) membranes over Lightweight Insulating Concrete (See Spec Supplement G-04-19).

28. **Miscellaneous**

a. **Carlisle Seam Probe:** A hand tool used to check the integrity of heat welded seams on

heat welded roofing systems. The probe has a heat-treated tip and the handle is tapped to fit standard threaded extension handles allowing the tool to be used from a standing position.

CARLISLE'S
SPEC SUPPLEMENT

T-01

Heat Welding Equipment Use & Procedures Thermoplastic Membranes

July 2024

The information contained in this supplement serves as a criteria for Specifiers and Authorized Applicators regarding the design and installation of Carlisle Roofing Systems and related products. Additional information essential for the design and installation of the Roof Systems mentioned herein are also included in the respective Specification for each Roof System and in the Design Reference Section of the Carlisle Technical Manual. Specifiers and Authorized Applicators are advised to reference all applicable sections.

A. Automatic Heat Welder

An electrically powered, self- propelled device that utilizes an electrical resistance heating element or heater and fan-forced super heated air to weld membrane seams.

1. Temperature Settings

a. When making a Sure-Weld / Sure-Flex splice, no one temperature setting or speed can be used to describe the temperature setting or speed to set the robot. The splice must be tested to determine the quality of the splice.

b. Consult the respective heat welding machine manufacturer for recommendations concerning proper temperature setting and speed control of their equipment.

c. Typically, the colder the ambient temperature (and likewise the membrane temperature) the slower the Automatic Heat Welder speed control must be adjusted to produce proper seams.

d. As a general guide, depending on the length of the nozzle, **Sure-Weld** membranes will weld at a lower temperature 1004° F (540° C) and faster speed (12 feet to 18 feet per minute) than most other heat welded membrane materials. **Sure-Flex** membrane will weld at a temperature of 1094° F (590° C) and a speed of 8 feet to 12 feet per minute.

e. Using an **Automatic Heat Welder**, the suggested starting point for welder set up is 1004° F (540° C) at 12.5 feet per minute for **Sure-Weld** OR 1094° F (590° C) at 10.4' per minute for **Sure-Flex**. Refer to automatic heat welder manufacturer's recommended temperature and speed to obtain the correct splice results.

f. The following is a list of items to be checked to determine the temperature setting and the speed at which a splice should be completed:

1) When the membrane is in direct sunlight, the temperature or robot speed may have to be adjusted when moving into a shaded area, check the splice results. Remember the membrane surface in a shaded area will be cooler than a membrane surface that is in sunlight. Darker colored membrane (such as gray) will be warmer than white and may affect the welder speed.

2) Dampness on the membrane from dew, a passing rain shower or misting condition will reduce heat from the splice due to evaporating moisture from the membrane surface. The heat welding temperature (increased) or the robot speed (slower) will have to be adjusted to produce a good splice. Water must be wiped from the welding surface prior to welding the splice.

3) Wind has a cooling affect as it blows over the surface. It will also affect the airflow in the splice reducing the effectiveness of the hot air gun. This will require the operator to increase heat from the hot air gun or reduce the welder speed.

4) Substrates make a substantial difference in the amount of heat required to produce a proper heat welded splice. The robot will have to be adjusted accordingly:

   a) Plywood and Concrete act as heat sinks and will take a higher temperature or slower speed setting than insulation.

   b) Cool damp substrates will take a higher temperature or slower speed setting than dry substrates.

5) Membrane “bleed-out” from sheets should occur with Sure-Flex membrane if properly welded. If bleed-out is not occurring (the underside of the membrane begins to melt and flow), the welder speed should be decreased to increase welding temperature.

2. **Equipment Set-up**

a. Equipment set up is the responsibility of the Authorized Applicator. When poor welding is occurring check the following:

1) If the membrane is overheated on one side or the other, check the nozzle to be sure it is distributing the heat evenly between the two sheets.

2) If the heat is bypassing the edge of the sheet producing a cold weld along the edge of the splice, be sure the nozzle is completely under the sheet and the air dam is in place and functional.

3) If the probed splice is tight at the edge but a cold weld is present in center of the splice (the heat is melting the edges but does not melt the center of the splice), check to be sure the robot is not running too fast.

4) Ensure the silicone pressure wheel is intact with no voids in the silicone. If voids are present, incomplete welding will result.

5) On certain heat welder models, be sure all wheels on the air dam are not binding. Binding wheels will cause sheet movement and distortion during the

welding process.

6) The automatic heat welder nozzle should be adjusted as close to the pressure wheel as possible. If the nozzle is too far away from the pressure wheel, distortion of the membrane may occur due to heat expansion.

   NOTE: Adjust welder nozzle so the curved portion (heel) extending outside the seam area does not contact or drag on the exposed surface of the membrane. This portion of the nozzle should be 1/16" to 1/8" above membrane surface.

7) Overheating the membrane will cause poor welds. It is recommended the automatic welder be run not less than 8' a minute on average temperature days.

8) Only on very cold days the welder should be run below this speed. The temperature and welder speeds must be determined based on test welds prior to actual sheet welding.

9) Clean screen of dirt and debris on air inlet of heat gun every day. Accumulation of contaminants on screen will reduce air flow and heat output of welder.

3. **Membrane Welding**

a. Prepare the Automatic Heat Welder and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

b. Position the Automatic Heat Welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

c. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap for the heat welder to begin operating. The welder will begin moving automatically.

d. Weight plates provided on Automatic Welders must be utilized.

e. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

   CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

f. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Sure-Weld/Sure-Flex membrane sheets.

When using **60-mil or 80-mil** Sure-Weld TPO or **80-mil** Sure-Flex PVC Membrane, a **TPO or PVC "T" Joint Cover** must be applied over all "T" joint splice intersections.

g. To stop the automatic welder, disengage and pull the nozzle from the seam area and the welder will automatically stop moving.

h. Mark the end of the heat welded seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Heat Welder is stopped and restarted.

i. Perform a test weld, at least, at the start of work each morning and afternoon. Test welds should be made if any changes in substrate or weather conditions occur.

4. **Preventing Membrane Creeping During Welding**

   a. The operator of the robot must apply foot pressure to the membrane, kicking and sliding the membrane under the robot to keep the membrane tight. Always have the operator stand on the unfastened sheet of membrane to prevent sheet movement.

   b. Do not release foot pressure from the membrane until the pressure wheel rolls over the membrane in front of the foot that is holding the membrane in place.

5. **Use of Welding Tracks**

   a. Set welding tracks lengthwise along the splice, close to the Automatic Heat Welder air dam to reduce membrane movement caused by the welding process. The operator must continue to apply foot pressure to the welding tracks to help hold the membrane splice in place. Welding tracks are moved as welder progresses along seam.

   b. Welding tracks can be:

      1) Sheet metal, 22 gauge – 12" wide by 10' long (with rounded corners).

      2) Aluminum or steel plates – 1/4" x 3", 4' to 6' long (with rounded corners).

      3) Wood planks – 2" x 12" X 4' to 6' long.

      4) Heavy plywood – 3/4" x 24" x 8' long.

6. **Test Cuts**

   a. Perform a test weld at least at the start of work each morning and afternoon.

   b. The test sample should be approximately 1 inch wide and longer than the width of the seam (cut across the heat welded seam).

   c. Peel the test sample apart after it has thoroughly cooled (approximately 10 minutes) and examine for a consistent 1-1/2 inch wide minimum weld. De-lamination of the membrane from the scrim-reinforcement is an indication of a properly welded seam.

d. Identify the following seam problems to assure seam quality:

1) Discolored or scorched membrane – Increase speed or decrease temperature setting if membrane discolors

2) Voids and wrinkles - A proper heat welded seam has no voids or wrinkles and must be at least 1-1/2 inches wide. Refer to Seam Probing procedures outlined below for proper inspection of seam deficiencies.

7. **Seam Probing**

The use of a Carlisle Seam Probe, a blunt or dull cotter pin puller is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Heat welded seams must be probed throughout the day to check seam quality and to make proper adjustments to heat welding equipment. **The repair of deficiencies must be done routinely throughout the day but no later than the end of each workday.**

a. Allow heat-welded seams to cool thoroughly for approximately 30 minutes. Premature probing can damage warm seams.

b. Draw probing tool tip along the edge of the heat welded seam. Apply firm pressure to probe the seam junction, but not into the bottom membrane sheet. The tool will not penetrate into the lap area of a properly welded seam.

c. If the seam-probing tool penetrates into the lap area, mark the seam using a water-soluble marker at the beginning and the end of voids or wrinkles in the seam edge.

d. Repair seam deficiencies as soon as possible using the hand held welder. Carlisle recommends that repairs be made the same day they are discovered.

e. Probe **repaired seams** after they have cooled completely. If the repair is acceptable, wipe off the water soluble marker lines; if not acceptable, repair the seam using standard heat welded overlay procedures.

Note: All laps must be probed each day soon after it has cooled to verify the welder set-up is effective. Particular attention must be given to all membrane intersections and heat-welded seams at insulation joints. In addition, there should be periodic checks (including at the start of each day) to verify good peel strength.

f. Considerations when probing TPO systems:

1) TPO does not "flow" like PVC. If you observe an area in which you see "flow" of the bottom black ply, scorched areas of detail/flashing membrane, or scorched field membrane welds, these areas should be probed. If these areas are overheated to the point of membrane damage, an overlay repair will be required even if the weld probes successfully.

2) A properly heated field membrane weld will typically have a visual "sheen" approximately 1/2" wide on the bottom sheet at the weld overlap. When walking seams look for the sheen. If it is not present probe to ensure weld quality.

3) TPO seams require a minimum 1.5" weld. Welds less than 1.5" must be overlaid following specification and detail, even if probing does not produce deficiencies.

g. Considerations when probing PVC Systems:

1) Welds on PVC systems should produce "bleed out". Bleed out refers to the flow of the bottom ply (of the top sheet) outside of the weld. If you do not see bleed out at seam areas, this increases the probability the seam did not receive enough heat when it was welded. Be sure to probe these areas to ensure weld quality.

2) PVC is a “softer” and more flexible membrane than TPO. As such, a different probe should be used than the one used on TPO roofing systems. The PVC probe should have a blunt/dull tip.

3) PVC seams require a minimum 1.5" weld. If you observe welds which are less than 1.5", these should be overlaid following specification and detail, even if probing does not produce deficiencies.

h. **Apply Cut-Edge Sealant** on all cut edges of the reinforced Sure-Weld membrane (where the scrim reinforcement is exposed) **after seam probing** is completed. When a 1/8" diameter bead of Cut-Edge Sealant is applied, approximately 225 – 275 linear feet of coverage per squeeze bottle can be achieved.

1) Cut Edge Sealant is not required on cut edges of Sure-Flex membrane (Horizontal or Vertical).

2) Cut-Edge Sealant is not required on vertical Sure-Weld splices.

B. Hot Air Hand Welder

1. General

a. An electrically powered, hand-held device that utilizes an electrical resistance heating element or heater and fan-forced super heated air to heat weld Sure-Weld/Sure-Flex membrane and flashing. A hand-held **silicone** rubber roller is used in conjunction with the welder to apply the pressure that fuses the heated membrane surfaces to each other.

b. The hand-held welder is typically used to repair seams, or when the use of the Automatic Heat Welder is inappropriate (such as flashing penetrations and on high sloped surfaces).

2. Hand Held Welder Settings

a. Temperature setting for hand held welders when used for flashing should be approximately “6” (on a scale from 1 to 10).

b. Temperature settings for hand held welders when used for membrane should be approximately “8 –10” (on a scale from 1 to 10).

c. Exact settings will vary based on heat welding membrane type, ambient temperatures, substrate and type of welder.

d. Silicone roller should be used to apply pressure to the membrane to be welded.

C. **Electrical Cords:** For generator requirements and maximum length of electrical cords, refer to Generator/Electrical Requirements below.

D. **Seam Probing:** The probing of heat welded seams is an important step in the application of a Sure-Weld/Sure-Flex Roofing Systems. Carlisle recommends the use of a Carlisle Seam Probe to probe all heat welded seams. All seams must be probed (**after the seam has thoroughly cooled**) with the appropriate seam probing tool and all deficiencies must be repaired accordingly with a hand held hot air welder no later than the end of each work day.

E. **Silicone Rubber Roller**: A 2" wide rubber roller used for rolling heat welded splices.

F. **Generator/Electrical Requirements**

Building power supplies do not typically provide the proper amount of power necessary for consistent heat welding. The use of a portable generator conforming to the following guidelines is strongly advised.

1. A **minimum 6500 watt generator** with a minimum output of 210 volts is required **for one Automatic Heat Welder**. Reduced power availability will result if additional equipment is connected to the generator and may result in faulty heat welded seams. GFI (Ground Fault Interrupter) protection is recommended. Additional generators will be required for operating other power tools and hand held heat welders.

   Electrical cords (3 conductors) of the maximum length indicated must be used with the corresponding wire as listed below:

Maximum Length	Wire Size
50 foot	#12
100 foot	#10
300 foot	#8

2. **A minimum 3,000 watt generator** may be used to power a maximum of **two hand held heat welders** as long as no other equipment is connected. This generator should service a minimum of 110 volts and be GFI (Ground Fault Interrupter) protected.

   Electrical cords (3 conductors) of the maximum length indicated must be used with the corresponding wire as listed below:

Maximum Length	Wire Size
50 foot	#14
100 foot	#12

For extension cords longer than 100', consult an electrician or electrical contractor to ensure proper size of generator and wire.

G. **Heat Welding Precautions**

1. Check the welding machine set-up to ensure proper alignment of the heating nozzle, air dam, pressure wheels, or moving parts to see they move properly or are free-spinning. Test run the welding machine to ensure it moves forward following a straight line. If the alignment is off, make necessary adjustments.

2. Make sure the air intake is open. Clean out the air intake screen for the blower unit at each start up.

3. Check the machine for worn or broken parts which need to be replaced. Exercise care to protect the pressure wheel from notches or cuts to prevent incomplete sealing of the welded seam.

4. Before the machine is connected to the power source, make sure it is switched off to prevent a power surge that could damage the unit. Turn the unit on and allow the blower/heater unit to warm up for approximately 5 to 10 minutes to reach operating temperature.

5. Clean the heat nozzle with a wire brush to remove any build-up of membrane, as needed.

6. To extend the life of the heating element of the Heat Welding Equipment, always turn the temperature adjustment down so the welder can cool prior to switching the machine off.

7. Follow all care and maintenance instructions recommended by the respective manufacturer.

8. It is recommended that two Automatic Heat Welders and two generators be available at the project site in the event of mechanical failure.

H. **Welding Problems/Repairs**

1. A Hand Held Hot Air Welder and a 2" wide silicone roller must be used when repairing the membrane. When the entire heat welded seam is to be overlaid, an Automatic Heat Welder may be used.

2. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned and any material which has been exposed to the elements must be prepared with Carlisle Weathered Membrane Cleaner (Sure-Weld) or PVC or KEE HP Membrane Cleaner (Sure-Flex). The membrane can typically be repaired up to 6 months to a year with a standard cleaning method. In cases where the standard cleaning method is not sufficient, the following procedures must be used:

    a. Scrub the area to be welded with a “Scotch Brite” Pad and appropriate Membrane Cleaner.

    b. Clean all residue from the area to be welded with a Splice Wipe or a clean natural fiber (cotton) rag.

    c. Weld the new membrane to the cleaned area using standard welding procedures.

3. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller. Depending on conditions, a splice overlay may be required.

4. Position the hand held welder facing into void so hot air is forced between overlapping

membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

5. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test weld areas must be repaired by overlaying the damaged area with a separate piece of membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

6. Probe all edges of the overlay once cooled to ensure a proper weld has been achieved.

7. Seal all cut edges of Sure-Weld Membrane with Cut-Edge Sealant. Cut-Edge sealant not required on cut edges of Sure-Flex Membrane (Horizontal or Vertical).

   Note: The same overlay repair procedures may be used for punctures in the heat weldable membrane.

CARLISLE'S SPEC SUPPLEMENT

E-01

Sure-Seal Polyepichlorohydrin (ECO/CO) Membrane / Application Procedure

July 2024

Information contained herein represents minimum requirements which must be complied with when overlaying any of Carlisle's Sure-Seal/Sure-White EPDM roofing systems with Polyepichlorohydrin membrane to protect primary roofing membrane from grease and oil. Building owner or his/her representative must assess and determine the variety of fluids expected to be in contact with membrane and consult Carlisle concerning their compatibility.

A. Description

The Sure-Seal Polyepichlorohydrin (ECO/CO) membrane is especially designed to resist hydrocarbons, aromatic solvents, grease and oil and shall be used as an overlayment to protect existing Sure-Seal/Sure-White EPDM membrane against minor or incidental oil spills.

The Sure-Seal ECO/CO overlayment membrane is considered a maintenance item and not included under the coverage of the warranted membrane roofing system.

1. For overlayment to an adhered or mechanically fastened roofing system, the ECO/CO membrane is adhered with 90-8-30A Bonding Adhesive or Low VOC Bonding Adhesive.
2. When overlaying ballasted membrane (prior to installing the ballast) the ECO/CO membrane may be loose laid and then ballasted.
3. At all edges allow a minimum width of 6" for splicing ECO/CO membrane onto the EPDM membrane.
4. In the area where the ECO/CO membrane is to be installed the roof slope shall be a minimum 1/4" in 12"

B. Related Products

1. **Carlisle Weathered Membrane Cleaner:** A clear, solvent-based cleaner used to clean the EPDM surface necessary for applying primer and Lap Sealant. Available in 1 or 5-gallon pails.
2. **Low-VOC Membrane Cleaner:** A low VOC (volatile organic compound) cleaner (100% EPA-exempted solvents) used to loosen and remove dirt and other contaminants from the surface of exposed EPDM membrane prior to applying Carlisle EPDM Primer. Available in 1 and 5-gallon pails.
3. **90-8-30A Bonding Adhesive:** A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Available in 5 gallon pails.
4. **EPDM x-23 Low-VOC Bonding Adhesive**: A Low-VOC (volatile organic compound)

bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Adhesive is available in 5 gallon pails.

5. **Low VOC Bonding Adhesive**: A low VOC (volatile organic compound) bonding adhesive (less than 250 grams/liter) used for bonding Sure-Seal/Sure-White EPDM membranes to various surfaces. Available in 5 gallon pails.
6. **Sure-Seal SecurTAPE:** A 3" or 6" wide by 100' long splice tape used for splicing adjoining sections of ECO/CO to ECO/CO membrane and to EPDM membrane.
7. **Sure-White SecurTAPE:** A 3" or 6" wide by 100' long, cream colored splice tape used with Sure-White Systems.
8. **Carlisle HP-250 EPDM Primer:** A solvent-based primer used to prepare the surface of EPDM or ECO/CO membrane for application of SecurTAPE. Available in 1 gallon pails.
9. **Low VOC EPDM Primer -** A low VOC (volatile organic compound) primer (less than 250 grams/liter) for use with SecurTAPE. Available in 1 gallon pails.
10. **CAV-GRIP III Low-VOC Aerosol Contact Adhesive/Primer:** a Low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding Sure-Weld membrane to various surfaces, priming unexposed asphalt prior to applying Flexible FAST Adhesive and for adhering Sure-Seal/Sure-Weld/Sure-Flex FleeceBACK and Sure-Seal EPDM or Sure-Weld TPO membrane to vertical walls and horizontally, for the field of the roof. Coverage rate is approximately 2,000-2,500 sq. ft. per #40 cylinder and 4,000-5,000 sq. ft. per #85 cylinder as a primer, in a single-sided application; 750 sq. ft. per #40 cylinder and 1,500 sq. ft. per #85 cylinder as an adhesive for vertical walls, in a double-sided application; 1,000 sq. ft. per #40 cylinder and 2,000 sq. ft. per #85 cylinder as an adhesive, horizontally, for the field of the roof, in a double-sided application.
11. **Sure-Seal (black) Lap Sealant**: A heavy bodied material used to seal the exposed edges of ECO/CO membrane splices. Available in individual tubes.

C. Membrane - Sure-Seal (Epichlorohydrin (ECO/CO))

1. Cured, non-reinforced (black), 60-mil (1.5 mm) thick ECO/CO compounded Hydrin epichlorohydrin elastomer, which conforms to the minimum physical properties as listed below. The membrane is available in maximum 10' (3.05 m) widths and 50' (15.25 m) lengths.

Physical Property	Test Method	SPEC.(Pass)	Typical
Tolerance on Nominal Thickness, %	ASTM D 412	±10	±10
Tensile Strength, min, psi (MPa)	ASTM D 412	1305 (9.0)	1556 (10.7)
Elongation, Ultimate, min, %	ASTM D 412	200	316
Tear Resistance, min, lbf/in (kN/m)	ASTM D 624 (Die C)	150 (26.3)	263 (46.0)
Resistance to Heat Aging* Properties after 168 hours @ 240°F (116°C) Tensile Strength, min, psi (MPa) Elongation, Ultimate, min, %	ASTM D 573 ASTM D 412 ASTM D 412	1305 (9.0) 1400 (9.6) 150	
Ozone Resistance* Condition after exposure to 100 pphm Ozone in air for 168 hours @ 104°F (40°C) Specimen is at 50% strain	ASTM D 1149	No Cracks	No Cracks
Brittleness Temp., max, deg. F (deg. C)*	ASTM D 746	-20 (-29)	-20 (-29)
Water Vapor Permeability* max, perms (.060" thickness)	ASTM E 96 (Proc. B)	0.1	.042
Oil Absorption * Change in mass, max, % after 7 days immersion in diesel fuel #2 at 158°F (70°C)	ASTM D 471	15	13.5
* Not a Quality Control Test due to the time required for the test or the complexity of the test. However, all tests are run on a statistical basis to ensure overall long-term performance of the sheeting.			

D. Splice Procedure

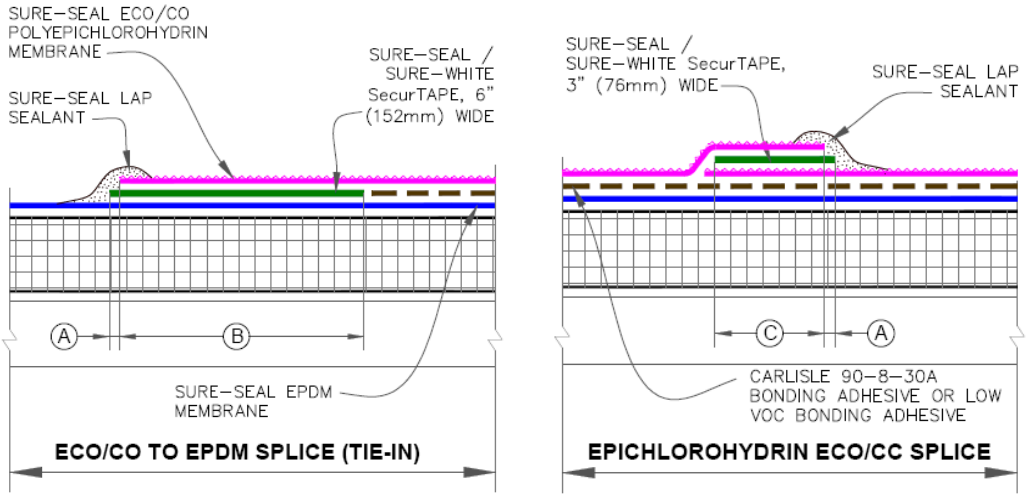
1. **Remove dirt and excess dust** from the mating surfaces of both sheets by wiping with a clean rag. Clean the dry splice area of both sheets by scrubbing with Weathered Membrane Cleaner until the mating surfaces are solid black in color with no streaking.
2. **Apply Primer to achieve a thin, even coat** on both membrane surfaces with Carlisle EPDM or Low VOC EPDM Primer. Splice area must be uniform in color, streak-free and free of globs or puddles.

   Note: Permeation-resistant gloves (that meet ANSI/ISEA 105-2005) are recommended when cleaners or primers are being used.
3. **Allow** Primer to dry until tacky but does not transfer to a dry finger touch.
4. **Unroll** approximately 3’ of SecurTAPE. Align release film with marked line and press tape down to bottom sheet using firm, even, hand pressure. Continue for the length of the

splice. Tape roll ends must be overlapped 1". Allow top sheet to rest on release film on backside of tape.

Note: A minimum of 1/8" to a maximum of 1/2" of tape must extend beyond the splice edge.

5. **Pull** release film from SecurTAPE beneath the top sheet and allow the top sheet to fall freely onto exposed tape.
6. **Roll** the top sheets onto the mating surface and assemble the seam with hand pressure by wiping toward the splice edge. Roll the splice with a 2-inch wide steel roller, using positive pressure toward the outer edge of the splice.
7. **Clean the dry** splice edges with Weathered Membrane Cleaner apply a 5/16-inch diameter bead of Sure-Seal Lap Sealant to completely cover the splice edge and feather.



DIMENSIONS		mm		DIMENSIONS		mm
A	1/8"	3	MIN.	B	6"	152
	1/2"	13	MAX.	C	3"	76

CARLISLE'S SPEC SUPPLEMENT

E-02

EPDM Membrane Splicing and Splice Repairs
(Including FleeceBACK and AFX)

July 2024

The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Assurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

A. **General**

1. **Sure-Seal/Sure-White - Adhered or Ballasted Roofing Systems**

   a. **Projects with 10, 15 and 20 year Warranties – Detail U-2A and U-2A.1**

   Side Laps / End Laps: Tape splices must be a minimum of 2-1/2" wide using **3" wide field-applied Pressure Sensitive SecurTAPE OR 3" Factory-Applied TAPE (FAT)**. (**Detail U-2A or U-2A.1**).

   Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and a 6"x6" minimum Pressure-Sensitive 'T'-Joint Cover, (for membranes of maximum thickness of 75 mil). (**Detail U-2A**). **For membranes of thickness of 90 mil**, Apply a second layer of 12"x12" Pressure-Sensitive 'T'-Joint Cover centered over 6"x6" 'T'-Joint Cover. (**Detail U-2A.1– Option 2**).

   Note: In lieu of the 6"x6" or 12"x12" Pressure-Sensitive 'T'-Joint cover, a 6"x6" or 12"x12" section of Pressure-Sensitive Elastoform flashing may be used as a 'T'-Joint cover. Pressure-Sensitive Elastoform flashing is available in rolls of 6", 9" and 12".

   b. **Projects with 25 and 30 year warranties – Details U-2A.1 or U-2B.1.**

   OPTION 1:

   Side Laps / End Laps: Tape splices may be a minimum **3" wide Factory-Applied Tape (FAT) OR 3" wide Field-Applied SecurTAPE**. In addition the entire field splice must be overlaid with a continuous 6" wide Pressure Sensitive Overlayment Strip. (See **Detail U-2A.1-Option 1).**

   Splice Intersections: Overlay the entire field splice with a continuous 6" wide Pressure-Sensitive Overlayment Strip. Apply Lap Sealant at all Intersections between Pressure-Sensitive Overlayment Strip. (See **Detail U-2A.1-Option 1).**

   OPTION 2:

   Side Laps / End Laps: Tape splices may be a minimum of 5-1/2" wide using **6" wide Factory-Applied Tape (FAT) OR 6" wide Field-Applied SecurTAPE**. (**Detail U-2A.1– Option 2**).

Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and a 6"x6" minimum Pressure-Sensitive 'T'-Joint Cover. Apply a second layer of 12"x12" Pressure-Sensitive 'T'-Joint Cover centered over the 6"x6" 'T'-Joint Cover. (**Detail U-2A.1– Option 2).**

Note: Pressure Sensitive Elastoform flashing is available only in rolls of 6", 9" or 12" rolls. Material used for Overlayment shall be cut from the appropriate size roll.

2. **Sure-Tough Mechanically Fastened Roofing Systems**

   a. **Projects with 10, 15 and 20 year Warranties – Detail MF-2A and MF-2B**

   Side Laps: Regardless of Warranty duration, where fastening plates are placed, shall be spliced using **6" wide Factory-Applied Tape (FAT) OR 6" wide Field-Applied SecurTAPE**. The splice tape shall be centered over the plates to extend approximately 2" on each side. SecurTAPE must extend approximately 1/8" beyond the edge of the overlapping membrane. (**Detail MF-2A**).

   End Laps: Shall be spliced using either **3" wide SecurTAPE** resulting in a minimum splice of 2-1/2" wide for a maximum of 20 year warranties. (**Detail MF-2B**).

   Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and 6"x6" pressure sensitive 'T'-Joint Cover, (for membranes of maximum thickness of 75 mil). (**Detail MF-2A**).

   b. **Projects with 25 and 30 year Warranties – Detail MF-2D and MF-2B**

   Side Laps: Where fastening plates are placed, shall be spliced using **6" wide Factory-Applied Tape (FAT) OR 6" wide Field-Applied SecurTAPE**. The splice tape shall be centered over the plates to extend approximately 2" on each side. SecurTAPE must extend approximately 1/8" beyond the edge of the overlapping membrane. (**Detail MF-2D**).

   End Laps: Shall be spliced using **6" wide Factory-Applied Tape (FAT) OR 6" wide Field-Applied SecurTAPE** resulting in a minimum splice of 5-1/2" wide for a maximum of 30 year warranties. (**Detail MF-2B**).

   Splice Intersections: 'T'-Joints are to be flashed with a bead of lap sealant and 6"x6" Pressure Sensitive 'T'-Joint Cover. Apply a second layer of 12"x12" Pressure Sensitive 'T'-Joint Cover centered over the 6" x 6" 'T'-Joint Cover. (**Detail MF-2D**).

3. **EPDM (Sure-Seal/Sure-White) FleeceBACK and FleeceBACK AFX**

   a. **Projects with 10, 15 and 20 year Warranties – Detail FB-2A or AFX-2A**

   Side Laps: Tape splices must be a minimum of 2-1/2" wide using **3" wide field-applied Pressure Sensitive SecurTAPE OR 3" Factory-Applied TAPE (FAT)**. (**Detail FB-2A or AFX-2A).**

   End Laps: A minimum of 6" wide Pressure-Sensitive Cured Cover strip or Pressure-Sensitive Overlayment Strip shall be used at all end laps and shall be centered over the leading edge (butt edge) of the splice. (**Detail FB-2A or AFX-2A**).

   Splice Intersections: All intersections between the Pressure-Sensitive Cover strip and side laps shall be overlaid by a 6"x6" minimum Pressure-Sensitive 'T'-Joint cover with a bead of Lap Sealant. (**Detail FB-2A**).

Note: In lieu of the 6”x6” Pressure Sensitive ‘T’-Joint cover, a 6”x6” section of Pressure-Sensitive uncured Elastoform flashing may be used. Pressure-Sensitive Elastoform flashing is available in rolls of 6”, 9” and 12”.

b. **Projects with 25 and 30 year Warranties - Detail FB-2A.1 or AFX-2A.1**

Side Laps: Must be a minimum of 5-1/2” wide using **6” wide Field-Applied or Factory-Applied Tape (FAT)** OR if **3” wide Factory-Applied Tape (FAT)** SecurTAPE is used, the 3” Tape must be overlaid with **6” Pressure-Sensitive Cured Cover Strip**. (**Detail FB-2A.1 or AFX-2A.1**).

End Laps: Use two layers of Pressure-Sensitive Flashing as an overlay for the end laps. The first layer shall be 6” wide Pressure-Sensitive Overlayment Strip or Pressure-Sensitive Cured Cover Strip and the top layer shall be 12” wide Pressure-Sensitive Elastoform Flashing. Both layers shall be centered over the butt edges of the sheet.

Splice Intersections: ’T’-Joints are to be flashed with a bead of lap sealant and 6”x6” Pressure-Sensitive ‘T’-Joint Cover. Apply a second layer of 12”x12” Pressure-Sensitive ‘T’-Joint Cover centered over 6”x6” ‘T’-Joint Cover. (**Detail FB-2A.1 or AFX-2A.1**).

Note: In lieu of the 6”x6” Pressure-Sensitive ‘T’-Joint cover, a 6”x6” section of Pressure-Sensitive uncured Elastoform flashing may be used. Pressure-Sensitive Elastoform flashing is available in rolls of 6”, 9” and 12”.

B. **Splicing Procedures**

1. **Set the Membrane** – Overlap the EPDM membrane a minimum 2 1/2“or 5 1/2” (63 or 138 mm) to coincide with the SecurTAPE width. Stagger factory seams on dusted EPDM to avoid a double thickness of membrane. For sheets without a pre-printed set mark, place a set mark 1/8” to 1/2” (3-13 mm) beyond the leading edge of the top membrane when field applying SecurTAPE. Locate field splices outside of drain sumps. The pre-marked line on the membrane edge can also be used as a guide for positioning splice tape.

   Note: Refer to Step 5 for position of membrane with Factory-Applied Tape.

2. **Clean the Splice Area** - The entire membrane surface where SecurTAPE will be applied must be clean and free of any residual mica dust or dirt. SecurTAPE will not adhere to dusted or dirty surfaces.

   a. Remove loose mica dust on dusted EPDM by brooming or wiping with a clean, dry rag or HP Splice Wipe. Pay particular attention to removing mica dust at any factory seam step-offs.

   b. Clean the splice areas with Weathered Membrane Cleaner. This allows for roller application of the primer which improves productivity and decreases potential over drying of the primer. This process is required on membrane that has been exposed for a number of weeks. Change HP Splice Wipes often to ensure mica dust is removed. Permeation-resistant gloves meeting ANSI/ISEA 105-2005 are required for hand protection when cleaners or primers are being used. Allow the Weathered Membrane Cleaner to flash-off before applying primer.

   CAUTION: Using rags or Splice Wipes that are saturated with mica dust only serve to move the dust from one area to another.

3. **Apply HP-250 EPDM or Low-VOC Primer**

a. **Dusted Membrane** - After removing the loose mica as noted above, Roller-apply the primer to the membrane with a 3/8” (9mm) medium nap paint roller achieving a thin and even coat that is uniform in color and free of streaks or heavy spots. Confirm that primer is applied into any factory seam step-offs.

b. **Pre-Kleened™ Membrane or membrane cleaned with Weathered Membrane Cleaner** - Roller-apply the primer to the membrane with a 3/8” (9mm) medium nap paint roller achieving a thin and even coat that is uniform in color and free of streaks or heavy spots. Confirm that primer is applied into any factory seam step-offs.

c. Allow the primer to flash-off until it does not transfer to a dry finger touch. Do not allow the primer to over dry.

d. Install SecurTAPE shortly after the primer flashes off to maximize bond strength and minimize potential dust contamination

CAUTION: Due to solvent flash-off, condensation may form on freshly applied primer when the ambient temperature is near the dew point. If condensation develops, the application of primer and SecurTAPE must be discontinued since proper adhesion will not be achieved. Allow the primer surface to dry and apply a thin freshener coat of primer to the previously coated surface and apply SecurTAPE when conditions allow. Do not stir Low-VOC Primer

4. **Field Applied SecurTAPE**

a. **Unroll** approximately 3' (1m) of SecurTAPE aligning the tape with the set marks. Use firm and even hand pressure to press the tape down to the bottom sheet along the length of the splice. Overlap tape roll ends 1”. A continuous section of SecurTAPE must be used at all factory seams and field splice intersections. In warm, sunny weather, keep SecurTAPE rolls in their box in a shaded area until ready to use.

b. Rolling the installed SecurTAPE with a 2"-wide hand roller will reduce the frequency of air blisters in the completed field seam. Crease the SecurTAPE into any factory seam step-off with the edge of the hand roller.

c. Allow the top sheet to fall freely onto the poly backing. Ensure that a minimum of 1⁄8" (3 mm) to a maximum of 1/2" (12 mm) of tape extends beyond the top membrane edge. Trim membrane if necessary.

d. Pull the poly backing off at a 45 degree angle and use firm hand pressure across the splice towards the outside splice edge mating the top sheet onto the SecurTAPE.

e. Immediately roll across the splice with a 2" (50 mm) wide hand roller applying positive pressure. Use the edge of the hand roller to crease the top membrane into any factory seam step-off.

Note: At any Pressure Sensitive SecurTAPE overlap, apply a 5⁄16" diameter (8 mm) bead of Lap Sealant 1/2” (12 mm) in all directions from the overlap.

5. **Factory Applied-Tape (FAT)**

a. Overlap the Factory Applied Tape membrane a minimum 3” or 6” (75 or 150 mm) to coincide with the SecurTAPE width. Stagger factory seams on dusted EPDM to avoid a double thickness of membrane.

b. Pull the poly backing off at a 45 degree angle and use firm hand pressure across the splice towards the outside splice edge mating the top sheet onto the primed area of the bottom sheet.

c. Immediately roll across the splice with a 2" (50 mm) wide hand roller applying positive pressure. Use the edge of the hand roller to crease the top membrane into any factory seam step-off.

6. **Install T-Joint Covers** - At all field splice intersections, follow the cleaning and priming steps listed above and then apply a 5⁄16" diameter (8 mm) bead of Lap Sealant 1/2" (12 mm) in each direction from the membrane intersection according to **Detail U-2-A**. Then install a 6" x 6" P.S. T-Joint Cover. For 25 and 30 year warranties and all 90-mil membranes apply a 12" x 12" P.S. T-Joint Cover centered over the 6" x 6" T-Joint Cover according to **Detail U-2A.1**

7. **Apply Lap Sealant** – Apply Lap Sealant at cut edges of reinforced membrane, splice tape overlaps and Pressure-Sensitive T-Joint Covers. Lap Sealant may be applied immediately following the completion of a splice. Feather the Lap Sealant with the specially formed plastic Lap Sealant Tool so the high point or crown is centered over the splice edge. Plastic Lap Sealant Tools are provided in cartons of Pressure-Sensitive Elastoform and cardboard tools are on the top of the Lap Sealant cartons.

8. **Cold Weather Requirements –** installation when temperatures fall below 40°F (4°C)

   a. Hot boxes for jobsite storage must be provided to maintain a minimum SecurTAPE temperature of 40°F (4°C).

   b. Heat the primed area of the bottom membrane as the SecurTAPE or Factory Applied Tape is installed and pressed into place.

   c. Field applied SecurTAPE must be rolled with a 2" (50 mm) wide hand roller prior to removal of the release liner when temperatures fall below 40°F (4°C).

   d. Prior to rolling the splice area with a 2" (50 mm) wide hand roller, apply heat to the topside of the membrane with a hot-air gun. The heated surface should be warm to the touch.

C. **Lap Sealant Application**

1. **Lap Sealant is required at the following locations:**

   a. Splice tape overlaps.

   b. Beneath 6"x6" T-Joint Covers and around the outer edge.

   c. Where joints in metal edgings intersect with Pressure-Sensitive Cured Cover Strip.

   d. Around all edges of Pressure-Sensitive Elastoform Flashing, Corners, and Pockets.

   e. Cut edges of reinforced membrane.

2. **Procedures**

   a. Dusted EPDM must be cleaned 1" (25 mm) on either side of the splice edge using Weathered Membrane Cleaner or EPDM Primer and HP Splice Wipes or a clean cloth.

   Note: Weathered Membrane Cleaner is not required when using Kleen EPDM unless accumulated dirt is present.

   b. Apply a 5/16" bead of Lap Sealant centered over the splice edge. Coverage rate is 22 lineal feet per tube.

c. Feather the Lap Sealant with the specially formed Lap Sealant Tool so the high point or crown is centered over the splice edge. Clean the feathering tool occasionally for consistent crowning of Lap Sealant.

d. Application of Lap Sealant **should be completed each day** to avoid extra cleaning of accumulated dirt.

D. **SPLICE REPAIRS**

1. **General**

a. Prior to initiating repairs, the membrane must be cleaned to remove field dirt and other contaminants. Using a scrub brush, scrub the splice areas with warm water and a low-sudsing soap (Spic and Span, Tide, Lestoil). Rinse with clean water and allow to dry prior to applying Weathered Membrane Cleaner or Carlisle EPDM Primer as required.

b. Sure-Seal Weathered Membrane Cleaner can be used to prepare membrane exposed to the weather prior to applying Carlisle EPDM Primer clean HP Splice Wipe or natural fiber rag (cotton) with Weathered Membrane Cleaner and scrub the area in a circular motion. Continue cleaning until the surface is a consistent matte black color without streaking.

2. **Repairs of Cuts and Tears (Surface Splice)**

Repairs to cuts and tears in the membrane must be accomplished by splicing a membrane section over the affected area.

a. Select a repair membrane, which is the same material as that to be repaired.

b. Extend the repair membrane section at least 3" in every direction from the cut or tear. Round the corners of the repair membrane prior to splicing. Clean the membrane to remove field dirt and other contaminants as outlined above.

c. Apply Carlisle EPDM Primer to the splice areas. Install Pressure-Sensitive Cured Cover Strip or Cured Membrane and SecurTAPE and then hand roll the splice areas. Apply T-Joint Covers at splice intersections. Lap Sealant is applied at flashing and tape overlaps in accordance with standard procedures.

3. **Repair of improperly installed Tape Splices**

a. Improperly installed tape splices include, but are not limited to, fishmouths at field splices, lack of or improper use of Primer, condensation formation on Primer or incorrect tape placement, etc.

b. **If fishmouths are present in the field splice**, the fishmouth must be cut by removing the top layer of membrane prior to overlaying the splice. The flashing overlay **must** be supported by the bottom layer of cured membrane.

c. Clean the splice area with Weathered Membrane Cleaner. Apply EPDM Primer on both sides extending past the width of the new flashing overlay to be installed.

d. Overlay the defective splice area with a minimum 6” wide Sure-Seal Pressure-Sensitive Uncured Elastoform, Cover Strip or Overlayment Strip centered over the edge of the splice. If using Pressure-Sensitive Elastoform, apply Lap Sealant around the outer edge and feather accordingly.

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturers Representative for any information, which has subsequently been made available.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S DESIGN REFERENCES

Table of Contents

July 2024

The information contained in this generic specification represents a part of Carlisle's requirements for obtaining a roofing system 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.

CARLISLE SYNTEC SYSTEMS

CARLISLE'S DESIGN REFERENCES

DR-01

Construction Generated Moisture

July 2024

The information contained in this Design Reference serves as a criteria for Specifiers and building owners regarding the design of the Roofing Systems and consideration for moisture generated and infiltrating into the roof assembly. The applicable roofing system specification shall be referenced for other design related information.

Illustrations included within this document are examples of how joints and gaps may be treated. Designers may opt to use other measures or products to achieve a proper roofing substrate.

While buildings should ultimately be designed to fit their intended purpose and accommodate their occupants, they must also tolerate various construction conditions (i.e., time of construction, material and process used).

In cold climatic regions or during wintertime construction, buildings in their construction phase will likely experience an upward moisture-drive as a result of hydration of freshly poured concrete floors and the practice of using oil or propane fired heaters.

According to National Roofing Contractors Association (NRCA):

1. Construction processes can release large quantities of water vapor. For example, wall or ceiling plaster or 4" thick concrete slabs release roughly one quart of water (2 pounds) for each square foot of surface area during the drying/curing process. A building that is 120,000 square feet in size could experience up to 30,000 gallons of construction-generated moisture.

2. The combustion process of an oil-or propane-fired heater, used for temporary heat during construction, produces more water as a by-product of burning than the weight of the fuel consumed. Approximately one-gallon of water will be produced for each gallon of heating oil burned. This generated moisture, if not addressed through ventilation or contained using vapor retarders, will subject the roof assembly to potential harmful effects that vary from mold accumulation to reduced insulation efficiency.

Moisture Migration

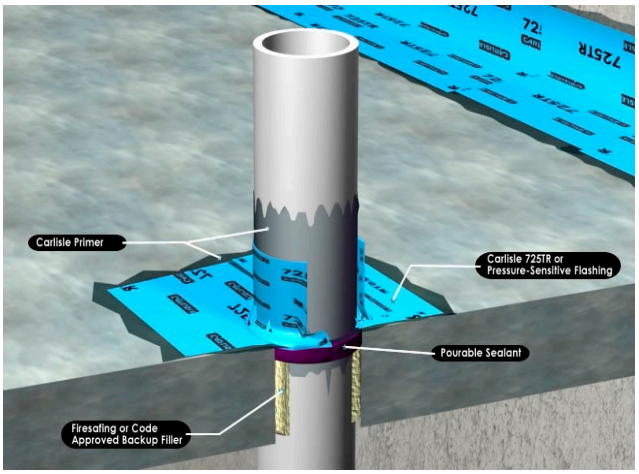
Moisture vapor can penetrate a roof assembly either by diffusion or by air leakage.

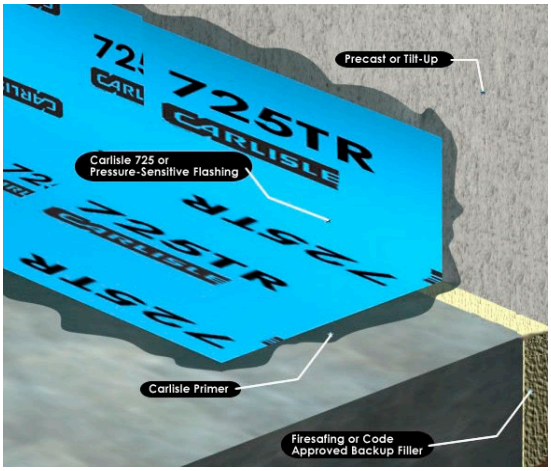
1. **Diffusion** of moisture is caused by the differences in vapor pressure that occurs with varying temperature conditions and relative humidity. The greater the temperature differential, the more active the moisture drive.

2. **Air leakage** occurs through joints in the metal deck or tilt-up panels, insulation joints and gaps around penetrations. Air leakage will also occur as a result of imperfections, such as punctures and tears. Air leakage can allow the transport of significantly greater amounts of moisture than can be transported by way of diffusion.

Air Infiltration

Humid internal air migrating upward through these joints and gaps could cause condensation. If the condensation occurs beneath the roofing membrane it could freeze, in colder temperatures (frozen moisture makes a crackling noise when walked on in winter). If the condensation occurs in the layers of insulation it could eventually weaken the bottom insulation facer which would compromise the wind performance. When a continuous vapor barrier is not to be used, infiltration of humid air, can be prevented by sealing joints and gaps. To achieve an air-tight seal, **all gaps may be sealed as illustrated.** In addition, vertical joints in pre-cast tilt-up panels and construction gaps resulting at inside and outside corners must be completely sealed to eliminate interior air from reaching the roofing assembly.





Gaps may be filled with fire-safing or building code approved backup filler.

Carlisle's VapAir Seal 725 TR or Pressure-Sensitive Flashing can be used as shown in illustrations after priming the substrate. Carlisle's CAV-GRIP III, CCW 702, CCW 702LV or CCW 702 WB may be specified as a substrate primer when VapAir Seal 725 TR is to be used. Carlisle's EPDM Primer must be used if Sure-Seal® Pressure-Sensitive Flashing is specified.

Projects with Steel decks, deck-to-wall junctions may be sealed using the Carlisle's VapAir Seal MD directly to the steel deck, without the use of a primer.

Preventing Moisture Damage

While occupancy generated moisture is usually addressed using a vapor retarder, construction generated moisture can be addressed by:

1. Reducing accumulated construction moisture

2. Sealing gaps between the structural deck and walls as well as gaps around penetrations (utilizing VapAir Seal Flashing Foam or VapAir Seal MD) and at the steel deck end laps (utilizing VapAir Seal MD).

3. Using of multiple layers of insulation can also provide an additional barrier, in the event of air infiltration and reduces the level of moisture concentration within the roofing assembly.

   Note: Studies have also revealed an 8 - 10 % reduction in energy costs between assemblies with equal R-Value when designed with multiple layers versus those designed with a single layer of insulation.

4. Construction generated moisture can also be reduced by project dehumidification prior to building occupancy.

CARLISLE'S DESIGN REFERENCES

DR-02

FM 1-28 Summary Update

July 2024

This Design Reference document offers a summary of updates to the FM 1-28 Property Loss Prevention Data Sheet announced by FM Global in February 2020.

Specifiers, Applicators or Building owners must access the FM website for other related information and contact the local FM office when working on a FM insured property. Enhancements mandated by FM Global for an FM insured property are not necessarily part of Carlisle's requirements for the issuance of the Carlisle warranty. When an inspection is performed by Carlisle, it is not to verify compliance with the FM requirements but to ensure Carlisle's minimum warranty requirements have been met.

FM 1-28 Recent Update

One key update relates to roof zone dimensions to align with the ASCE 7-16 Design Standards. In some cases (depending on the roof dimensions, building height, and roof slopes), four zones may exist: interior, inner perimeter (also referred to as field), outer perimeter, and corner zones. The Roof Zone table below may be referenced for more detailed information.

Roof Height / Slope	Reference	Corner Zone (Zone 3)	Outer Perimeter Zone (Zone 2)	Inner Perimeter / Field Zone (Zone 1)	Interior Zone (Zone 1')
Building slopes less than 1- 1/2" (7˚ or less) OR Buildings less than 90' with height to width ratio of 1.0 or less	Figure I	0.6h x 0.6 x 0.2h "L" shaped	0.6h from roof edge	1.2h from roof edge	Covers the remaining roof area
Building slopes 1-1/2" or greater (greater than 7˚)	Figure II	The width (a) of the various perimeter and corner zones equals the lesser of 10% of the building width or 0.4h, but not less than 4% of the width or 3ft.		Covers the remaining roof area	N/A
Buildings 90'-high or taller, or buildings higher than 60' with height to width ratio greater than or equal to 1.0	Figure III	The depth of the corner and perimeter zones shall equal 10% of the building width dimension, but not less than 3ft (0.9m). The corner zone shall extend along both perimeters a distance equal to twice the depth forming an "L" pattern.		Covers the remaining roof area	N/A

Note: h = building height

Other important items to note include:

1- Revised design wind guidance reflects changes in pressure coefficients (GC_P).

2- The basic design wind speed maps for the continental United States and Alaska remain unchanged and are still based on ASCE 7-05.

3- Wind pressure tables have been removed. Roof pressures can be determined by using either the RoofNav Ratings Calculator or the pressure calculations in section 3.0 of 1-28. Also, pressure coefficients have been provided as outlined in the tables included with Figure I, Figure II, and Figure III.

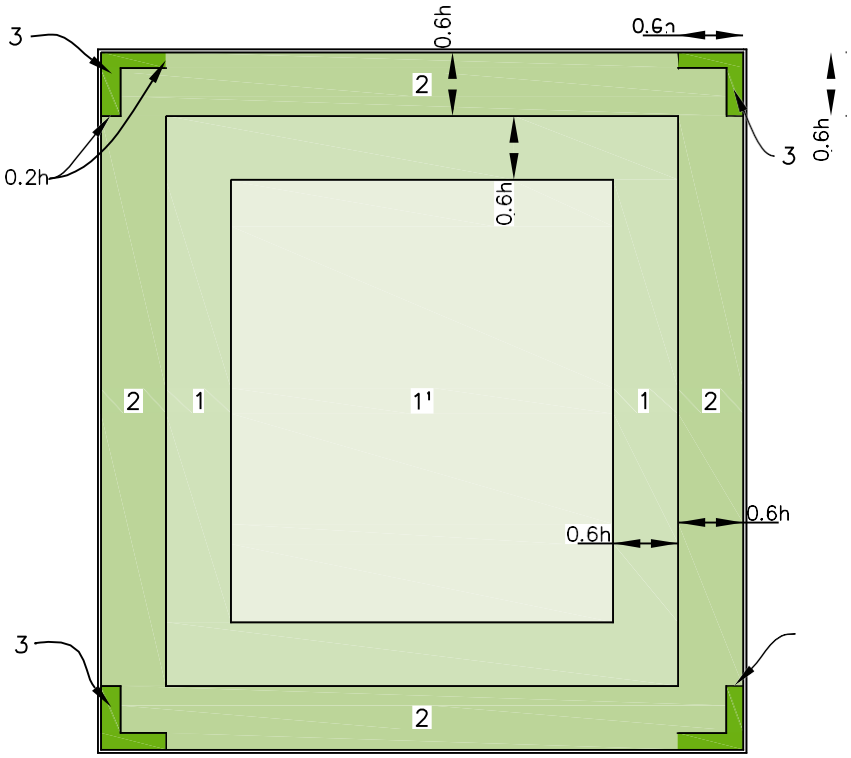
4- A separate 100-year MRI wind map has been provided for each of the islands of Hawaii, instead of using one wind speed for all the islands.

Figure I

Building slopes less than 1-1/2" (7° or less)

OR

Buildings less than 90' with height to width ratio of 1.0 or less

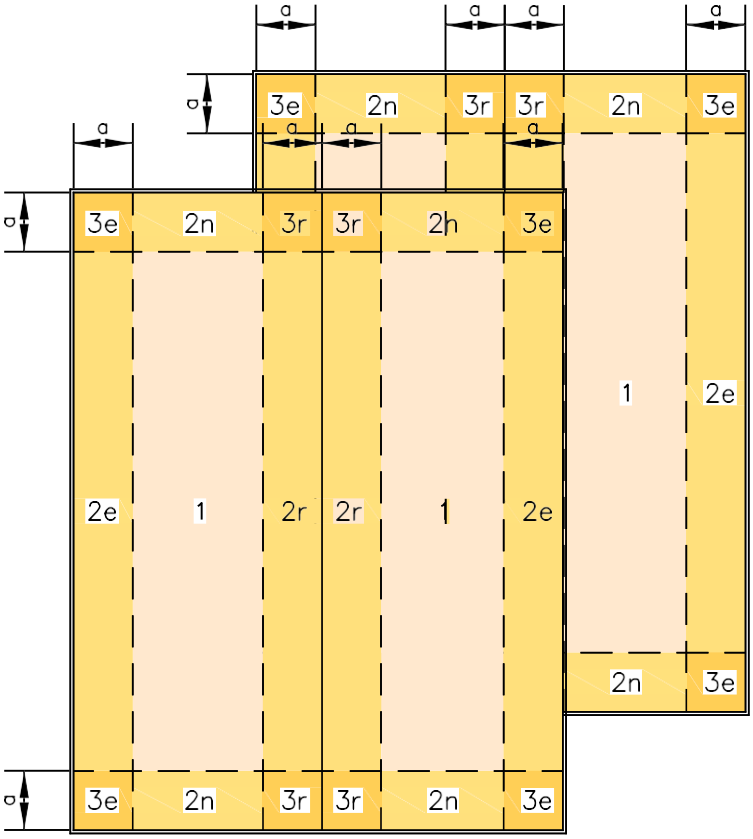


Zone	GCP
Corner Zone (3)	-3.2
Outer Perimeter Zone (2)	-2.3
Inner Perimeter / Field Zone (1)	-1.7
Interior Zone (1')	-0.9

Figure II

Building slopes 1-1/2" or greater (greater than 7°)

Note: a = the width of the various perimeter and corner zones equals the lesser of 10% of the building width or 0.4h, but not less than 4% of the width or 3’ (0.9 m).



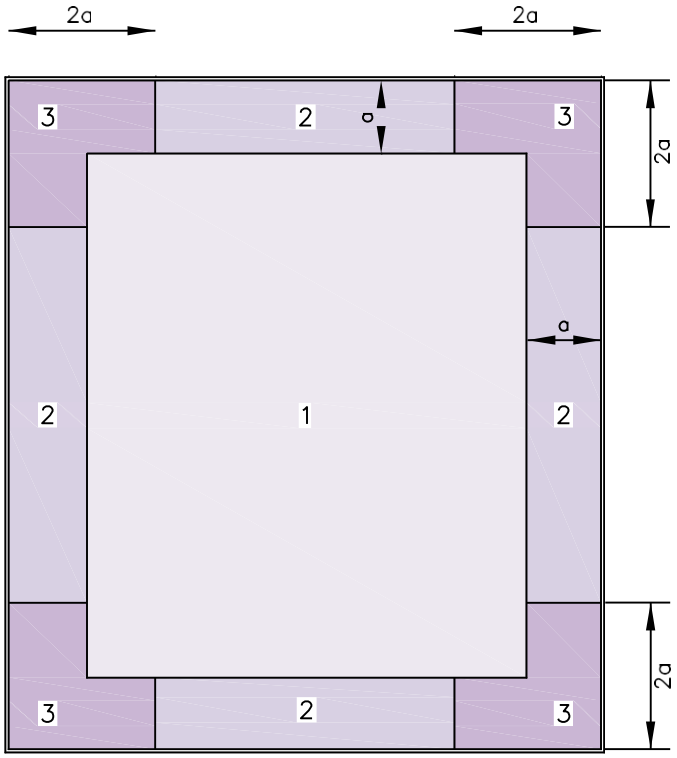
Zone	GC_P
Corner Zone (3r)	-3.6
Outer Perimeter Zone (2n, 2r, 3e)	-3
Inner Perimeter / Field Zone (1, 2e)	-2

This table contains conservative GC_P values for slopes 1-1/2" or greater. For lesser values for steeper slopes, refer to FM 1-28 table 3.2.2d or table 3.2.2c.

Figure III

Buildings 90’ high or taller, or buildings higher than 60’ with height to width ratio greater than or equal to 1.0

Note: a = 10% of the lesser horizontal dimension, but not less than 3’ (0.9m).



Zone	GCp
Corner Zone (3)	-3.2
Outer Perimeter Zone (2)	-2.3
Inner Perimeter/Field Zone (1)	-1.7

This document is intended for informational reference only and shall not be considered a replacement to the actual FM 1-28 publication. All FM-insured projects must be reviewed by the local FM Engineering office before beginning any roofing work.

Additional information may be obtained by logging on to https://www.roofnav.com to access the RoofNav number search, RoofNav Ratings Calculator, and all applicable Property Loss Prevention Data Sheets.

CARLISLE'S DESIGN REFERENCES

DR-03

FM 1-29 Summary Update
Adhered Roofing Systems

July 2024

This Design Reference document offers a summary of updates to the FM 1-29 Property Loss Prevention Data Sheet for adhered roofing systems announced by FM Global in February 2020.

Specifiers, Applicators or Building owners must access the FM website for other related information and contact the local FM office when working on a FM insured property. Enhancements mandated by FM Global for an FM insured property are not necessarily part of Carlisle's requirements for the issuance of the Carlisle warranty. When an inspection is performed by Carlisle, it is not to verify compliance with the FM requirements but to ensure Carlisle's minimum warranty requirements have been met.

A summary of the changes made to the FM 1-29 document that affect adhered roofing systems include the following:

New designations for field, perimeter and corner areas. Now referred to as Zones 1, 2 and 3, respectively.
Addition of a new secondary interior field area, designated as Zone 1' ("Zone 1 Prime").
Modified perimeter and corner prescriptive insulation attachment enhancements for adhered roofing systems utilizing ribbon adhesive. (Mechanically attached insulation enhancements have not changed).

This Design Reference will focus on the February 2020 FM 1-29 prescriptive enhancement requirements for insulation attachment using mechanical fasteners and ribbons of adhesive on adhered roofing systems.

Prescriptive Enhancements – Adhered Systems

Prescriptive enhancements for Zones 2 and 3 of a building are acceptable when either of the following conditions are met.

- The FM Zone 1 rating in any location does not exceed 1-90, **OR**
- The building is located in a non-tropical cyclone-prone region and the Zone 1 rating does not exceed 1-105.

Buildings that do not meet these criteria must use a roofing system with a FM approved wind uplift rating that meets or exceeds the design rating for each Zone (Zones 1', 1, 2, and 3).

Adhered Systems Using Mechanical Fasteners

The method for prescriptively enhancing adhered systems that utilize mechanically fastened insulation has not changed. The attachment requirements are as follows:

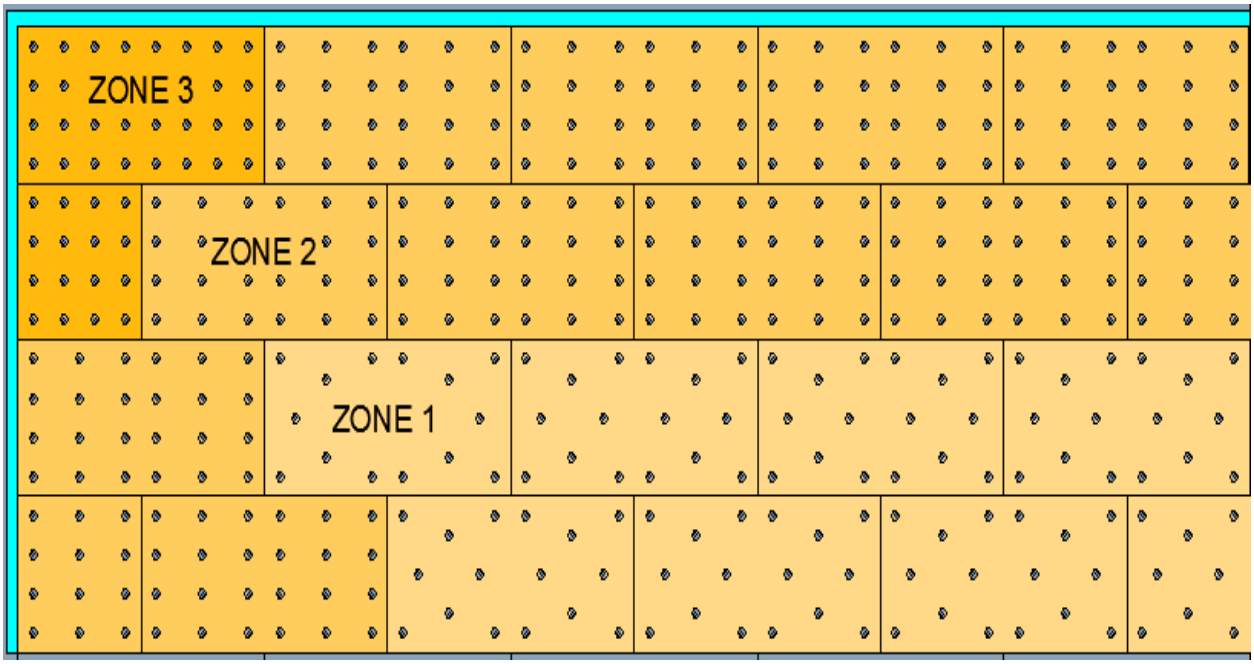
- Zone 2 - 50% increase over Zone 1 but no less than 1 fastener/plate per 2 ft² (16 per 4'x8' board).
- Zone 3 - 1 fastener/plate per 1 ft² (32 per 4'x8' board).

Mechanically Fastened Insulation Example

A roofing assembly specified for use in a non-tropical cyclone-prone region achieves a 1-105 wind uplift rating using 1 fastener/plate per 2 sq. ft. (16 per 4'x8' board). The enhanced Zone fastening would be as detailed in the following table.

1-105 Rated Adhered Assembly – Fastened Insulation			
Zone 1' Fastening	**Zone 1 Fastening (Tested)**	**Zone 2 Fastening (50% increase of Zone 1)**	**Zone 3 Fastening**
Use Zone 1 or alternate system meeting Zone 1' rating requirements	16 fasteners per 4'x8' board	24 fasteners per 4'x8' board	32 fasteners per 4'x8' board

The plan view fastening for this example would appear as shown below. Zone 1' is not shown.



Adhered Systems Using Ribbon Applied Adhesives

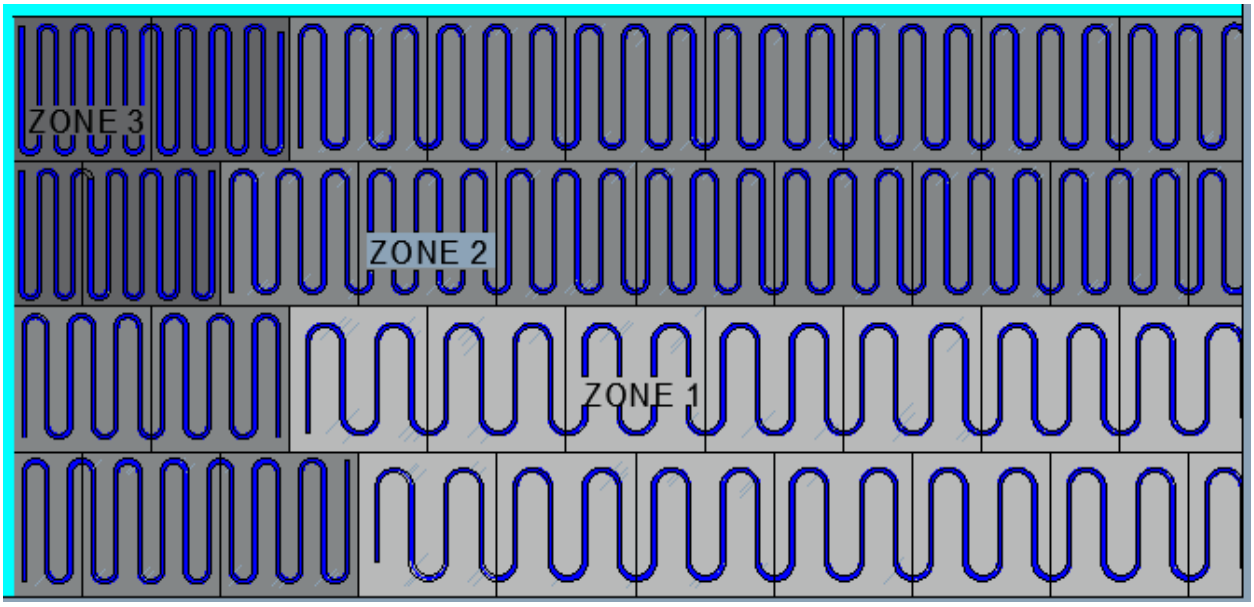
The method for prescriptively enhancing insulation attachment with ribbon applied adhesive on adhered systems has changed. The Zone 2 reduction in spacing between ribbons has changed from 60% (previously allowed) to 67% of the tested Zone 1 spacing. Likewise, the Zone 3 reduction of spacing between ribbons has changed from 40% to 50% of the Zone 1 spacing.

Ribbon Attached Insulation Example

A roofing assembly specified for use in a non-tropical cyclone-prone region achieves a 1-105 wind uplift rating using ribbons of adhesive spaced 12" o.c. The enhanced Zone ribbon spacing would be as detailed in the following table.

1-105 Rated Adhered Assembly – Adhesive Ribbons			
Zone 1′ Spacing	**Zone 1 Spacing (Tested)**	**Zone 2 Spacing (67% of Zone 1)**	**Zone 3 Spacing (50% of Zone 1)**
Use Zone 1 or alternate system meeting Zone 1′ rating requirements	12" o.c. Max.	8" o.c. Max.	6" o.c. Max.

The plan view ribbon spacing for this example would appear as shown below. Zone 1' is not shown.



Non-Prescriptive Enhancements

The option is always available to provide a roofing system that has been tested to achieve the uplift pressure requirement / FM rating for each roof Zone. As such, a system that meets the Zone 3 requirements may be installed over the entire roof, or multiple systems may be installed to meet the individual Zone 1', 1, 2 and 3 design pressures.

This document is intended for informational reference only and shall not be considered a replacement to the actual FM 1-29 publication. All FM-insured projects must be reviewed by the local FM Engineering office before beginning any roofing work.

Additional information can be obtained by logging on to https://www.roofnav.com to access the RoofNav number search, RoofNav Ratings Calculator, and all applicable Property Loss Prevention Data Sheets.

CARLISLE'S DESIGN REFERENCES

DR-04

FM 1-29 Summary Update
Mechanically Fastened Roofing Systems

July 2024

This Design Reference document offers a summary of updates to the FM 1-29 Property Loss Prevention Data Sheet for mechanically fastened roofing systems announced by FM Global in February 2020.

Specifiers, Applicators or Building owners must access the FM website for other related information and contact the local FM office when working on a FM insured property. Enhancements mandated by FM Global for an FM insured property are not necessarily part of Carlisle's requirements for the issuance of the Carlisle warranty. When an inspection is performed by Carlisle, it is not to verify compliance with the FM requirements but to ensure Carlisle's minimum warranty requirements have been met.

An updated version of the FM 1-29 Property Loss Prevention Data Sheet was published in February 2020. Changes made to that document that affect mechanically fastened roofing systems include the following:

New designations for field, perimeter and corner areas. Now referred to as Zones 1, 2 and 3, respectively.
Addition of a new secondary interior field area designated as Zone 1' ("Zone 1 Prime").
Addition of a calculated, performance-based attachment enhancement method for Zones 2 and 3.
Modified prescriptive enhancement attachment requirements for Zones 2 and 3.

This Design Reference will focus on the 2020 FM 1-29 performance-based and prescriptive enhancement requirements for membrane attachment on mechanically fastened roofing systems. This includes linear induction-welded systems.

Performance-Based Enhancement

FM has added an option into 1-29 for the performance-based enhancement of Zones 2 and 3 for mechanically fastened membrane systems. The determination is based on the membrane width and the fastener spacing of the tested assembly chosen for Zone 1. The following example is offered for clarification.

Performance-Based Enhancement Option Example

The FM RoofNav Ratings Calculator was used to determine that an example building requires the following wind uplift ratings:

Zone 1'	Zone 1	Zone 2	Zone 3
90 psf (1-90)	120 psf (1-120)	150 psf (1-150)	210 psf (1-210)

Choose a roofing system that has been tested to meet or exceed the **Zone 1 rating** which for this example is a 12' wide membrane fastened 6" oc. The Zone 1' pressure is less than Zone 1 so the as-tested assembly can be used in Zone 1'. However, since the Zone 2 and Zone 3 pressures exceed the tested Zone 1 pressure (120 psf), the membrane width must be reduced (to increase the membrane fastening density) in these areas while maintaining the 6" oc fastener spacing. The calculations for Zones 2 and 3 are as follows.

Step 1: Determine the area of membrane secured by a single fastener for Zone 1:

- Fastener row spacing *times* the fastener spacing along the row;
  - 11.5 ft (12' sheet minus seam overlap) x 0.5 ft (6" oc fastener spacing) = 5.75 ft^2 (per fastener securement area)

Zone 2 Enhancement

Step 2: Determine the needed reduction in the area of membrane secured by a single fastener for Zone 2:

- Zone 1 tested pressure *times* fastener securement area *divided by* Zone 2 pressure;
  - 120 psf x 5.75 ft^2 / 150 psf = 4.6 ft^2 per fastener

Step 3: Determine the reduction in fastener row spacing for Zone 2:

- Zone 2 area of membrane secured by a single fastener *divided by* fastener spacing;
  - 4.6 ft^2 / 0.5 ft = 9.2 ft maximum row spacing with fasteners spaced 6" oc

Zone 3 Enhancement

Step 4: Determine the needed reduction in the area of membrane secured by a single fastener for Zone 3:

- Zone 1 tested pressure *times* fastener securement area *divided by* Zone 3 pressure;
  - 120 psf x 5.75 ft^2 / 210 psf = 3.3 ft^2 per fastener

Step 5: Determine the reduction in fastener row spacing for Zone 3:

- Zone 3 area of membrane secured by a single fastener *divided by* fastener spacing;

- 3.3 ft^2 / 0.5 ft = 6.6 ft maximum row spacing with fasteners spaced 6” oc

The following table summarizes the performance-based example results calculated above.

Performance-Based Example Summary

Zone 1’	Zone 1 – Tested	Zone 2	Zone 3
Use Zone 1 or system passing 1-90	12’ Sheets 11.5’ Row Spacing 6” oc Fastener Spacing	9.2’ Row Spacing 6” oc Fastener Spacing	6.6’ Row Spacing 6” oc Fastener Spacing

Prescriptive Enhancement Option

The FM prescriptive enhancement option has always been available for mechanically fastened systems and is a simple way to determine the reduction in membrane sheet width / fastener row-to-row spacing for Zones 2 and 3. This method, like the performance-based method, is based on the testing results for Zone 1. The following table contains a summary of the prescriptive enhancement requirements.

Zone 1’	Zone 1 – Tested	Zone 2	Zone 3
Use Zone 1 or separately tested system	Tested Spacing	67% of Zone 1 Fastener Row-To-Row Spacing (60% previously)	50% of Zone 1 Fastener Row-To-Row Spacing (40% previously)

Prescriptive Enhancement Option Example

A FM Approved roofing system requires the use of a 12’ wide membrane (11.5’ oc fastener row spacing) with fasteners spaced 6” oc along the row. The following table identifies the prescriptive enhancement requirements.

Zone 1’	Zone 1 – Tested	Zone 2 (67%)	Zone 3 (50%)
Use Zone 1 or separately tested system	12’ Sheets 11.5’ Row Spacing 6” oc Fastener Spacing	7.7’ Row Spacing 6” oc Fastener Spacing	5.75’ Row Spacing 6” oc Fastener Spacing

In summary, either the performance-based enhancement or the prescriptive enhancement option can be used to comply with the FM 1-29 2020 update. Please refer to the FM Global publications for all the applicable requirements.

This document is intended for informational reference only and shall not be considered a replacement to the actual FM 1-29 publication. All FM-insured projects must be reviewed by the local FM Engineering office before beginning any roofing work.

Additional information can be obtained by logging on to https://www.roofnav.com to access the RoofNav number search, RoofNav Ratings Calculator, and all applicable Property Loss Prevention Data Sheets.

This Design Reference represents the applicable information available at the time of its publication. Owners, specifiers and roofing applicators should consult FM Global and all related FM publications to ensure full compliance with applicable FM requirements.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S DESIGN REFERENCES

DR-05

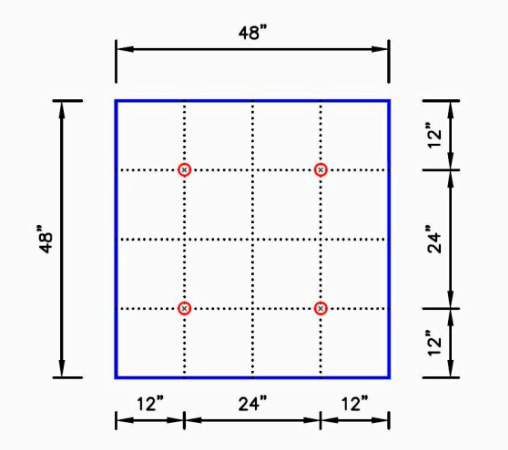
Insulation Fastening Patterns

July 2024

The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Insurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

When enhanced insulation fastening is required as prescribed in Factory Mutual Loss Prevention Data Sheet 1-29, ANSI/SPRI WD-1, or Miami-Dade County, the specifier may consider the enclosed insulation pattern securements. **Note: All insulation and underlayment shown are the minimum thickness required for the established rating.**

Insulation Patterns for boards 4' x 4' in size



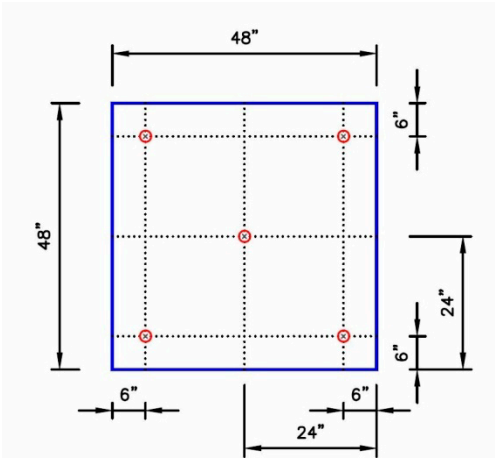
4 Insulation Fasteners & Plates

Only FM 1-90 for:

2" Polyiso HP-H/Insulbase or SecurShield

1/2" SecurShield HD Plus

5/8" Dens Deck Prime, DensDeck StormX Prime or Securock

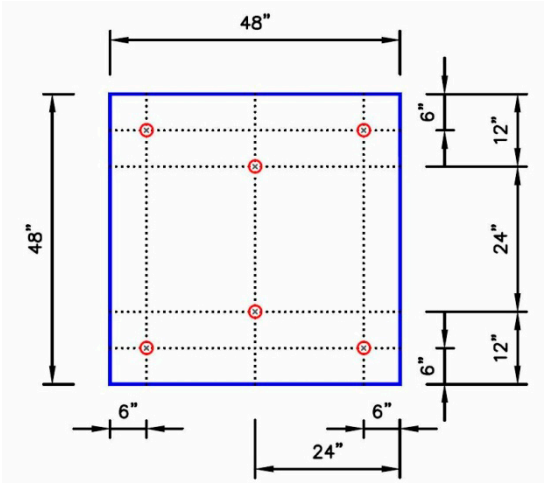


5 Insulation Fasteners & Plates

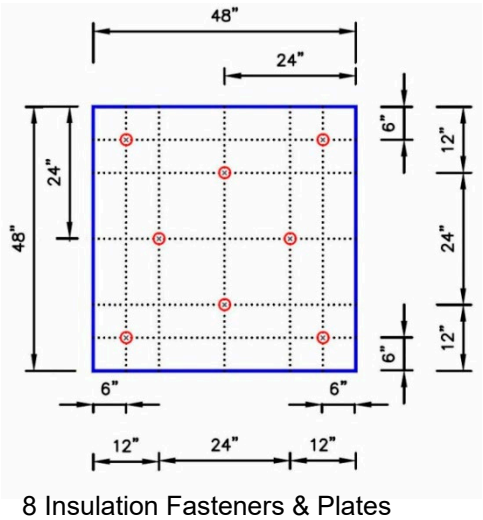
Only FM 1-90 for:

1/2" Securock

1-1/2" Polyiso HP-H/Insulbase (base layer fastened only)



6 Insulation Fasteners & Plates



8 Insulation Fasteners & Plates

FM 1-90 for:

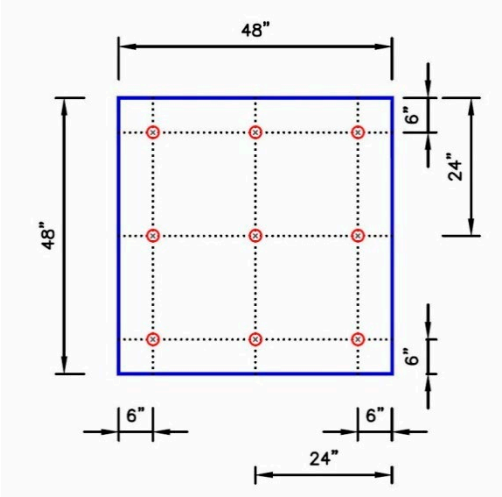
1/4" Dens Deck Prime

FM 1-75 for:

1/4” Securock

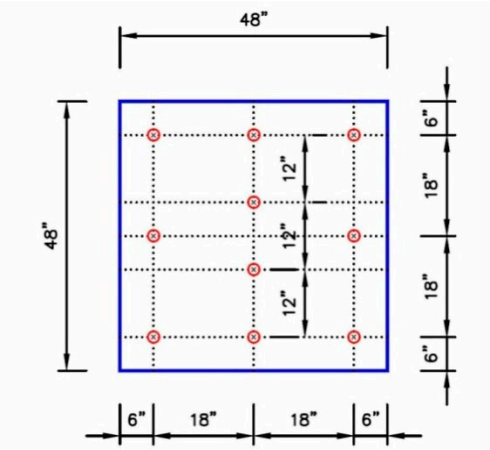
FM 1-90 for all except:

1” Polyiso HP-H/Insulbase (recover only)



9 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



10 Insulation Fasteners & Plates

FM 1-150 for:

2” Polyiso HP-H/Insulbase
(EPDM, TPO and FleeceBACK)

1/2” Securock
(EPDM, TPO and FleeceBACK)

FM 1-135 for:

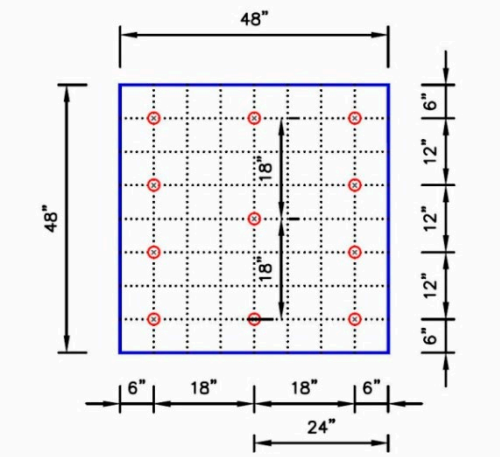
2” Polyiso HP-H/Insulbase (PVC)

FM 1-105 for:

1/2” Dens Deck Prime

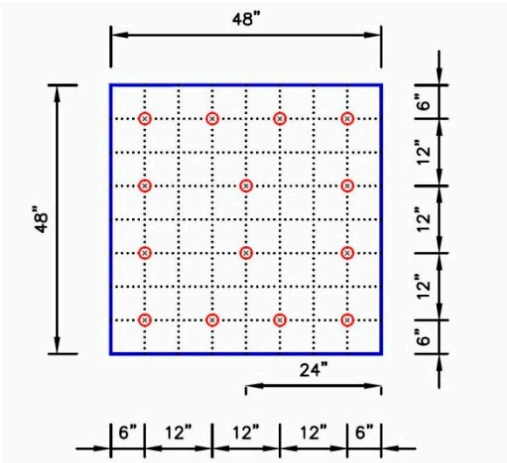
FM 1-90 for:

1-1/2” Polyiso HP-H/Insulbase (Recover)



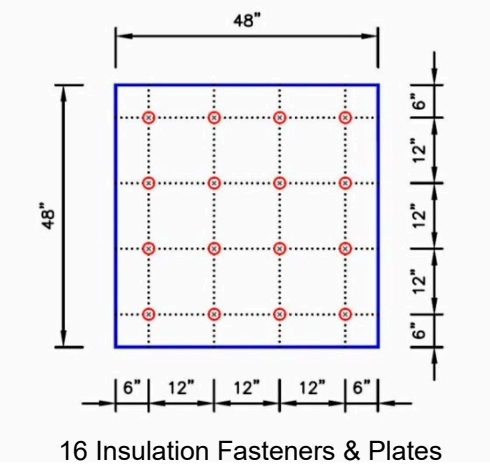
11 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



14 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



16 Insulation Fasteners & Plates

FM I-285 for:

1/2" Dens Deck Prime (FleeceBACK)

FM 1-225 for:

2” SecurShield

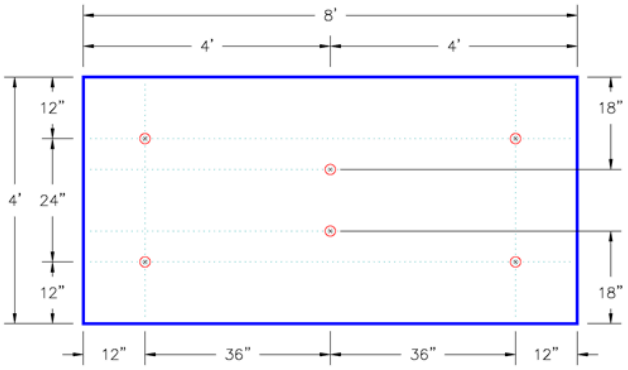
2” Polyiso HP-H/InsulBase (FleeceBACK)

1/2" Securock

FM 1-195 for:

2” Polyiso HP-H/InsulBase (EPDM and TPO)

Insulation Patterns for boards 4’ x 8’ in size



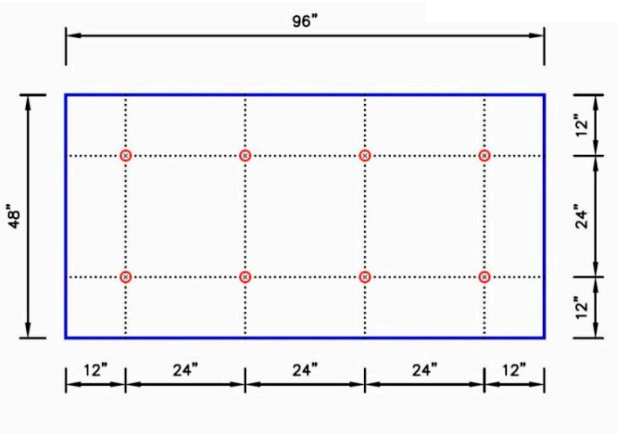
6 Insulation Fasteners & Plates

FM 1-75 for:

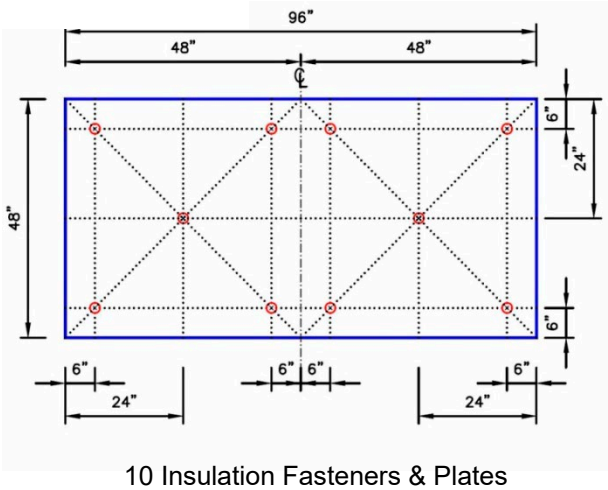
1/2" Securock (with InsulFAST fasteners and SecurFAST Plates)

FM 1-90 for:

5/8" Securock (with InsulFAST fasteners and SecurFAST Plates)



8 Insulation Fasteners & Plates



10 Insulation Fasteners & Plates

FM 1-90 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL or SecurShield

1/2” SecurShield HD Plus

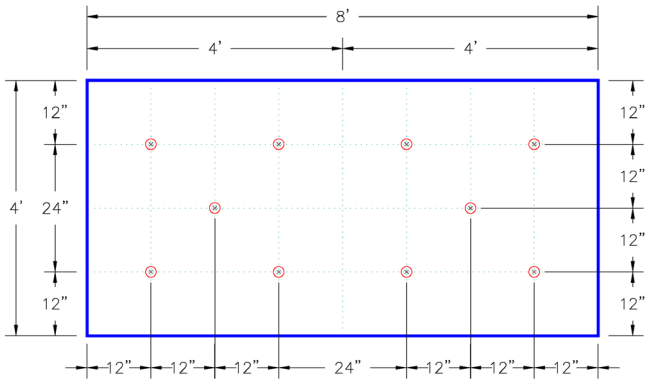
5/8” Dens Deck Prime, DensDeck StormX Prime or Securock

5/8” or 1/2" Securock (with InsulFAST fasteners and SecurFAST Plates)

FM 1-90 for:

1/2" Securock

1-1/2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (base layer fastened only)

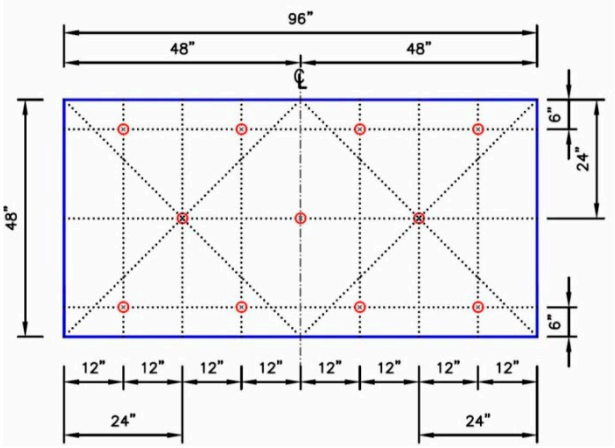


10 Insulation Fasteners & Plates

FM 1-90 for:

1/4" Securock (with InsulFAST fasteners and SecurFAST Plates)

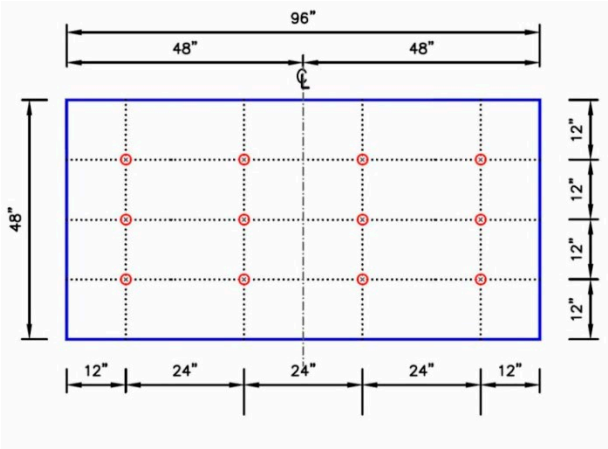
1/2" Dens Deck Prime



11 Insulation Fasteners & Plates

FM 1-90 for:

1-1/2" Polyiso HP-H/InsulBase/InsulBase NH/ InsulBase RL



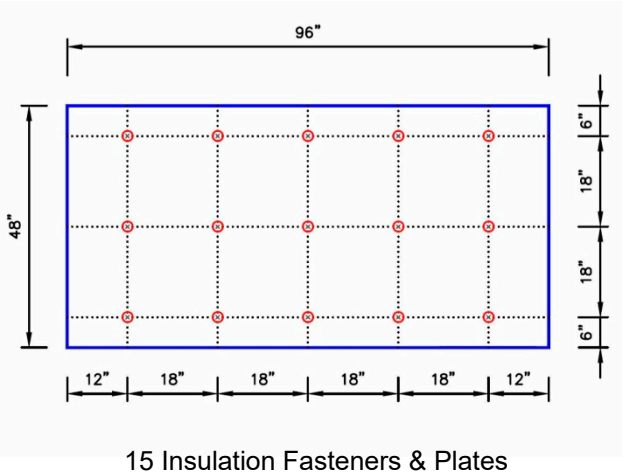
12 Insulation Fasteners & Plates

FM 1-90 for:

1/4” Dens Deck Prime

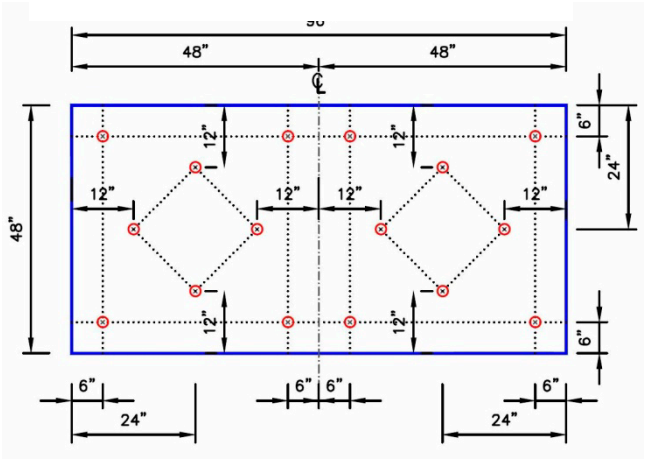
FM 1-75 for:

1/4” Securock



15 Insulation Fasteners & Plates

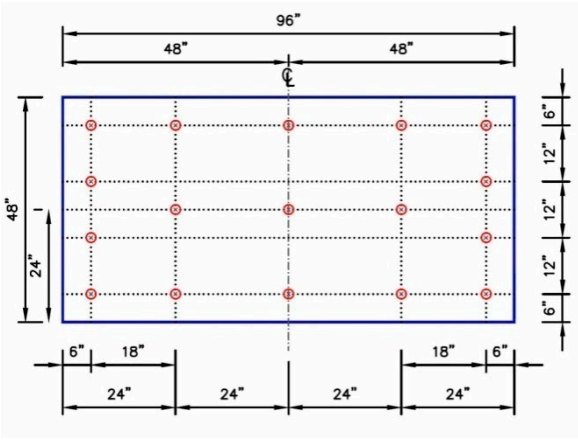
Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



16 Insulation Fasteners & Plates

FM 1-90 for all except:

1” Polyiso HP-H/InsulBase/InsulBase NH/ InsulBase RL (Recover Only)



17 Insulation Fasteners & Plates

FM 1-105 for:

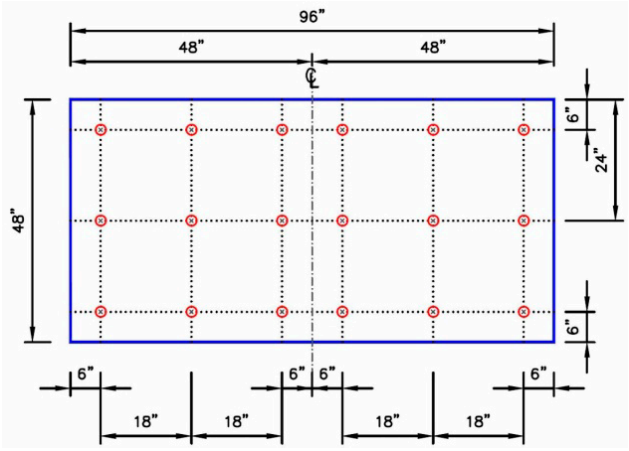
7/16” OSB (EPDM)

FM 1-150 for:

7/16” OSB (TPO and FleeceBACK)

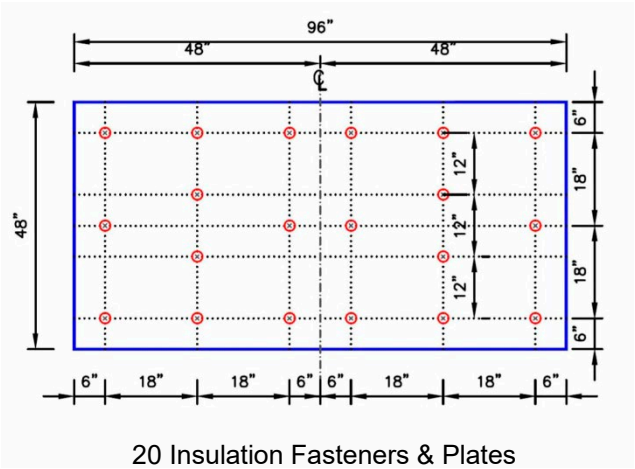
FM-120 for:

7/16” OSB (PVC)



18 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



20 Insulation Fasteners & Plates

FM 1-150 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (EPDM, TPO and FleeceBACK)

1/2" Securock (EPDM, TPO and FleeceBACK)
1-1/2” SecurShield HD Composite
2” SecurShield HD Composite RL

FM 1-135 for:

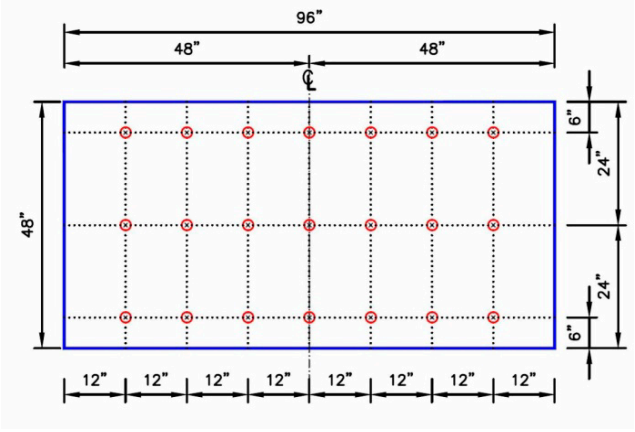
2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (PVC)

FM 1-105 for:

1/2" Dens Deck Prime

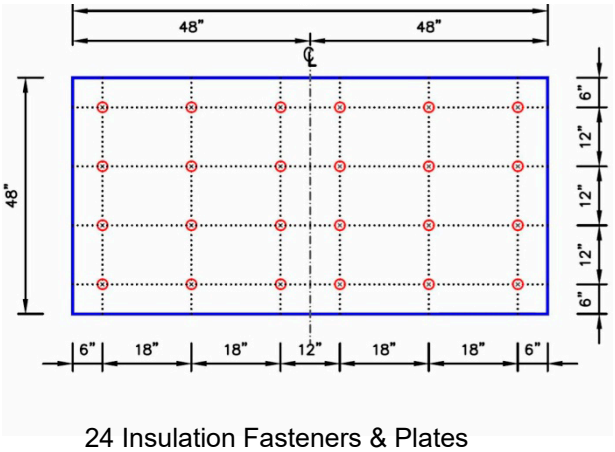
FM 1-90 for:

1” Poyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (Recover)



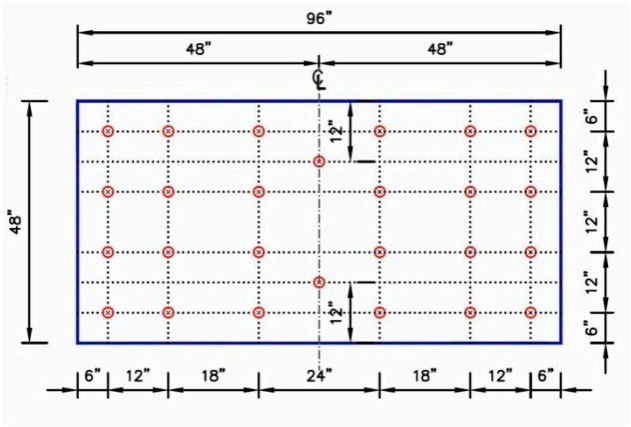
21 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



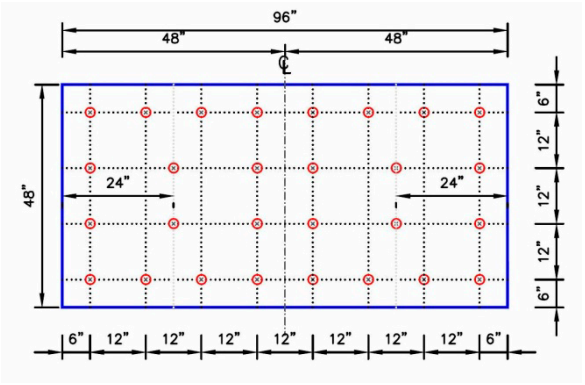
24 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



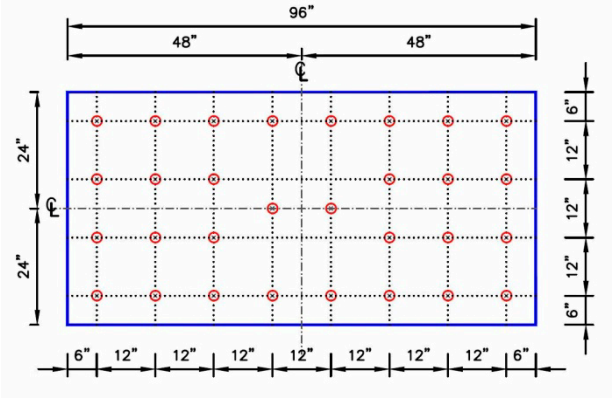
26 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



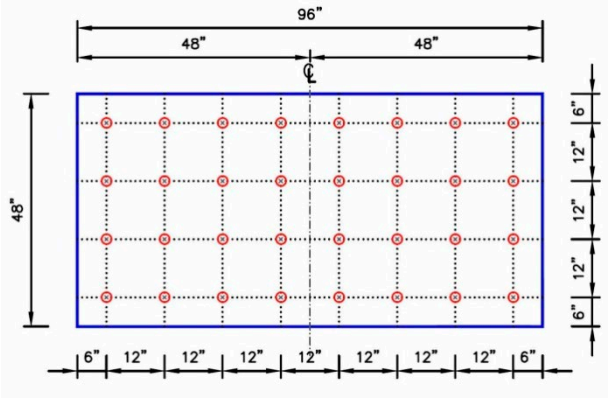
28 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



30 Insulation Fasteners & Plates

Fastening pattern should only be used when required by FM for perimeter or corner enhancement or required by Carlisle for issuance of extended wind speed warranty.



32 Insulation Fasteners & Plates

FM 1-225 for:

2” SecurShield

1/2” Securock

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (FleeceBACK)

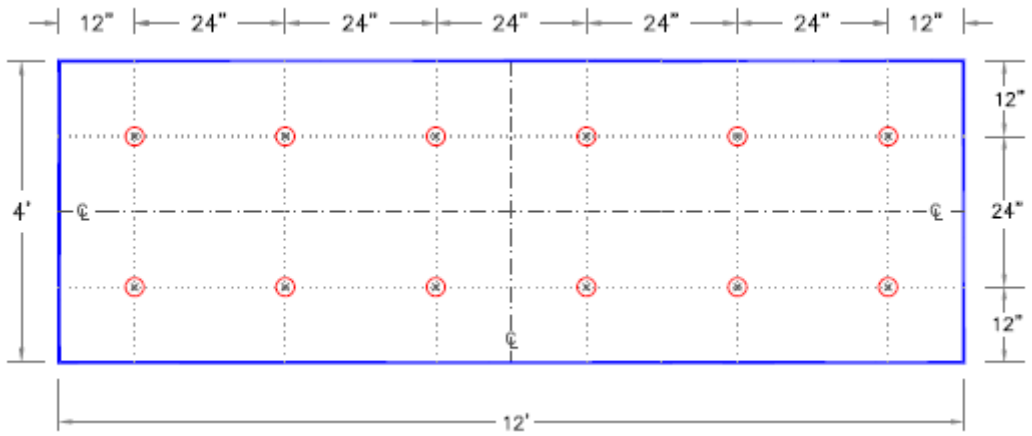
FM 1-195 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (EPDM and TPO)

FM 1-285 for:

1/2” Dens Deck Prime (FleeceBACK)

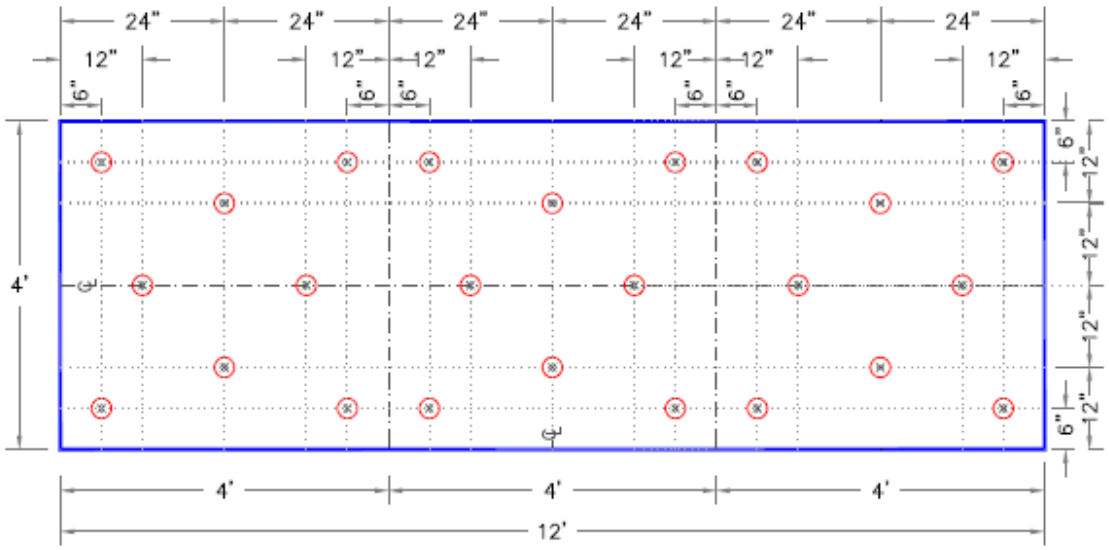
Insulation Patterns for boards 4’ x 12’ in size.



12 Insulation Fasteners & Plates

FM 1-90 for:

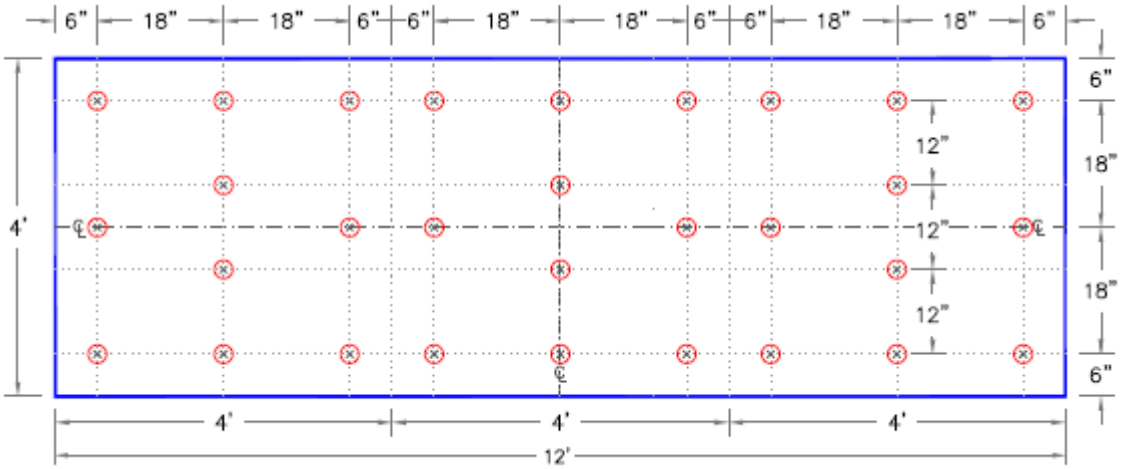
2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL



24 Insulation Fasteners & Plates

FM 1-90 for all except:

1” Polyiso HP-H/InsulBase/InsulBase NH/ InsulBase RL (Recover Only)



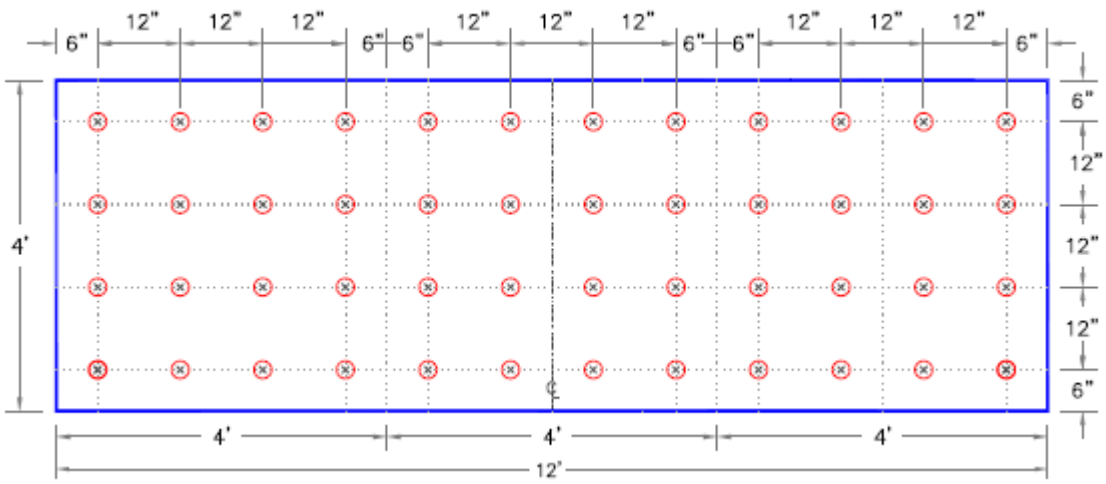
30 Insulation Fasteners & Plates

FM 1-150 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (EPDM, TPO and FleeceBACK)

FM 1-135 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (PVC)



48 Insulation Fasteners & Plates

FM 1-225 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (FleeceBACK)

FM 1-195 for:

2” Polyiso HP-H/InsulBase/InsulBase NH/InsulBase RL (EPDM and TPO)

CARLISLE'S DESIGN REFERENCES

DR-06

Withdrawal Resistance Criteria

July 2024

The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Assurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

A. The following chart indicates the appropriate Sure-Seal Fastener for use with the referenced roof deck and includes the **minimum pullout** and fastener penetration requirements for membrane/insulation securement on Mechanically Fastened Roofing Systems and for insulation attachment on Adhered assemblies.

Deck Type	Minimum Pullout, in pounds	Approved Carlisle Fastener	Minimum Penetration
Steel, 22 gauge or heavier	425 (Mechanically Fastened) (1)	HP, HPX Fasteners	¾"
	360 (Adhered)	HP, HPX ASAP or InsulTite Fasteners	
Steel, less than 22 gauge	300 (Adhered Only) (2)	HP, HPX ASAP or InsulTite Fasteners	
Lightweight Insulating Concrete Over Steel (3)	360	HP, HPX ASAP or InsulTite Fasteners (Adhered)	
		HP Fasteners (Mechanically Fastened)	
Structural Concrete, rated 3,000 psi or greater	800	CD-10 or MP 14-10	1"
Wood Planks	360	HP, HPX ASAP or InsulTite Fasteners (Adhered)	
		HP Fasteners (Mechanically Fastened)	
OSB Composite and Minimum 15/32" thick Plywood (4)	210 (Mechanically Fastened)	HP Fasteners (Mechanically Fastened)	1"
	210 (Adhered)	HP or HPX Fastener (Adhered)	
Gypsum	300	Gyptec or Lite-Deck	1-1/2" (HP-NTB)
			2" (Lite-Deck)
Cementitious Wood Fiber	300 (Mechanically Fastened) 225 (Adhered Only)	Gyptec	1-1/2"

(1) Mechanically Fastened Roofing Systems are not permitted over corrugated steel decks, regardless of gauge
(2) Mechanically Fastened Roofing Systems are not permitted over corrugated steel decks less than 22 gauge unless in conjunction with lightweight insulating concrete and acceptable pullouts are obtained using HPV fasteners.
(3) Fasteners installed through the lightweight insulating concrete into the steel deck below.
(4) 7/16" OSB or 5/8" OSB and 15/32" 3-ply plywood or 15/32" 5-ply plywood.

B. Withdrawal resistance testing may be conducted by an independent laboratory, fastener manufacturer or a representative of Carlisle on the following roof decks. The results of the pullout tests must be documented and submitted to Carlisle when the pullout results are less than listed on the previous chart.

1. **Adhered Roofing Systems:**

   a. Cementitious wood fiber or gypsum decks – Gyptec Fasteners or an approved fastener by others.

   b. Steel decks lighter than 22 gauge - Carlisle HP, HP-X, ASAP, InsulFAST Fasteners or an approved fastener by others.

   c. Oriented strand board (OSB) decks (less than 5/8" thick) - Carlisle HP, HP-Xtra or an approved fastener by others.

2. **Mechanically Fastened Roofing Systems:**

   a. Cementitious wood fiber or gypsum decks – Gyptec Fasteners.

   b. Lightweight insulating concrete over steel decks lighter than 22 gauge - Carlisle HP Fasteners. Fasteners must penetrate the steel deck below the lightweight concrete.

   c. Minimum 7/16" thick oriented strand board (OSB) decks - Carlisle HP Fasteners.

   d. Minimum 5/8" thick oriented strand board (OSB) decks - Carlisle HP Fasteners.

   e. Plywood decks less than 5/8" thick - Carlisle HP Fasteners.

3. On all other acceptable roof decks, a withdrawal resistance test is strongly recommended.

C. **Withdrawal Resistance Procedures**

1. On retrofit projects, a core cutter shall be used to remove existing roofing material prior to conducting the withdrawal resistance test (even if the existing roofing membrane is specified to remain). Existing roofing materials will contribute to a higher, misleading pullout value.

2. The following minimum trial fastener samples must be installed and tested over the roof deck at each level:

   a. For each roof level of 5,000 sq. ft. or less, conduct a minimum of 3 pullouts.

   b. For each roof level greater than 5,000 sq. ft. and less than 20,000 sq. ft., conduct a minimum of 10 pullouts.

   c. For each roof level greater than 20,000 sq. ft. and less than 50,000 sq. ft., conduct a minimum of 15 pullouts.

   d. For each roof level greater than 50,000 sq. ft. and less than 100,000 sq. ft., conduct a minimum of 20 pullouts.

   e. For each roof level greater than 100,000 sq. ft., conduct a minimum of 1 pullout per each 5,000 sq. ft.

Note: On projects with multiple roof levels, when pullouts are conducted on the main roof level, smaller canopies, overhangs, penthouses, etc., of 1,000 square feet or less will not require pullout tests providing these areas consist of the same decking material as the main roof level.

3. The trial fastener installations should be tested in various locations of the roof deck including roof corners and perimeters (areas parallel to the edge of the roof with a width which is 0.4 times the building height). Designate the test locations on a roof plan and include with the submittals to Carlisle, when requested.

For building height ≤ 60 ft: .4 x the building height or .1 x the width (whichever is less), but not less than 4% the width.
For buildings > 60 ft: .1 x the width

Corner	**Perimeter**	**Corner**
Perimeter	**Field**	**Perimeter**
Corner	**Perimeter**	**Corner**

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturers Representative for any information, which has subsequently been made available.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Versico authorized roofing contractors should consult Versico or their Versico Independent Sales Representative for any information, which has subsequently been made available.

Review the appropriate Versico warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S DESIGN REFERENCES

DR-07

CRRC / LEED Information

July 2024

The tables below illustrates membrane properties as they pertain to reflectivity, emittance, recyclability and test methods. The data can be referenced when compliance with CRRC standards and LEED pre-requisites are required. Other LEED compliant information could be obtained by contacting Carlisle or by consulting www.carlisle-syntec.com . Additional LEED information is contained in various Product Data Sheets.

Sure-White EPDM Membranes - Sure Weld TPO Membranes (White/Tan/Gray)

Physical Property	Test Method	Sure-White	Sure-Weld	Sure-Weld	Sure-Weld	Spectro-Weld
Membrane Color		White	White	Tan	Gray	White
ENERGY STAR – Initial solar reflectance	ASTM E903	0.76	0.79	0.71	-	0.88
ENERGY STAR – Solar reflectance after 3 years (uncleaned)	ASTM E903	0.64	0.70	0.64	-	0.75
CRRC – Initial solar reflectance	ASTM C1549	0.76	0.79	0.71	0.46	0.88
CRRC – Solar reflectance after 3 years (uncleaned)	ASTM C1549	0.64	0.70	0.64	0.43	0.75
CRRC – Initial thermal emittance	ASTM C1371	0.90	0.90	0.86	0.89	0.89
CRRC – Thermal emittance after 3 years (uncleaned)	ASTM C1371	0.87	0.86	0.87	0.88	0.90
LEED – Thermal emittance	ASTM E408	0.90	0.90	0.86	0.89	0.89
Solar Reflective Index (SRI) - Initial	ASTM E1980	94	99	86	53	111
Solar Reflective Index (SRI) – 3 YR	ASTM E1980	77	85	77	48	93
LEED – Pre-consumer recycled content	-	0%	10%	10%	10%	10%
LEED – Post-consumer recycled content	-	0%	0%	0%	0%	0%
LEED – Manufacturing location	-	Carlisle, PA or Greenville, IL	Senatobia, MS or Tooele, UT	Senatobia, MS or Tooele, UT	Senatobia, MS or Tooele, UT	Senatobia, MS or Tooele, UT

Note: Sure-Seal (Black) Membrane: SRI 7; Pre-consumer recycled content 0%; Post-consumer recycled content 3%; Manufacturing Location Carlisle, PA and Greenville, IL.

Sure-Flex PVC / Sure-Flex KEE HP Membranes (White/Tan/Gray)

Physical Property	Test Method	Sure-Flex	Sure-Flex	Sure-Flex	Sure-Flex KEE HP	Sure-Flex KEE HP	Sure-Flex KEE HP
Membrane Color		White	Tan	Gray	White	Tan	Gray
ENERGY STAR – Initial solar reflectance	ASTM E903	0.86	0.72	0.59	0.87	0.74	0.58
ENERGY STAR – Solar reflectance after 3 years (uncleaned)	ASTM E903	0.63	-	-	-	-	-
CRRC – Initial solar reflectance	ASTM C1549	0.86	0.72	0.59	0.87	0.74	0.58
CRRC – Solar reflectance after 3 years (uncleaned)	ASTM C1549	0.63	0.60*	0.49*	0.71*	0.63*	0.50*
CRRC – Initial thermal emittance	ASTM C1371	0.89	0.87	0.89	0.89	0.88	0.88
CRRC – Thermal emittance after 3 years (uncleaned)	ASTM C1371	0.87	0.86*	0.86*	0.87*	0.84*	0.84*
LEED – Thermal emittance	ASTM E408	0.89	0.87	0.89	0.89	0.88	0.88
Solar Reflective Index (SRI) - Initial	ASTM E1980	108	88	70	110	90	69
Solar Reflective Index (SRI) – 3 YR	ASTM E1980	75	71*	56*	87*	71*	56*
LEED – Pre-consumer recycled content	-	10%	10%	10%	10%	10%	10%
LEED – Post-consumer recycled content	-	0%	0%	0%	0%	0%	0%
LEED – Manufacturing location	-	Greenville, IL	Greenville, IL	Greenville, IL	Greenville, IL	Greenville, IL	Greenville, IL

* CRRC Rapid Ratings: These are interim laboratory-aged values that simulate weathered values. These values will be replaced with the measured three-year aged values upon completion of the weathering process. SRI values calculated using Rapid Ratings may change once the aged rating replaces the interim rating.

CARLISLE'S DESIGN REFERENCES

DR-08

Wood Nailers and Securement Criteria

(Factory Mutual Loss Prevention Data Sheet 1-49)

July 2024

The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Assurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

One of the most often overlooked details on a roofing system is the attachment method for wood nailers at the perimeter of the roof. Factory Mutual Global (FMG) publishes design recommendations for the attachment of wood nailers to various substrates and for the attachment of perimeter flashing details to wood nailers. This information is contained in Factory Mutual's Property Loss Prevention Data Sheet 1-49. In accordance with that Data Sheet, the information listed below should be referenced when selecting an appropriate perimeter attachment method.

General Criteria

A **horizontal wood nailer** is used to provide an effective substrate for some installation details and for other roof accessories. In addition, it is used to provide solid protection for the edge of the membrane underlayment. Minimum thickness of the nailer must be thick enough that the top of the nailer is flush with the top of the membrane underlayment.

1. The width of the nailers must exceed the width of the metal flange of edgings, scuppers, etc.

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

   If non-treated lumber is to be specified, it must be stored to protect from moisture sources. A seal should be provided between the non-treated lumber and a concrete or gypsum substrate (similar to a sill sealer).

3. Methods used to fasten the nailer vary with building conditions; however, it is essential that secure attachment of durable stock be accomplished. Factory Mutual Loss Prevention Data Bulletin 1-49 (Perimeter Flashing) contains options for the spacing and sizing of fasteners based on the project wind zone.

4. Wood nailers are not covered by the Carlisle warranty.

- Wood nailers that are anchored to steel, wood or masonry decking should not be less than 2" X 6" nominal (minimum1-1/2" X 5-1/2").
- Wood nailers should be Douglas Fir, Southern Yellow Pine or of wood having similar decay resistant properties.

Attachment to Masonry Walls

When fastening to a masonry wall, a 1/2 inch diameter anchor bolt is placed 48 inches on center at an 8 inch minimum depth (12 inches minimum when masonry walls are composed of lightweight aggregate or cinder) as shown in **Figure 1**. Each anchor bolt is positioned (staggered if the wood nailer is wider than 6 inches) in a block core or air space and tightly filled with concrete to the depth of the bolt.

Note: Plastic parts must not be used with masonry anchors.

FMG has specific requirements concerning filling of cores or voids in the top course of cinder blocks.

For example:
Projects requiring 75-psf or 90-psf ratings - fill the entire top course.
Projects requiring 60-psf ratings - fill only required where anchor bolts are positioned (48 inches on center in the field, 24 inches on center at roof corners).

At outside corners, the fastening density must be increased within the first 8 feet in each direction by positioning anchor bolts 24 inches on center.

An alternate method may be used by installing 3/8 inch diameter anchor bolts spaced 32 inches apart. For outside corners, bolts are fastened 16 inches apart, 8 feet from each side of the corner. If additional wood nailers are needed, refer to **Figure 5** for attachment of additional wood nailers.

Attachment to Steel and Wood Decking

- Penetration of the fasteners should be to the top flutes only. The fasteners must be staggered as shown in **Figure 2**. Consultant the Steel Deck Institute for separation requirement if treated nailers are used.

- The staggered fastening pattern should be increased within 8 feet from outside corners as shown in **Figure 3A**.

- If the perimeter nailer is to be secured to a steel angle, anchor bolts must be positioned at 48 inch centers as show in **Figure 4**.

- On wood decks, the staggered fastening pattern with galvanized steel screws should be utilized as shown in **Figure 2**.

  Caution: Attention should be paid to the FMG requirement which calls for galvanized steel washers (minimum 5/8 inch outside diameter) to be used in conjunction with galvanized screws. This requirement is not recognized in most cases and most often forgotten.

Attachment of Additional Wood Nailers

- When additional wood nailers are required, they must be attached with galvanized nails or lag screws that penetrate into the bottom nailer at 1-1/4 inches using a staggered fastening pattern in two rows at 24 inches apart as shown in **Figure 5**.

- The increased fastening density within 8 feet from outside corners is still required and must comply with **Figure 3**.

- The Data Sheet also contains important information pertaining to attachment of metal fascia/edging especially for those edgings which are shop fabricated.

- Even though not emphasized in the Data Sheet, contractors should examine or question existing conditions to determine if existing wood nailers are attached in compliance with the above criteria. If not, existing wood nailers should be refastened using one of these options and additional wood nailers must be secured following **Figure 5**.

Projects where Factory Mutual is the insurance underwriter should be reviewed by the local Factory Mutual office for specific criteria.

Since wood nailers are not considered part of the Carlisle Membrane System Warranty, they are not addressed in depth in the Carlisle specifications nor inspected by the Carlisle Field Service Representative. Wood nailers, however, play a major role in the performance of the roofing system and contribute to the wind uplift resistance of the roof edge which is the first line of defense during wind storms.

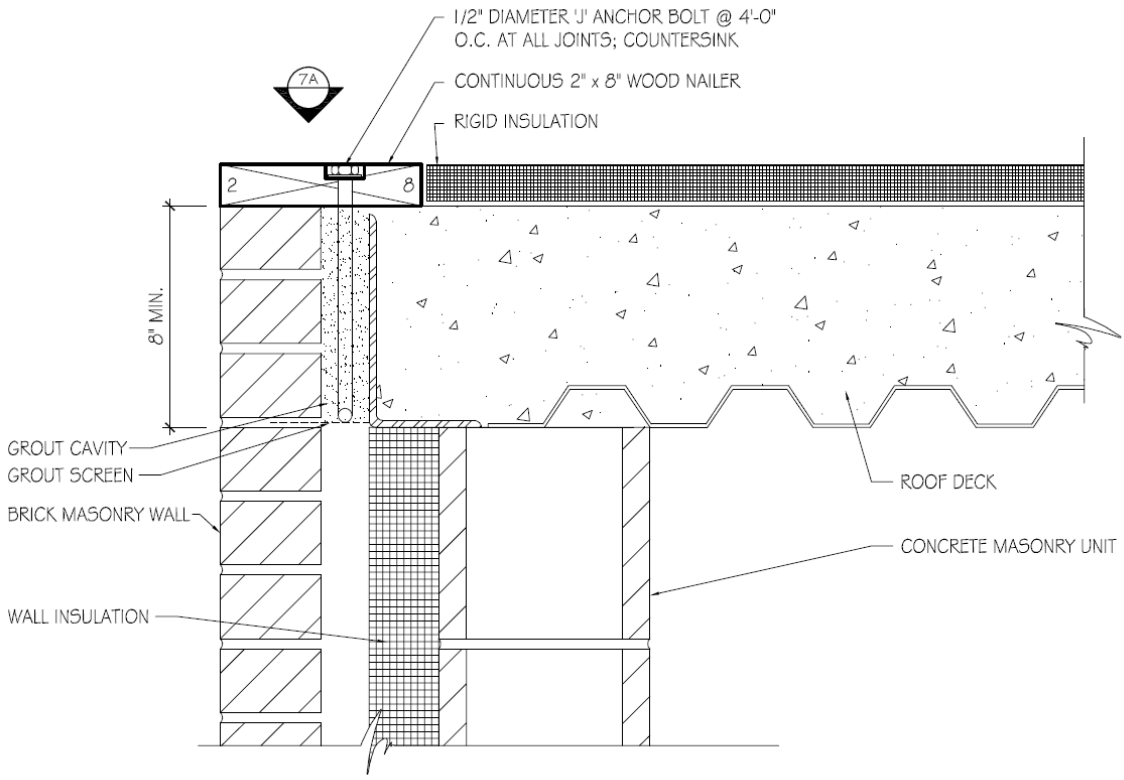


FIGURE 1 - ROOF EDGE WOOD BLOCKING - ANCHOR BOLT SECUREMENT

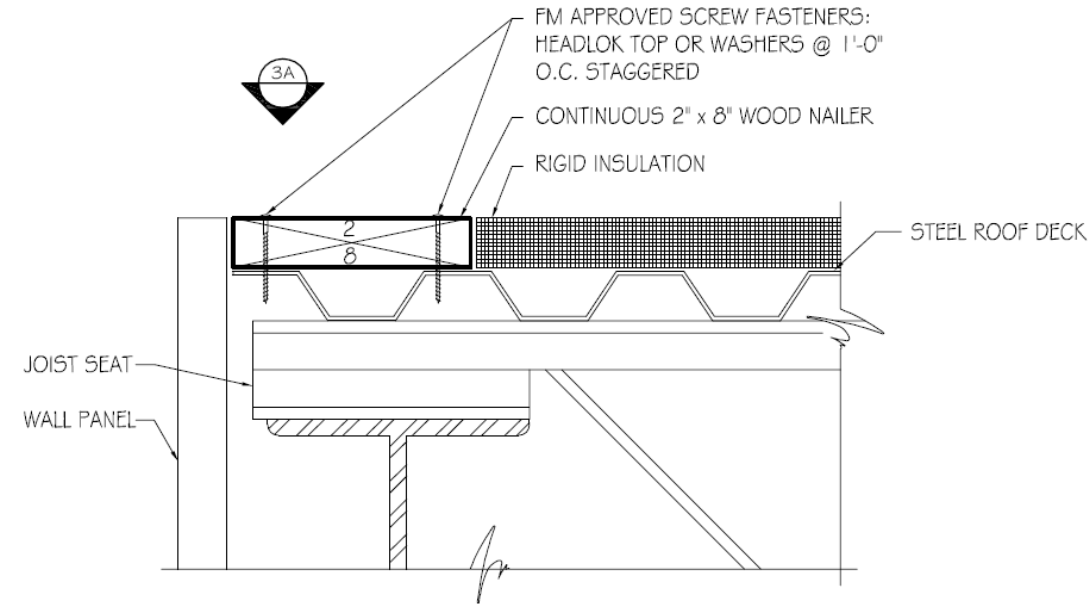


FIGURE 2 - ROOF EDGE WOOD BLOCKING - SCREW FASTENER ANCHORAGE

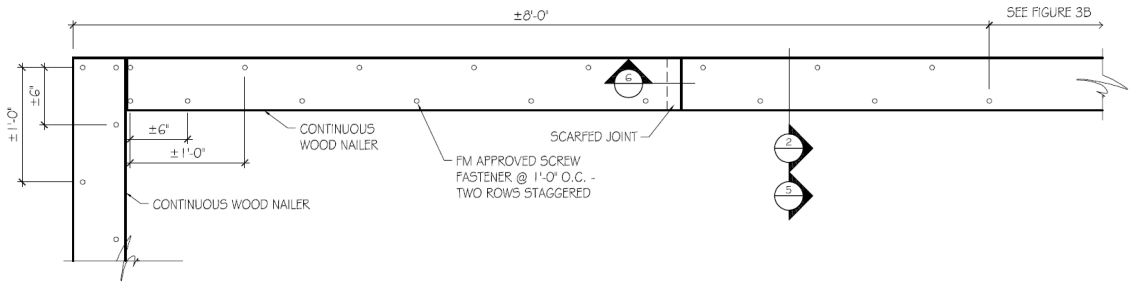


FIGURE 3A - WOOD BLOCKING CORNER ANCHORAGE 8'-0" FROM CORNER

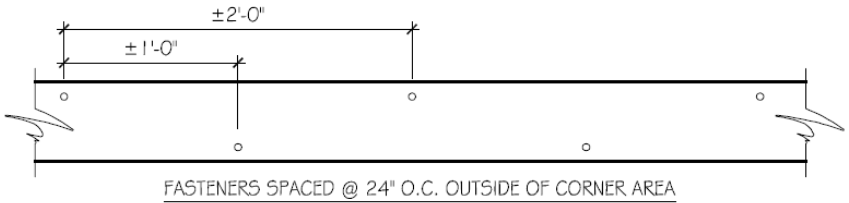


FIGURE 3B - TYPICAL ROOF EDGE WOOD BLOCKING - SCREW FASTENER ANCHORAGE

1 1/2" = 1'-0" 2/22 /11

NOTES:
1. AT 8'-0" CORNERS, FASTENERS DOUBLED (12" O.C. IN EACH ROW).

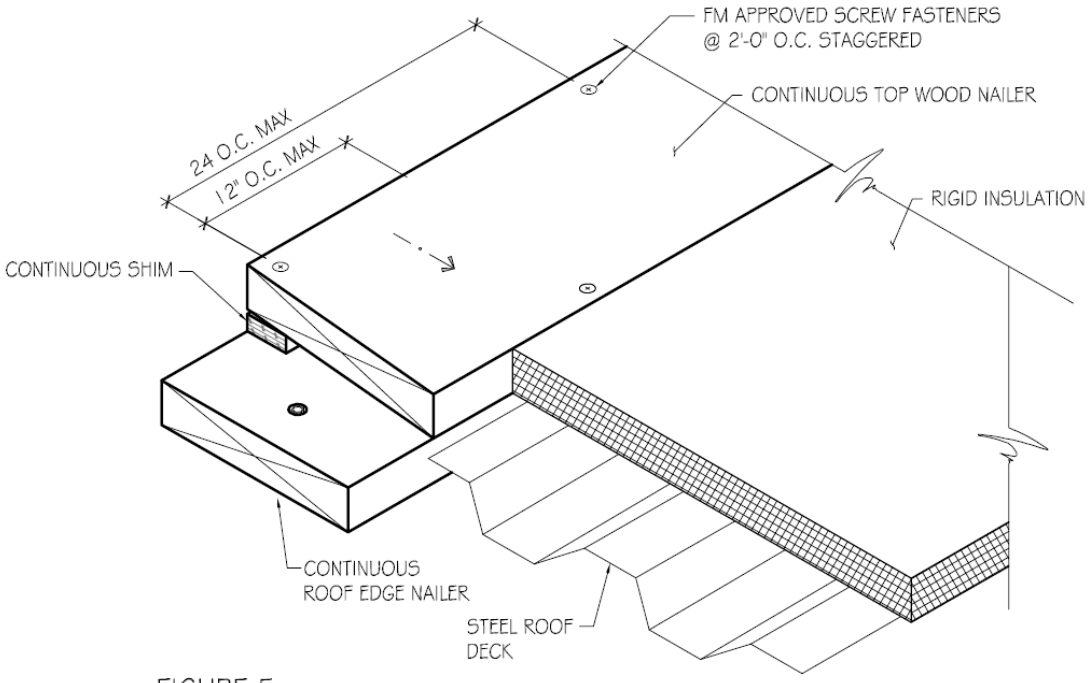


FIGURE 5

STEEL WOOD DECK SCREW FASTENERS AS FOLLOWS:

- 2 x 4 - 2 SCREW FASTENERS
- 2 X 6 - 3 SCREW FASTENERS
- 2 X 8 - 4 SCREW FASTENERS

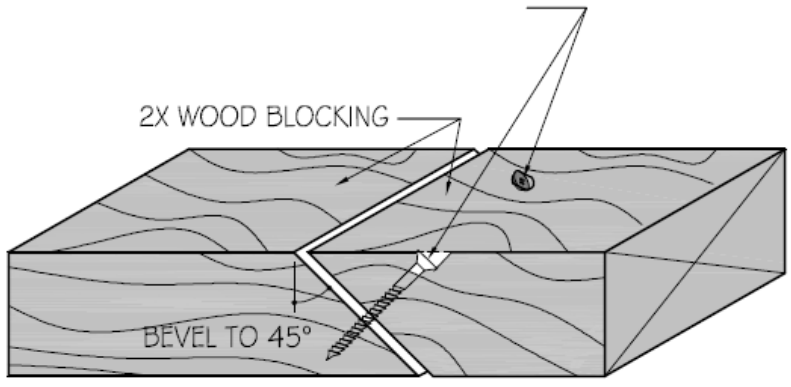
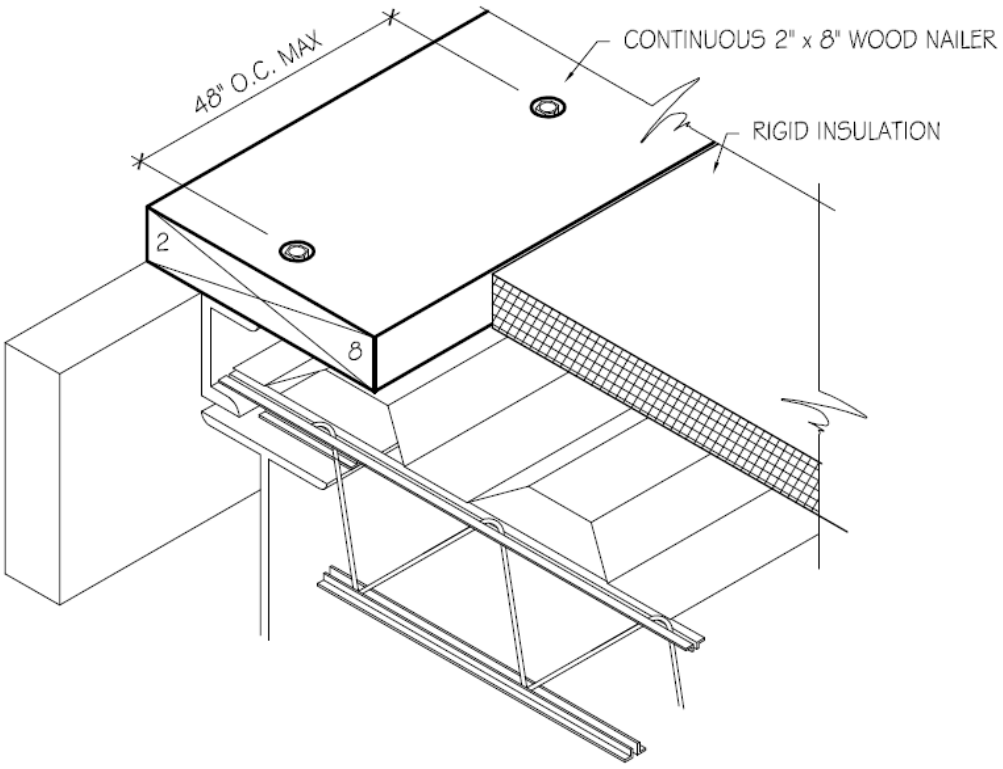


FIGURE 6 - MITERED WOOD JOINT DETAIL

NOTES:
1. 3/4" Ø ANCHOR BOLTS @ 48" O.C.
2. AT 8'-0" CORNERS: FASTENING DOUBLED (24" O.C. MAX)



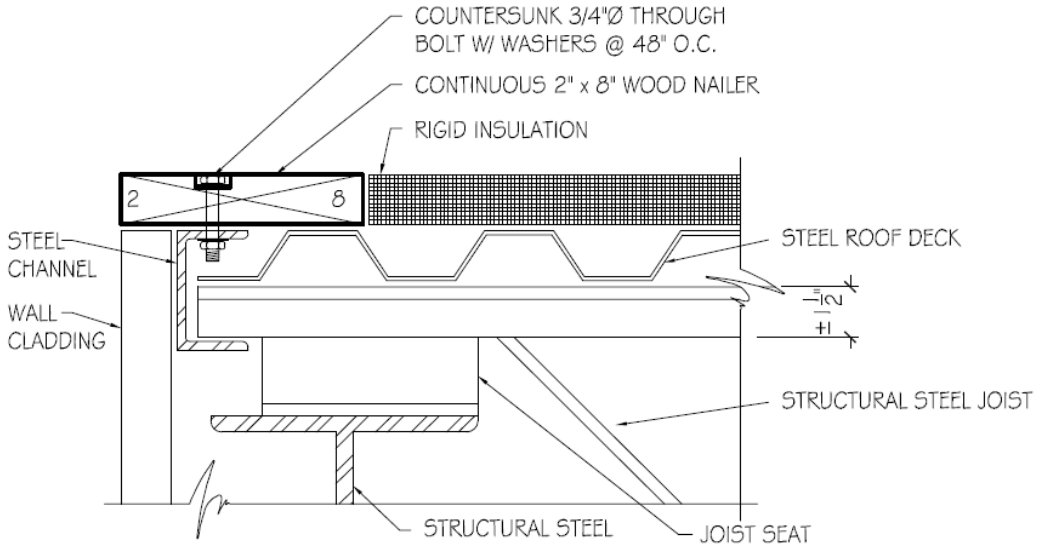


FIGURE 4 - ROOF EDGE WOOD BLOCKING - THROUGH BOLT ANCHORS

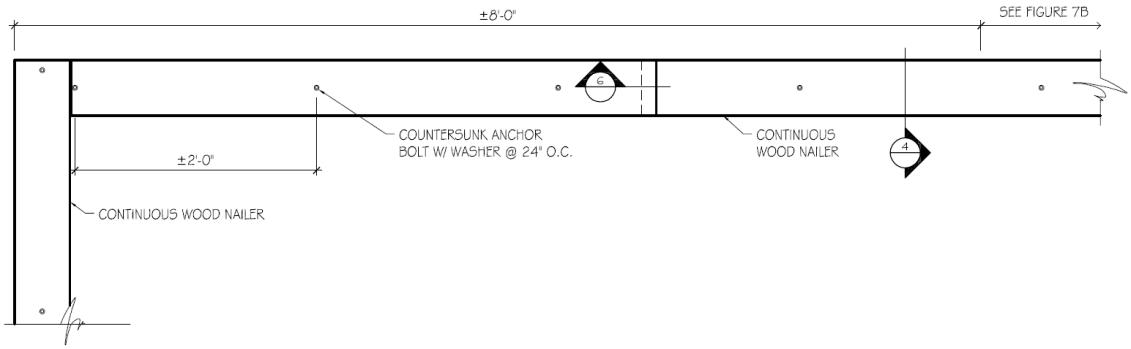


FIGURE 7A - ROOF EDGE WOOD BLOCKING @ CORNER - THROUGH BOLT ANCHORAGE 8'-0" FROM CORNER

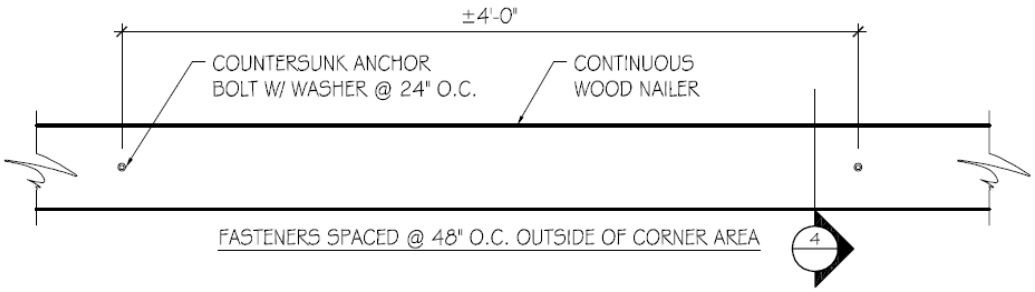


FIGURE 7B - TYPICAL ROOF EDGE WOOD BLOCKING - THROUGH BOLT ANCHORAGE

This specification represents the applicable information available at the time of its publication. Owners, specifiers and Carlisle authorized roofing applicators should consult Carlisle or their Carlisle Manufacturers Representative for any information, which has subsequently been made available.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S DESIGN REFERENCES

DR-09

Considerations for Hail Design

July 2024

The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Assurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

The map below (Figure 1) depicts areas of the United States that are more prone to hail storms. In areas of potential hail, the use of a thicker roofing membrane is recommended to provide greater puncture resistance.

1. FleeceBACK 115 or thicker FleeceBACK membranes are recommended for areas prone to large hail.

2. Large hail areas may also warrant the use of thicker conventional EPDM, TPO, PVC or KEE HP membrane in conjunction with a rigid membrane underlayment/cover board.

3. To eliminate possible damage of membranes, the substrate below the membrane should be adhered. Insulation fasteners and plates are not recommended for use directly beneath the membrane (except where used for membrane securement).

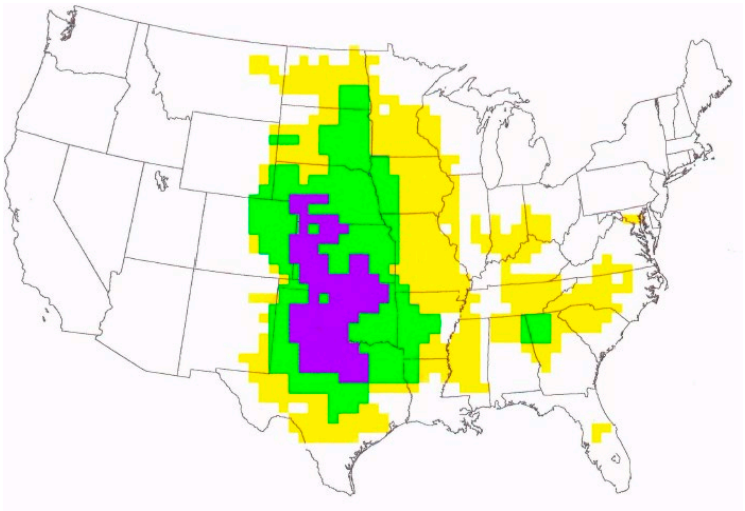


Fig. 1 – U.S. Hail Zone Map

0.5" – 1.0" Hail **1.0" – 2.0" Hail** **2.0" – 4.0" Hail**

Warranty

A. A warranty covering leaks caused by hail, maximum 1" diameter with FleeceBACK 100 or 105-mil membrane (EPDM,TPO or PVC KEE HP) and maximum 2" diameter with FleeceBACK 115-mil (EPDM or TPO) or 105-mil (PVC KEE HP) and maximum 3” diameter 135-mil (TPO) or 145-mil (EPDM) membrane, can be issued. Contact Carlisle for specific information. An additional 1” of hail coverage is available when Flexible FAST adhesive in full coverage or extrusions at 4” on center is utilized with EPDM, TPO or PVC KEE HP) FleeceBACK.

B. On projects utilizing FleeceBACK 115 membrane, a 5, 10, 15, or 20-year warranty with limited coverage for accidental punctures (up to 16 man-hours per year) is available. An additional 4 man-hours per year can be obtained when using Flexible FAST Adhesive in full coverage spray or extrusions at 4” on center.

C. On projects utilizing FleeceBACK 135 or 145 membrane, a 5, 10, 15, 20, 25 or 30-year warranty with limited coverage for accidental punctures (up to 32 man-hours per year) is available for an additional charge. An additional 4 man-hours per year can be obtained when using Flexible FAST Adhesive in full coverage spray or extrusions at 4” on center.

Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

CARLISLE'S DESIGN REFERENCES

DR-10

Adhesives, Sealants and Primers Compatibility Guide

July 2024

The table below illustrates adhesive, sealant and primer compatibility with Carlisle roofing membranes. Individual Product Data Sheets should be consulted for coverage rates, packaging and shelf life information.

Adhesives and Primers

MEMBRANES	Sure-Seal EPDM	Sure-White EPDM	Sure-Tough EPDM	Sure-Weld TPO	Sure-Flex PVC	Sure-Flex PVC KEE HP	FleeceBACK EPDM (Black)	FleeceBACK EPDM (White)	FleeceBACK TPO	FleeceBACK PVC	FleeceBACK PVC KEE HP	FB AFX EPDM	FB AFX TPO	
ADHESIVES	√	√	√											90-8-30A EPDM Bonding Adhesive
	√	√	√											EPDM x-23 Low-VOC Bonding Adhesive
				√										Sure-Weld TPO Bonding Adhesive
	√	√	√	√										Low-VOC Bonding Adhesive
	√	√	√	√										Low-VOC Bonding Adhesive 1168
	√	√	√	√			√	√	√	√	√			Aqua Base 120
					√		√	√	√	√	√			HydroBond Water Based Adhesive
					√	√								Low-VOC PVC Bonding Adhesive
							√	√	√	√	√			Flexible FAST Adhesive
												√	√	Asphalt (By Others)
											√	√	√	Cold Applied Adhesive
	√	√	√	√			√	√	√	√	√			CAV-GRIP III Low-VOC Adhesive/Primer
PRIMERS	√	√	√				√	√				√		HP-250 EPDM Primer
				√					√				√	TPO Primer
	√	√	√	√			√	√	√			√	√	Low-VOC EPDM/TPO Primer
							√	√	√	√	√			CAV-GRIP III Low-VOC Adhesive/Primer
							√	√	√	√	√			CCW-702 Primer
							√	√	√	√	√			CCW-702LV Primer

Sealants and Cleaners

MEMBRANES	Sure-Seal EPDM	Sure-White EPDM	Sure-Tough EPDM	Sure-Weld TPO	Sure-Flex PVC	Sure-Flex PVC KEE HP	FleeceBACK EPDM (Black)	FleeceBACK EPDM (White)	FleeceBACK TPO	FleeceBACK PVC	FleeceBACK PVC KEE HP	FB AFX EPDM	FB AFX TPO	
SEALANTS AND CLEANERS	√	√	√	√			√	√	√			√	√	Weathered Membrane Cleaner
	√	√	√	√	√	√	√	√	√	√	√	√	√	Low-VOC Membrane Cleaner
					√	√				√	√			PVC AND KEE HP Membrane Cleaner
	√	√	√	√	√	√	√	√	√	√	√	√	√	Water Cut-Off Mastic
				√					√				√	TPO Cut Edge Sealant
				√					√				√	Low-VOC TPO Cut Edge Sealant
					√	√				√	√			PVC Cut Edge Sealant
	√		√				√					√		Sure-Seal Lap Sealant (Black)
		√						√						Sure-White Lap Sealant (White)
		√		√	√	√		√	√	√	√		√	Universal Single-Ply Sealant (White)
	√		√				√					√		Sure-Seal One-Part Pourable Sealer (Black)
		√		√	√	√		√	√	√	√		√	White One-Part Pourable Sealer
	√	√	√				√	√				√		Sure-Seal Two-Part Pourable Sealer (Black)
	√		√				√					√		EP-95 Splice Cement (Black)
		√						√						Sure-White Splice Cement (White)

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CARLISLE'S DESIGN REFERENCES

DR-12

Metal Edging

July 2024

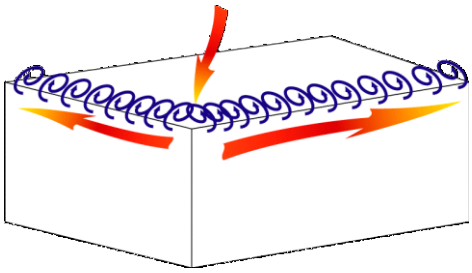
The information contained represents guidelines to address possible requirements as part of the building specification as listed under the Quality Assurance or Performance Article. Carlisle recommends that the building owner retain a design professional to verify that these guidelines are appropriate.

Pre-Manufactured vs. Shop Fabricated Metal

Introduction

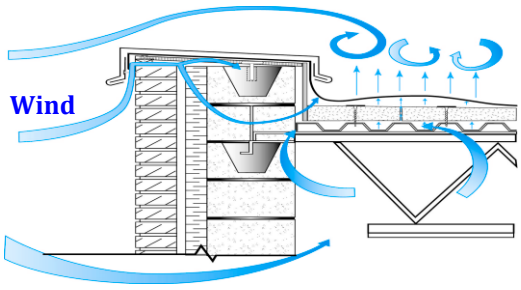
The devastation caused by major hurricanes in Florida as well as the destruction of New Orleans and a portion of the Gulf Coast from Hurricanes Katrina and Rita serve as important reminders of the importance of a strong, impermeable roofing system.

Understandably, the roof edge is one of the more important components of a roofing system. Metal roof edging has a far greater function than merely providing an aesthetic trim at the top of the building – it is a critical component that holds the roofing membrane in place.



Typical Vortex Patterns on Rooftop Approaching at Corner

- Red Arrows – positive wind pressures acting on the building
- Blue Swirls – negative pressures created by the wind pressure forcing the materials on the edge in an upward and outward direction



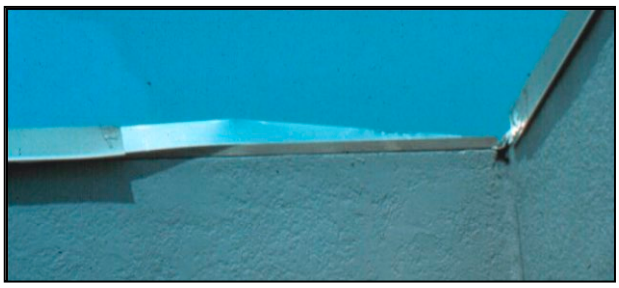
Roof Uplift

The diagram illustrates the wind uplift patterns on a coping and how it moves over and under the coping.

Drawings courtesy of W. P. Hickman Company

Wind Damage Investigation

The Roofing Industry Committee on Weather Issues (RICOWI) found roof edges to be number 2 out of a list of 20 roofing issues that needed improvement. In 2006 they released a study that analyzed the 2004 Florida hurricanes (Hurricanes Charley and Ivan). The report found that most of the damage to roofs was caused by failure at the roof perimeter, further confirming the importance of **properly specified and installed roof edge systems**.



Another key finding from the study included discovery of cleat gauges that were less than those recommended by FM Global 1-49 and ANSI/SPRI ES-1. The committee also found that 95 percent of roof failures were caused by poor workmanship and substituted materials.

Factory Mutual Global (**FMG**) and others have found that over 80% of all roof failures can be attributed directly to failure of the roof edge. It is clear that specifying and installing a roof edge that holds the roof membrane in place as well as looks good is critical to the performance of a building's roof system.

Pre-Manufactured Edging

The performance of pre-manufactured roof edge systems is generally well recognized. Most of these systems are engineered with covers, which tightly snap onto cleats or chairs with pre-punched, slotted fastening holes that assure proper attachment to the roof edge while still allowing for thermal movement. Most of the pre-manufactured systems are tested per ANSI/SPRI ES-1 criteria (now part of the International Building Code) to assure that they resist the calculated wind loads for the project on which they will be used. Additionally, many pre-manufactured roof edge systems are also tested and approved by Factory Mutual Global to further assure their performance.

ES-1

Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems

In 1998 SPRI (Single Ply Roofing Industry, a roofing industry trade association) developed a series of three tests for judging the quality and durability of fascia and coping systems under the **ES-1**, an edge standard for low-slope roofs. The **ES-1** was developed to aid architects, specifiers, and other roofing professionals in ensuring that a quality roof edge is specified and installed.

ES-1 was accepted by the American National Standard Institute (ANSI) as a standard and in 2002 the IBC (International Building Code) included the **ES-1** guidelines into their code. With its inclusion with in the 2003 IBC, **ES-1** has now become building code and a majority of the United States has adopted some version of the IBC. Delaware, Missouri and Nebraska have adopted versions of IBC but may on a Local Government level, refer to the Authority Having Jurisdiction (AHJ) in those states.

So designing a roof edge system that meets **ANSI/SPRI ES-1** Wind Design Standard is not just a good idea; it is the law in many states.

The main reason for the development of **ES-1** was to improve the longevity and safety of low-slope commercial roofs, to protect the building owner's investment by reducing the risk of edge failure, and consequentially roof failure. Basically, **ES-1** provides formulas for calculating the wind load on edges of low-slope roofs and prescribes methodology for testing and evaluating the ability of edge systems to withstand those loads; as a result this ensures wind resistance and long-term performance.

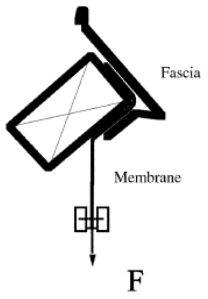
The **ANSI/SPRI ES-1** standard is comprised of three pull-off tests (two tests for fascia and one test for coping) and they are based on the American Society of Civil Engineers' document ASCE-7/02 – *Minimum Design Loads for Buildings and Other Structures.*

- **Test Method RE-1** measures how well the edge secures the perimeter on ballasted and mechanically attached membranes.
- **Test Method RE-2** is a pull-off test for the metal edge flashing. It tests for wind load on the face dimension of the flashing system.
- **Test Method RE-3** tests the strength of the metal coping cap to assure it meets or exceeds calculated design wind pressure. It tests wind load on both the top and back leg dimensions.

How the test is performed – The tests use a pull/release and pull/release method rather than one continuous pull. This allows for a realistic simulation of wind, which acts on a building in periodic gusts rather than one long, continuous gust.

Roof Edge Test RE-1

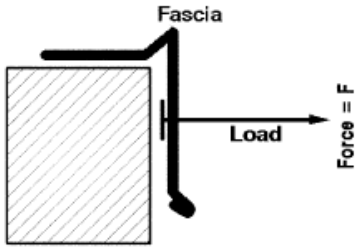
- A static test with a 100 lb. load every foot
- The membrane is pulled at a 45° angle to the roof deck to simulate a billowing membrane
- The termination must withstand a minimum force of 100 lbs./foot
- Failure is defined as any event that allows the membrane to come free of the edge termination or the termination to come free.



Roof Edge Test RE-2

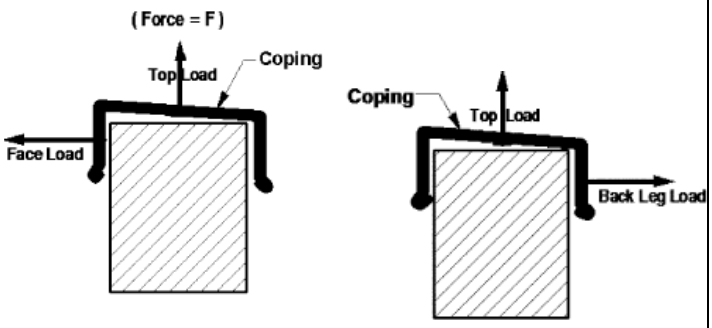
- Determines the maximum load at failure
- Failure is the loss of securement of any component of the roof edge system.

Fascia Blow-Off Test Set Schematic
(Force at Failure x Face Area = Blow-off Resistance)



Roof Edge Test RE-3

- Simultaneously tests the vertical and horizontal wind gust load coefficient
- Failure is the loss of securement of any component of the roof edge system.



ES-1 / FM Compliance

Carlisle supplies a wide range of metal fascia systems which meet the referenced design guidelines and carry FM Class 1-90 approval. Carlisle's metal edging is also covered by the Carlisle Membrane System Warranty.

Carlisle Metal Edging			
Product	**Type**	**FM Approval**	**ES-1 Compliant**
SecurEdge 4000 HP	Coping	-	Yes
SecurEdge 4000 HP	Fascia	-	Yes
SecurEdge 400 Spring-Tite	Coping	-	Yes
SecurEdge 400	Coping	-	Yes
SecurEdge 400	Fascia	-	Yes
SecurEdge 400 Spring-Tite	Edge (Ballast)	-	Yes
SecurEdge 400 Snap Lock	Edge (Ballast)	-	Yes
SecurEdge 400	Edge (MF/FA)	-	Yes
SecurEdge 300	Coping	1-90 (20 ga cleat) 1-180 (16 ga cleat)	Yes
SecurEdge 300	Fascia	1-225	Yes
SecurEdge 3000	Fascia	1-180 (.050 Alum. Retainer) 1-465 (20 ga Steel Retainer)	Yes
SecurEdge 3000XT	Fascia	1-315	Yes
SecurEdge 200	Coping	1-90	RE-3 (140 lbs/sf)
SecurEdge 200	Fascia	1-195	RE-2 (150 lbs/sf)
SecurEdge 2000	Fascia	1-645	RE-2 (470 lbs/sf)
SecurEdge 2000	Extended Fascia	1-270	RE-2 (190 lbs/sf)
SecurEdge 2000	Canted Fascia	1-270	RE-2 (190 lbs/sf)
SecurEdge One	Fascia	-	RE-2 (400 lbs/sf)
SecurEdge One	Edge (MF/FA)	-	RE-2 (210 lbs/sf)
SecurEdge One	Edge (Ballast)	-	RE-2 (200 lbs/sf)
SecurEdge One	Coping	-	RE-3 (160 lbs/sf)

Shop Fabricated Metal

One of the leading causes of wind related disturbances is improperly designed, manufactured or installed metal fascia systems. All too frequently, shop fabricated metal accessories do not meet industry recognized standards.

Countless studies, many initiated by hurricanes, have pointed to metal edge components as a major contributor to roof failures. These components are vulnerable since the building edge is first hit, with winds and uplift pressures are always greatest at perimeters and especially roof corners.

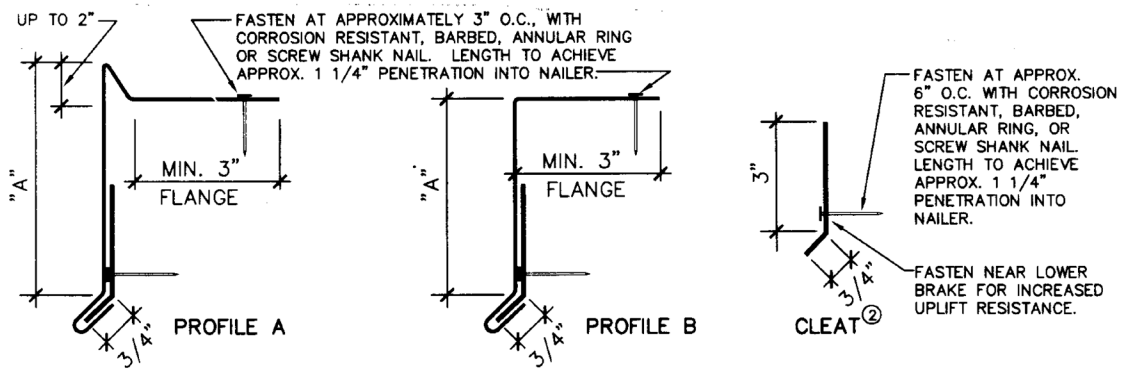
When metal edging or coping is to be shop fabricated, it is strongly advised that the design conforms with the Factory Mutual recommendations identified in Loss Prevention Data Bulletin 1-49 and with SMACNA (Sheet Metal and Air Conditioning National Association) specifications. To ensure such compliance, specify FM 1-90 approved metal edge systems and request certification from the manufacturer.

Guide for Sheet Metal Fascia Edges

(Reprinted from the NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing - 2014)

Recommended Minimum Gauges for Fascia and Cleat[1]				
Exposed Face Without Brakes "A" Dimension	Aluminum Alloy (3003-H14)	Galvanized or Coated (G60 & G90) Steel	Stainless Steel (302 & 304)	Cleat[2]
Up to 3" Face	.032"	24 ga.	26 ga.	Same gauge as fascia metal
3" to 6" Face	.040"	24 ga.	24 ga.	One gauge heavier than fascia metal
6" to 8" Face	.040"	24 ga.	24 ga.	One gauge heavier than fascia metal
8" to 10" Face	.050"	22 ga.	22 ga.	One gauge heavier than fascia metal
More than 10" Face	Add brakes to stiffen or use two-piece face	Add brakes to stiffen or use two-piece face	Add brakes to stiffen or use two-piece face	One gauge heavier than fascia metal

Recommended Profiles and Fastening for Fascia and Cleat[1]



Notes:

1. Consideration must be given to wind zone and local conditions in regard to the selection of metal gauge, profile, and fastening schedule. Severe conditions or code and regulatory bodies may require more conservative designs. When using the above table, additional items should be considered, such as fastening pattern.

2. All cleats shall be continuous with lengths not to exceed 12 feet. Allow a 1/4" gap between pieces. Joints in cleat should not coincide with joints in fascia metal.

3. The securement of perimeter wood nailers, play an equally important role in the overall performance of metal fascia systems. Design Criteria for the attachment of wood nailers and associated metal edge components are also identified in the FM 1-49 Bulletin.

Why Specify Pre-Manufactured Roof Edges? Top 10 Reasons

Listed below are the top 10 reasons to specify Pre-Manufactured Metal Edge Systems versus Shop Fabricated Metal:

Pre-Manufactured	Shop Fabricated
Known high quality that is consistent each time and available nationwide	Unknown, possibly poor quality, that will vary by contractor and location
Snap-on details with no exposed fasteners for a clean look without leaks	Exposed fasteners that can rust, leak, and prohibit required thermal movement
Pre-punched slotted fastener holes to assure proper fastener location and to allow for thermal movement	Fasteners driven through the roof edge in the field may be spaced improperly and do not allow for thermal movement as required
Concealed internal splice plates for smooth, maintenance free joints	Frequently use exterior “band aid” splices that are unsightly and require maintenance
Factory fabricated and finished miters, end caps, and accessories provide clean, professional appearance	Miters, end caps, and accessories are field fabricated; often yielding a cobbled together appearance
Radius sections are welded to fit the project’s actual conditions providing a smooth, finished look	Segmented straight lengths, or riveted or seamed radius, give a rough, unprofessional appearance
ANSI/SPRI ES-1 tested for wind resistance per International Construction Code as is now required in many States	No testing and may not meet local building codes
Independently tested and granted a FM approval rating by the Factory Mutual Insurance Company	No testing or FM approval
Included as part of the Roofing System Warranty with coverage up to 30 years and peak gust wind speed coverage up to 120 mph	Little or no warranty protection provided by companies with varying, unknown levels of experience
Factory finishes that incorporate Kynar 500 or Hylar 5000 baked-on architectural paint to provide a finish that is warranted for up to 20 years	Field painted edge metal is often not properly prepared to assure good paint adhesion; also, many paints will not hold up to extreme UV exposure which can result in fading and chalking over time

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