



CARLISLE'S  
**THERMOPLASTIC**  
 ROOFING SYSTEMS - TPO/PVC

**Sure-Weld®/Sure-Flex™**  
**Mechanically Fastened and Adhered Roofing Systems**

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 November 2011

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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.



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## **Sure Weld®/Sure-Flex™** **Mechanically Fastened and Adhered** Roofing Systems

November 2011

*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 Thermoplastic 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 / Sure-Flex / Spectro-Weld)**

1. The **Sure-Weld Mechanically Fastened Roofing System** incorporates 12', 10' or 8' wide, white, tan or gray 45, 60 or 80-mil thick scrim-reinforced, Sure-Weld Thermoplastic Polyolefin (TPO) membrane field 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.
2. The **Sure-Flex Mechanically Fastened Roofing System** incorporates 50, 60 or 80-mil Polyester Reinforced Sure-Flex Polyvinyl Chloride (PVC) membrane or Polyester Reinforced Sure-Flex KEE Polyvinyl Chloride (PVC) Membrane. Either membrane is available in 10' wide (white membrane only) field sheets and 5' perimeter sheets. Standard Polyester Reinforced membrane is also available in 81" wide (white, gray or tan) field sheets and 40.5" perimeter sheets. Sure-Flex sheets are available in rolls in 65', 80' 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 utilizing the RhinoBond attachment method, refer to Attachment I, at the end of this specification for additional information.

**NOTE:** Either Roofing System may be specified 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™ / Sure-Flex / Spectro-Weld)**

1. The **Sure-Weld Adhered Roofing System** incorporates maximum 12' wide white, gray or tan 45, 60 or 80-mil thick scrim-reinforced Sure-Weld Thermoplastic Polyolefin (TPO) membrane. 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 FAST™ Adhesive, 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' wide, white 60-mil reinforced TPO membrane laminated to an elastomeric pressure-sensitive adhesive. Limited to 20 Year Maximum Warranty.
3. 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. 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 or Aqua Base 120 Bonding Adhesive (for maximum 15-year warranty). Adjoining sheets of membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld.

A KEE enhanced (white only) Sure-Flex PVC membrane with Polyester Reinforcement is available in 10' width.

Polyester Reinforced membrane is available in widths of 10' (white only) and 81" wide (white, gray and tan).

Fiberglass Reinforced membrane is available in widths of 10' (white only) and 81" wide (white or gray).

## **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 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.
- G. The Sure-Weld white and tan (TPO) and Sure-Flex white (PVC) membranes meets the ENERGY STAR® Roofing Products program guidelines for energy efficiency. Energy savings are climate specific and may vary significantly from building to building and geographic location. The greatest savings are experienced in buildings located in hot,

sunny climates that have a large roof surface to building volume ratio, and lower levels of insulation with lesser thermal resistance.

For specific on savings obtainable from installing an ENERGY STAR Roofing Product, contact Carlisle, one of Carlisle's Representatives/Distributors or call 1-888-STAR-YES (1-888-782-7937).

For information regarding CRRC (Cool Roof Rating Council) and LEED™, refer to the applicable Product Data Sheets and Design Reference DR 07-11 "CRRC/LEED Information".

#### H. 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 Spec Supplement G-01-11 "Construction Generated Moisture" included in the Carlisle Technical Manual OR SPRI Advisory Bulletin included in the Design Reference DR-03-11 "Construction Generated Moisture".
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.

#### I. 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.

#### J. 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 respective **owner** or **specifier** should consult local codes for applicable requirements and limitations. It is the responsibility of the specifier to review local, state and regional codes to determine their impact on the specified Carlisle Roofing System.

**NOTE: For code approvals** achieved with the Carlisle Roofing Systems, refer to the Carlisle Code Approval Guide, Factory Mutual (FM) Approval Guide or Underwriters Laboratories (UL) Fire Resistance or Roofing Materials and Systems Directories.

- A. Carlisle recommends the use of Carlisle supplied products for use with Sure-Weld/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.
- B. This roofing system must be installed by a Carlisle Authorized Roofing Applicator in compliance with drawings and specifications as approved by Carlisle SynTec.
- C. There must be no deviations made from Carlisle's specifications or Carlisle's approved shop drawings without the **PRIOR WRITTEN APPROVAL** of Carlisle SynTec.
- D. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative (FSR) of Carlisle SynTec to ascertain that the membrane roofing system has been installed according to Carlisle's published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.
- E. 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. 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.
- G. Refer to the Design Reference DR-07-11 "CRRRC/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 or 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-06-11 "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. Membrane System Warranty is available for roofing systems on commercial buildings within the United States and applies only to **products manufactured or marketed by Carlisle SynTec**. The membrane system is defined as membrane, flashings, adhesives, sealants and other Carlisle brand products utilized in the installation. For a complete description of these products, refer to the Part II "Products" Section in this Specification and Spec Supplement "Related Products" P-01-11.

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 – 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 IV - Mechanically Fastened Roofing Systems – TPO Membrane Fastening Criteria - Wood 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 - Mechanically Fastened Roofing Systems – PVC Membrane Fastening Criteria - Wood 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 VI - 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 VII - Mechanically Fastened Roofing Systems – PVC 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 VIII – 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 IX – 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 X – 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 XI – Adhered Roofing Systems - Underlayment and Fastening Density for 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 XII – Adhered Roofing Systems - Underlayment and Fastening Density for 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)**

Years	Thermoplastic Membranes (Sure-Weld TPO / Sure-Flex PVC)								
	55, 72, 80 or 90 mph		100 mph		110 to 120 mph		Minimum Membrane Thickness (2)	Additional Membrane Coverage	
	Adhered	Mech. Fastened	Adhered	Mech. Fastened	Adhered	Mech. Fastened		Additional Puncture	Hail
5, 10, or 15 year	√(3)	√	√	N/A(1)	√	N/A	Sure-Weld 45-mil OR Sure-Flex 50-mil (6)	See Below	See Below
20 year	√	√	√	N/A	√	N/A	Sure-Weld 60-mil (4) OR Sure-Flex 60 mil (6)(7)	See Below	See Below
25 year (9)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5) OR Sure-Flex 80-mil (6)(8)	See Below	See Below
30 year (9)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5) OR Sure-Flex KEE 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 60 or 80-mil membrane.
- (3) Water based adhesive may be used for projects with 15 year maximum warranty and wind speed coverage up to 55 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 can be used in lieu of Sure-Weld 80-mil membrane.
- (6) Sure-Flex FRS membrane can be used in lieu of Sure-Flex Polyester reinforced membrane for Adhered Roofing Systems Only.
- (7) Sure-Flex KEE 50-mil membrane can be used in lieu of Sure-Flex 60-mil membrane for Warranties Up to 20 Year.
- (8) Sure-Flex KEE 60-mil membrane can be used in lieu of Sure-Flex 80-mil membrane for Warranties Up to 25 Year.
- (9) Enhancements may be required for certain flashing details. Published details must be referenced for applicable requirements.

**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, DensDeck Prime, or Securock – Adhered Only).

**Puncture**

- Minimum 80-mil TPO Adhered or Mechanically Fastened.

**Sure-Flex PVC Membrane**

**Hail**

- No Coverage available.

**Puncture**

- Minimum 60-mil PVC with Polyester Reinforcement.

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 Warranties greater than 20 year			Field* Membrane Width	Perimeter* Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Local Wind Speed					
		Up to 110 MPH	110-120 MPH	120 MPH or Greater			
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.

**PVC Membrane Fastening Criteria (All Warranties)  
for Mechanically Fastening Roofing Systems  
22 GA. Steel Deck or Structural Concrete Only**

**Table III**

**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 Warranties greater than 20 year See Below ***			Field* Membrane Width	Perimeter* Sheet Width	Fastening Density* (Field & Perimeter Sheets)
		Local Wind Speed					
		Up to 110 MPH	110-120 MPH	120 MPH or Greater			
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 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.

\*\*\* For 25 and 30 year warranties add one additional perimeter sheet in addition to the perimeter requirement listed above.

**TPO Membrane Fastening Criteria (Up to 20 year Warranty)  
for Mechanically Fastening Roofing Systems  
Wood Decks**

**Table IV**

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)
			Local Wind Speed				
			Up to 100 MPH	100 MPH to 110 MPH (Max.)			
55 MPH	7/16" OSB*	210 lbs	2	3	10'	6'	9" O.C.
			2	3	8'	4'	12" O.C.
	15/32" 3-Ply Plywood	240 lbs	2	3	8'	4'	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	1	10'	6'	12" O.C.
	5/8" OSB*	310 lbs	2	3	10'	6'	12" O.C.
			2	3	8'	4'	12" O.C.
72 MPH	15/32" 3-Ply Plywood	240 lbs	2	3	8'	4'	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	1	10'	6'	12" O.C.
	5/8" OSB*	310 lbs	2	3	10'	6'	12" O.C.
			2	3	8'	4'	12" O.C.

\*Maximum duration for OSB NOT to exceed 20 Years.

**PVC Membrane Fastening Criteria (Up to 20 year Warranty)  
for Mechanically Fastening Roofing Systems  
Wood Decks**

**Table V**

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)
			Local Wind Speed				
			Up to 100 MPH	100 MPH to 110 MPH (Max.)			
55 MPH	7/16" OSB*	210 lbs	2	3	10'	5'	9" O.C.
			2	3	81"	40.5"	12" O.C.
	15/32" 3-Ply Plywood	240 lbs	2	3	81"	40.5"	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	1	10'	5'	12" O.C.
	5/8" OSB*	310 lbs	2	3	10'	5'	12" O.C.
			2	3	81"	40.5"	12" O.C.
72 MPH	15/32" 3-Ply Plywood	240 lbs	2	3	81"	40.5"	12" O.C.
	15/32" 5-Ply Plywood	530 lbs	1	1	10'	5'	12" O.C.
	5/8" OSB*	310 lbs	2	3	10'	5'	12" O.C.
			2	3	81"	40.5"	12" O.C.

\*Maximum duration for OSB NOT to exceed 20 Years.

**TPO Membrane Fastening Criteria**  
**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)
		Local Wind Speed					
	Deck Type	Up to 110 MPH	110 MPH to 120 MPH	120 MPH or Greater			
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-06-11 "Withdrawal Resistance Criteria" for more information.

**PVC Membrane Fastening Criteria**  
**Table VII 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	Up to 110 MPH	110 MPH to 120 MPH	120 MPH or Greater			
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, Up to 110 MPH.
- (3) Building Height may be Up to 75' in height.

**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-06-11 "Withdrawal Resistance Criteria" for more information.

**Table VIII**

**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*	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 MPH	1-1/2" (20 psi) Polyisocyanurate	10	12" (6)(7)	6" (6)	Carlisle Drip Edge, SecurEdge™ 200 or SecurEdge 1000
	2"(20 psi) Polyisocyanurate	8	12" (6)(7)	6" (6)	
72 or 80 MPH	1/4" Dens-Deck Prime (2)	12	12" (6)(7)(8)	6' (6)(8)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000 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.
	1/4" Securock				
	1/2" HP Recovery Board (2)	16	12" (6)(7)(8)	6" (6)(8)	
	1/2" SecurShield™ HD (3)				
	1-1/2" (25-psi) Polyisocyanurate				
2" (25 -psi) Polyisocyanurate	8	12" (6)(7)(8)	6" (6)(8)		
90 MPH	1/2" Dens-Deck Prime (2)	12	6" (10)	6" (8)(9)	Carlisle Drip Edge (4), SecurEdge 200 (4)(5) or SecurEdge 1000, 2000 or 3000.
	1/2" Securock				
	1-1/2" (20-psi) SecurShield Polyiso	16	6" (10)	6" (8)(9)	
	2" (20-psi) SecurShield Polyiso	8	6" (10)	6" (8)(9)	
	2" SecurShield HD Composite	8	6"(10)	6"(8)(9)	
	1-1/2" Insulfoam HD Composite	16	6"(10)	6"(8)(9)	
100 MPH	5/8" Dens Deck Prime (2)	16	FS	FS	Carlisle Drip Edge (4), SecurEdge 200 (4)(5) or SecurEdge 2000 or 3000.
	5/8" Securock				
	7/16" Oriented Strand Board (OSB) (2)	17	FS	FS	
	2" (25-psi) SecurShield Polyiso (1)	16	FS	FS	
	2" SecurShield HD Composite	16	FS	FS	
110 MPH	5/8" Dens Deck Prime (1)(2)	16	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock (1)				
	7/16" Oriented Strand Board (OSB) (2)	17	FS	FS	
120 MPH	5/8" Dens Deck Prime (2)	24	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock				
	7/16" Oriented Strand Board (OSB) (1)(2)	17	FS	FS	

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

(2) Except Cover boards must be installed over a min. 1" thick approved Carlisle Insulation.

- (3) 1/2" SecurShield HD limited to 72 mph.
- (4) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
- (5) Membrane securement is required at the base of the SecurEdge 200 waterdam.
- (6) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (7) Steel Decks - Field & Perimeter @ 6" O.C.
- (8) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (9) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (10) Gravel Surface BUR - FS

### 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 3/4" plywood.

\* Projects where building height exceeds 100' or wind speed exceeds 130 mph, shall be submitted to Carlisle for review.

### Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for TPO SAT Adhered Roofing Systems

**Table IX**

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 MPH	1-1/2" (20 psi) Polyisocyanurate	11	12" (4)(5)	6" (4)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000
	2" (20 psi) Polyisocyanurate	8	12" (4)(5)	6" (4)	
	2" (1.25 lb/density) Insulfoam SP*	12	12" (4)(5)	6" (4)	
72 or 80 MPH	1/4" Dens-Deck Prime (2)	12	12" (4)(5)(6)	6' (4)(7)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000 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.
	1/4" Securock				
	1/2" SecurShield HD (3)	16	12" (4)(5)(6)	6" (4)(6)	
	1-1/2" (25-psi) Polyisocyanurate	11	12" (4)(5)(6)	6" (4)(6)	
	2" (25-psi) Polyisocyanurate	8	12" (4)(5)(6)	6" (4)(6)	
	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)	

**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) 1/2" SecurShield HD limited to 72 mph.
- (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
- \*Maximum warranty available 20 year.
- \*\* Maximum warranty available 15 year.

### 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 3/4" plywood.
- 5- All "T-joints" must be overlaid with appropriate flashing material or Carlisle "T-Joint" Covers.

\* Projects where building height exceeds 100' or wind speed exceeds 130 mph, shall be submitted to Carlisle for review.

### Underlayment/Insulation & Required Attachment Assemblies 25 YR or 30 YR Warranty for Adhered TPO Roofing Systems

**Table X**

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 MPH	1-1/2" to 2-1/2" (25 psi) Polyisocyanurate	16	6" (3)(5)	6" (5)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000
	1/2" HP Recovery Board (1)				
	1/4" Dens-Deck Prime (2)				
	1/4" Securock (2)				
72 or 80 MPH	1-1/2" to 2-1/2" (25-psi) SecurShield Polyisocyanurate	16	6" (4)(5)(6)	6" (5)(6)	Carlisle Drip Edge (7), SecurEdge 200 (7)(8) or SecurEdge 1000, 2000 or 3000
	1/2" Dens-Deck Prime (2)				
	1/2" Securock (2)				
90 or 100 MPH	5/8" Dens-Deck Prime (2)	16	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock (2)				
	7/16" Oriented Strand Board (OSB) (2)	17	FS	FS	

**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
- (8) Membrane securement is required at the base of the SecurEdge 200 waterdam.

## 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 3/4" 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.

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

## Underlayment/Insulation & Required Attachment Assemblies Up to 20 YR Warranty for Adhered PVC Roofing

**Table XI**

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 MPH	1-1/2" (20 psi) Polyisocyanurate	10	12" (6)(7)	6"(6)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000
	2"(20 psi) Polyisocyanurate	8	12"(6)(7)	6"(6)	
72 or 80 MPH	1/4" Dens-Deck Prime (2) or Securock	12	12"(6)(7)(8)	6"(6)(8)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000 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.
	1/2" SecurShield HD (3) or HP Recovery Board (2)	16	12"(6)(7)(8)	6"(6)(8)	
	1-1/2" (25 psi) Polyisocyanurate	10	12"(6)(7)(8)	6"(6)(8)	
	2" (25 psi) Polyisocyanurate	8	12"(6)(7)(8)	6"(6)(8)	
90 MPH	1/2" Dens-Deck Prime(2) or Securock	12	6"(10)	6"(8)(9)	Carlisle Drip Edge (4), SecurEdge 200 (4)(5) or SecurEdge 1000, 2000 or 3000.
	1-1/2" (20 psi) Securshield Polyiso	16	6"(10)	6"(8)(9)	
	2" (20 psi) SecurShield Polyiso	8	6"(10)	6"(8)(9)	
	2" SecurShield HD Composite	8	6"(10)	6"(8)(9)	
	1-1/2" Insulfoam HD Composite	16	6"(10)	6"(8)(9)	
100 MPH	2" (25-psi) SecurShield Polyiso(1)	16	FS	FS	Carlisle Drip Edge (4), SecurEdge 200 (4)(5) or SecurEdge 1000, 2000 or 3000.
	5/8" Dens-Deck (2)		FS	FS	
	5/8" Securock		FS	FS	
	2" Securshield HD Composite		FS	FS	
110 MPH	5/8" Dens Deck Prime (1)(2)	16	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock (1)		FS	FS	
120 MPH	5/8" Dens Deck Prime (2)	24	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock		FS	FS	

**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 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) 1/2" SecurShield HD limited to 72 mph.
- (4) Carlisle HP or HP-X Fasteners must be used to secure Carlisle Drip Edge or SecurEdge 200 Metal Fascia to perimeter wood nailers.
- (5) Membrane securement is required at the base of the SecurEdge 200 waterdam.
- (6) Gravel Surface BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (7) Steel Decks - Field & Perimeter @ 6" O.C.
- (8) Cementitious Wood Fiber - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (9) Smooth BUR - Field @ 6" O.C. / Perimeter @ 4" O.C.
- (10) Gravel Surface BUR – FS

**Additional Design Considerations (Up to 20 YR Warranty)**

- 1 - Minimum membrane thickness 60-mil 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 3/4" plywood.
  - 5 - All "T-Joints" must be overlaid with Carlisle "T-Joint" Covers.
- \* Projects where building height exceeds 100' or wind speed exceeds 130 mph, shall be submitted to Carlisle for review.

**Underlayment/Insulation & Required Attachment Assemblies  
25 YR or 30 YR Warranty for Adhered PVC Roofing Systems**

**Table XII**

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 MPH	1-1/2" to 2-1/2" (25 psi) Polyisocyanurate	16	6" (3)(5)	6" (5)	Carlisle Drip Edge, SecurEdge 200 or SecurEdge 1000
	1/2" HP Recovery Board (1)		6" (3)(5)	6" (5)	
	1/4" Dens-Deck Prime (2)		6" (3)(5)	6" (5)	
	1/4" Securock (2)		6" (3)(5)	6" (5)	
72 or 80 MPH	1-1/2" to 2-1/2" (25-psi) SecurShield Polyisocyanurate	16	6" (4)(5)(6)	6" (5)(6)	Carlisle Drip Edge (7), SecurEdge 200 (7) (8) or SecurEdge 1000, 2000 or 3000
	1/2" Dens-Deck Prime (2)		6" (4)(5)(6)	6" (5)(6)	
	1/2" Securock (2)		6" (4)(5)(6)	6" (5)(6)	
90 or 100 MPH	5/8" Dens-Deck Prime (2)	16	FS	FS	SecurEdge 2000 or 3000
	5/8" Securock (2)		FS	FS	

**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.

## Additional Design Considerations (25 YR or 30 YR Warranty)

- 1 - Minimum membrane thickness 80-mil 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 3/4" plywood.
- 5 - All "T-joints" must be overlaid with Carlisle "T-Joint" Covers.
- 6 - New construction or complete tear-off of existing roofing material.

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

### 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 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 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 or CCW Cav-Grip Primer may be used. Refer to Product Section Part II for additional product information and Specification Supplement G-08-11.
- 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-08-11 "Application Procedures for 725 TR 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-08-11 "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 Spec Supplement G-01-11 "Construction Generated Moisture" and Design Reference DR-03-11 "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 (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).
- E. Do not store adhesive 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 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 Membranes

### A. Sure-Weld Membranes

#### 1. General

- a. Sure-Weld TPO Membrane meets or exceeds the requirements of ASTM D6878-11a, standard specification for Thermoplastic Polyolefin Based Sheet Roofing. In addition to the physical properties listed below, refer to the Sure-Weld Membrane Technical Data Bulletin for Cool Roof Rating Council (CRRC) 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 CRRC (California Roof Rating Council) requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of .79 and a 3-year aged reflectance of .70. The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of .90 and a 3-year aged emittance of .86 were achieved. The Spectro-Weld TPO membrane (white) meets the CRRC (California Roof Rating Council) requirement for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of .88 and a 3-year aged reflectance of "pending". The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of .89 and a 3-year aged emittance of "pending" were achieved.
  - c. 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 .95 was achieved and an SRI (solar reflectance index) of 110 was calculated using ASTM E1980. 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 .95 was achieved and an SRI (solar reflectance index) of 113 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-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 membrane is available in 10' width and Sure-Weld Standard / HS membrane available in field sheets in rolls 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.

**Note:** Sure-Weld HS 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 Elongation reinf., % retained Tearing strength, % retained Weight change, %	90 min. 90 min. 60 min. ± 1.0 max.	90 min. 90 min. 60 min. ± 1.0 max.	90 min. 90 min. 60 min. ± 1.0 max.	90 min. 90 min. 60 min. ± 1.0 max.	90 min. 90 min. 60 min. ± 1.0 max.

## B. Sure-Flex Membranes

### 1. General

- a. The Sure-Flex PVC membrane (white) meets the CRRC (California Roof Rating Council) requirement

for reflectance and emittance. When tested in accordance with ASTM C1549, the material has an initial reflectance of .87 and a 3-year aged reflectance of .61. The material has also been tested for emittance in accordance with ASTM C1371. An initial emittance of .95 and a 3-year aged emittance of .86 were achieved.

- b. 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 .94 was achieved and an SRI (solar reflectance index) of 111 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 80' lengths and 80-mil is available in 65' lengths. Sure-Flex Membrane is available in white, gray or tan.

<b>Sure-Flex Polyester Reinforced PVC Membrane</b>			
<b>Physical Property</b>	<b>Test Method</b>	<b>Property of Unaged Sheet</b>	<b>Property After ASTM D3045 aging 56 days @ 176° F</b>
Tolerance on Nominal Thickness, %	ASTM D 751	± 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.	
Breaking Strength, lbf/in. (kN/m)	ASTM D 751 (Grab Method)	200 (35) min. 300 (53) typical	90% min. retention of original breaking strength
Elongation at Break of fabric, %	ASTM D 751	15 min. 25 typical	90% min. retention of original elongation
Tearing Strength, lbf (N) 8 x 8 in. specimen	ASTM D 751 (B-Tongue Tear)	45 (200) min. 100 (445) typical	
Low Temperature Bend, ° F (° C)	ASTM D 2136	-40 (-40) max. -50 (-46) typical	
Linear Dimensional Change (shrinkage), % After 6 hours at 176° F (80° C)	ASTM D 1204	+/- 0.5 max. -0.3 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. 2.0 typical	
Field seam strength lbf/in. (kN/m) Seam tested in peel after welding	ASTM D1876	25 (4.4) min. 60 (10.5) typical	
Water vapor permeance, Perms	ASTM E 96	0.10 max. 0.05 typical	
Puncture resistance, lbf (N) (see supplemental section for additional puncture data)	FTM 101C Method 2031	250 (1110) min. 280 (1245) typical 50-mil 320 (1423) typical 60-mil 380 (1690) typical 80-mil	
Resistance to xenon-arc weathering Xenon-Arc, 12,600 kJ/m <sup>2</sup> total radiant exposure, visual condition at 10X (ASTM D 4434 light & spray cycle)	ASTM G155 0.35 W/m <sup>2</sup> 63° C B.P.T. (10,000 hours)	No cracks No crazing	
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 rolls 81" and 120" wide. 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 and gray.

<b>Sure-Flex Reinforced FRS PVC Membrane</b>			
<b>Physical Property</b>	<b>Test Method</b>	<b>Property of Unaged Sheet</b>	<b>Property After ASTM D3045 aging 56 days @ 176° F</b>
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, Pems	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/m <sup>2</sup> total radiant exposure, visual condition at 10X (ASTM D 4434 light & spray cycle)	ASTM G155 0.35 W/m <sup>2</sup> 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 **PVC** (Polyvinyl Chloride) Polyester Reinforced **KEE** 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 PVC based top and bottom plies. The combination of the fabric and PVC plies provide Sure-Flex PVC Polyester Reinforced KEE membranes with high breaking strength, tearing strength, and puncture resistance.
- b. Field membrane sheets are packaged in rolls of 120" wide. Perimeter membrane sheets are available in a width of 60" wide. 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 KEE Membrane is available in white only.

<b>Sure-Flex PVC Polyester Reinforced KEE Membrane</b>				
<b>PHYSICAL PROPERTY</b>	<b>ASTM Test Method</b>	<b>KEE Membrane</b>		
		<b>50-mil</b>	<b>60-mil</b>	<b>80-mil</b>
Thickness (in.)	D751	0.050"	0.060"	0.080"
Minimum Thickness above scrim (in.)	D751	0.024"	0.029"	0.036"
Weight/Density (oz/yd <sup>2</sup> )	D751	47.0	55.0	73.0
Breaking Strength (grab method, lbs.)	D751	235 min. 275 typ.	250 min. 280 typ.	275 min. 300 typ.
Elongation break of reinforcement, %	D751	31 min. 32 typ.	29 min. 30 typ.	28 min. 31 typ.
Heat Aging % Retension	D3045	>90%	>90%	>90%
Tongue Tear Strength, lbs	D751	50 min. 95 typ.	50 min. 105 typ.	50 min. 100 typ.
Low Temperature Bending, °F	D2136	PASS -40 max.	PASS -40 max.	PASS -40 max.
Linear dimensional change, %, 6 hours at 176 °F	D1204	± 0.7 max. -0.36 typ.	± 0.6 max. -0.27 typ.	± 0.5 max. -0.21 typ.
Water Immersion (%)	D570	1.25	0.87	0.89
Ozone resistance, no cracks, 100 pphm, 168 hrs	D1149	PASS	PASS	PASS
Interply Adhesion (lb/in)	D75	20	22.	24

## 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-05-11 "Insulation Fastening Patterns".
5. When new insulation or cover boards are specified, the use of Carlisle Insulation and Carlisle marketed cover board is required. Any of the Carlisle Insulation/Underlayment may be specified subject to design restrictions included with each of the following tables.

**B. Carlisle Polyisocyanurate**

<b>Table B1 Polyisocyanurate</b> (See below for product descriptions)				
Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability	
			Adhered	Mechanically Fastened
Carlisle HP-H Polyiso	*1.5"	C1289-06, Type II, Class 1, Grade 2 or 3	√	√
Carlisle SecurShield Polyisocyanurate	*1.5"	C1289-06, Type II Class 2, Grade 2 or 3	√	√
Carlisle Securshield HD Composite (SS HD)	2"	C1289-06, Type II, Class 2, Grade 2 or 3	√	√
Carlisle HP-NB Polyiso Composite (OSB)	1.5"	C1289-06, Type V, Class 1, Grade 2 or 3	√	N/A
<b>Design Restrictions</b>				
-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. *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				

Note: SecurShield HD is listed in Paragraph C4 below.

2. **Carlisle HP-H Polyiso** – 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.
3. **Carlisle SecurShield Polyisocyanurate**– A foam core insulation board covered on both sides with a coated 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.
4. **Carlisle SecurShield HD Composite** – Composite insulation panel comprised of ½-inch high-density Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type II, Class2, 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.
5. **Carlisle HP-NB Polyiso** – 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".

C. EPS : Expanded Polystyrene

<b>Table C1 EPS : Expanded Polystyrene (See below for product descriptions)</b>				
Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability	
			Adhered	Mechanically Fastened
InsulFoam I	1"	C578 Type I	N/A	√ (1)(3)
InsulFoam VIII	.75"	C578 Type VIII	N/A	√ (1)
InsulFoam II	.75"	C578 Type II	N/A	√ (1)
InsulFoam IX	.75"	C578 Type IX	N/A	√ (1)
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	N/A	√
InsulFoam SP	2"	C578 Type VIII	(2)	√
<b>Design Restrictions</b>				
-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) Sure-Flex PVC Membrane is not acceptable for this application. (2) May be used as a substrate for Sure-Weld TPO SAT membrane Only. (3) Minimum 1.25 lbs/cubic ft (pcf) density required for Sure-Weld TPO Membrane (White Membrane Only)				
Notes: N/A = Not Acceptable √ = Acceptable				

Note: R-Tech Fanfold Recover Board is listed in Paragraph C4 below.

Note: Insulation boards listed in a through d, may be specified beneath Securshield HD, Sure-Seal HP Recovery Board, Dens-Deck Prime or Securock.

2. **InsulFoam I (EPS: Expanded Polystyrene)** – 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.
3. **InsulFoam VIII (EPS: Expanded Polystyrene)** – 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.
4. **InsulFoam II (EPS: Expanded Polystyrene)** – 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.
5. **InsulFoam IX (EPS: Expanded Polystyrene)** – 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.
6. **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".
7. **InsulLam** – InsulFoam expanded polystyrene (EPS) insulation laminated with a top surface of 7/16" or 5/8" thick Oriented Strand Board (OSB), 1/2" Dens Deck Prime, 1/2" Securock, or 1/2" HP Recovery Board. Available in 4' x 8' boards with thickness from 1-1/2" to 7".

8. **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), available in 4' x 8' size, and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or Self Adhered, Sure-Weld TPO 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.

<b>Table D1 XPS: Extruded Polystyrene</b> (See below for product descriptions)				
<b>Insulations / Underlayment</b>	<b>Minimum Thickness</b>	<b>ASTM</b>	<b>Roofing System Acceptability</b>	
			<b>Adhered</b>	<b>Mechanically Fastened</b>
Thermapink 18	.75"	Refer to Product Data Sheet	N/A	√ (1)
Thermapink 25	1"	Refer to Product Data Sheet	N/A	√ (1)
Foamular 400	1"	Refer to Product Data Sheet	N/A	√ (1)
Dow Styrofoam Deckmate Plus	1"	Refer to Product Data Sheet	N/A	√ (1)
<b>Design Restrictions</b>				
-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. -Extruded 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-01-11 "Related Products" for other products which may be suitable for use. Carlisle must be contacted for specific requirements.  (1) Sure-Flex PVC Membrane is not acceptable for this application.				
Notes: N/A = Not Acceptable √ = Acceptable				

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

E. Cover Boards / Slip Sheets

<b>Table E1 Cover Boards / Slip Sheets</b> (see below for product descriptions)				
Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability	
			Adhered	Mechanically Fastened
SecurShield HD	.5"	C1289-06, Type II, Class 2 (100 psi)	√	√
Securock Cover Board	.25"	Refer to Product Data Sheet	√	√
HP Recovery Board	.5"	C208 Grade 2	√	√
Dens Deck Prime	.25"	C1177	√	√ (1)
Dens Deck	.25"	C1177	N/A	√ (1)
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√ (2)
HP Protection Mat	6 oz	Refer to Product Data Sheets	N/A	√
<b>Design Restrictions</b>				
-HP Recovery Board and R-Tech Fanfold not recommended for direct use over Type B and F steel decks. -SecurShield HD not recommended for direct use over steel decks in lieu of thermal barrier. Fire testing standards yet to be established. -Securock Cover Board, HP Recovery Board, Dens Deck Prime or Dens Deck may not be used directly over New or Existing Lightweight Insulating Concrete Decks existing or Structural Concrete. -Due to some warranty restrictions, Dens Deck and Dens Deck 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 for use on combustible decks with slopes greater than 2" per foot for compliance with external fire codes, refer to UL listings or contact Carlisle. (2) Install Polymeric Side Up when installing Sure-Flex PVC membrane.				
Notes: N/A = Not Acceptable √ = Acceptable				

2. **SecurShield HD** – a rigid insulation panel composed of a high-density (100 psi), closed-cell polyisocyanurate foam core laminated to coated-glass fiber-mat facer 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.
3. **Securock Cover Board** – A uniform composition of fiber-reinforced with no 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.
4. **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.
5. **Dens Deck 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.
6. **Dens Deck 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.
7. **R-Tech FanFold Recover Board** – Closed-cell lightweight expanded polystyrene (EPS) with polymeric laminated faces which meets ASTM C 578 for use as a recover board. Polymeric facer compatible with PVC membrane, 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.
8. **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 30' roll (450 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, **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.
  2. **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.
  3. **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.
  4. **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.
  5. **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:** Fabricated flashings are made of 60-mil thick reinforced Sure-Weld 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. **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.
    - e. **Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Weld 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.
    - f. **TPO Square Tubing Wraps:** Fabricated flashings made of 60-mil thick reinforced Sure-Weld 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.
    - g. **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.
    - h. **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.

- i. **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. Sure-Flex Flashing (for use with Sure-Flex PVC Polyester Reinforced, FRS, and KEE Membrane Assemblies)**

1. **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 inside/outside corners and field fabricated pipe flashings when use of pre-molded accessories is not feasible.
2. **Sure-Flex PVC "T" Joint Cover:** A 4-1/2" diameter, 40-mil thick, injection molded PVC flashing used to overlay "T" joints at field splices when 60-mil or 80-mil Sure-Flex PVC membrane is used.
3. **Pre-Molded Accessories:**
  - a. **Sure-Flex PVC Inside Corners:** A pre-molded flashing for inside corners. Reversible for use as white or gray; 80-mil thick.
  - b. **Sure-Flex PVC Outside Corners:** A pre-molded flashing for outside corners. Available in white only; 60-mil thick.
  - c. **Sure-Flex PVC Pipe Flashings:** A pre-molded white pipe flashing used for pipe penetrations. Available for 3/4" – 8" diameter pipes with clamping rings included.
  - d. **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 as a standard color. Gray or tan can be special ordered and will require a lead time.
  - e. **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 as a standard. Gray or tan can be special ordered and will require a lead time.
  - f. **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 PVC 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.

**C. PRIMERS, ADHESIVES, SEALANTS AND CLEANERS**

Refer to Technical Data Bulletins 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-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 ft<sup>2</sup> 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.** See Carlisle's Product Data Sheet for a listing of the counties involved.
- 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 ft<sup>2</sup> 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.** See Carlisle's Product Data Sheet for a listing of the counties involved.
- 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-10-11 "Aqua Base 120 Bonding Adhesive" for Warranty limitations and other considerations.
- e. **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.
- f. **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).
- g. **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.
- h. **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.
- i. **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).
- j. **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.
- k. **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.

## 2. 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. **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-10-11 "Aqua Base 120 Bonding Adhesive" for Warranty limitations and other considerations
- c. **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 Membranes is not required, however it is recommended.

- d. **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).
- e. **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.
- f. **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.
- g. **PVC Membrane Cleaner:** Used to prepare membrane that has been exposed to the elements prior to heat welding or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

## 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	1-1/2"	Note (4)	N/A
Gypsum	Polymer Gyptec	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 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-Weld or 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.

#### 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. **Oval 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 membrane on Mechanically Fastened Roofing Systems.

#### 2.06 Insulation Securement Adhesive

- A. **FAST 100 LV or 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. **FAST Catalyst:** Added to FAST Adhesive (Part B Side) to quicken adhesive reaction time.
- C. **Carlisle FAST Dual Cartridge and Bag in a Box 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 600 sq.ft. per carton of Dual Cartridges or 170 sq ft per gallon for Bag in a Box Adhesive. A standard version is available for temperatures of 50° F (10° C) and above and a winter "IC" formula is available for temperatures

between 25-50° F(-4-10° C) .

- D. **OlyBond 500 BA** – A two-component, polyurethane, low-rise expanding adhesive used to bond insulation to various substrates. Packaged in 5-gallon pails 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 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 FAST Adhesive, the vapor retarder must be compatible and shall be fully adhered to the substrate. Available products include Carlisle supplied "peel and stick" rubberized asphalt membrane with compatible film coating (Carlisle 725 Air and Vapor Barrier), and spray or roller applied butyl coatings. Installation requirements for Carlisle's 725 Air and Vapor Barrier are identified in Spec Supplement G-08-11 "Application Procedures for 725 TR Air and Vapor Barrier" in the Carlisle Technical Manual.

- B. **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 FAST Adhesive. 725TR can also function as a temporary roof for up to 120 days. Available in rolls 39" wide by 75' long (244 square feet).
- C. **CCW 702 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 250 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.
- D. **CCW Cav-Grip** - is a low VOC contact adhesive used to prime surfaces for the application of 725TR. It features a quick dry time and ease of application from the self contained pressurized cylinder. Cav-Grip is 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). Coverage rate is 2,500-3,000 sq ft per cylinder.

## 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

1. **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.
2. **Sure-Flex PVC Coated Metal:** A 24 gauge, galvanized steel sheet coated with a layer of 40-mil non-reinforced Sure-Flex Flashing. The sheet is cut to the appropriate width and used to fabricate metal drip edges or other roof perimeter edging profiles. Sure-Flex Membrane may be heat welded directly to the coated metal. Coated metal is available in sheets 4' x 10' and comes packaged 10 sheets per pallet. Available in white, gray or tan.
3. **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.

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 1000 Fascia:** A metal anchor bar fascia system consisting of a formed quarter hard 0.050" aluminum retainer bar, corrosion resistant fasteners and a 0.040" aluminum or 24 gauge steel snap-on fascia cover. Available in two versions, one for Fully Adhered and Mechanically Fastened Roofing Systems. ANSI/SPRI ES-1 certified.
6. **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**.
7. **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).
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 Lap Sealant and provide increased stability for membrane terminations.
9. Refer to Spec Supplement P-01-11 "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
- b. **Sure-Flex PVC Heat Weldable Walkway Rolls:** Manufactured from specially compounded PVC, offering superior tear, puncture and weather resistance. Designed to protect Sure-Flex membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Flex membrane using an automated heat welder or hand held heat welder. Walkway Rolls are 36" wide by 60' long and are nominal 80-mils thick. Available in gray only.
- c. **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.
- d. **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 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.

## 2.10 OTHER CARLISLE ACCESSORIES

Refer to Spec Supplement P-01-11 "Related Products" for additional accessories.

## Part III – EXECUTION

***Prior to commencing with the installation of any of the Thermoplastic 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. Material Safety Data Sheets (MSDS) 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-06-11 "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	PVC Membrane	
Adhered	Mechanically Fastened	<b>NEW CONSTRUCTION</b>	Mechanically Fastened	Adhered
Insulation	Insulation	Steel (min. 22 gauge)(1)(2), Wood Plank (3/4" min.), or Fibrous Cement	Insulation	Insulation
Direct Application	Insulation	Structural Concrete (min. 3000 psi ) or Gypsum	Insulation	Direct Application
Direct Application(5)	Direct Application(5)	Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)	Direct Application(5)	Direct Application(5)
Direct Application (5)(10)	Direct Application(5)	Lightweight Insulating Concrete	Insulation	Direct Application(5)(10)
Adhered	Mechanically Fastened	<b>RETROFIT / NO TEAR-OFF</b>	Mechanically Fastened	Adhered
Direct Application (9) (11)	Direct Application (9) (11)	Existing Smooth Surface BUR (3)(8) or Mineral Surface Cap Sheet	Insulation	Insulation
Insulation	Insulation	Gravel Surfaced BUR (3)(4) or Coal Tar Pitch (3)(4)	Insulation	Insulation
Direct Application (7)(9)	Direct Application (7)(9)	Modified Bitumen (11)	Insulation	Insulation
Insulation	Direct Application (6)	Existing Single-Ply (11)	Direct Application (6)	Insulation
Complete Tear-off Required	Complete Tear-off Required	Sprayed-in-place Urethane	Complete Tear-off Required	Complete Tear-off Required
Adhered	Mechanically Fastened	<b>RETROFIT / TEAR-OFF</b>	Mechanically Fastened	Adhered
Insulation	Insulation	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 gravel 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 15 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 or 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 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.

- 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.
6. 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.
7. On retrofit projects, all existing phenolic insulation must be removed.
8. Refer to table above for other Recover/Retro-fit considerations.

**J. Vapor Retarder Installation**

For Carlisle's Vapor Retarder refer to Spec Supplement G-08-11 "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-08-11 "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. Consult Design Reference DR-04-11 "Energy Efficiency" for R-value Tables.
2. 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-05-11 "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-05-11 "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 (FAST or Flexible FAST) or Bead (FAST, 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-03-11 "FAST Adhesive Application / Coverage Rate".
  - 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 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, 100 – 150 pound weighted steel roller** to ensure full embedment. Optimal set up time should be approximately 5 to 10 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-02-11 "FAST Adhesive Equipment, Catalyzing Instructions and Equipment Set-Up" and G-03-11 "FAST Adhesive Application / Coverage Rate" 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 / 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-Weld / 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-08-11 "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 Extra 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 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.

3. Use of Dens Deck and Dens Deck 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 12' wide Sure-Weld or maximum 10' wide Sure-Flex Membrane is fully adhered or mechanically fastened to an approved insulation or substrate.

1. **Position** Sure-Weld or 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-Weld or Sure-Flex membrane to an acceptable substrate with Carlisle Bonding Adhesive. Comply with Labels, Material Safety Data Sheet (MSDS) 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** or **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-10-11 "Aqua Base 120 Bonding Adhesive" for application methods and warranty requirements.

6. **Allow** adhesive to dry until tacky but will not string or stick 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/Sure-Flex membrane, to avoid rust stains.

**D. Membrane Securement / Fastening - Mechanically Fastened Roofing Systems**

1. Thermoplastic 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 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-06-11 "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 3'. 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 subdividing 8' or 10' wide field sheet using 10" wide Pressure-Sensitive RUSS strip or row of seam fastening plates as described below. For Sure-Flex membranes, perimeter sheets can be formed by using individual 40.5" or 5'-0" wide sheets.

a. **Individual perimeter sheets** (TPO – 4', 5' or 6' wide)(PVC - 40.5" or 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. **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 - 10" 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 Cut-Edge Sealant to seal any exposed scrim, it is recommended that cut edge sealant should be used for PVC overlay but it is not required.
- 2) Projects with Warranties greater than 20 Years OR Sure-Flex projects regardless of warranty duration center 6" wide section of TPO/PVC 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 Cut-Edge Sealant to seal any exposed scrim, it is recommended that cut edge sealant should be used for PVC overlay but it is not required.

**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

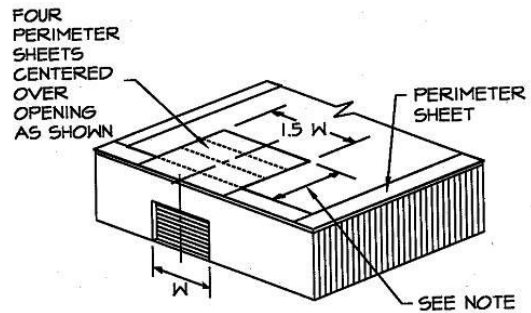
d. **Building with Special Conditions:**

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/Sure-Flex Adhered Roofing System.

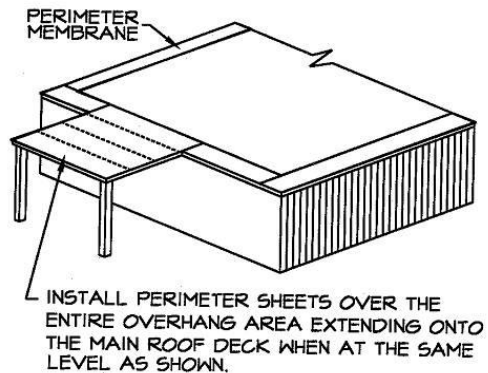


**NOTE:** Depth of perimeter area, noted above, shall not be less than 2.5 times the width of the opening.

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/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. **SAT (Self-Adhering Technology) – Self-Adhered Roofing System (membrane bonding)**

10' 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. **Roll** the membrane onto the substrate while avoiding wrinkles. To achieve the best adhesion, the membrane should be rolled onto the substrate at an angle with 150 lb weighted 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. Heat weld the Sure-Weld or Sure-Flex 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 or PVC Membrane Cleaner (Weathered Membrane Cleaner should not be used to clean Sure-Flex PVC). Weathered or PVC 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-01-11 "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/Sure-Flex membrane sheets.

When using **60-mil or 80-mil** Sure-Weld/Sure-Flex Membrane, a **TPO/PVC "T"-Joint Cover** must be applied over all "T" joint splice intersections. The **use of Sure-Flex Non-Reinforced Flashing is not acceptable as an overlay** due to its thickness (80-mil). Reinforced membrane regardless of thickness should not be used since a water tight seal will not be obtainable. Sure-Flex 'T'-Joint is the only acceptable 'T'-Joint cover permitted by Carlisle.



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-01-11 "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-01-11 "Heat Welding Equipment"** for additional information.

**F. Seam Probing**

1. A cotter pin puller (blunt or dull for PVC Membranes) or 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-01-11 "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 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 cut edges of Sure-Flex membrane (Horizontal or Vertical) However, it is recommended.
  - b) 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/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 Membrane Cleaner (Weathered Membrane Cleaner should not be used to clean Sure-Flex 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 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/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. **Seal** all cut edges of Sure-Weld Reinforced membrane with Cut-Edge Sealant. Cut-Edge Sealant is not required on cut edges of Sure-Flex Membranes, however, it is recommended.

**Note:** The same overlay repair procedures may be used for punctures in the Sure-Weld/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-05-11 "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 20 year or greater warranties Carlisle Pre-Fabricated accessories must be used when feasible.

#### 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 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) or 160° F (71° C) (TPO), 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) or 160° F (71° C) (TPO).
- 5. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld/Sure-Flex **reinforced** membrane. Sure-Weld/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-Weld/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-Weld/Sure-Flex Bonding Adhesive. Bonding Adhesive shall be applied continuously, without globs or puddles.
2. After the Bonding Adhesive has properly dried, roll the membrane into the adhesive.
3. 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.
4. Terminate the edges of the installed membrane in accordance with Carlisle's applicable details.
5. 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 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 3.08, Additional Membrane Securement, with the required Carlisle Fastener and plate.
2. Flash the fasteners/plates with a separate piece of Sure-Weld/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 TPO/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-Weld/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. 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/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) and 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 PVC membranes require total isolation between the two roofing systems. For TPO membranes refer to applicable Carlisle details for tie-ins.

### 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-06-11 "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-07-11 "Daily Seal & Clean Up".

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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

**Thermoplastic Mechanically Fastened Roofing Systems  
RhinoBond Attachment Method**

**“Attachment I”**

**November 2011**

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

**A. Description**

The RhinoBond Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO or PVC coating. The RhinoBond 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 Thermoplastic membrane is positioned over the secured RhinoBond plates and welded to the top surface of the plate with the RhinoBond Induction Welding Tool.

RhinoBond Attachment Method Limited to 20 year maximum warranty and wind speed coverage up to 90 mph. Perimeter enhancements will be required on systems greater than 72 mph. Contact Carlisle for requirements for enhancements.

**B. Products/Heat Welding Equipment**

Products listed in "Part II" of the Carlisle Thermoplastic Mechanically Fastened Roofing System Specification can be used as part of this alternate securement method in conjunction with the RhinoBond Welding Plates.

1. **RhinoBond 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 Induction Welding Tool.
2. **RhinoBond 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 Welding Plate to fuse with the roofing membrane. Refer to RhinoBond Owner's Manual for additional information.
3. **Cooling Clamp Device:** A stand-up device that allows the weld to cool as it clamps the membrane to the heated plate. Refer to RhinoBond 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 Cooling Clamp on the membrane over the plate and leave in place for 60 seconds.
4. Place Induction Welding Tool on the next plate as previously done and increasing induction energy one level by depressing the "up" button once. After welding, immediately place the Cooling Clamp.

5. Repeat above procedure for the remainder of the plates, increasing induction energy one level for each plate.
6. After allowing the membrane and plates to cool to ambient temperature, remove Cooling Clamp and use a pliers by apply force to peel RhinoBond Plate from underside of membrane to determine bonding strength. Desired result is welded ply of membrane stays fused to RhinoBond Plate.
7. Repeat trial process, if needed, adjusting energy level up or down until desired results are achieved.

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

**D. Installation**

1. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond Plates per 4' x 8' in the designated field and eight HP-X Fasteners and RhinoBond 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 or Sure-Flex membrane over the appropriate RhinoBond Plates and allowing membrane to relax.
3. Place RhinoBond Induction Tool centered over the RhinoBond PVC Welding Plate (+/- 1") under the roofing membrane.
4. Elevate the temperature of plate from ambient to 400-500°F using induction tool.
5. Immediately place Cooling Clamp 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.

**E. 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 Thermoplastic 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 Thermoplastic Mechanically Fastened Roofing System.

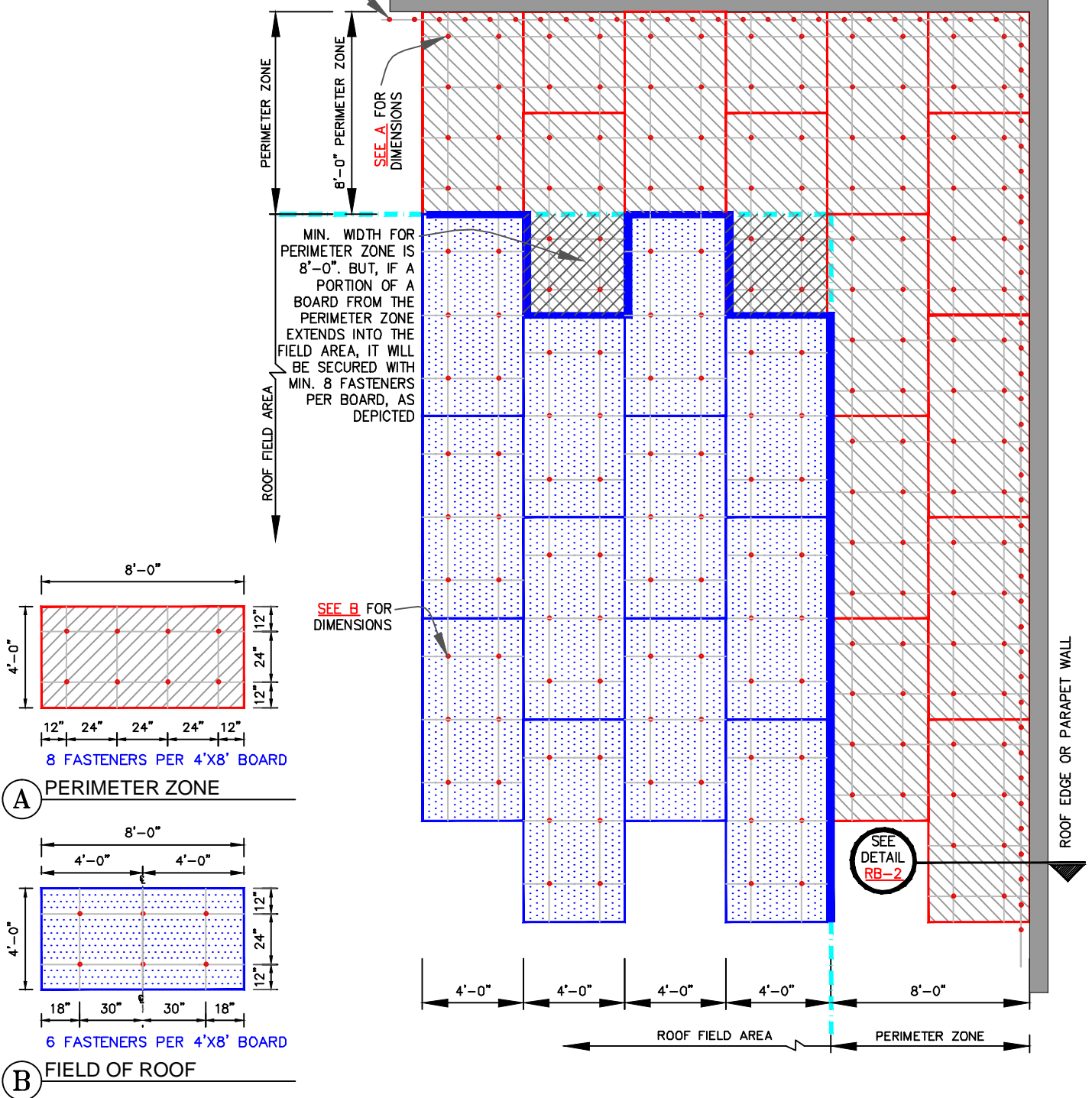
**F. Associated Installation Details**

RhinoBond Attachment Method – Number of Fasteners and Location .....RB-1  
 Angle Change Securement Method RhinoBond Plates.....RB-2

End of Section

12" (305mm) O.C. POSITIONED  
3-1/2"-4" (89-102mm)  
FROM ANGLE CHANGE

ROOF EDGE OR PARAPET WALL



LEGEND - ROOF PLAN

- CARLISLE SYNTEC FASTENER & RhinoBond FASTENING PLATE
- PERIMETER AREA
- ROOF FIELD AREA
- TRANSITION AREA

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE	CARLISLE HP-X FASTENER	3-1/8" (79.4mm) DIAMETER
PLYWOOD	15 / 32" (11.91mm)	CARLISLE HP-X FASTENER	3-1/8" (79.4mm) DIAMETER

NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.

THERMOPLASTIC MEMBRANE

APPROVED SUBSTRATE

SEE NOTE(S)

RhinoBond ATTACHMENT METHOD - NUMBER OF FASTENERS AND LOCATION

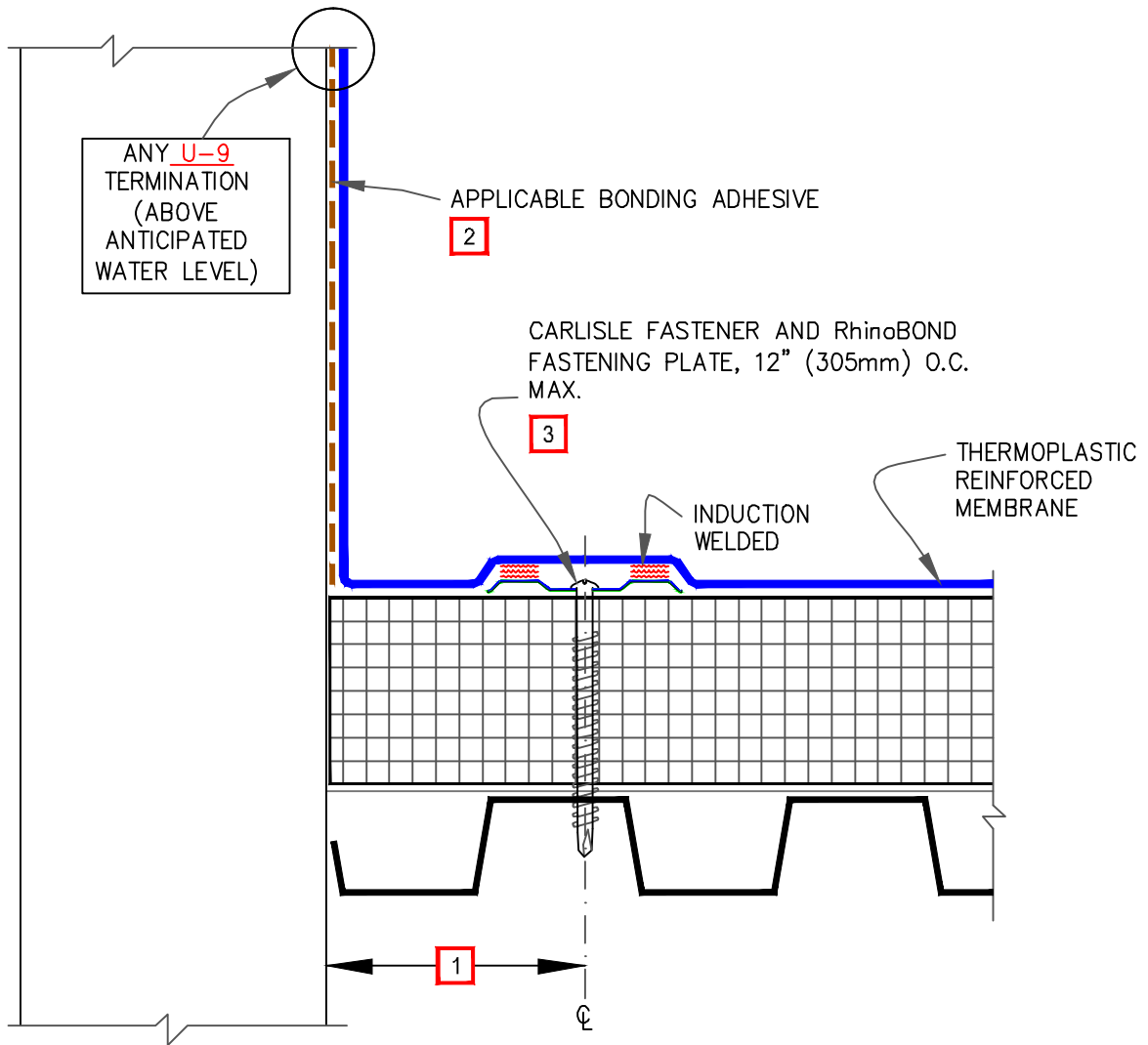
For additional information, refer to Specifications



DETAIL NO.

**RB-1**

**RhinoBond**



NOTES:

1. POSITION RhinoBOND PLATES 3-1/2" TO 4" (89 TO 102mm) FROM ANGLE CHANGE.
2. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.
3. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.
4. THIS METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS OR XPS INSULATION.

<p> → THERMOPLASTIC MEMBRANE</p> <p> → APPROVED SUBSTRATE</p> <p> → SEE NOTE(S)</p>	<p>ANGLE CHANGE SECUREMENT METHOD WITH RhinoBond PLATES</p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>RB-2</b></p> <p><b>RhinoBond</b></p>
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**Sure-Weld®/Sure-Flex™**

**Mechanically Fastened and Adhered Roofing Systems**

**Installation Details**

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**Sealant Pocket**

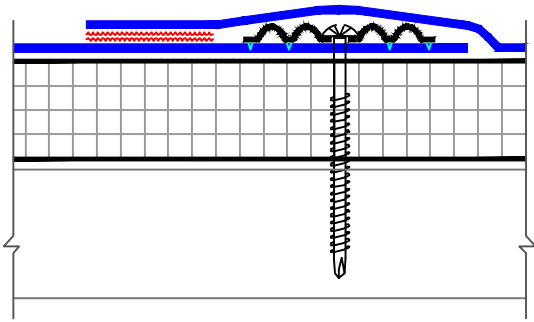
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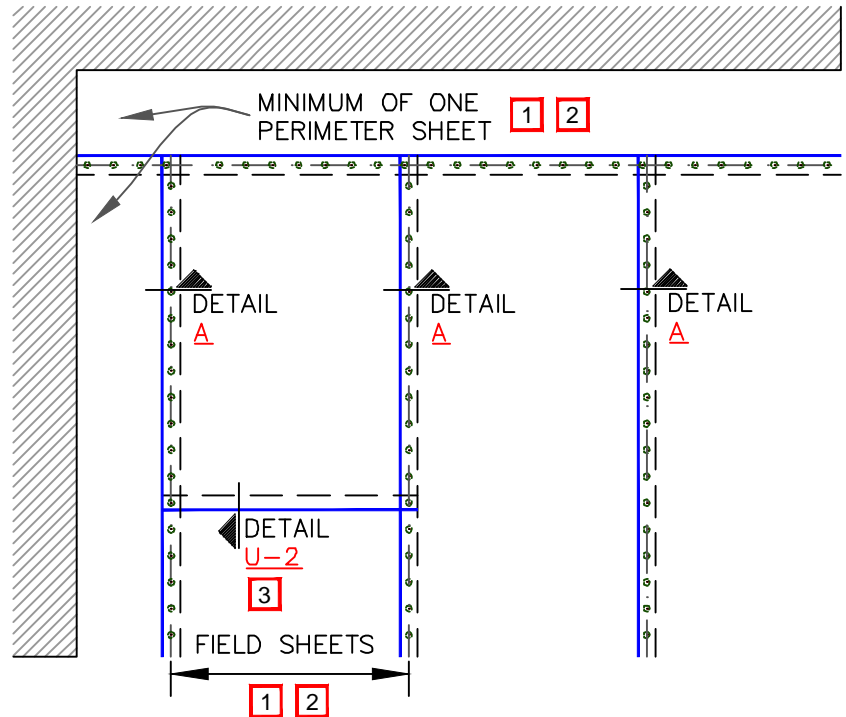
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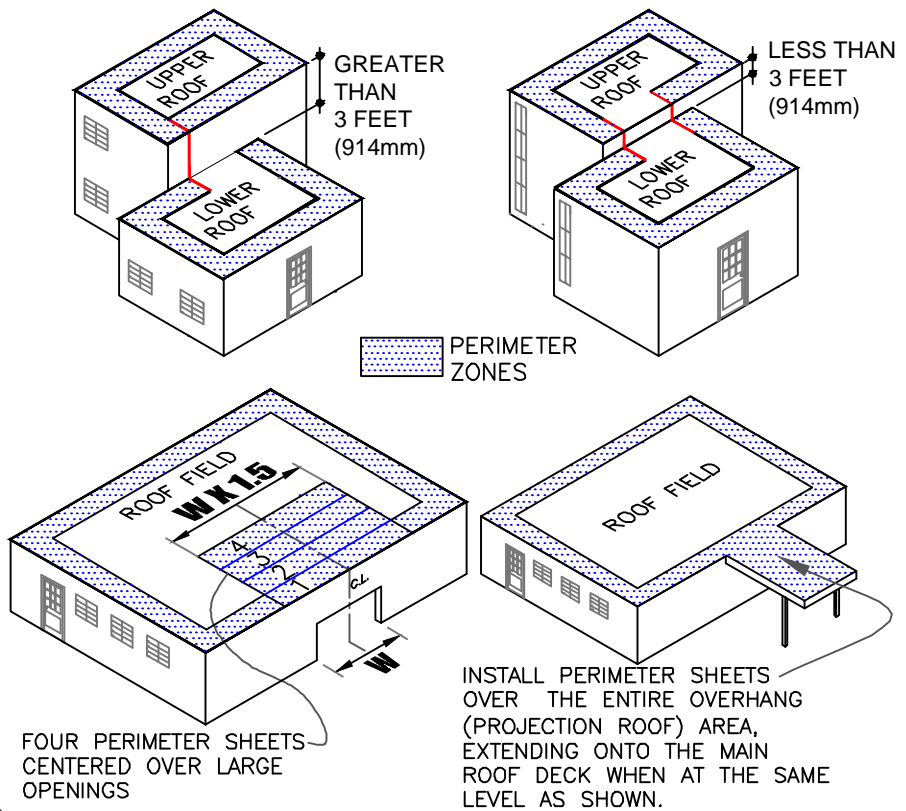
DETAIL A: (FOR RELATED NOTES, REFER TO DETAILS MF-2A & 2B)



NOTES:

1. WHEN USING 10' (3048mm) OR 12' (3658mm) WIDE TPO FIELD SHEETS, 6' (1829mm) WIDE PERIMETER SHEETS ARE UTILIZED. WHEN USING 8' (2438mm) WIDE TPO FIELD SHEETS, 4' (1219mm) WIDE PERIMETER SHEETS ARE USED. WHEN USING 10' (3048mm) WIDE PVC FIELD SHEETS, 5' (1524mm) WIDE PERIMETER SHEETS ARE UTILIZED. WHEN USING 81" (2057mm) WIDE PVC FIELD SHEETS, 40.5" (1029mm) WIDE PERIMETER SHEETS ARE USED.
2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
3. END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (51mm) MINIMUM. REFER TO THERMOPLASTIC DETAIL U-2.

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY FASTENED ROOF SYSTEM

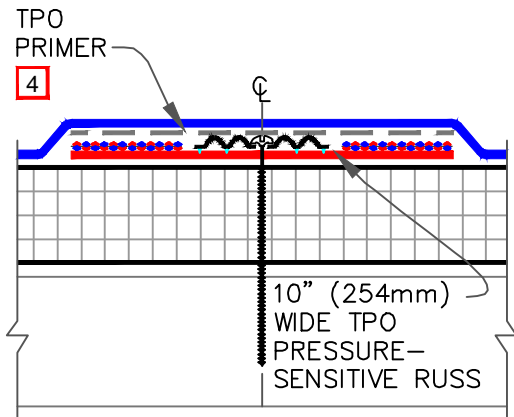


	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

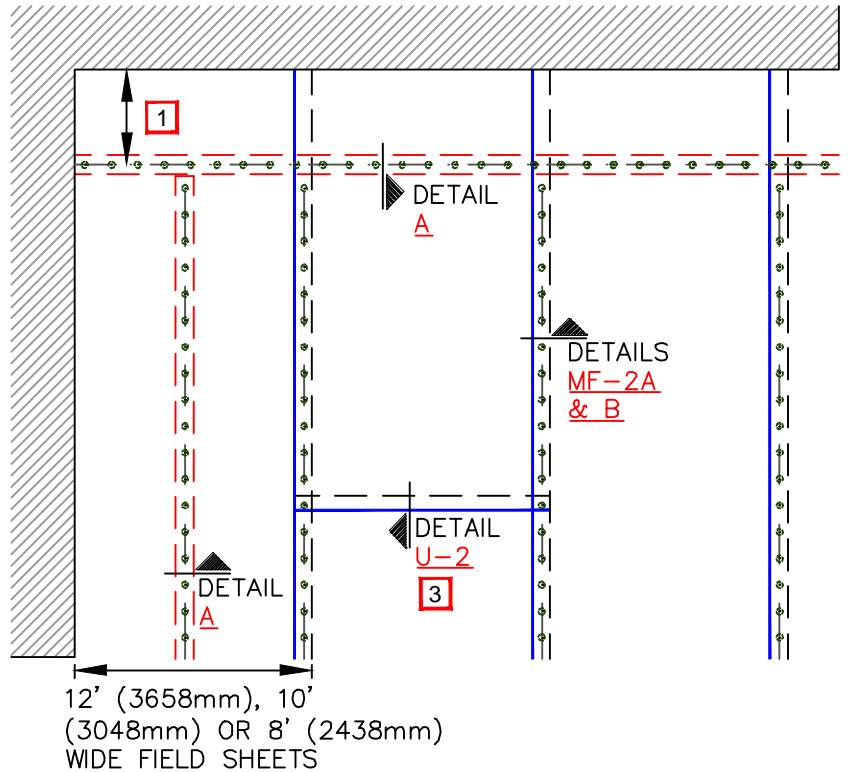
**MEMBRANE SECUREMENT**

For additional information, refer to Specifications

	DETAIL NO.
	<b>MF-2</b>
THERMOPLASTIC UNIVERSAL	



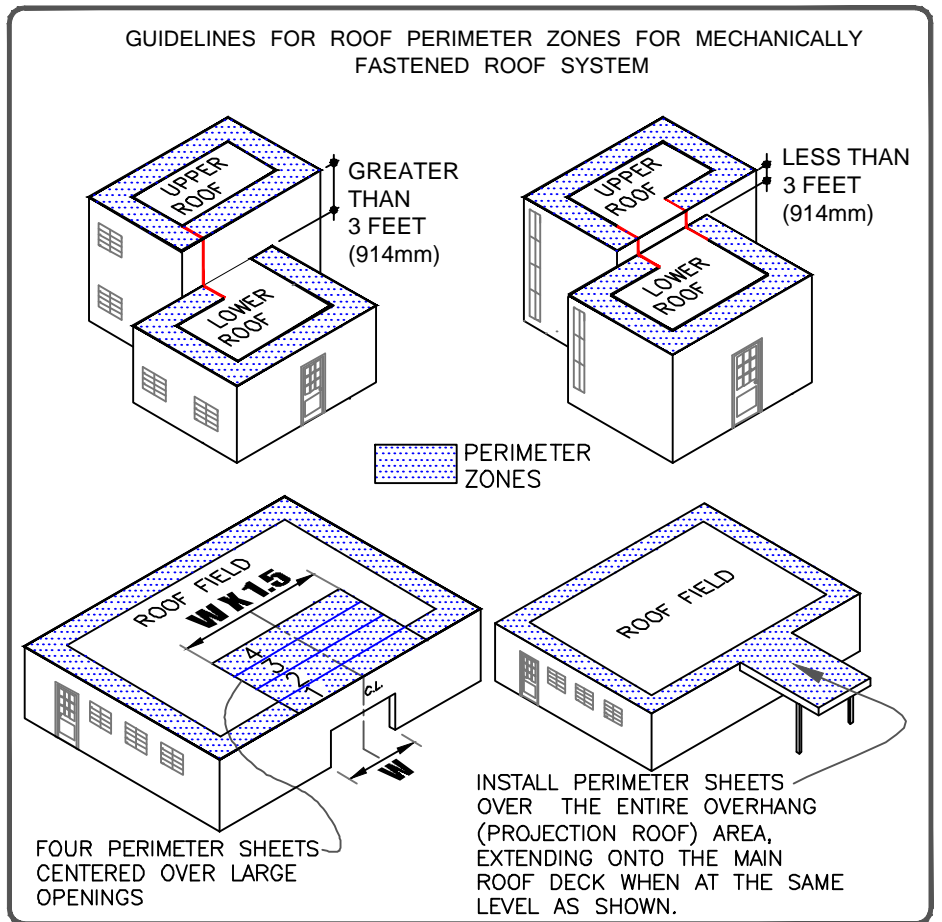
DETAIL A



NOTES:

1. PRESSURE-SENSITIVE RUSS SHALL BE POSITIONED 5' (1524mm) TO 6' (1829mm) FROM THE PERIMETER EDGE WHEN USING 10' (3048mm) OR 12' (3658mm) WIDE TPO FIELD SHEETS. WHEN USING 8' (2438mm) WIDE TPO FIELD SHEETS, PRESSURE-SENSITIVE RUSS SHALL BE POSITIONED 4' (1219mm) FROM THE PERIMETER EDGE.
2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
3. END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (51mm) MINIMUM. REFER TO THERMOPLASTIC [DETAIL U-2](#).
4. TPO PRIMER MUST BE APPLIED TO THE BACK SIDE OF MEMBRANE SURFACE PRIOR TO ADHERING MEMBRANE TO PRESSURE-SENSITIVE RUSS.

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY FASTENED ROOF SYSTEM

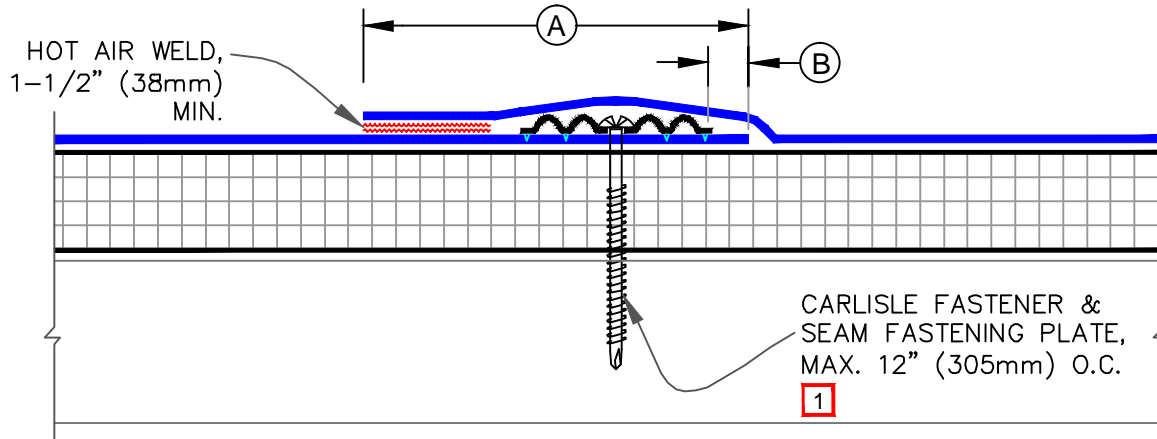


	● TPO MEMBRANE
	● APPROVED SUBSTRATE
	● SEE NOTE(S)

TPO MEMBRANE SECUREMENT WITH PRESSURE-SENSITIVE RUSS

For additional information, refer to Specifications

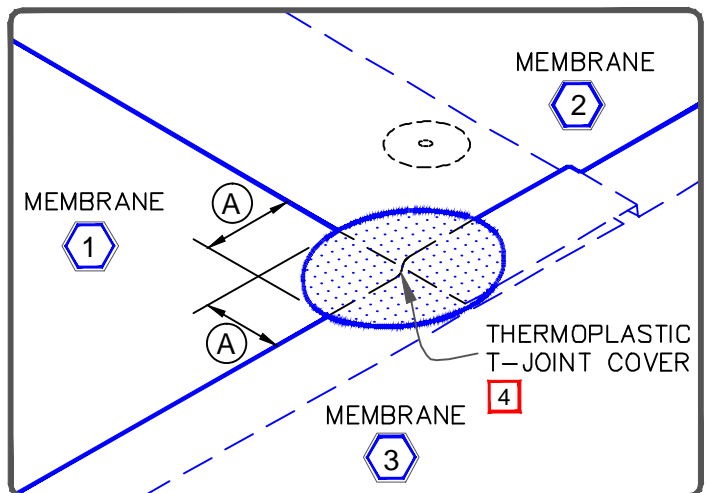
	DETAIL NO.
	<b>MF-2.1</b>
THERMOPLASTIC TPO	



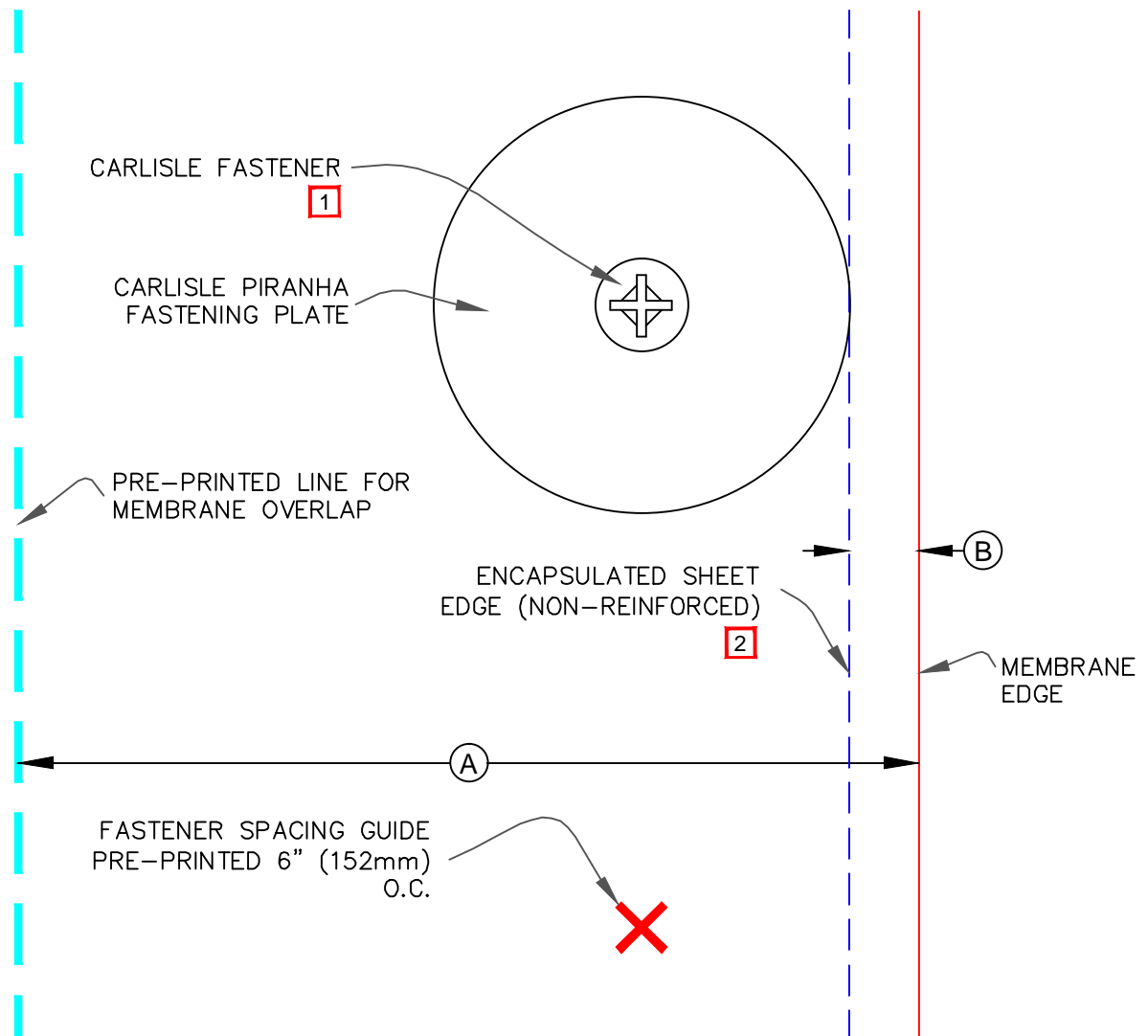
NOTES:

- ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
- POSITION SEAM FASTENING PLATES BEYOND NON-REINFORCED ENCAPSULATED EDGE.
- APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
- WHEN USING 60 OR 80-MIL MEMBRANE, APPLY A 4-1/2" (114mm) DIAMETER THERMOPLASTIC T-JOINT COVER AT ALL FIELD SPLICE INTERSECTIONS.

DIMENSIONS	mm	
(A)	5-1/2"	140 APPROX.
(B)	1/2"	13 APPROX.



THERMOPLASTIC REINFORCED MEMBRANE APPROVED INSULATION SEE NOTE(S)	<p><b>MECHANICALLY FASTENED MEMBRANE SPLICE</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>MF-2A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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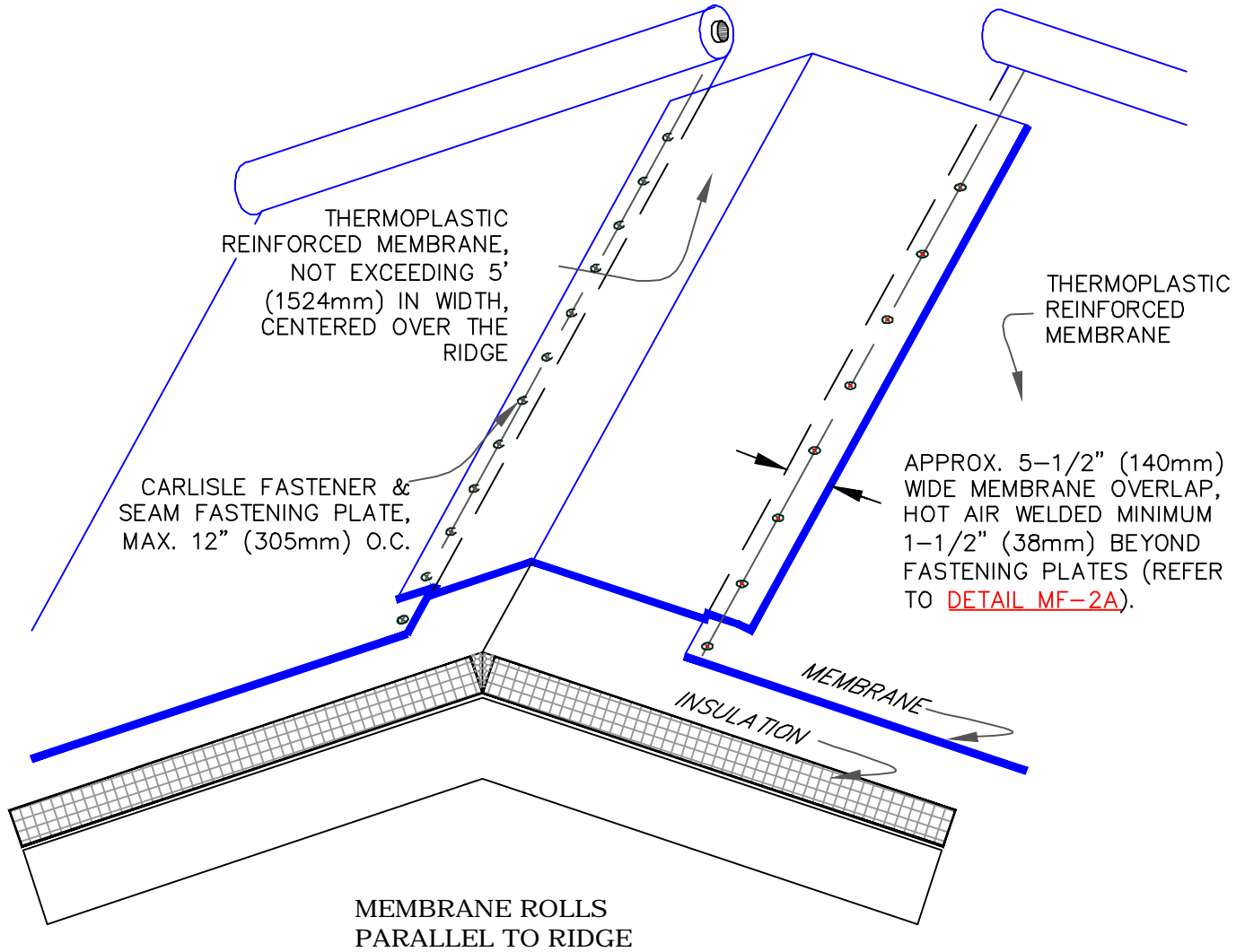


DIMENSIONS	mm	
(A)	5-1/2"	140 APPROX.
(B)	1/2"	13 APPROX.

NOTE:

- ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
- POSITION SEAM FASTENING PLATES BEYOND NON-REINFORCED ENCAPSULATED EDGE.

THERMOPLASTIC REINFORCED MEMBRANE APPROVED INSULATION SEE NOTE(S)	<p align="center"><b>FASTENER AND PLATE PLACEMENT</b></p> <p align="center">For additional information, refer to Specifications</p>		DETAIL NO. <p align="center"><b>MF-2B</b></p> THERMOPLASTIC UNIVERSAL
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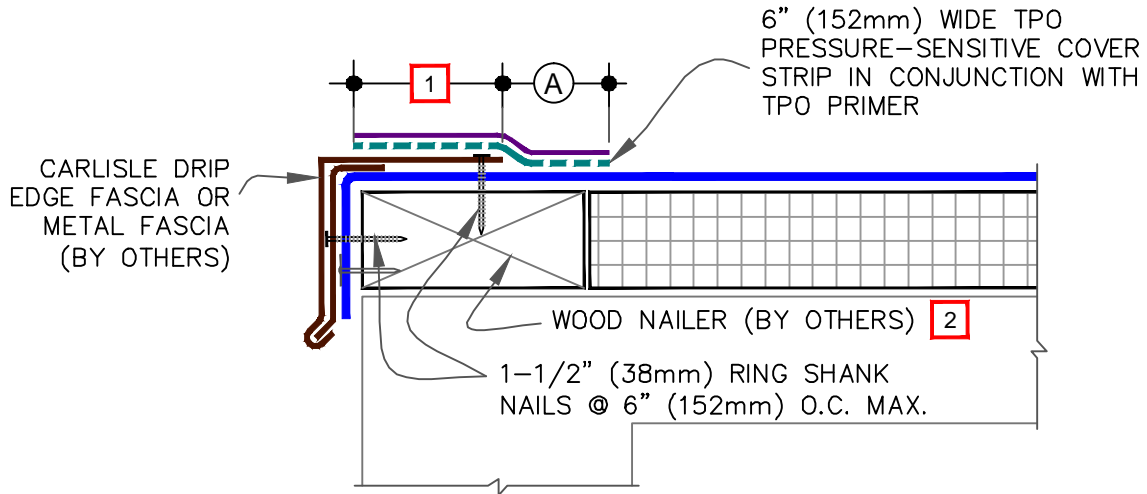
NOTES

1. RIDGE MEMBRANE ATTACHMENT IS ONLY REQUIRED WHEN ROOF SLOPE EXCEEDS 3" (76mm) TO ONE HORIZONTAL FOOT.
2. POSITION FASTENING PLATES 1/2" (13mm) MINIMUM TO 1" (25mm) MAXIMUM FROM THE EDGE OF THE DECK MEMBRANE.
3. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING DENSITY.
5. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
6. AS AN OPTION TO USING PERIMETER SHEETS, 10" (254mm) WIDE TPO PRESSURE-SENSITIVE RUSS MAY BE USED BENEATH TPO FIELD SHEETS ONLY FOR PERIMETER SECUREMENT.

	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p>RIDGE MEMBRANE ATTACHMENT</p>		<p>DETAIL NO.</p>
	<p>● APPROVED INSULATION</p>			<p>MF-22</p>
<p>0</p>	<p>● SEE NOTE(S)</p>	<p>For additional information, refer to Specifications</p>	<p>THERMOPLASTIC UNIVERSAL</p>	

CAUTION

DETAIL NOT FOR USE ON 25 OR 30-YEAR WARRANTY PROJECTS. ACCEPTABLE EDGING SHALL CONFORM WITH THERMOPLASTIC UNIVERSAL DETAILS U-1B, U-1C, U-1D, U-1E OR U-1F.

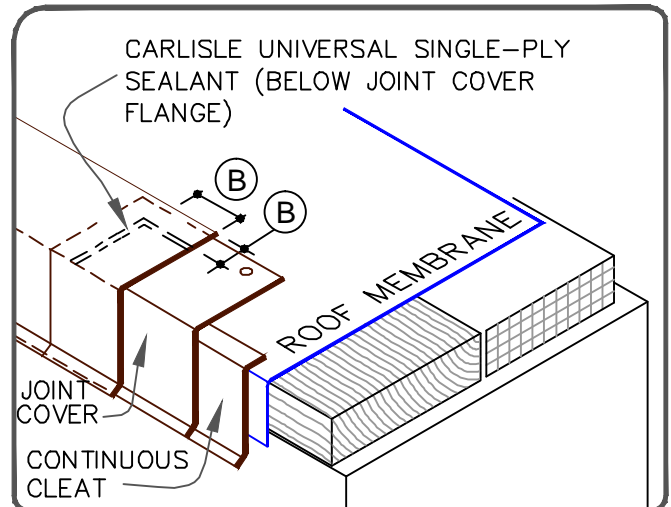


TPO ONLY  
(NOT FOR PVC)

NOTES:

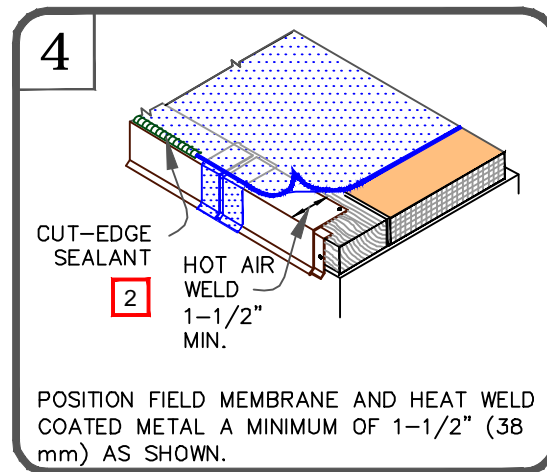
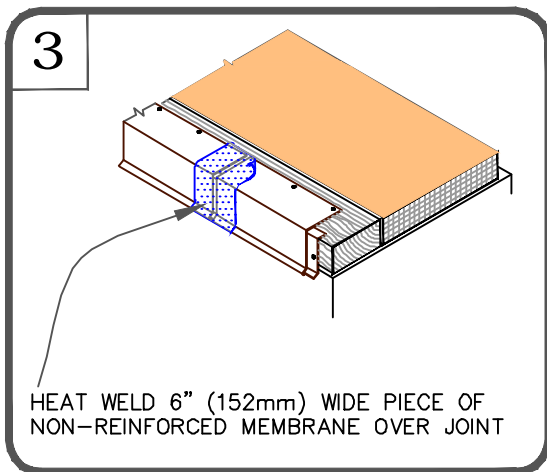
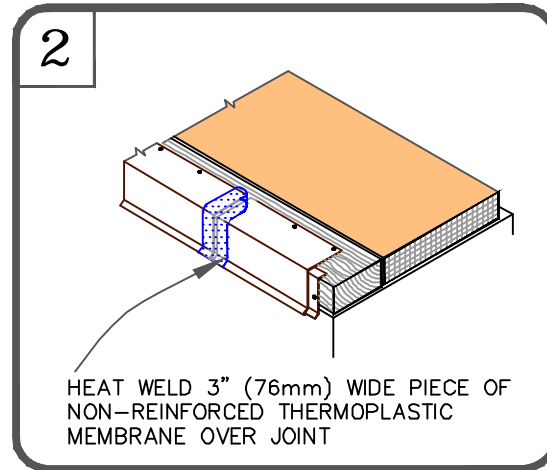
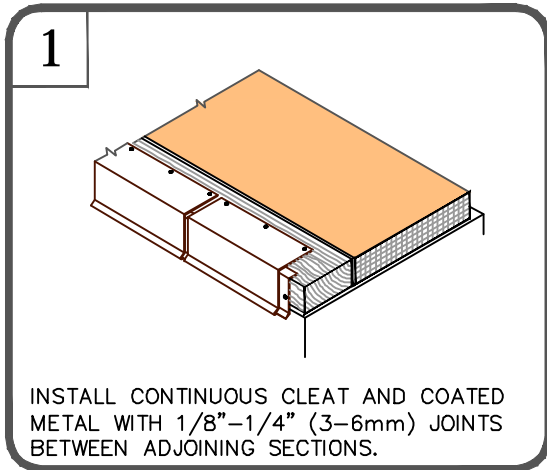
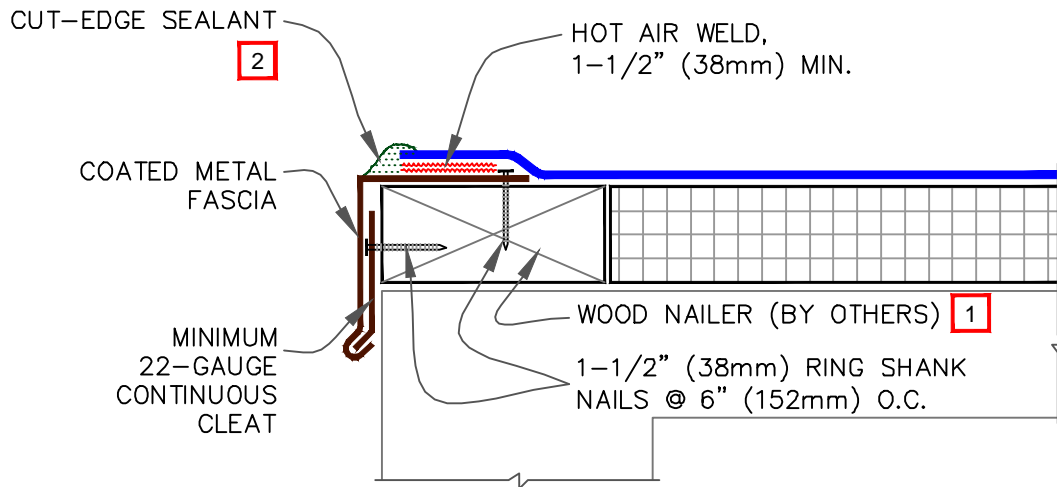
- METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY TPO PRESSURE-SENSITIVE COVER STRIP WITH MINIMUM 2" (51mm) COVERAGE PAST NAIL HEADS.
- WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
- TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING TPO PRIMER.
- APPLY TPO PRIMER TO METAL FLANGE AND MEMBRANE SURFACE PRIOR TO INSTALLING TPO PRESSURE-SENSITIVE COVER STRIP.
- WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
- TO ENSURE TPO PRESSURE-SENSITIVE COVER STRIP CONFORMS TO STEP-OFFS, HEAT COVER STRIP AT SPLICE INTERSECTIONS PRIOR TO ROLLING.

DIMENSIONS	mm	
(A) 2"	51	MIN.
(B) 1/2"	13	TO
1"	25	



TPO MEMBRANE APPROVED SUBSTRATE SEE NOTE(S)	<p>SecurSeal DRIP EDGE FASCIA</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-1A</b></p> <p>THERMOPLASTIC TPO</p>
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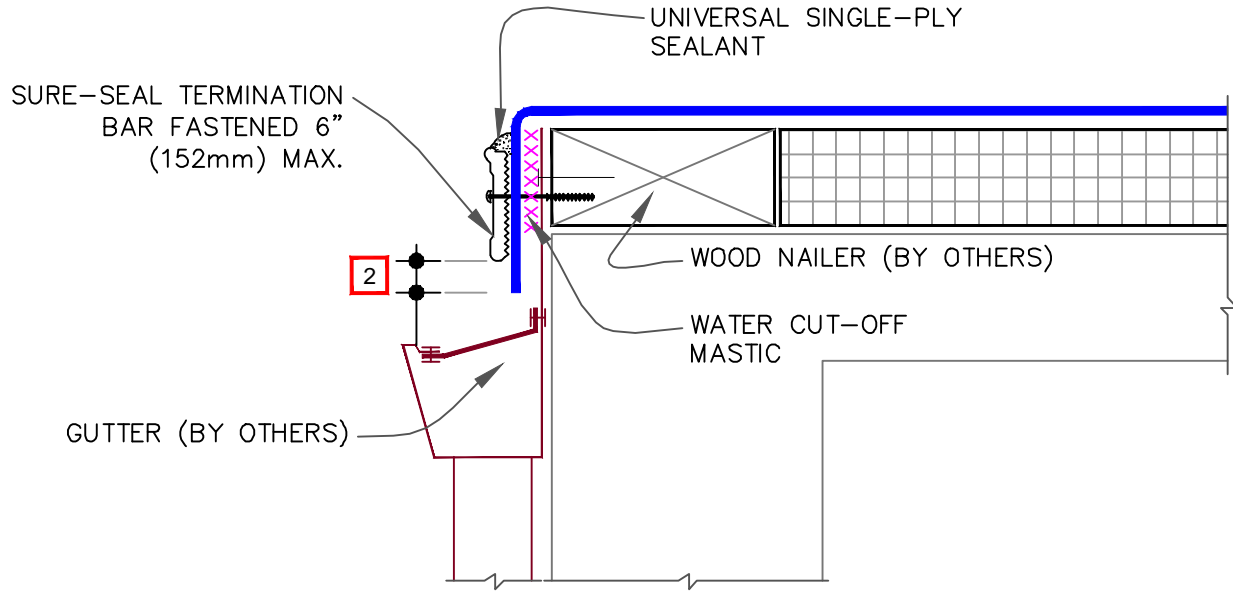




NOTES:

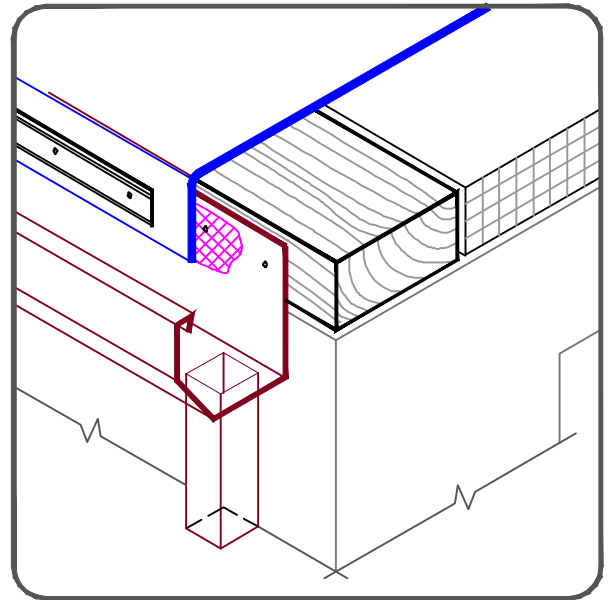
- WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF METAL FASCIA DECK FLANGE.
- APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

	<p>— THERMOPLASTIC REINFORCED MEMBRANE</p>	<p><b>SecurWELD COATED DRIP EDGE FASCIA</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p>
	<p>— APPROVED INSULATION</p>			<p><b>U-1B</b></p>
	<p>— SEE NOTE(S)</p>	<p>THERMOPLASTIC UNIVERSAL</p>		

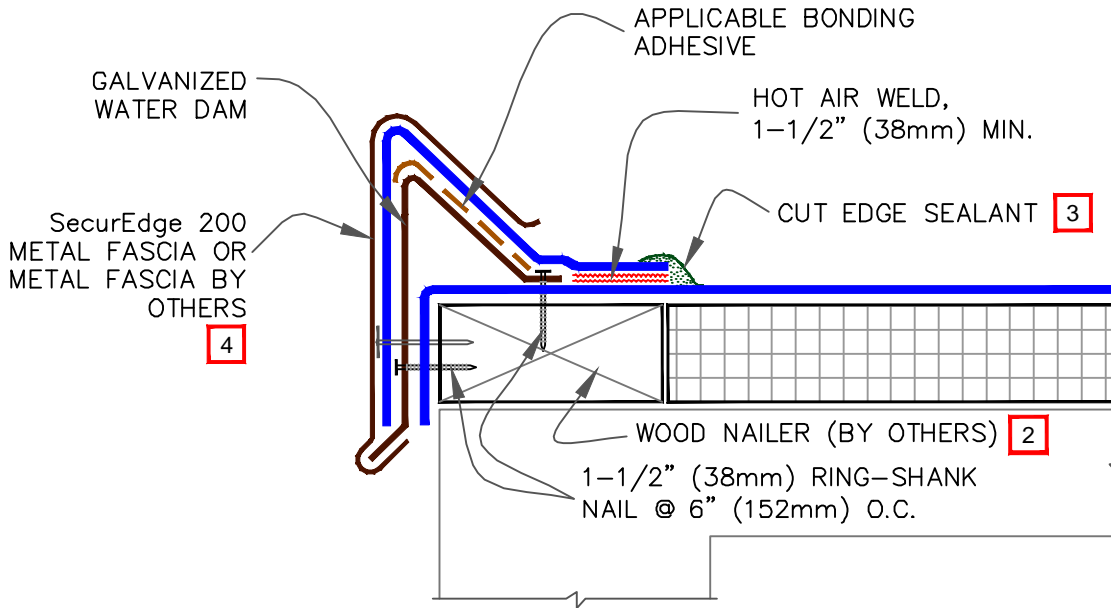


NOTE:

1. FASTENING OF METAL TERMINATION BAR MUST PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
2. ALLOW MEMBRANE SHEET TO EXTEND 1/2" (13mm) MINIMUM BELOW THE METAL TERMINATION BAR.

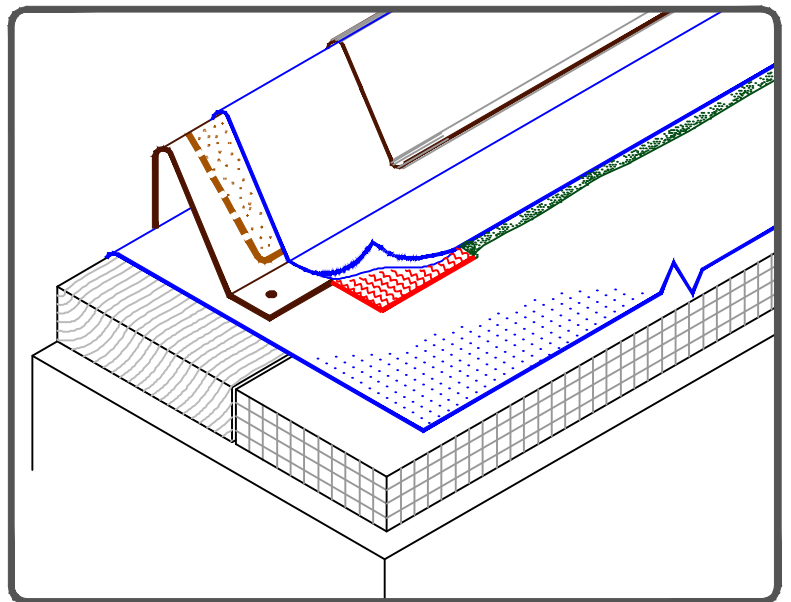


<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p><span style="border: 1px solid red; padding: 2px;">0</span> SEE NOTE(S)</p>	<p><b>METAL BAR EDGE TERMINATION</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p style="font-size: 24pt; font-weight: bold;">U-1C</p> <p>THERMOPLASTIC UNIVERSAL</p>
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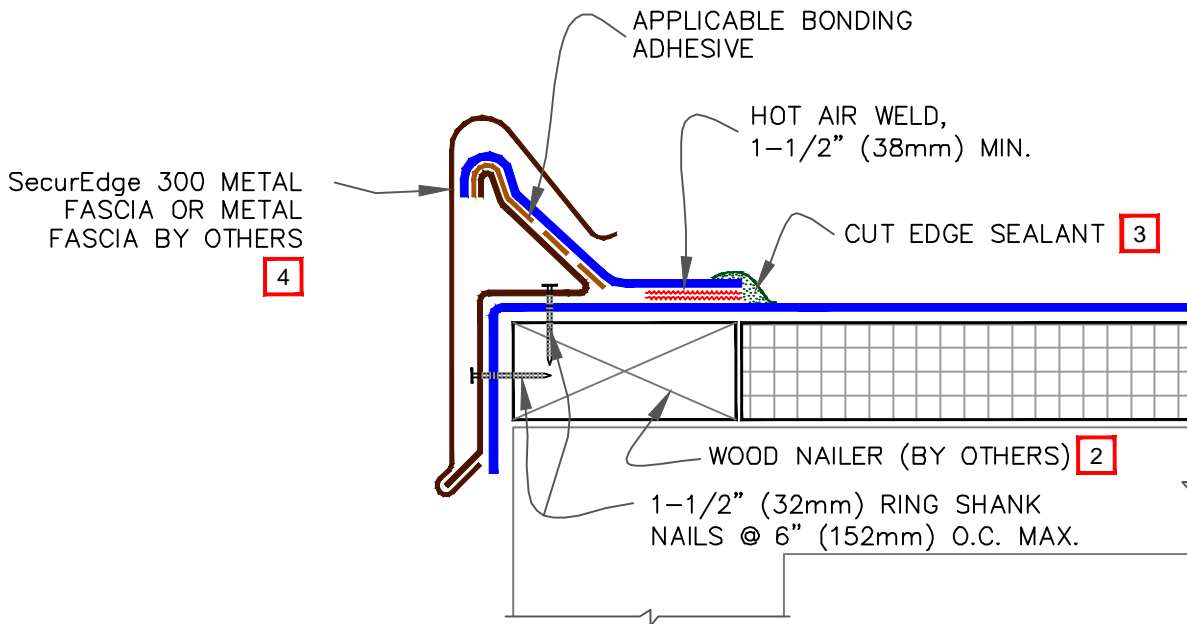


NOTES:

1. REFER TO [SecurEdge 200 INSTRUCTION MANUAL](#) FOR STEP-BY-STEP INSTALLATION PROCEDURES.
2. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF SecurEdge DECK FLANGE.
3. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.

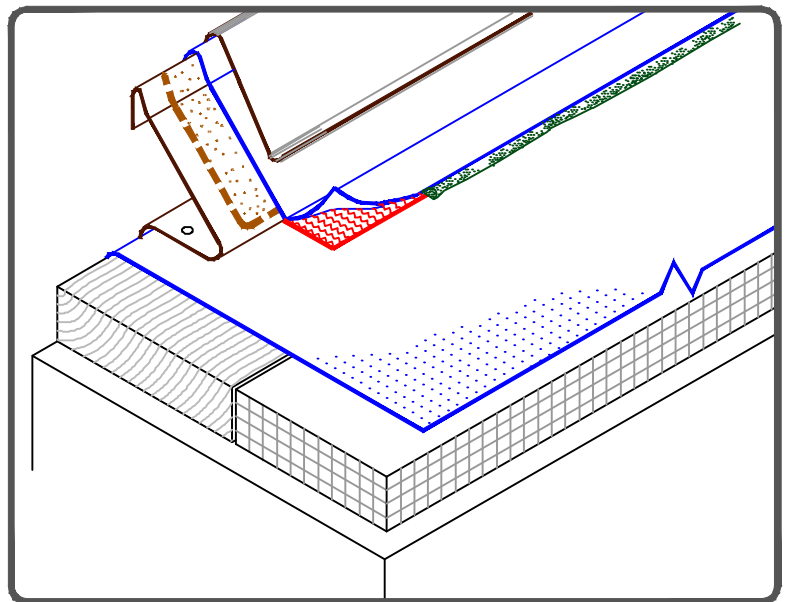


<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p> SEE NOTE(S)</p>	<p><b>CARLISLE SecurEdge 200</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-1D</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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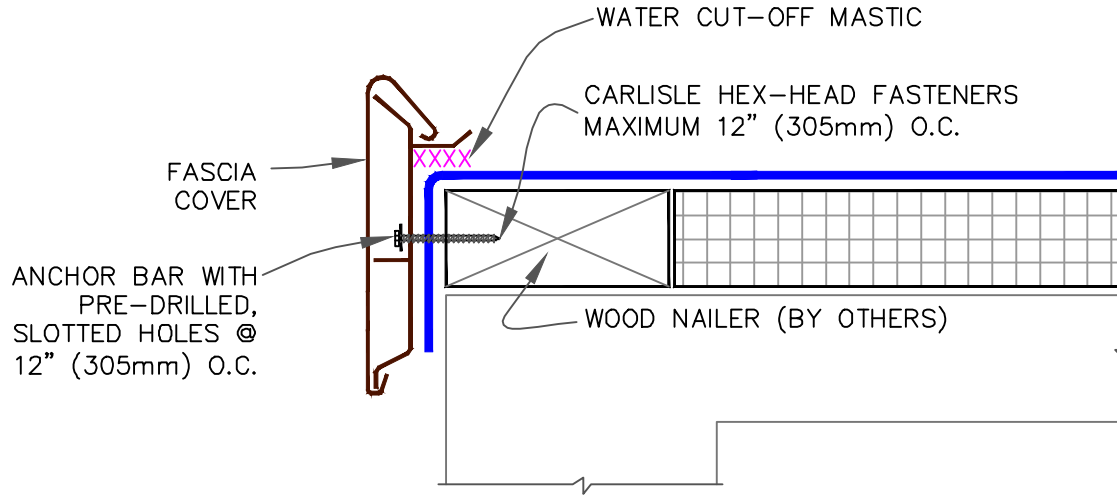


NOTES:

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. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



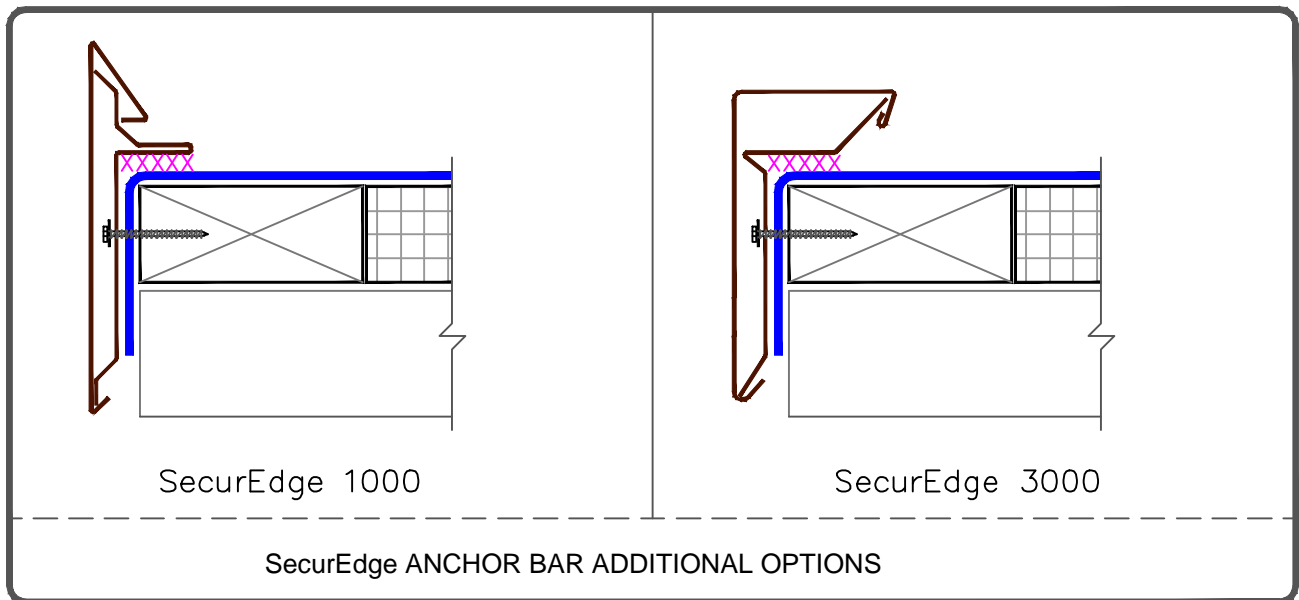
<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p> SEE NOTE(S)</p>	<p><b>CARLISLE SecurEdge 300</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-1E</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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SecurEdge 2000

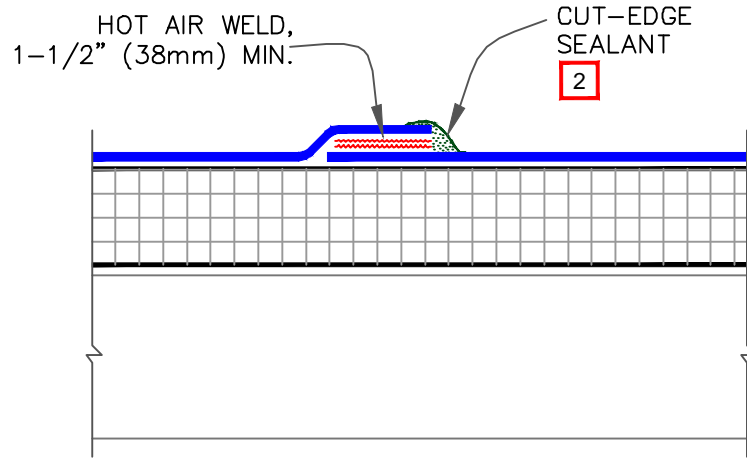
NOTES:

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.



SecurEdge ANCHOR BAR ADDITIONAL OPTIONS

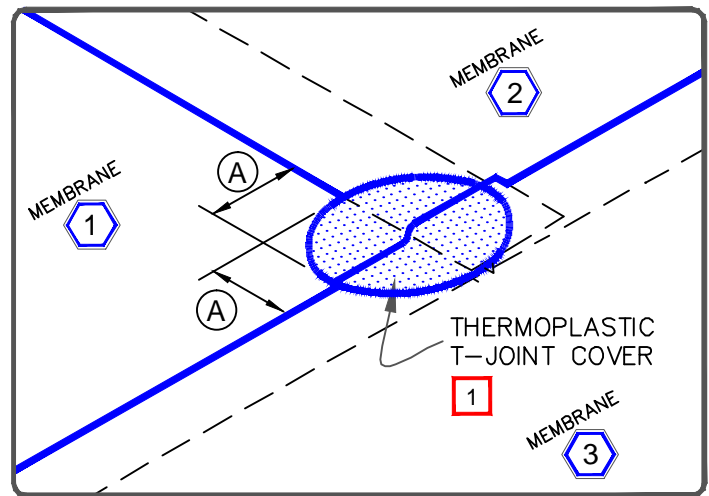
<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p><span style="border: 1px solid red; padding: 2px;">0</span> SEE NOTE(S)</p>	<p><b>CARLISLE SecurEdge</b> 1000, 2000, &amp; 3000</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-1F</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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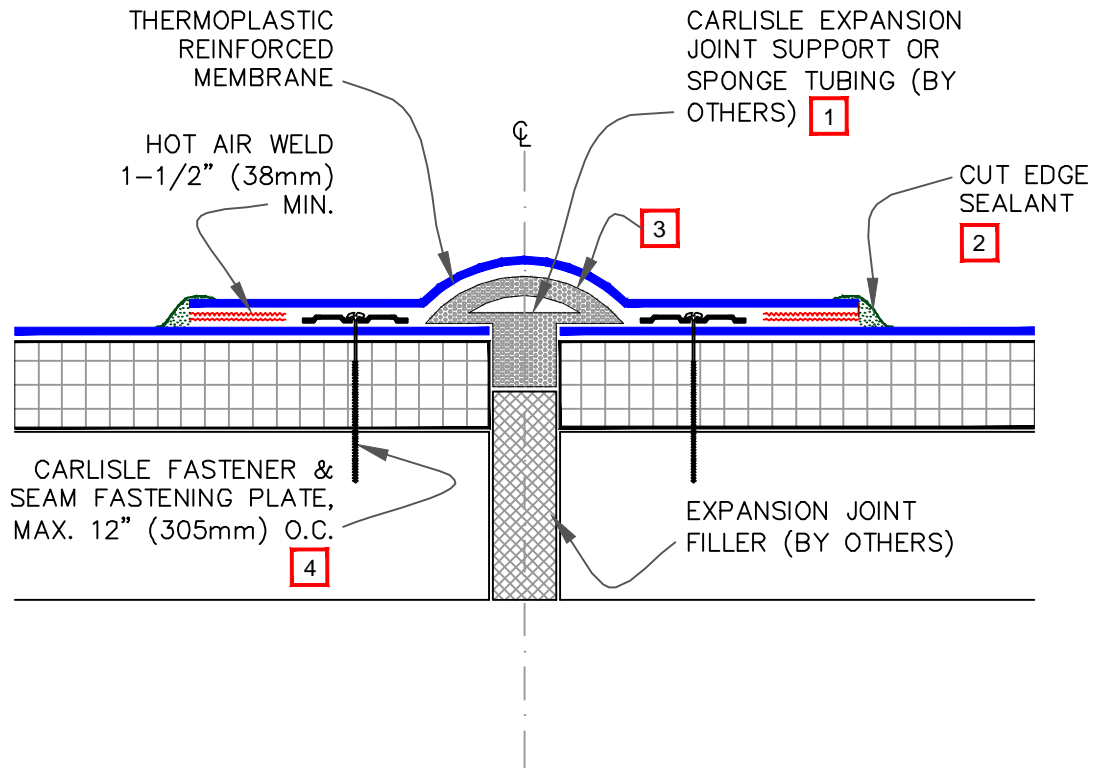
DIMENSIONS	mm	
(A)	2-1/4"	57 MIN.

NOTE:

1. WHEN USING 60 OR 80-MIL MEMBRANE, APPLY A 4-1/2" (114mm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.




 <ul style="list-style-type: none"> <li>● THERMOPLASTIC REINFORCED MEMBRANE</li> </ul>	<p><b>MEMBRANE SPLICE</b></p> <p>For additional information, refer to Specifications</p>		DETAIL NO.
 <ul style="list-style-type: none"> <li>● APPROVED INSULATION</li> </ul>			<b>U-2</b>
 <ul style="list-style-type: none"> <li>● SEE NOTE(S)</li> </ul>			THERMOPLASTIC UNIVERSAL



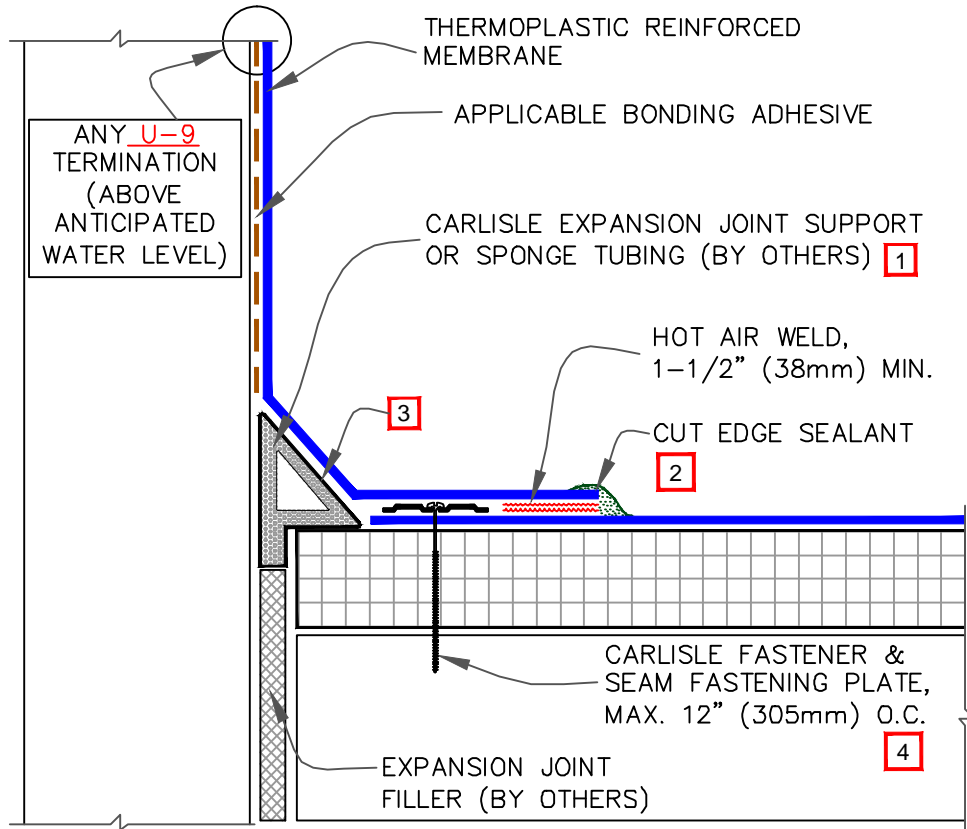
NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (19mm) AND SHALL NOT EXCEED 3" (75mm).
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
3. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.
4. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.

<p>—● THERMOPLASTIC REINFORCED MEMBRANE</p> <p>—● APPROVED INSULATION</p> <p>0 —● SEE NOTE(S)</p>	<p>DECK-TO-DECK EXPANSION DETAIL</p> <p>For additional information, refer to Specifications</p>	 <p>DETAIL NO.</p> <p><b>U-3A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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CAUTION

WHEN A WARRANTY WIND SPEED GREATER THAN 90MPH IS SPECIFIED, CARLISLE FASTENERS AND SEAM FASTENING PLATES SHALL NOT EXCEED 6" (152mm) ON CENTER FOR ADHERED MEMBRANE ASSEMBLIES.

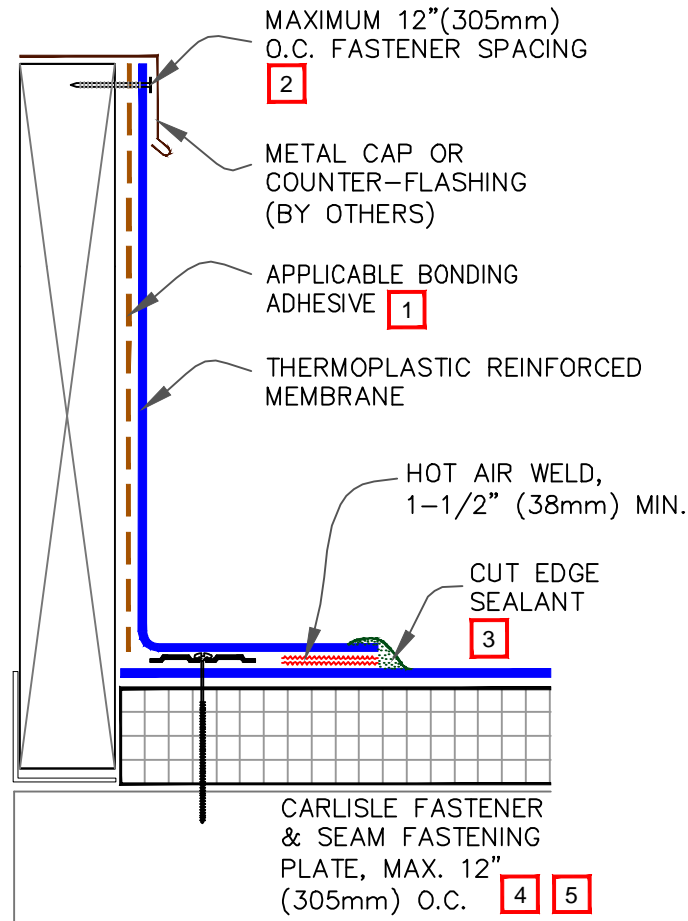


NOTES:

1. WHEN CARLISLE EXPANSION JOINT SUPPORT IS USED, WIDTH OF JOINT SHALL BE A MINIMUM OF 3/4" (19mm) AND SHALL NOT EXCEED 2" (51mm).
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
3. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.
4. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.

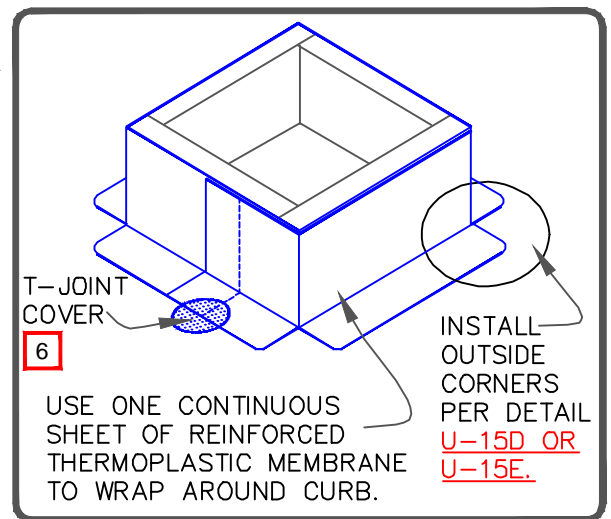
THERMOPLASTIC REINFORCED MEMBRANE	DECK-TO-WALL EXPANSION DETAIL			DETAIL NO.
APPROVED INSULATION				<b>U-3B</b>
SEE NOTE(S)	For additional information, refer to Specifications		THERMOPLASTIC UNIVERSAL	



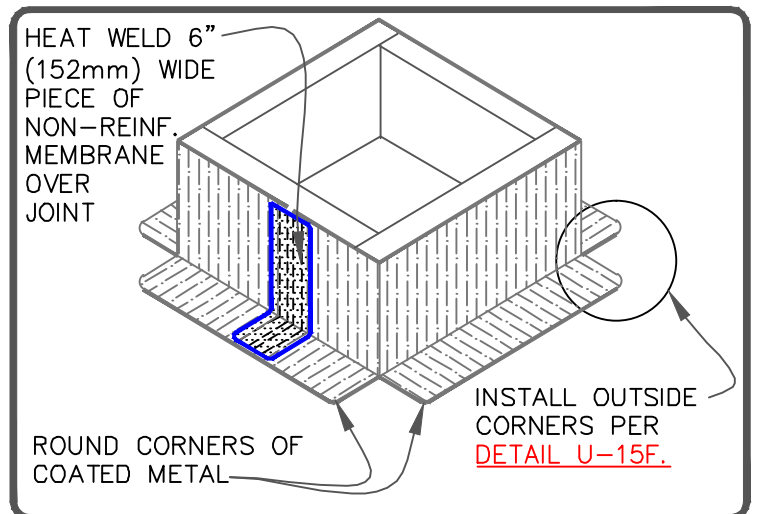
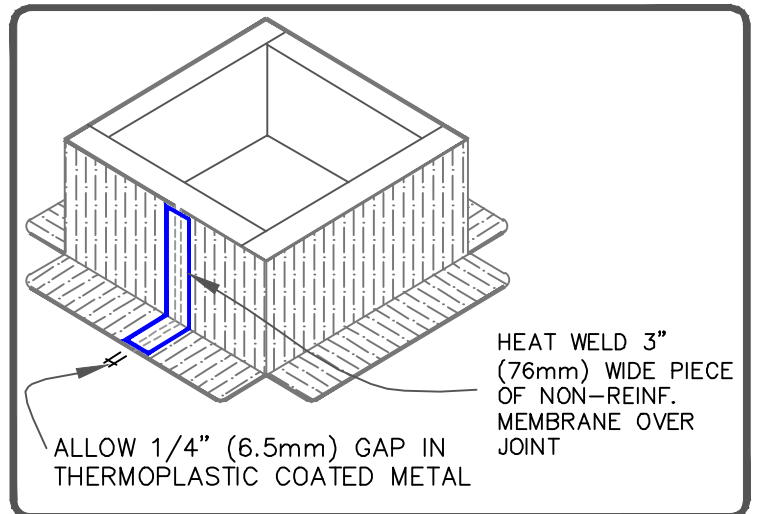
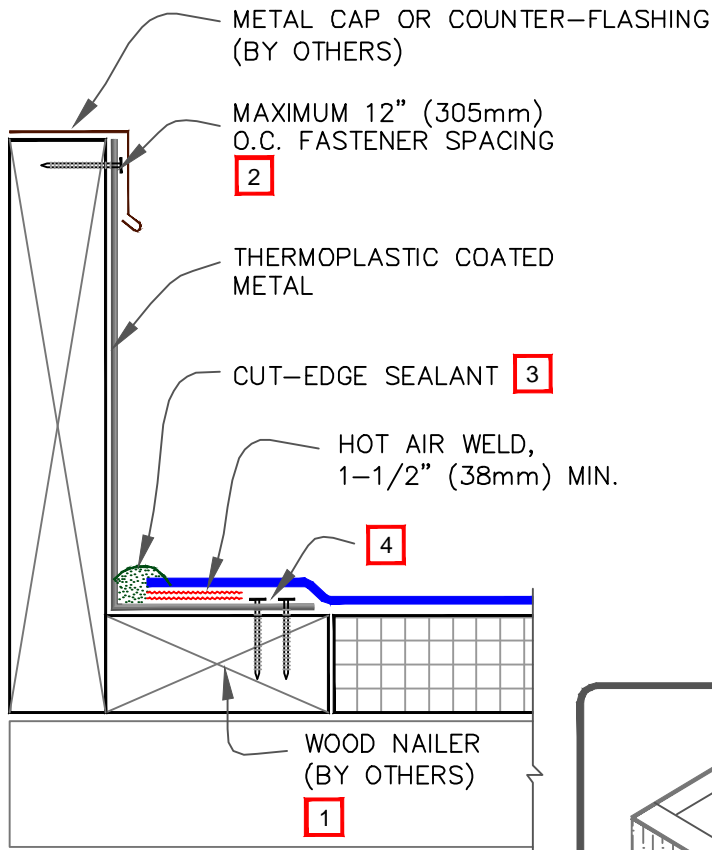


NOTES:

1. WHEN USING TPO MEMBRANE, BONDING ADHESIVE IS NOT REQUIRED WHEN THE FLASHING HEIGHT IS 12" (305mm) OR LESS AND THE MEMBRANE IS FASTENED "AS SHOWN" ON TOP OF THE CURB. WHEN CARLISLE TERMINATION BAR IS USED BENEATH THE COUNTER-FLASHING, BONDING ADHESIVE CAN BE ELIMINATED WHEN THE MEMBRANE HEIGHT IS 18" (457mm) OR LESS.
2. 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.
3. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENER AND PLATE.
5. MECHANICAL SECUREMENT MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
6. WHEN USING 60 OR 80 MIL THICK CURB FLASHING, THE INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A THERMOPLASTIC "T-JOINT" COVER.



<p>— THERMOPLASTIC REINFORCED MEMBRANE</p> <p>— APPROVED INSULATION</p> <p>— SEE NOTE(S)</p>	<p><b>CURB FLASHING</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p style="font-size: 2em;"><b>U-5A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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NOTES:

1. WOOD NAILER MUST EXTEND PAST TOTAL WIDTH OF COATED METAL DECK FLANGE.
2. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER-FLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER COUNTER-FLASHING OR CAULK THE FASTENER HEAD.
3. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. FASTEN COATED METAL USING 1-1/2" (38mm) MIN. RING SHANK NAILS AT 6" (152mm) STAGGERED APPROX. 1/2" (13mm).

	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

COATED METAL CURB FLASHING

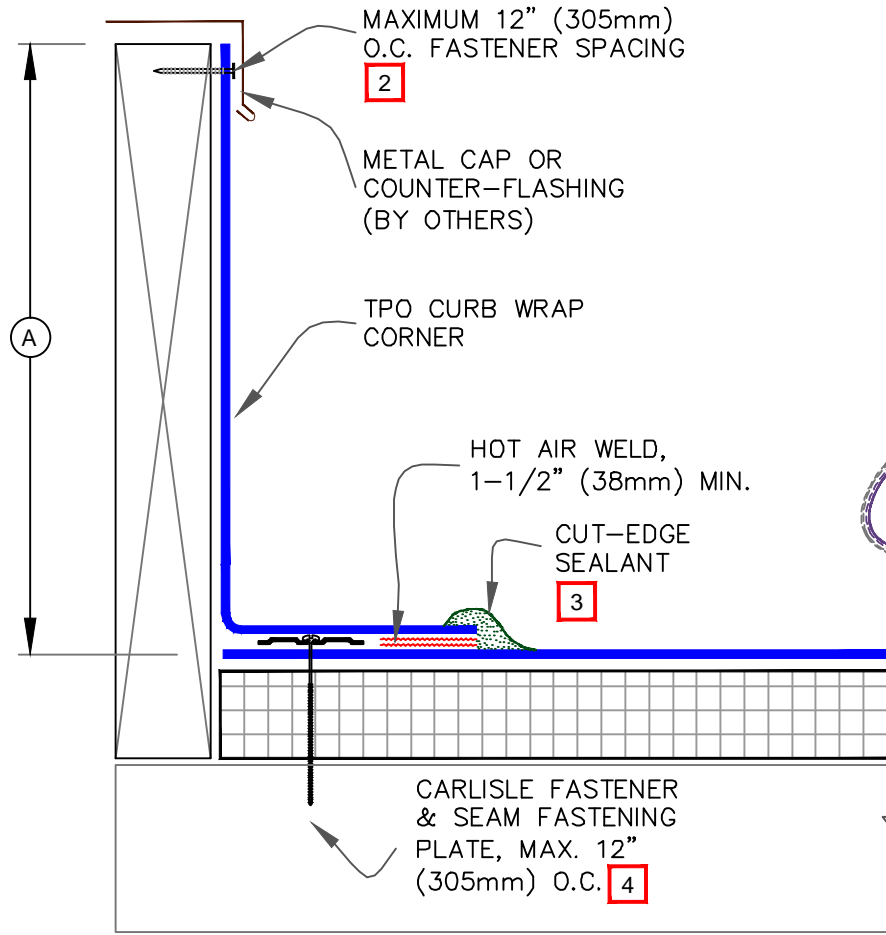
For additional information, refer to Specifications



DETAIL NO.

U-5B

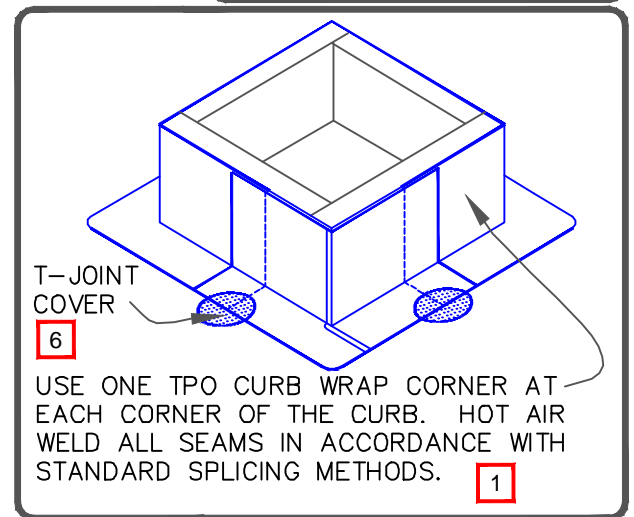
THERMOPLASTIC UNIVERSAL



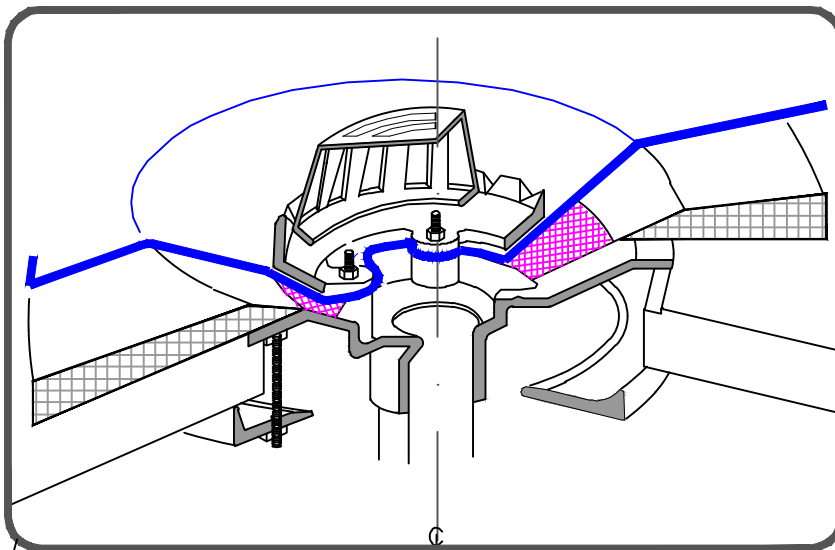
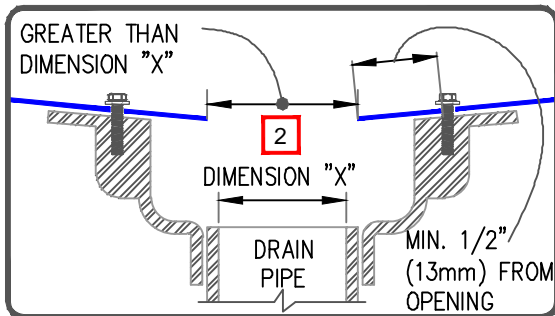
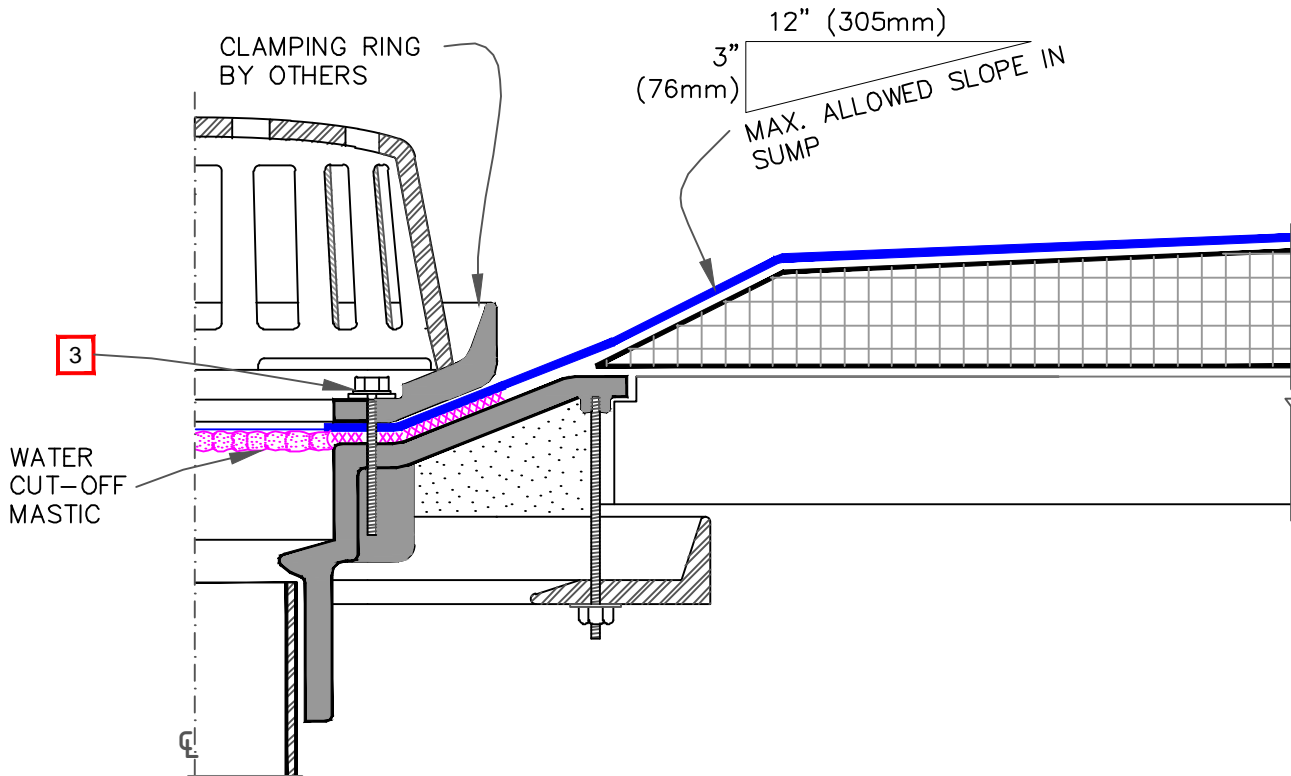
NOTES:

- FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (914mmX 914mm). FOR LARGER CURBS USE THE TPO CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF SURE-WELD TPO MEMBRANE.
- WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTERFLASHING, USE EPDM WASHERS, APPLY WATER CUT-OFF MASTIC UNDER COUNTER-FLASHING OR CAULK FASTENER HEAD.
- APPROXIMATELY 1/8" (3mm) BEAD OF CUT-EDGE SEALANT IS REQUIRED ON THE CUT EDGES OF THE TPO FIELD WRAP CORNER.
- REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
- CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (305mm).
- REGARDLESS OF THE FIELD MEMBRANE THICKNESS, THE INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A THERMOPLASTIC "T-JOINT" COVER.

DIMENSIONS		mm
(A)	12"	305



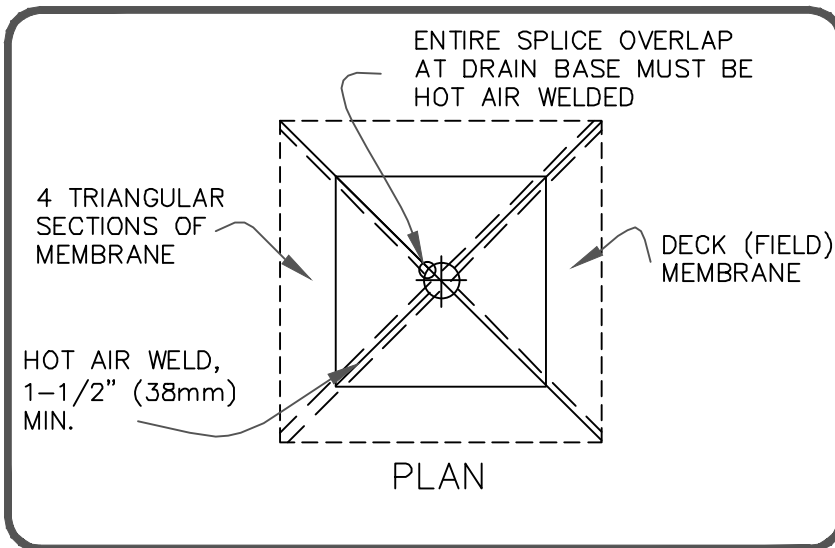
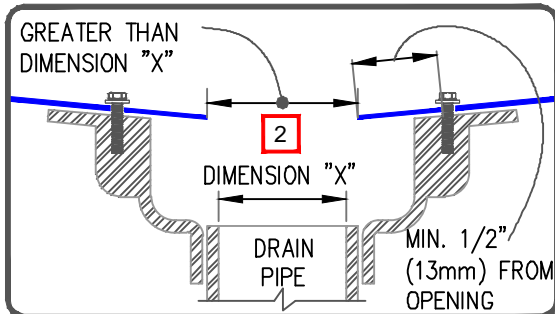
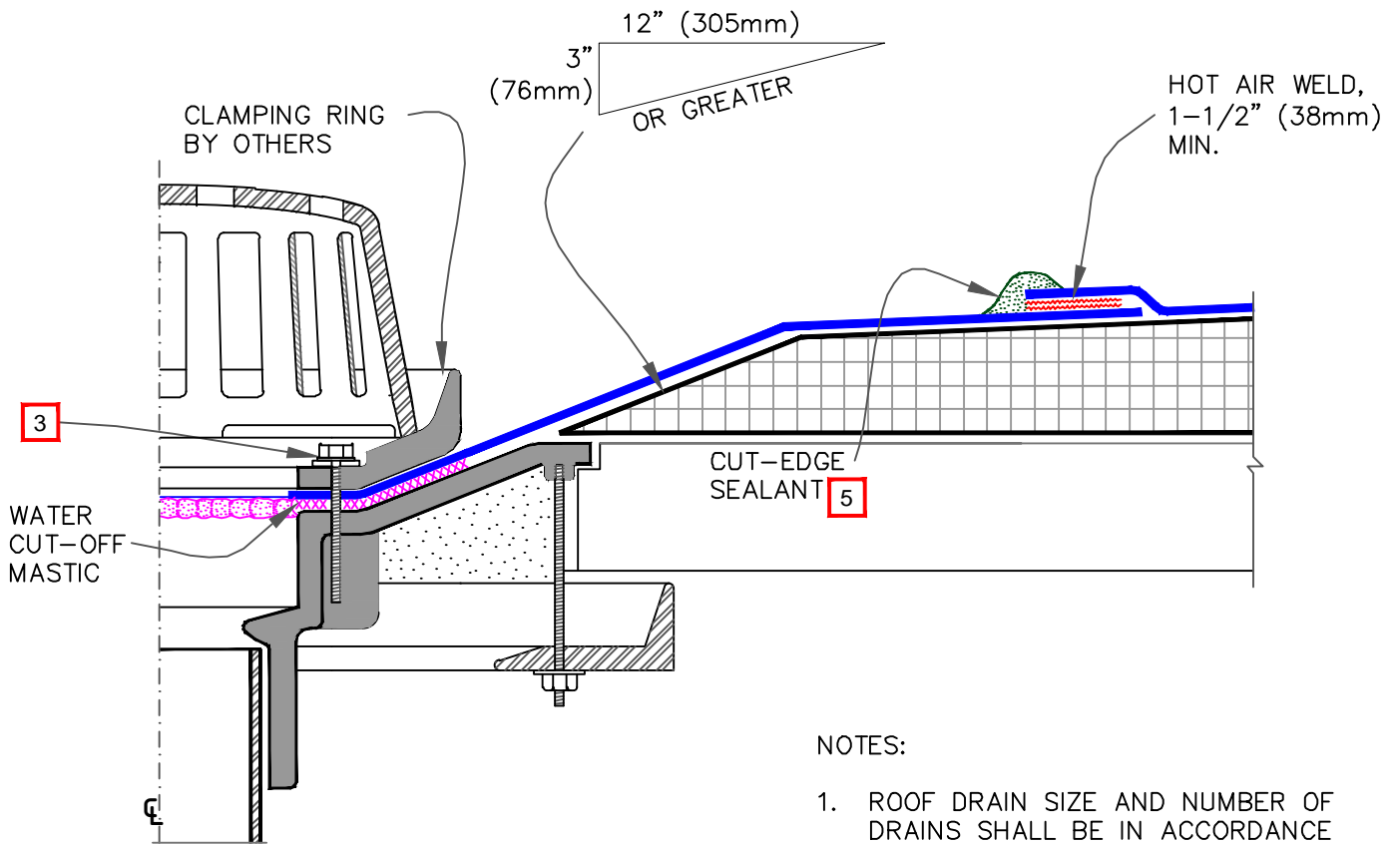
	—• TPO MEMBRANE	PRE-FABRICATED TPO CURB WRAP CORNER		DETAIL NO.
	—• APPROVED SUBSTRATE			U-5C
<b>0</b>	—• SEE NOTE(S)	For additional information, refer to Specifications	THERMOPLASTIC TPO	



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" (13mm) 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.

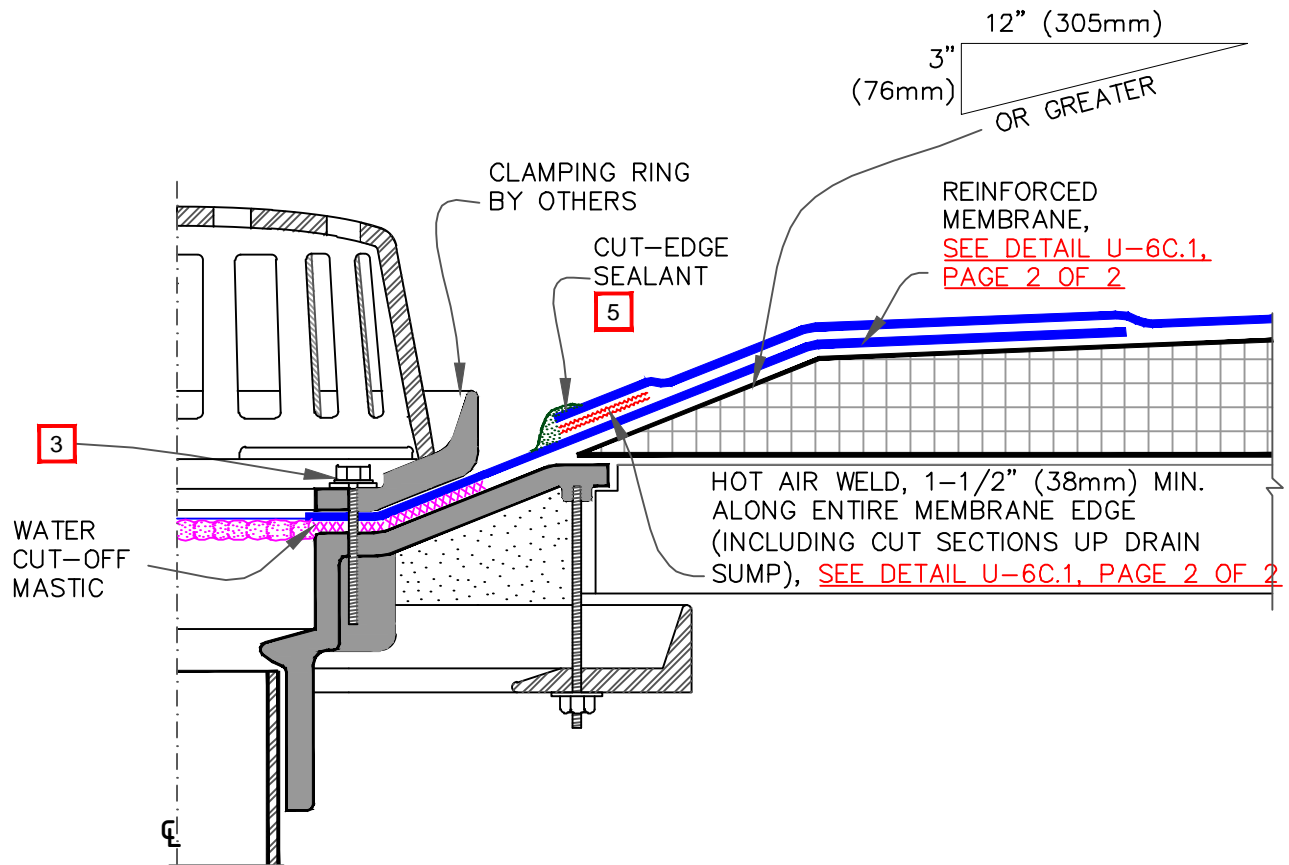
<p>—●— THERMOPLASTIC REINFORCED MEMBRANE</p> <p>—●— APPROVED INSULATION</p> <p>—●— SEE NOTE(S)</p>	<p><b>ROOF DRAIN (DRAIN SUMP UP TO 3 INCHES TO 1 HORIZONTAL FOOT)</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-6A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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NOTES:

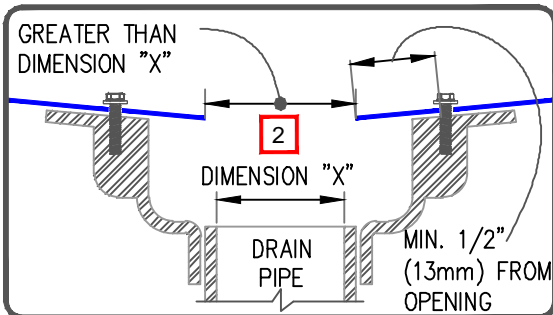
1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.
2. THE HOLE IN THE MEMBRANE SHALL EXCEED THE DIAMETER OF THE DRAIN PIPE, BUT SHALL BE NO LESS THAN 1/2" (13mm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE 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" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

THERMOPLASTIC REINFORCED MEMBRANE APPROVED INSULATION SEE NOTE(S)	<p><b>ROOF DRAIN (DRAIN SUMP GREATER THAN 3 INCHES TO 1 HORIZONTAL FOOT) - OPTION 1</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-6B</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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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" (13mm) 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" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.



	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
0	● SEE NOTE(S)

ROOF DRAIN (DRAIN SUMP GREATER THAN 3 INCHES TO 1 HORIZONTAL FOOT) - OPTION 2, PAGE 1 OF 2

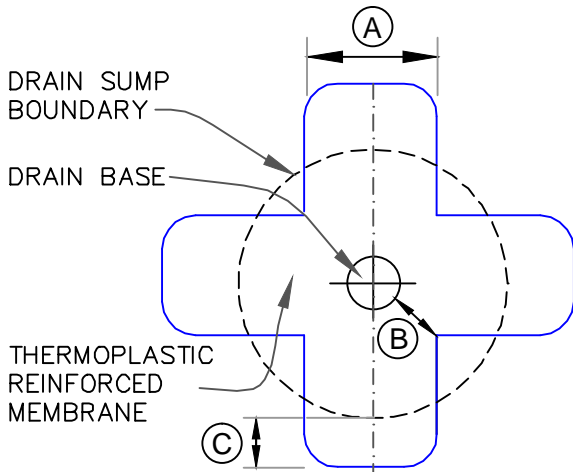
For additional information, refer to Specifications



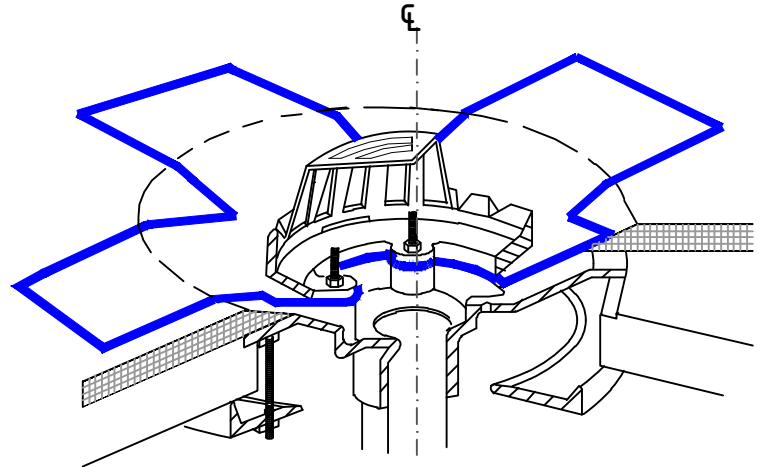
DETAIL NO.

U-6C

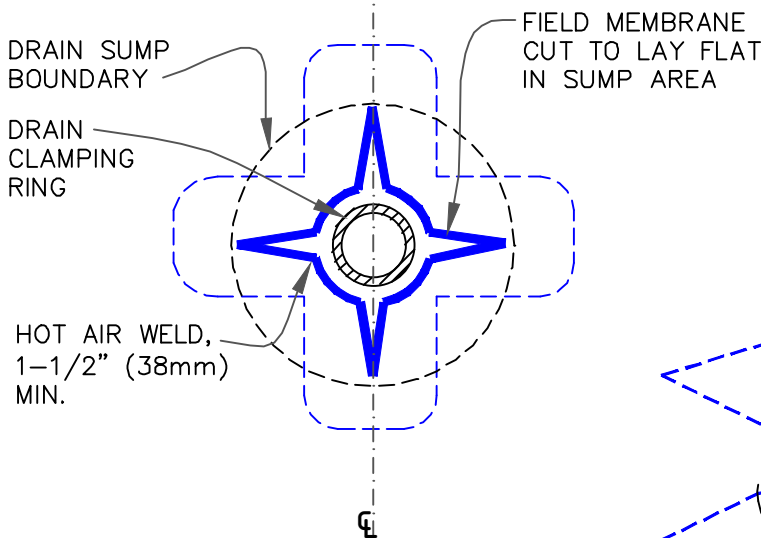
THERMOPLASTIC UNIVERSAL



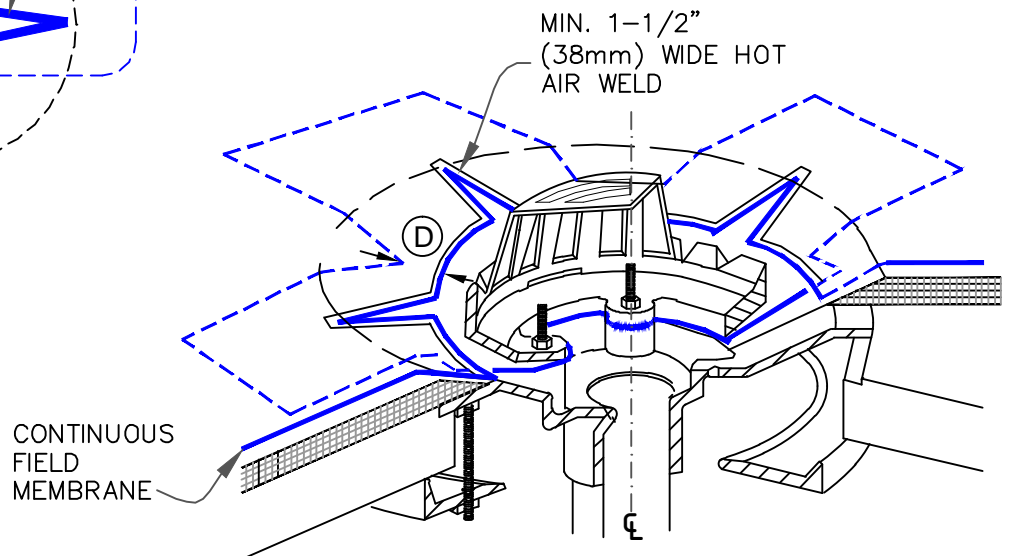
CUT SECTION OF THERMOPLASTIC REINFORCED MEMBRANE AS SHOWN AND POSITION INTO DRAIN SUMP. EXTEND MEMBRANE OUT OF DRAIN SUMP APPROXIMATELY 6" (152mm) (ROUND CORNERS).



EXTEND THERMOPLASTIC 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" (38mm) COMPLETELY SURROUNDING AREA.



DIMENSIONS		mm	
(A)	12"	305	MIN.
(B)	6"	152	MIN.
(C)	6"	152	APPROX.
(D)	3"	76	MIN.

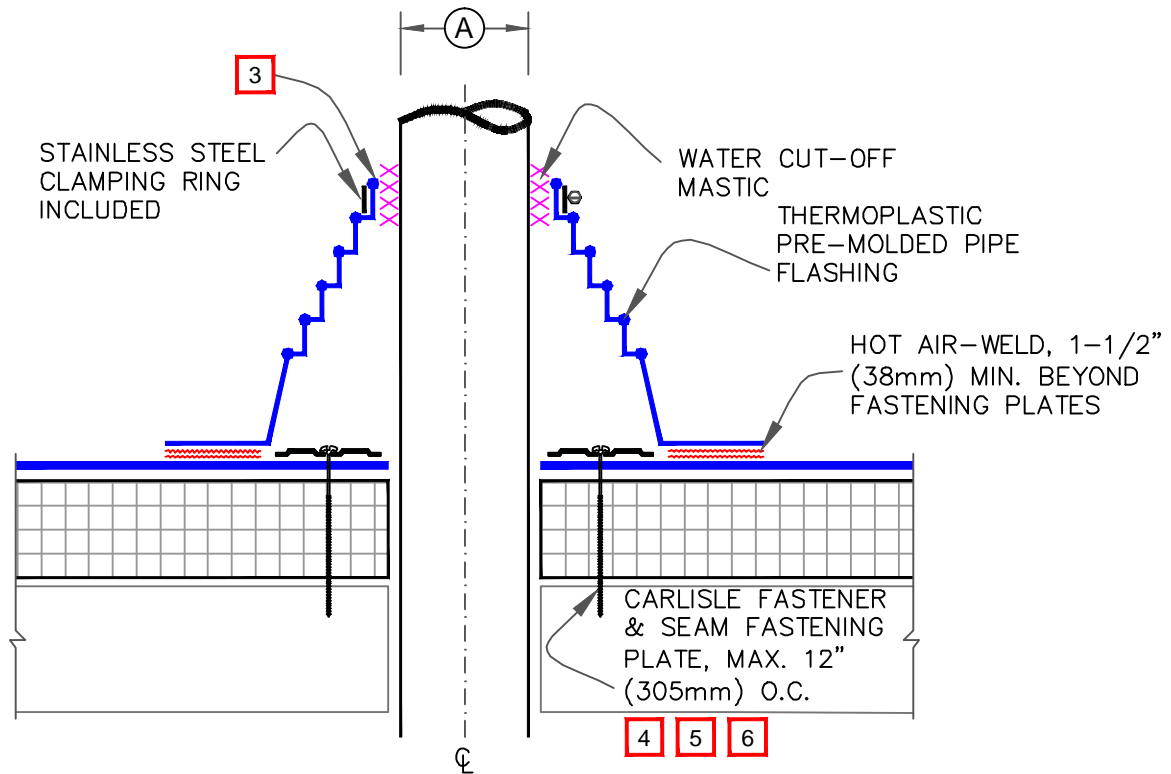


	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

**ROOF DRAIN (DRAIN SUMP GREATER THAN 3 INCHES TO 1 HORIZONTAL FOOT) - OPTION 2, PAGE 2 OF 2**

For additional information, refer to Specifications

	DETAIL NO.
	<b>U-6C.1</b>
THERMOPLASTIC UNIVERSAL	



DIMENSIONS		mm	
(A)	3/4"	19	TO
	8"	203	

NOTES:

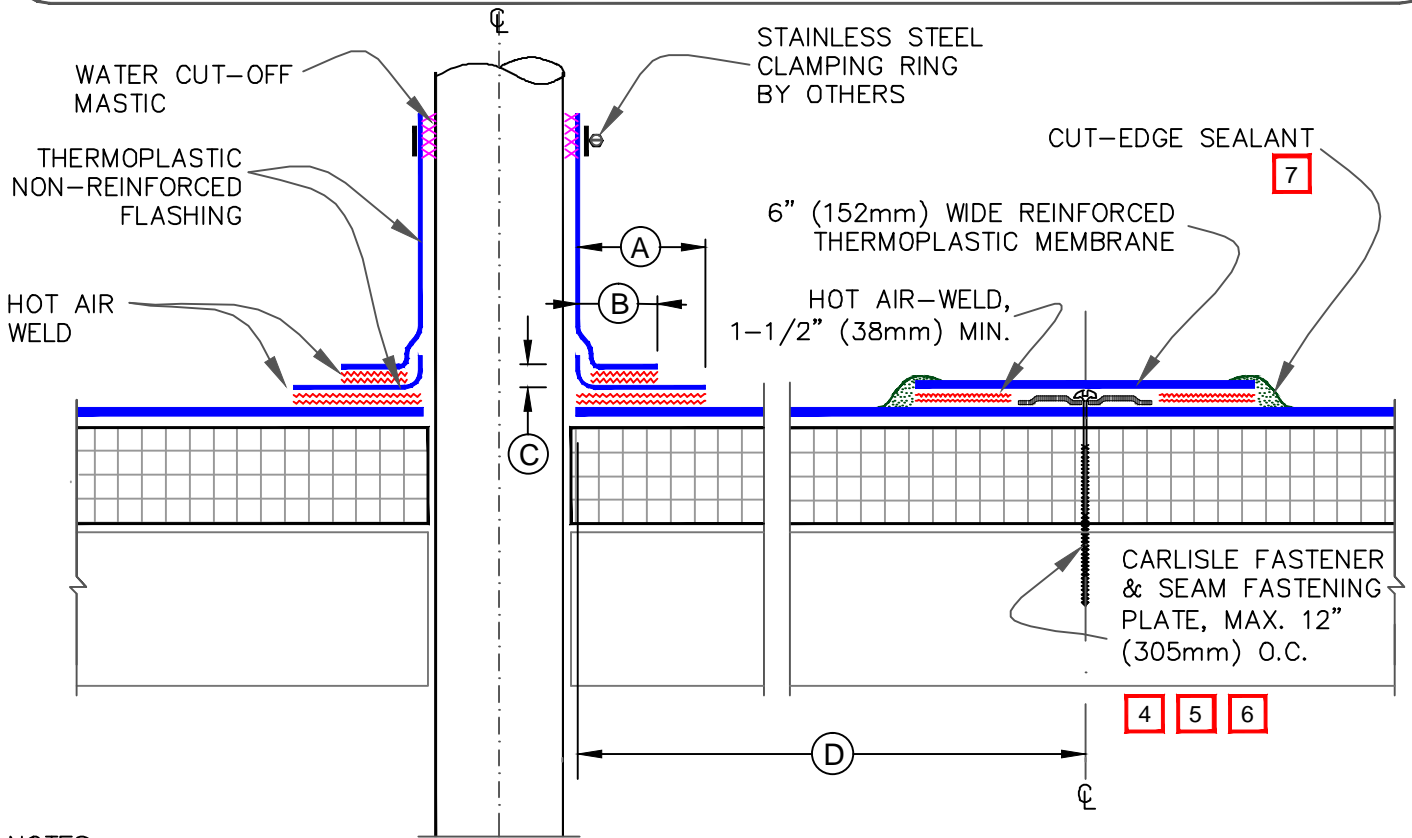
1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE-MOLDED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C) WHEN USING PVC AND 160°F (71°C) WHEN USING TPO FLASHING.
3. PIPE SEAL MUST HAVE INTACT RIB AT TOP EDGE, REGARDLESS OF PIPE DIAMETER.
4. INSTALL 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" (305mm) O.C. AND FLASHED WITH THERMOPLASTIC REINFORCED MEMBRANE/CUT-EDGE SEALANT. REFER TO [DETAIL U-8B](#).
5. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (457mm).
6. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.

<p>—● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p>PRE-MOLDED PIPE FLASHING</p> <p>For additional information, refer to Specifications</p>		DETAIL NO.
<p>—● APPROVED INSULATION</p>			U-8A
<p>—● SEE NOTE(S)</p>			THERMOPLASTIC UNIVERSAL



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 THERMOPLASTIC UNIVERSAL DETAILS U-8A, 8C OR 8D.

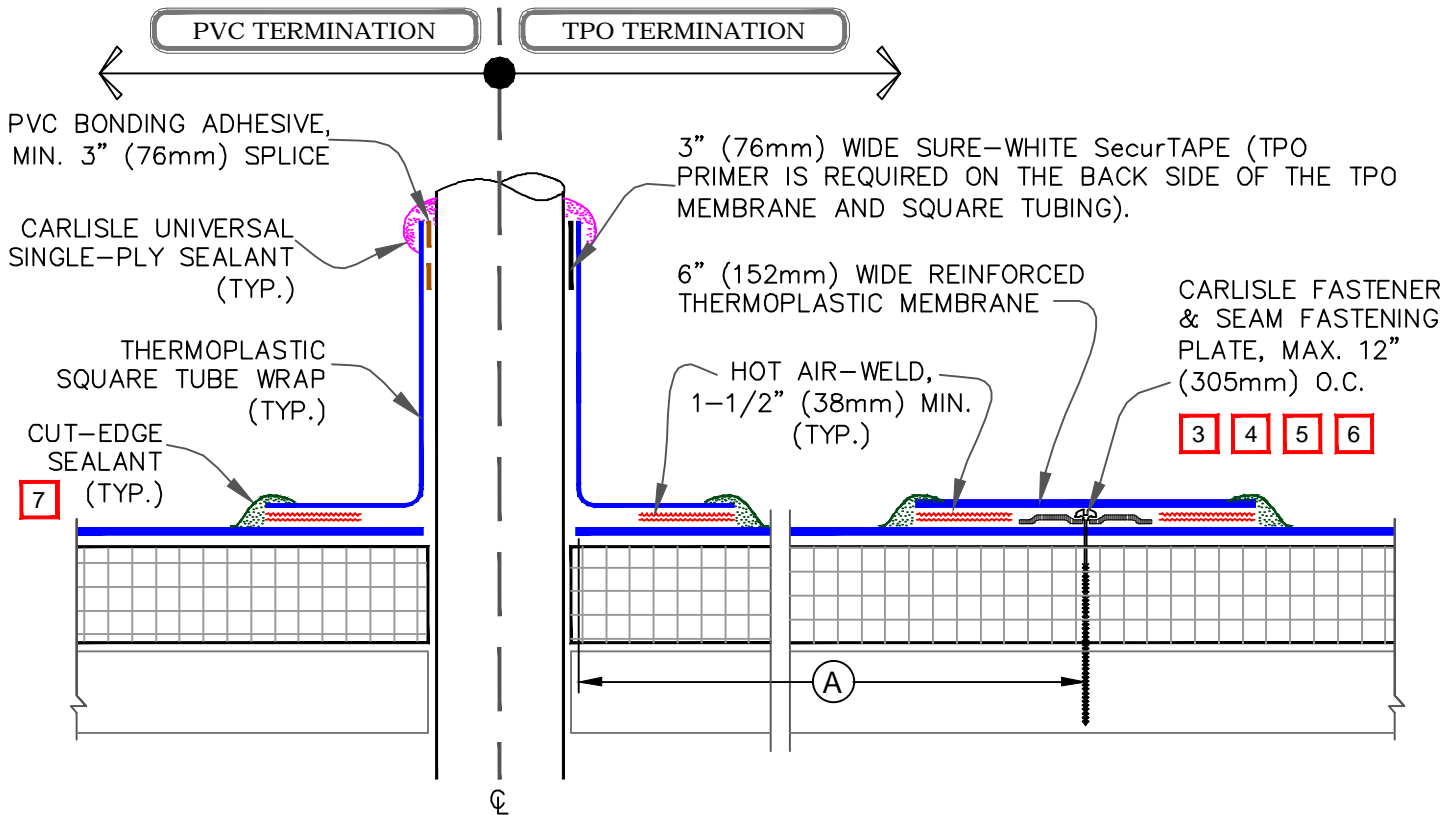


NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING FIELD FABRICATED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 140°F (60°C) WHEN USING PVC AND 160°F (71°C) WHEN USING TPO FLASHING.
3. THERMOPLASTIC NON-REINFORCED FLASHING WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2" (38mm) VERTICAL HOT AIR WELD.
4. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR PIPES WITH A DIAMETER UP TO 6" (152mm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (152mm) IN DIAMETER AND SHALL BE SPACED 12" (305mm) ON CENTER MAXIMUM.
5. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (500mm).
6. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
7. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

DIMENSIONS	mm	
(A)	1-1/2"	38 TO
	2"	51
(B)	1"	25 MIN.
(C)	1/2"	13 MIN.
(D)	12"	305 APPROX.

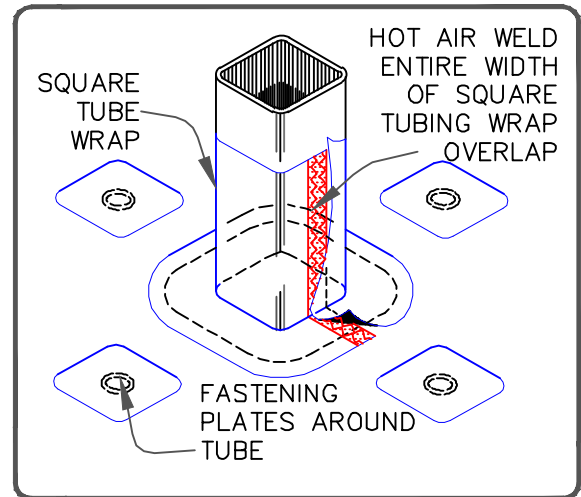
<ul style="list-style-type: none"> <li>— THERMOPLASTIC REINFORCED MEMBRANE</li> <li>— APPROVED INSULATION</li> <li>0 — SEE NOTE(S)</li> </ul>	<p><b>FIELD FABRICATED PIPE FLASHING</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-8B</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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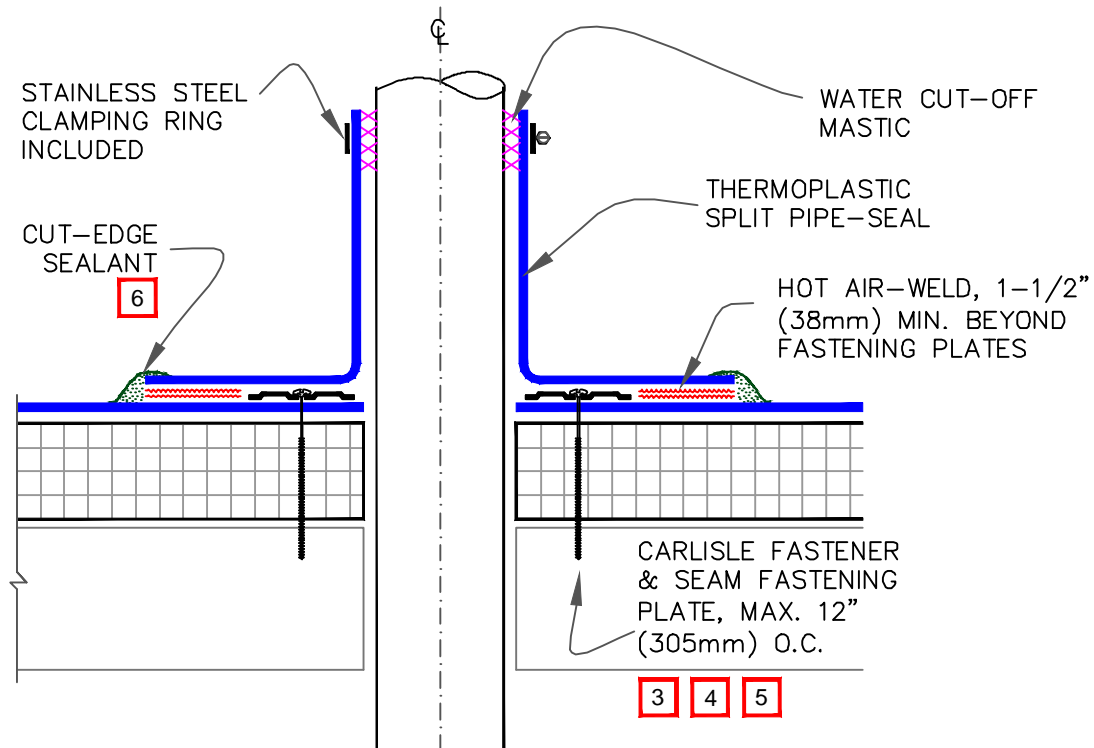
NOTES:

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) WHEN USING PVC AND 160°F (71°C) WHEN USING TPO FLASHING.
3. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR TUBE SIDE DIMENSIONS UP TO 6" (152mm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR SIDES GREATER THAN 6" (152mm) AND SHALL BE SPACED 12" (305mm) ON CENTER MAXIMUM.
4. SEAM PLATES MAY BE POSITIONED INSIDE (OR BELOW) THE PIPE FLASHING FLANGE PROVIDED MINIMUM 1-1/2" (38mm) HOT AIR WELD IS ACHIEVED BEYOND THE PLATES.
5. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS TUBE DIMENSION EXCEEDS 12" (305mm).
6. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
7. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
8. REGARDLESS OF THE FIELD MEMBRANE THICKNESS, THERMOPLASTIC "T-JOINT" COVERS ARE REQUIRED OVER THE SPLICE INTERSECTIONS OF THE SQUARE TUBE WRAP.

DIMENSIONS	mm	
(A) 12"	305	APPROX.

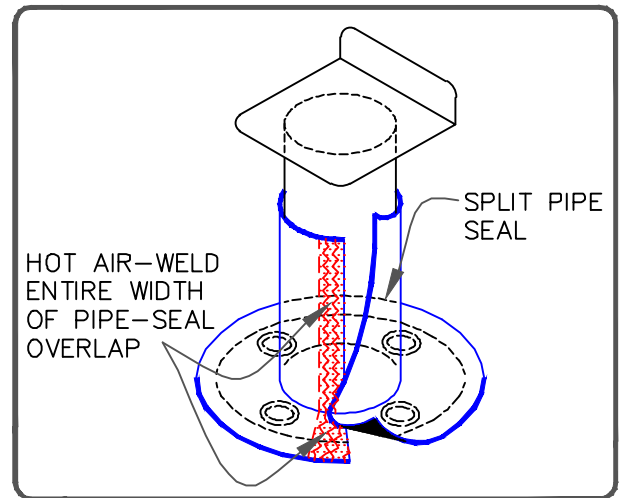


<p>— THERMOPLASTIC REINFORCED MEMBRANE</p> <p>— APPROVED INSULATION</p> <p>0 — SEE NOTE(S)</p>	<p><b>PRE-FABRICATED SQUARE TUBE WRAP</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-8C</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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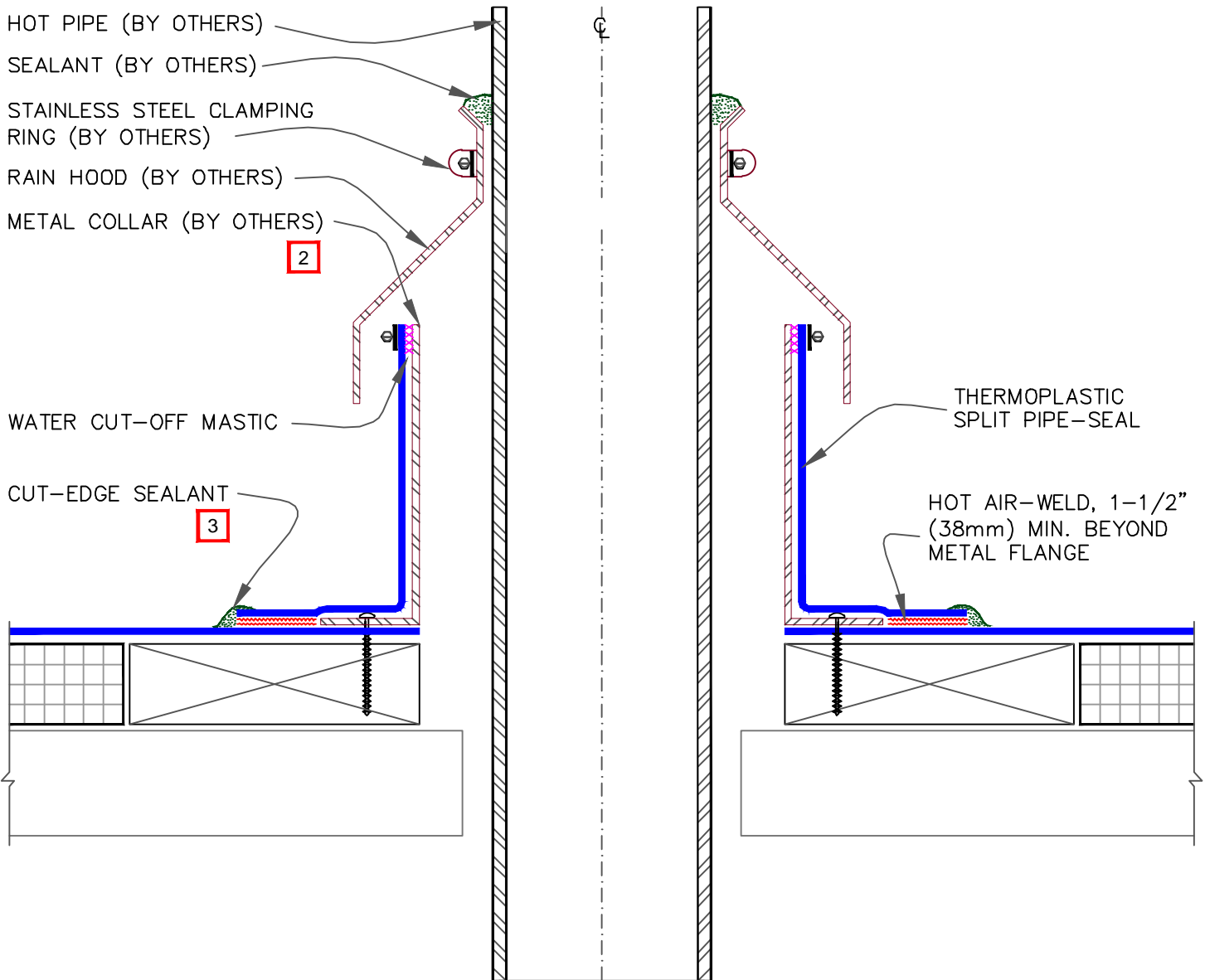


NOTES:

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) WHEN USING PVC AND 160°F (71°C) WHEN USING TPO FLASHING.
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" (305mm) O.C. AND FLASHED WITH THERMOPLASTIC 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" (457mm).
5. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
6. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
7. REGARDLESS OF THE FIELD MEMBRANE THICKNESS, THERMOPLASTIC "T-JOINT" COVERS ARE REQUIRED OVER THE SPLICE INTERSECTIONS OF THE SPLIT PIPE SEAL.



	<p>—● THERMOPLASTIC REINFORCED MEMBRANE</p> <p>—● APPROVED INSULATION</p> <p>—● SEE NOTE(S)</p>	<p><b>PRE-FABRICATED SPLIT PIPE SEAL</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-8D</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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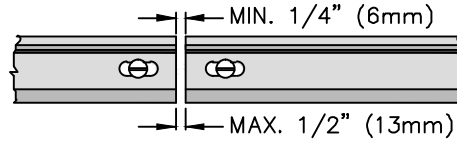
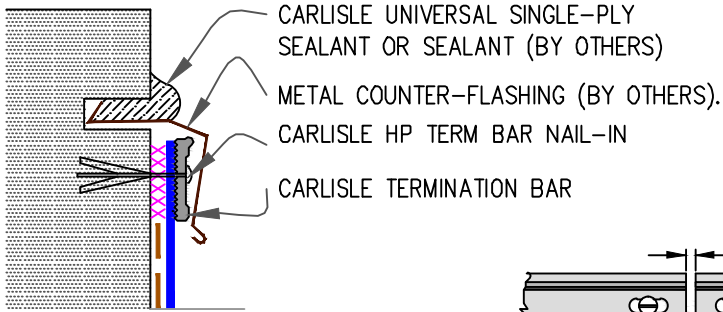
NOTES:

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) WHEN USING PVC AND 160°F (71°C) WHEN USING TPO FLASHING.
3. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
4. REGARDLESS OF THE FIELD MEMBRANE THICKNESS, THERMOPLASTIC "T-JOINT" COVERS ARE REQUIRED OVER THE SPLICE INTERSECTIONS OF THE SPLIT PIPE SEAL.

<p>● THERMOPLASTIC REINFORCED MEMBRANE</p> <p>● APPROVED INSULATION</p> <p>0 ● SEE NOTE(S)</p>	<p><b>HOT PIPE FLASHING</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-8E</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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9A

MECHANICAL TERMINATION WITH COUNTER FLASHING

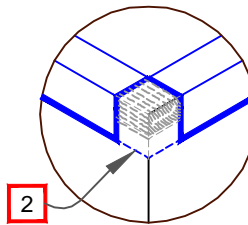
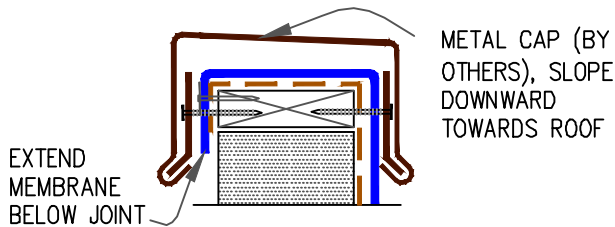


NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY; NOT FOR USE ON EXPOSED WOOD.
2. DO NOT WRAP TERMINATION BAR AROUND CORNERS.

9B

SHEET METAL COPING (BY OTHERS)

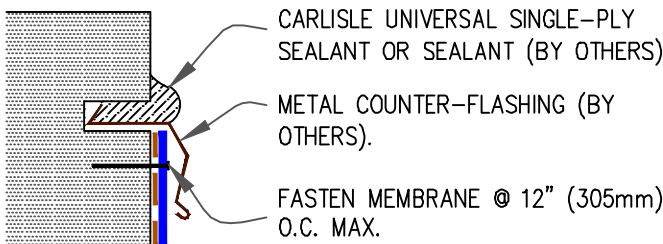


NOTES:

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

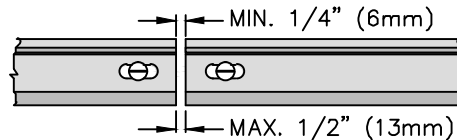
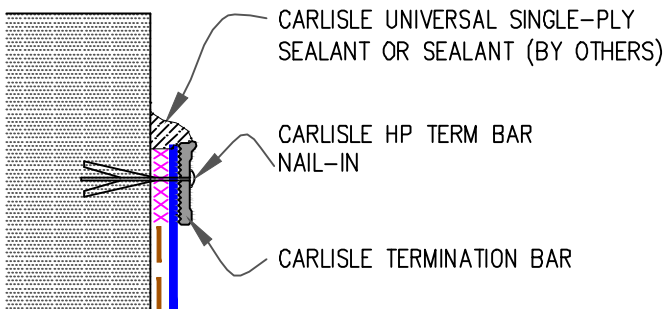


NOTES:

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 COMPRESSION TERMINATION BAR AROUND CORNERS.
3. DETAIL NOT FOR USE ON WARRANTY PROJECTS EXCEEDING 20-YEARS.

— APPLICABLE BONDING ADHESIVE

xxxxxxx WATER CUT-OFF MASTIC- MUST BE HELD UNDER CONSTANT COMPRESSION.

- THERMOPLASTIC REINFORCED MEMBRANE
- APPROVED INSULATION
- 0 — SEE NOTE(S)

MEMBRANE TERMINATIONS  
PAGE 1 OF 2

For additional information, refer to Specifications

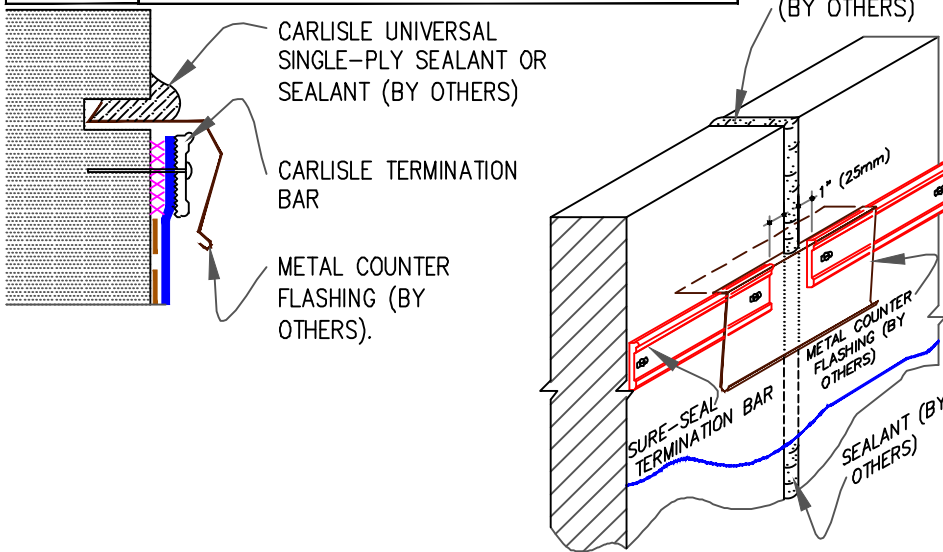


DETAIL NO.

U-9

THERMOPLASTIC UNIVERSAL

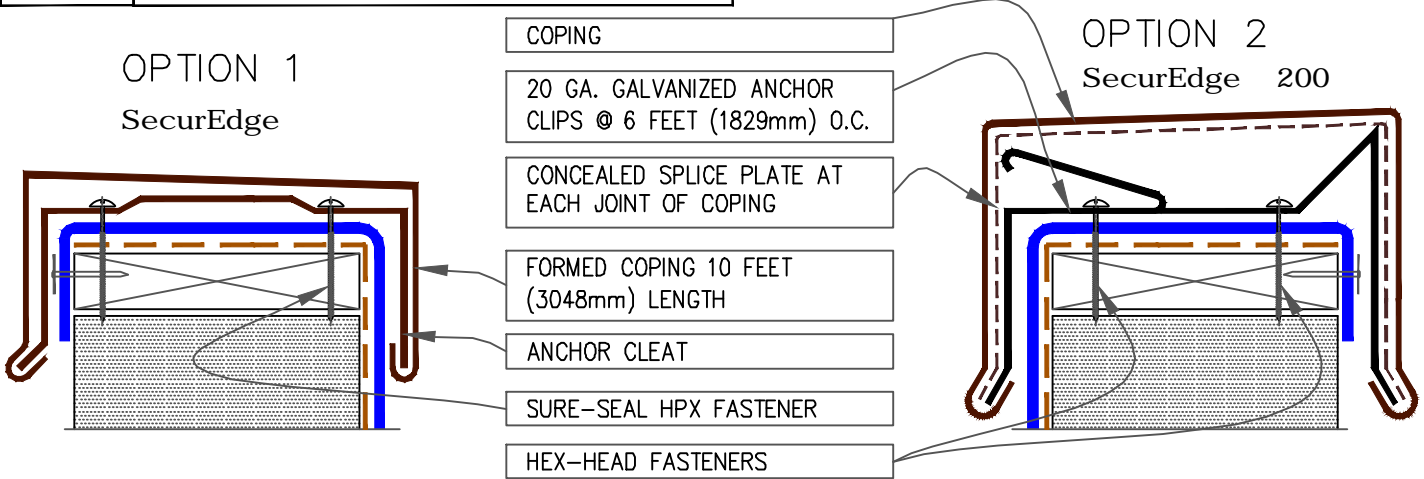
**9E** MECHANICAL TERMINATION AT VERTICAL JOINT



NOTES:

1. APPLY ON HARD SMOOTH SURFACE ONLY.
2. DO NOT WRAP COMPRESSION TERMINATION BAR AROUND CORNERS.
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. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.

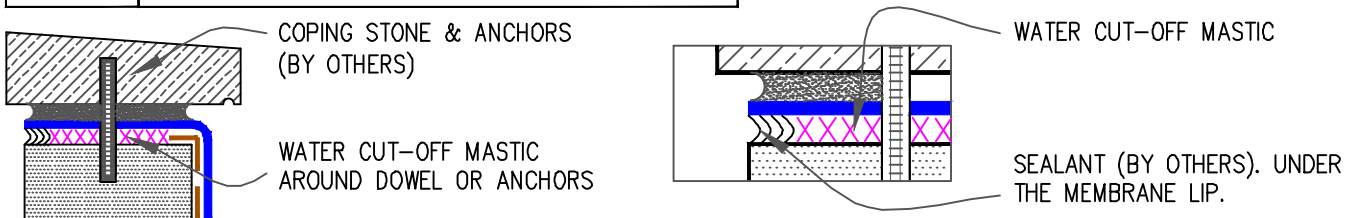
**9F** SecurEDGE COPING



NOTE:

1. MEMBRANE SHOULD 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



— APPLICABLE BONDING ADHESIVE

XXXXXXX WATER CUT-OFF MASTIC— MUST BE HELD UNDER CONSTANT COMPRESSION.

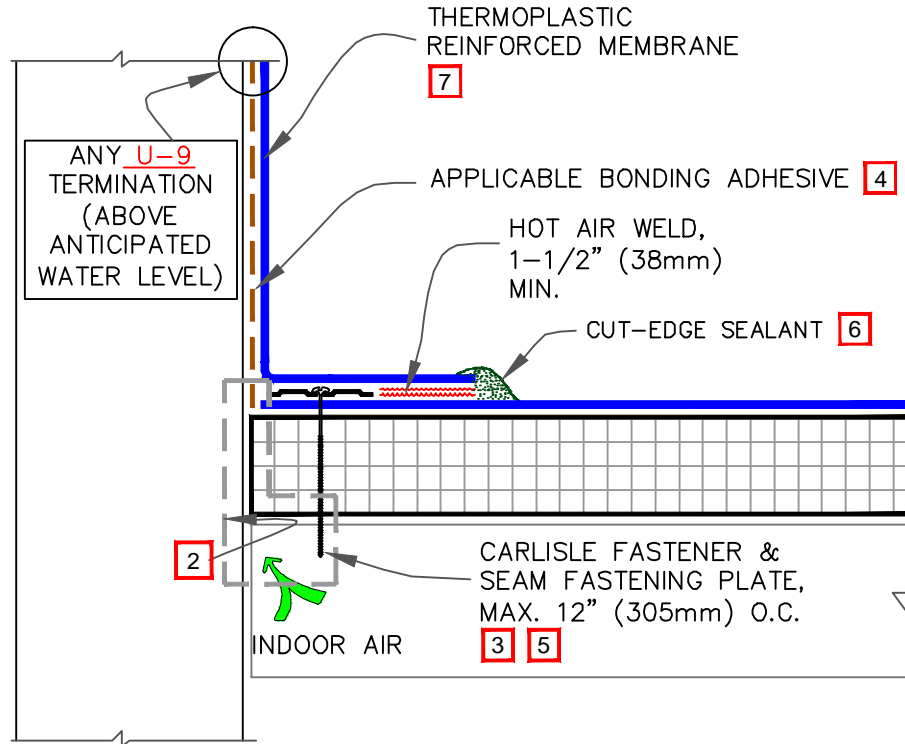
THERMOPLASTIC REINFORCED MEMBRANE  
 APPROVED INSULATION  
 SEE NOTE(S)

**MEMBRANE TERMINATIONS**  
 PAGE 2 OF 2  
 For additional information, refer to Specifications

DETAIL NO.  
**U-9.1**  
 THERMOPLASTIC UNIVERSAL

CAUTION

WHEN A WARRANTY WIND SPEED GREATER THAN 90MPH IS SPECIFIED, CARLISLE FASTENERS AND SEAM FASTENING PLATES SHALL NOT EXCEED 6" (152mm) ON CENTER FOR ADHERED MEMBRANE ASSEMBLIES.



NOTES:

1. POSITION FASTENING PLATES 1/2" (13mm) TO 1" (25mm) FROM EDGE OF DECK MEMBRANE.
2. REFER TO SPECIAL CONDITION [SPEC. SUPPLEMENTS G-01-11 OR G-08-11](#):
  - 2.1. TO BLOCK INDOOR AIR INFILTRATION AND HUMIDITY AT THE JUNCTION (G-01-11).
  - 2.2. WHERE ROOF SYSTEM IS DESIGNED WITH A VAPOR RETARDER (G-08-11).
3. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
4. WHEN USING TPO MEMBRANE, BONDING ADHESIVE IS NOT REQUIRED WHEN THE FLASHING HEIGHT IS 12" (305mm) AND COUNTERFLASHING IS USED FOR TERMINATION. WHEN COPING OR CARLISLE TERMINATION BAR IS USED, BONDING ADHESIVE MAY BE ELIMINATED WHEN THE FLASHING HEIGHT IS 18" (457mm) OR LESS.
5. IN A CASE WHERE FASTENERS MUST BE FASTENED INTO THE VERTICAL SURFACE, 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.
6. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
7. WHEN PARAPET WALL HEIGHT EXCEEDS 48" (1219mm), REFER TO DETAILS U-12D OR U-12E FOR ADDITIONAL REQUIREMENTS WHEN USING PVC MEMBRANE ONLY.

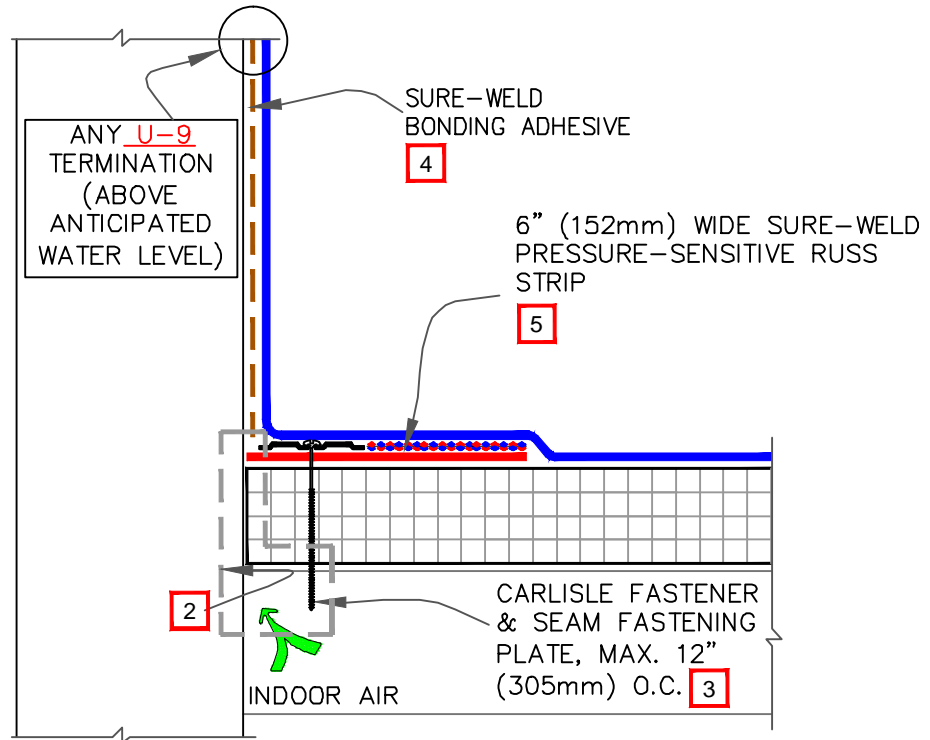
THERMOPLASTIC REINFORCED MEMBRANE	<p>PARAPET FLASHING</p> <p>For additional information, refer to Specifications</p>			DETAIL NO.
APPROVED INSULATION				<p>U-12A</p>
SEE NOTE(S)			THERMOPLASTIC UNIVERSAL	



CAUTION

WHEN A WARRANTY WIND SPEED GREATER THAN 90MPH IS SPECIFIED, CARLISLE FASTENERS AND SEAM FASTENING PLATES SHALL NOT EXCEED 6" (152mm) ON CENTER FOR ADHERED MEMBRANE ASSEMBLIES.

TPO ONLY  
(NOT FOR PVC)

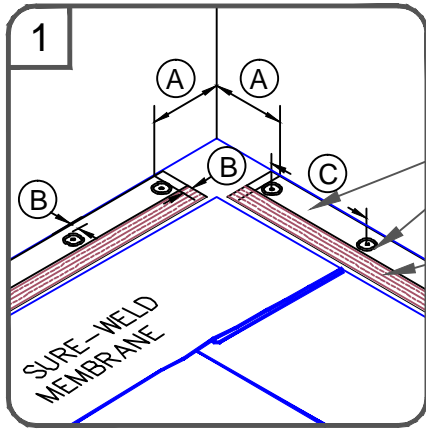


NOTES:

1. FOR INSIDE CORNER AND RUSS APPLICATION SEE [PAGE 2.](#)
2. REFER TO SPECIAL CONDITION [SPEC. SUPPLEMENTS G-01-11 OR G-08-11:](#)
  - 2.1. TO BLOCK INDOOR AIR INFILTRATION AND HUMIDITY AT THE JUNCTION (G-01-11).
  - 2.2. WHERE ROOF SYSTEM IS DESIGNED WITH A VAPOR RETARDER (G-08-11).
3. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. ON CONCRETE DECKS, CD-10 OR HD 14-10 FASTENERS ARE USED WITH PIRANHA PLATES.
4. WHEN COUNTERFLASHING IS USED FOR TERMINATION, BONDING ADHESIVE IS NOT REQUIRED WHEN FLASHING HEIGHT IS 12" (305 mm) OR LESS. WHEN COPING OR TERMINATION BAR IS USED, ADHESIVE MAY BE ELIMINATED WHEN FLASHING HEIGHT IS 18" (457mm) OR LESS.
5. TPO PRIMER MUST BE APPLIED TO BACK SIDE OF THE SURE-WELD MEMBRANE PRIOR TO COMPLETING SPLICE TO PRESSURE-SENSITIVE RUSS.
6. IN A CASE WHERE FASTENERS MUST BE FASTENED INTO THE VERTICAL SURFACE, CARE MUST BE TAKEN TO CREASE THE 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 RUSS IN THE PROPER POSITION.

—● TPO MEMBRANE —● APPROVED SUBSTRATE —● SEE NOTE(S)	PARAPET FLASHING WITH PRESSURE-SENSITIVE RUSS- PAGE 1 OF 2 For additional information, refer to Specifications		DETAIL NO. <b>U-12B</b> THERMOPLASTIC TPO
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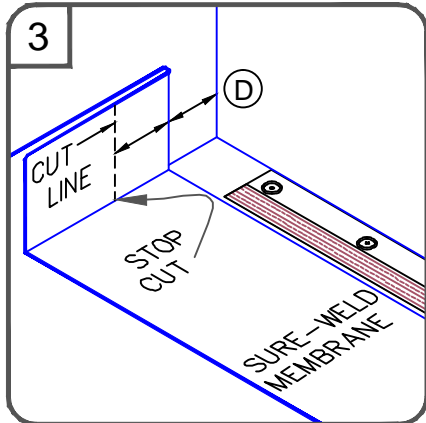
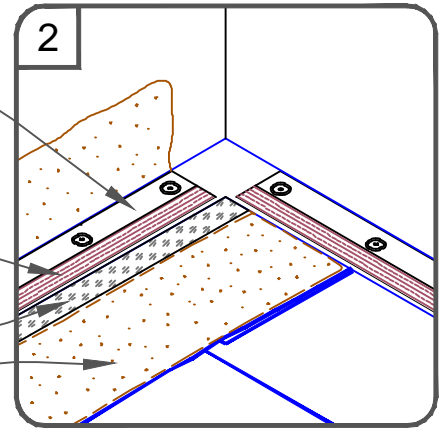
6" (152mm) WIDE  
PRESSURE-SENSITIVE  
RUSS

CARLISLE FASTENER &  
SEAM FASTENING PLATE,  
MAX. 12" (305mm) O.C.

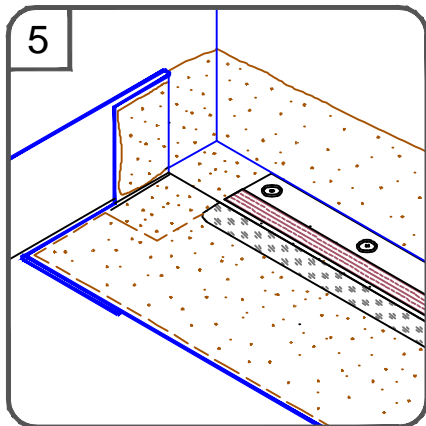
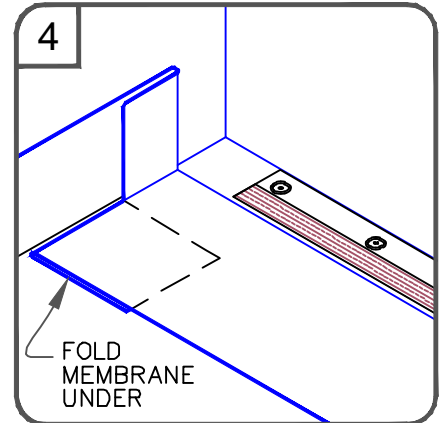
PRE-APPLIED  
PRESSURE-SENSITIVE TAPE

TPO PRIMER

SURE-WELD  
BONDING ADHESIVE



DIMENSIONS		mm	
(A)	6"	152	TO
	9"	229	
(B)	1/8"	3	MIN.
	1"	25	MAX.
(C)	12"	305	MIN.
(D)	6"	152	MIN.
(E)	1-1/2"	38	MIN.

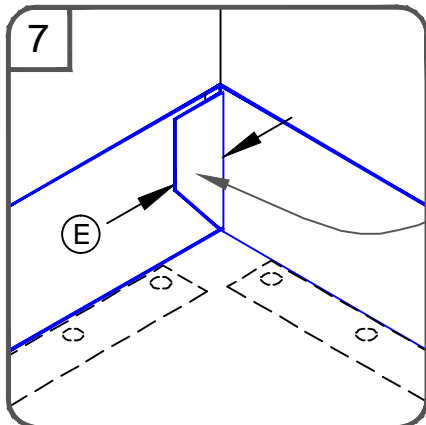
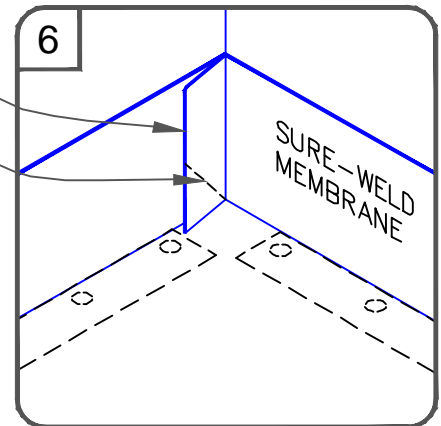


HOT AIR WELD FLAP  
IN STEP 7

CUT AT 45°

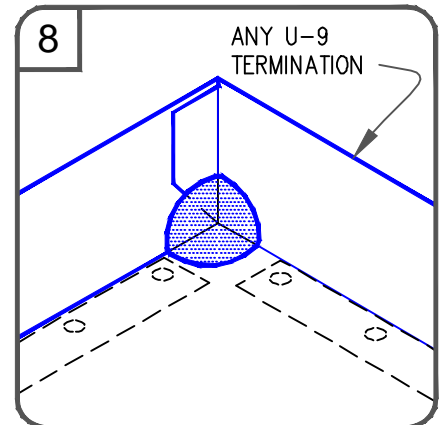
NOTES:

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 SW-15A OR SW-15B.



HOT AIR WELD

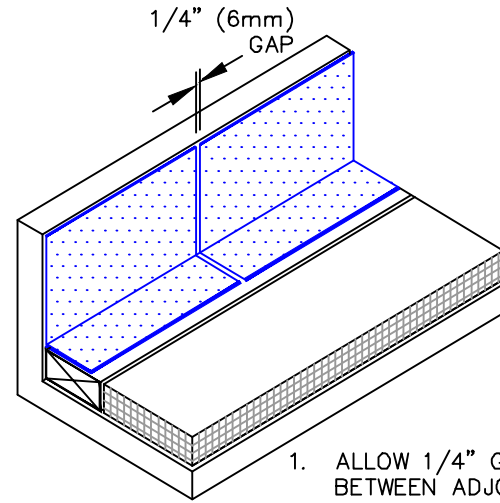
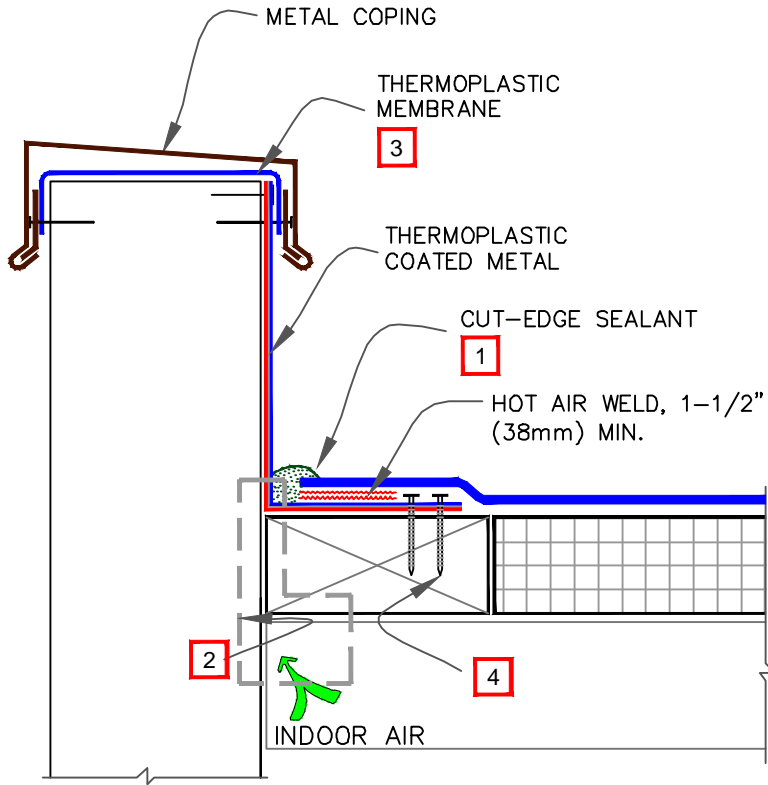
**TPO ONLY**  
(NOT FOR PVC)



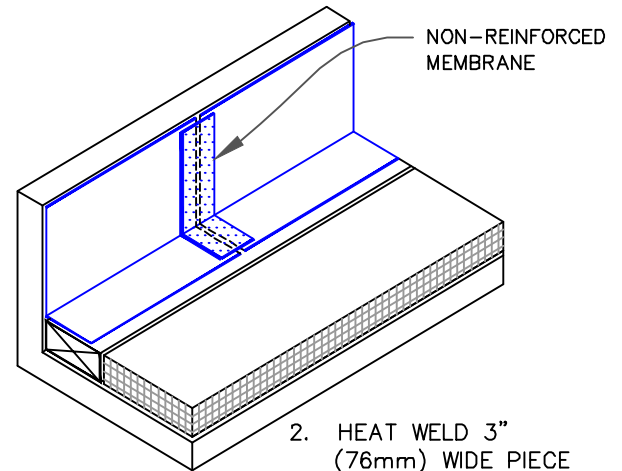
TPO MEMBRANE  
 APPROVED SUBSTRATE  
 SEE NOTE(S)

**PARAPET FLASHING WITH PRESSURE-SENSITIVE RUSS-**  
 PAGE 2 OF 2  
 For additional information, refer to Specifications

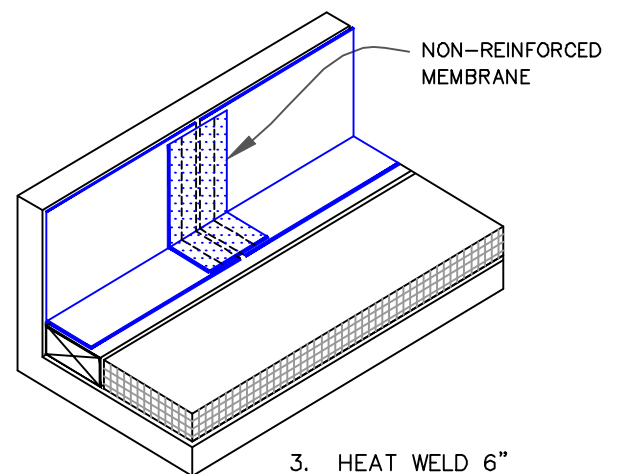
DETAIL NO.  
**U-12B.1**  
 THERMOPLASTIC TPO



1. ALLOW 1/4" GAP BETWEEN ADJOINING SECTIONS OF COATED METAL.



2. HEAT WELD 3" (76mm) WIDE PIECE OF NON-REINF. MEMBRANE OVER JOINT.



3. HEAT WELD 6" (152mm) WIDE PIECE OF NON-REINF. MEMBRANE OVER JOINT.

NOTES:

1. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
2. REFER TO SPECIAL CONDITION [SPEC. SUPPLEMENTS G-01-11 OR G-08-11](#):
  - 2.1. TO BLOCK INDOOR AIR INFILTRATION AND HUMIDITY AT THE JUNCTION (G-01-11).
  - 2.2. WHERE ROOF SYSTEM IS DESIGNED WITH A VAPOR RETARDER (G-08-11).
3. PLACE A LAYER OF THERMOPLASTIC MEMBRANE UNDER THE METAL CAP TO PROTECT AGAINST MOISTURE INFILTRATION AT JOINTS.
4. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (38mm) MIN. RING SHANK NAILS SPACED 6" (152mm) ON CENTER AND STAGGERED APPROX. 1/2" (13mm).

	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

COATED METAL WALL FLASHING

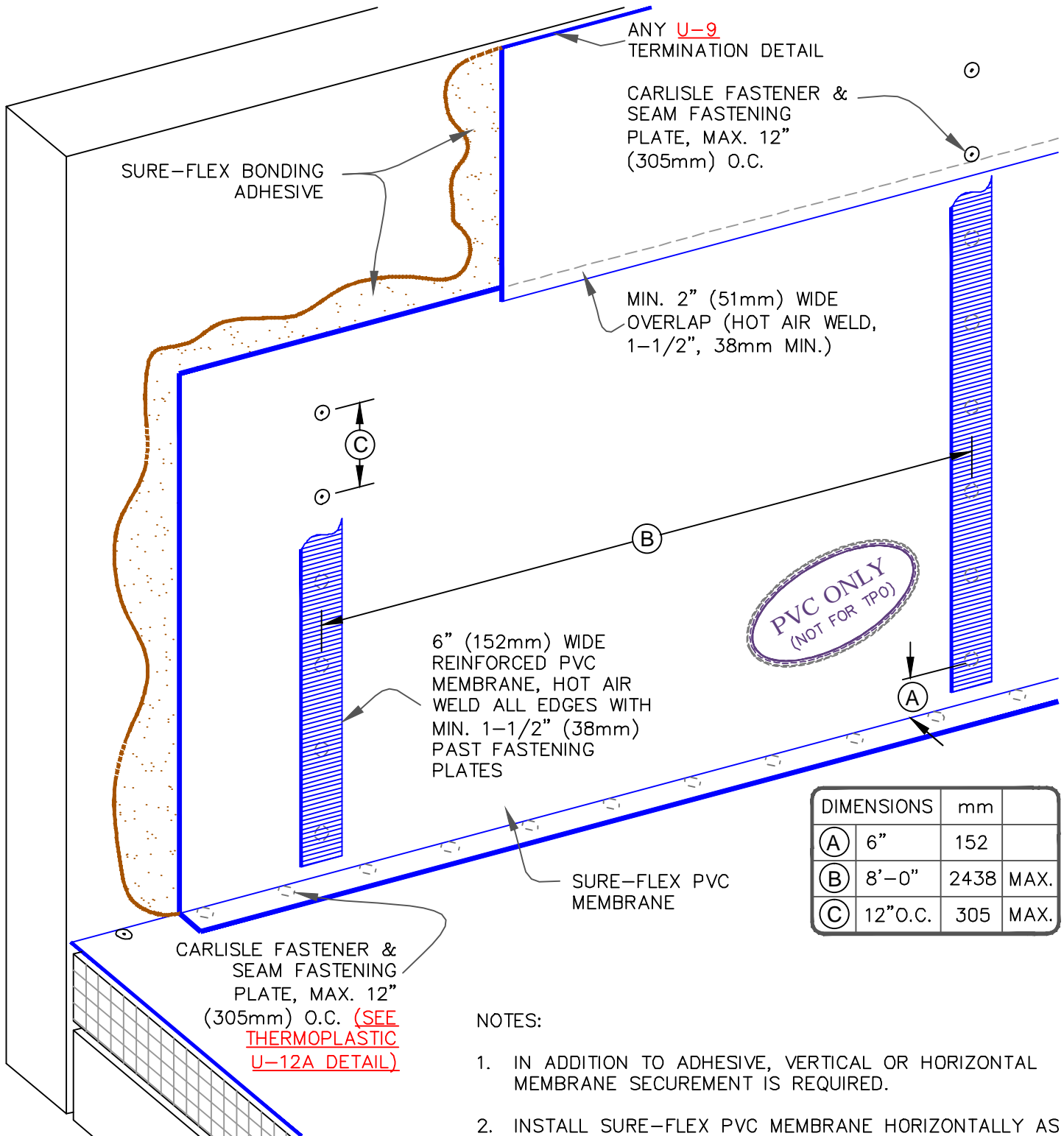
For additional information, refer to Specifications



DETAIL NO.

U-12C

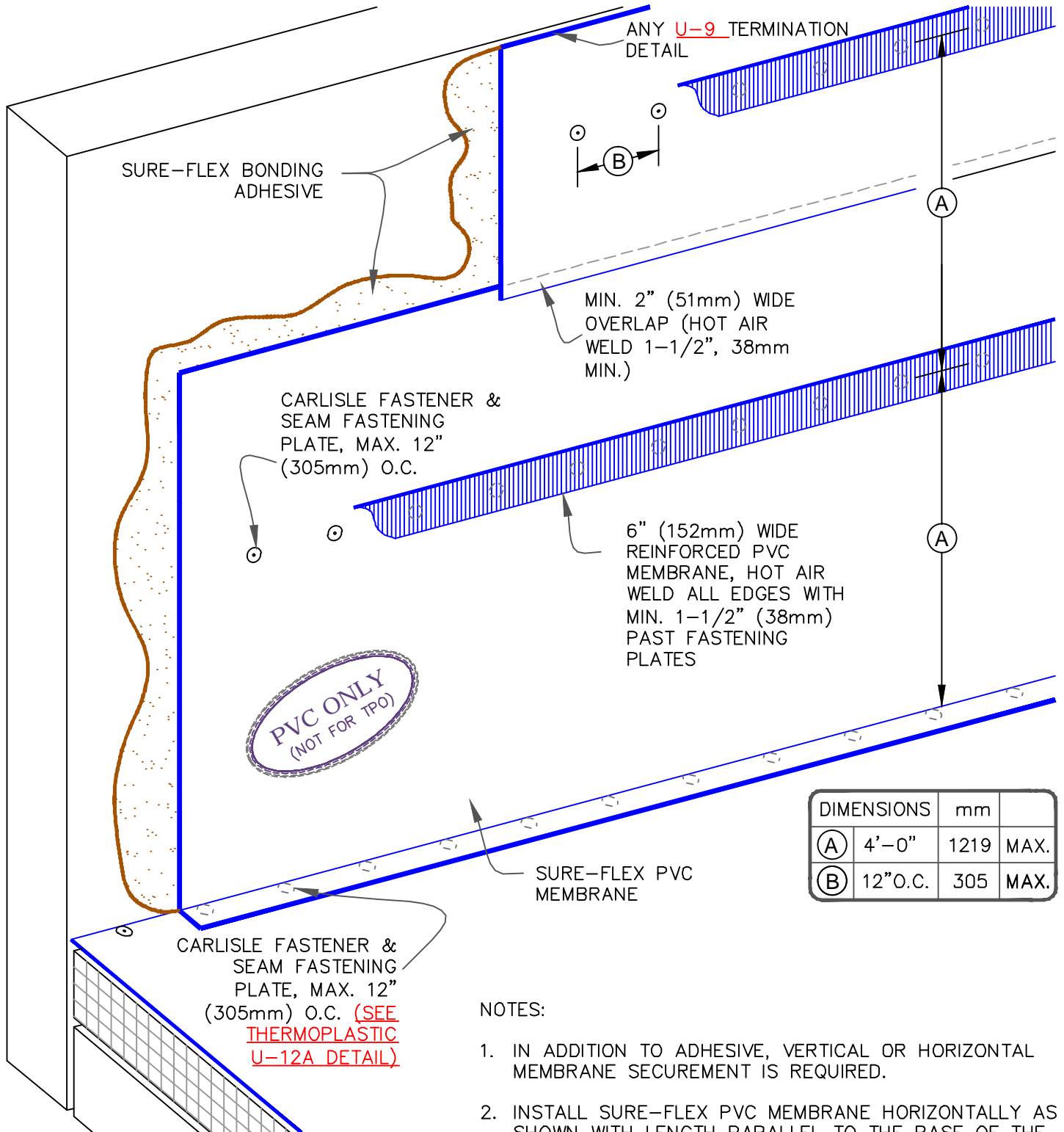
THERMOPLASTIC UNIVERSAL



NOTES:

1. IN ADDITION TO ADHESIVE, VERTICAL OR HORIZONTAL MEMBRANE SECUREMENT IS REQUIRED.
2. INSTALL SURE-FLEX PVC MEMBRANE HORIZONTALLY AS SHOWN WITH LENGTH PARALLEL TO THE BASE OF THE WALL.
3. ADDITIONAL SECUREMENT IS NOT REQUIRED WHEN FLASHING TERMINATION IS 48" (1219mm) OR LESS.

— PVC MEMBRANE — APPROVED SUBSTRATE — SEE NOTE(S)	<p>PARAPET FLASHING &gt; 48" (1200mm) - VERTICAL SECUREMENT</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-12D</b></p> <p>THERMOPLASTIC PVC</p>
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NOTES:

1. IN ADDITION TO ADHESIVE, VERTICAL OR HORIZONTAL MEMBRANE SECUREMENT IS REQUIRED.
2. INSTALL SURE-FLEX PVC MEMBRANE HORIZONTALLY AS SHOWN WITH LENGTH PARALLEL TO THE BASE OF THE WALL.
3. ADDITIONAL SECUREMENT IS NOT REQUIRED WHEN FLASHING TERMINATION IS 48" (1219mm) OR LESS.

	—● PVC MEMBRANE
	—● APPROVED SUBSTRATE
	—● SEE NOTE(S)

PARAPET FLASHING > 48" (1200mm) - HORIZONTAL SECUREMENT

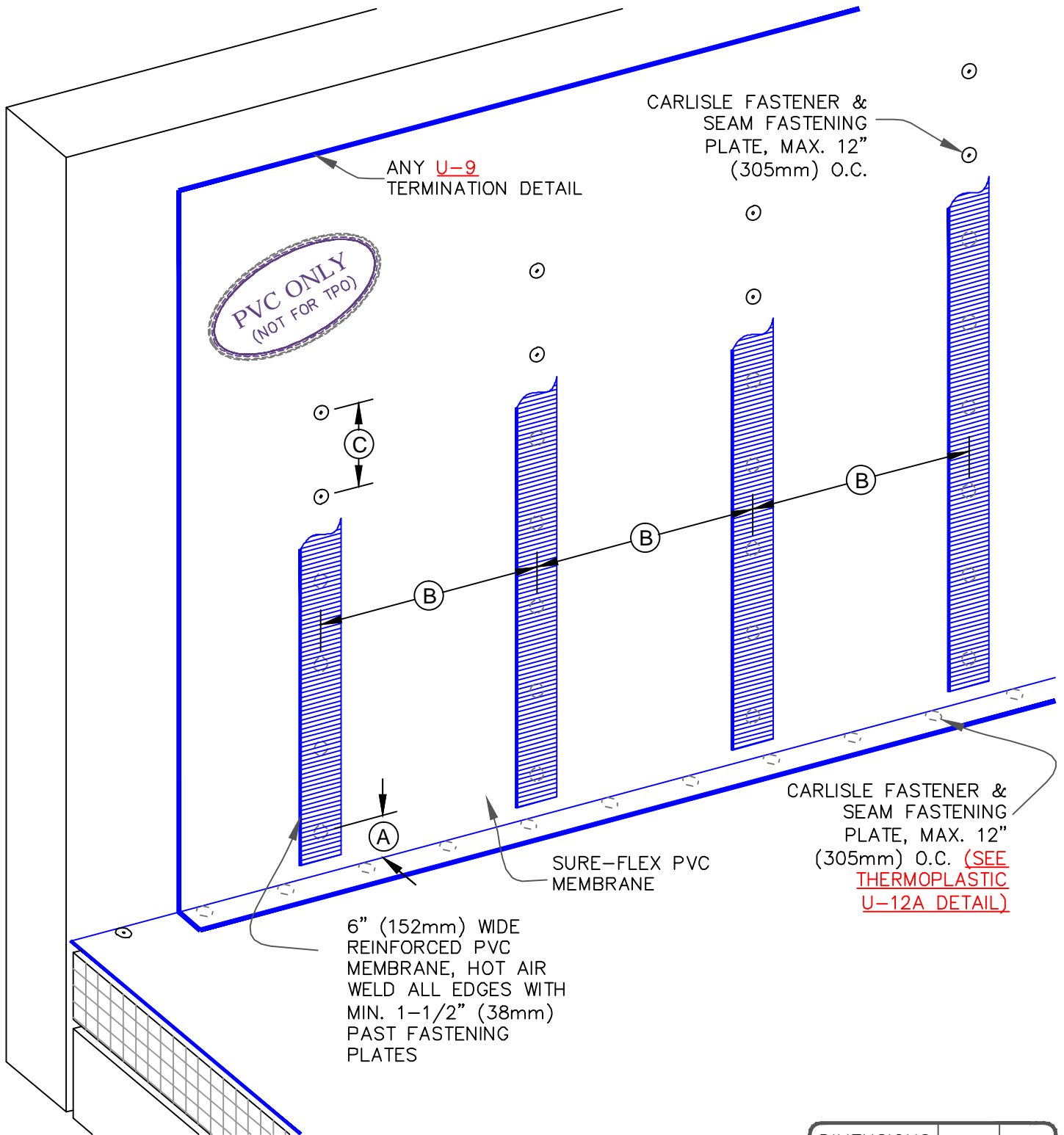
For additional information, refer to Specifications



DETAIL NO.

U-12E

THERMOPLASTIC PVC



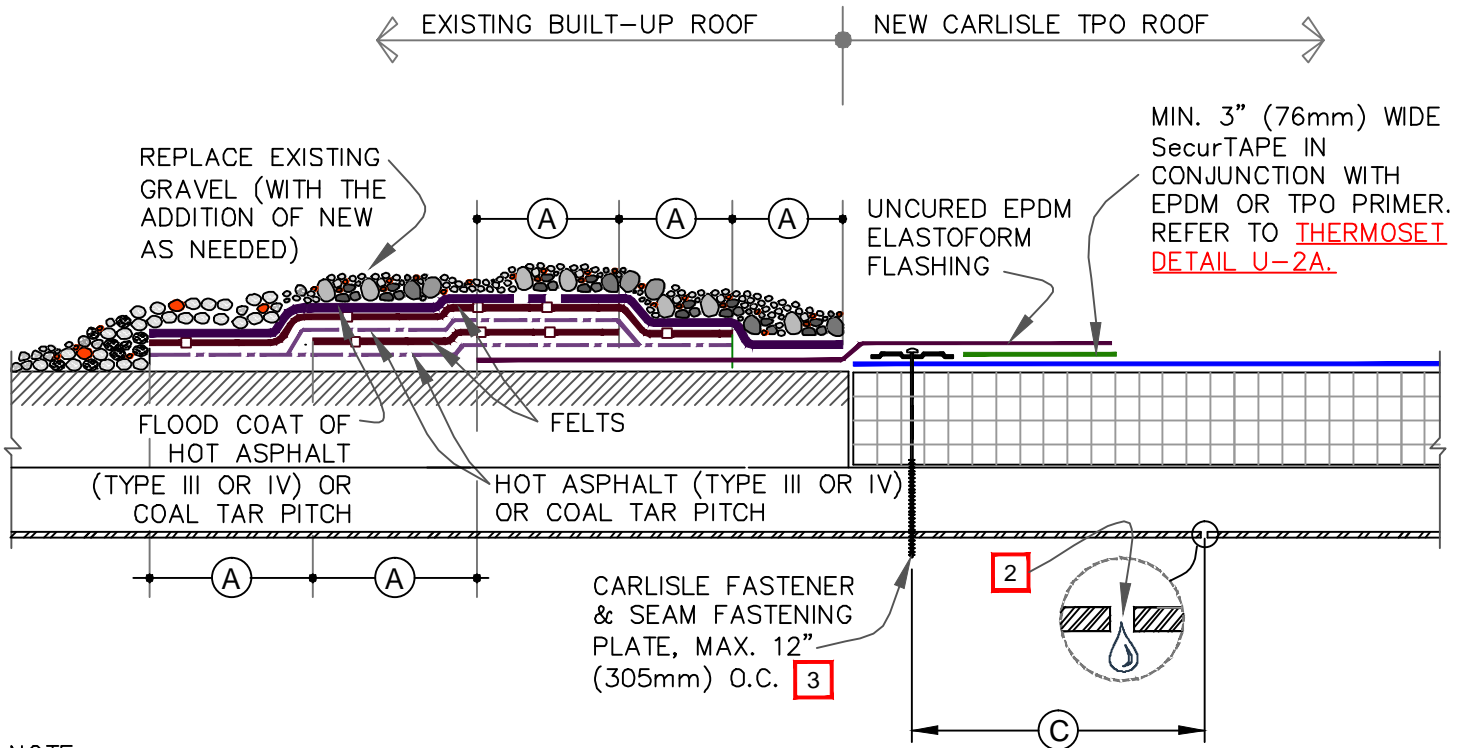
DIMENSIONS	mm	
(A) 6"	152	
(B) 32"	813	MAX.
(C) 12"	305	MAX.

- PVC MEMBRANE
- APPROVED SUBSTRATE
- 0 —● SEE NOTE(S)

PARAPET FLASHING / NO ADHESION - ANY HEIGHT OPTION

For additional information, refer to Specifications

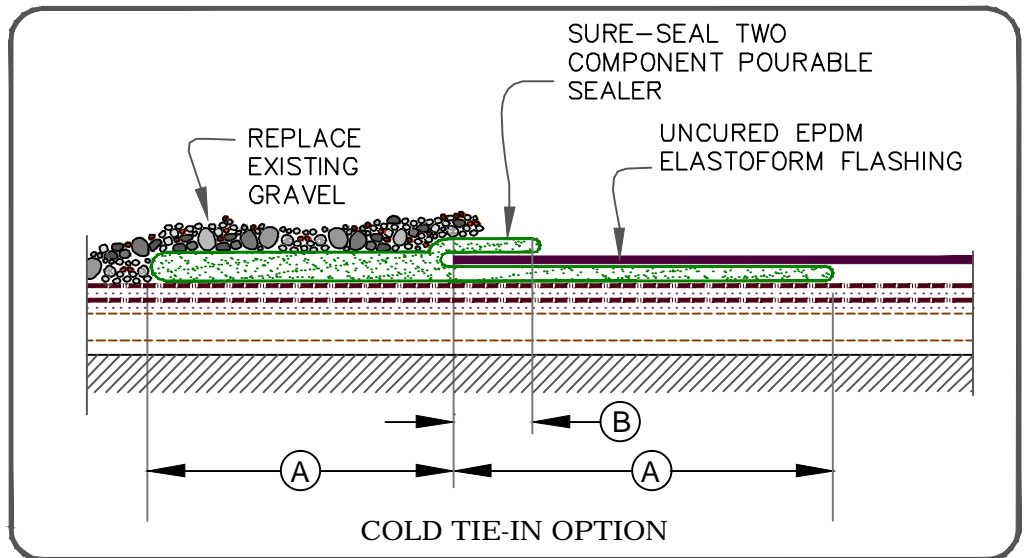
	DETAIL NO.
	<b>U-12F</b>
THERMOPLASTIC PVC	



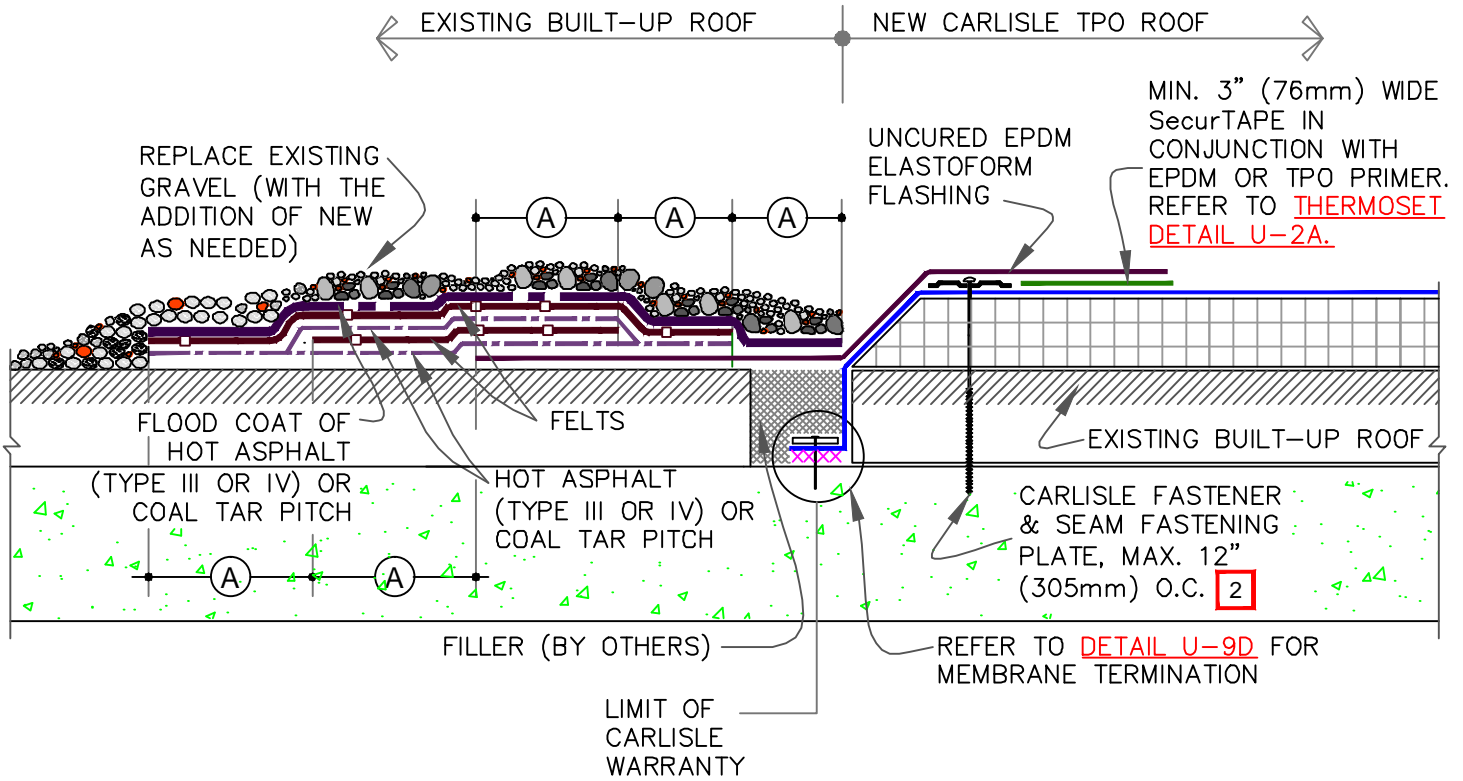
NOTE:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. DRILL A 3/8" (10mm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (152mm) MINIMUM TO 12" (305mm) MAXIMUM FROM THE SEAM FASTENING PLATE.
3. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL DECKS.
4. IF WATER PONDS OR FLOWS OVER TIE-IN FROM BUR SURFACE, CARLISLE ROOFING SYSTEM MUST BE TOTALLY ISOLATED; SEE [DETAIL U-13B](#).

DIMENSIONS	mm	
(A)	6"    152	MIN.
(B)	2"    51	± 1/2" (13mm)
(C)	6"    152	TO
	12"   305	



TPO MEMBRANE APPROVED SUBSTRATE <span style="border: 1px solid red; padding: 2px;">0</span> SEE NOTE(S)	<p><b>TPO TIE-IN TO BUILT-UP ROOFING OVER STEEL ROOF DECK</b></p> <p>For additional information, refer to Specifications</p>		DETAIL NO. <h2 style="margin: 0;">U-13A</h2> THERMOPLASTIC TPO
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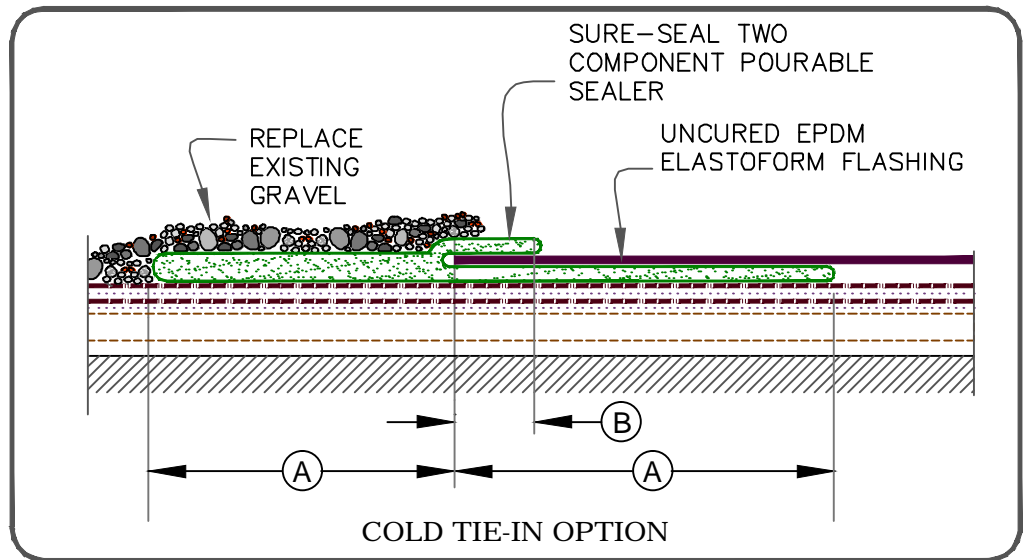


NOTE:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. ON MECHANICALLY FASTENED SYSTEMS, CD-10 OR HD 14-10 FASTENERS AND PIRANHA PLATES ARE REQUIRED OVER CONCRETE DECKS.
3. WATER CUT-OFF 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 ROOFING SYSTEM.

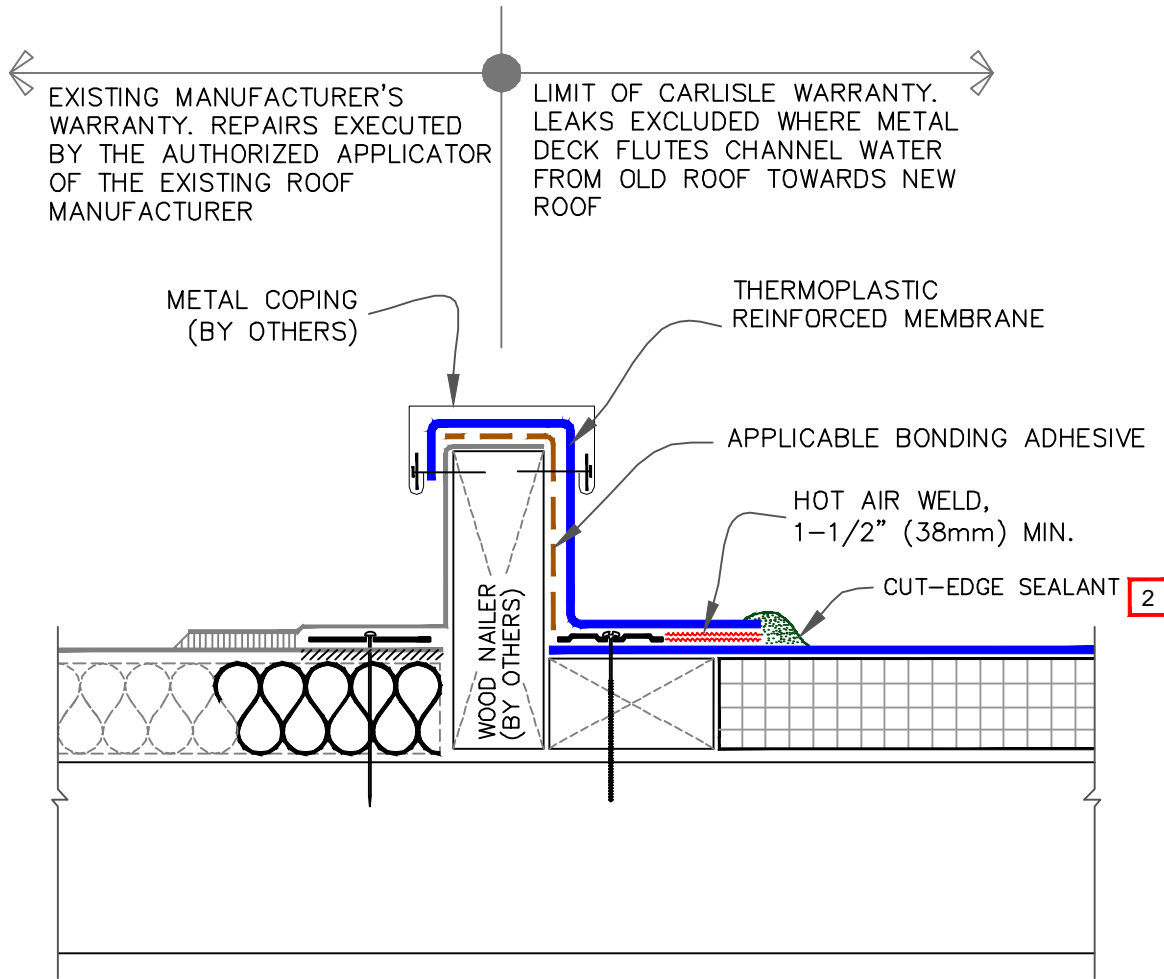
DIMENSIONS	mm	
(A)	6"	152 MIN.
(B)	2"	± 1/2" (13mm)

**TPO ONLY**  
(NOT FOR PVC)





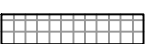
TPO MEMBRANE APPROVED SUBSTRATE SEE NOTE(S)	<p><b>TPO TIE-IN TO BUILT-UP ROOFING OVER CONCRETE ROOF DECK</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-13B</b></p> <p>THERMOPLASTIC TPO</p>
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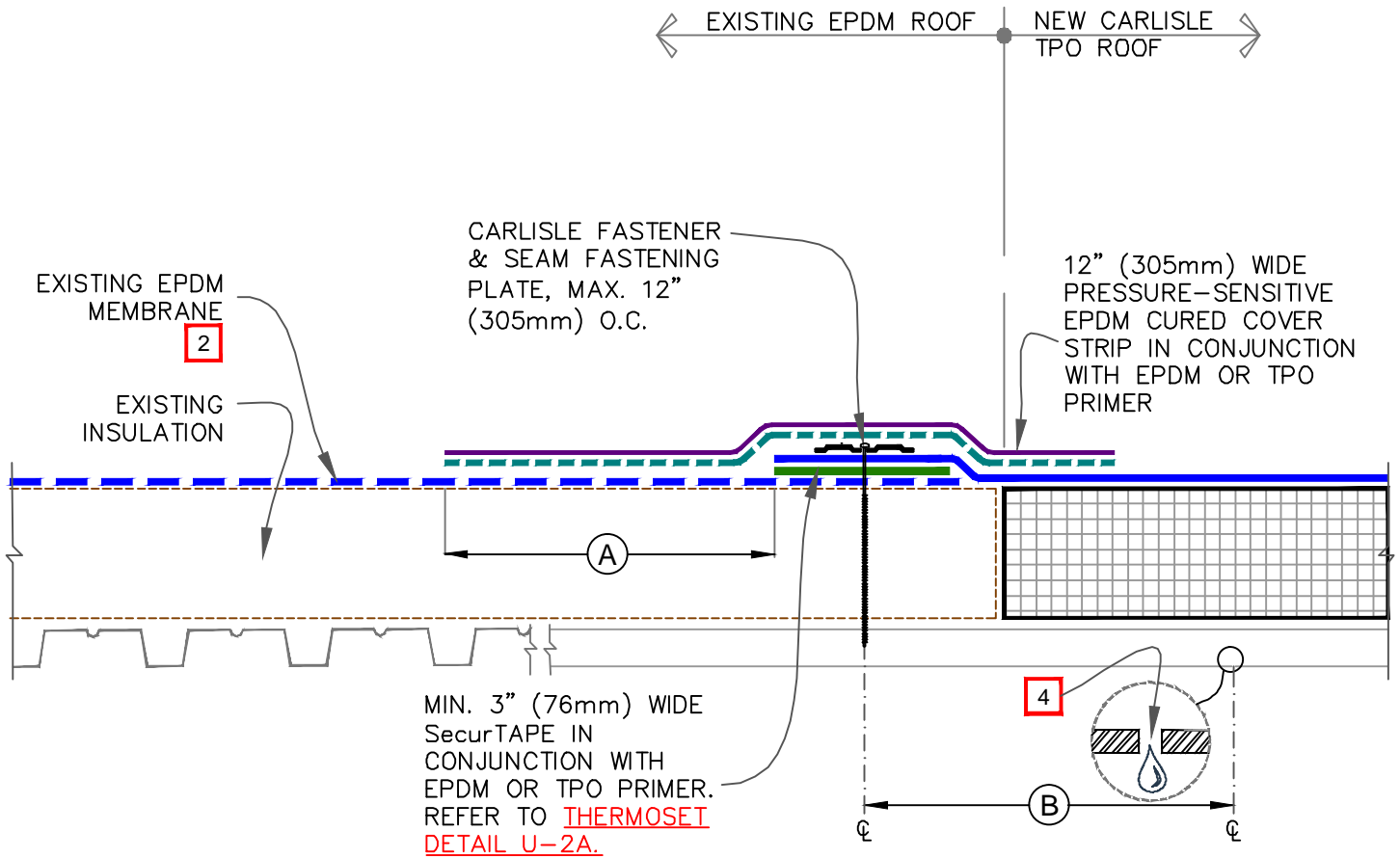


NOTES:

1. POSITION MEMBRANE FASTENING PLATES 1/2" (13mm) TO 1" (25mm) FROM EDGE OF DECK MEMBRANE.
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
3. ENSURE THE LOCATION OF CURB WILL NOT IMPEDE THE FLOW OF WATER AT EXISTING ADJACENT ROOF.

	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p>TPO/PVC TIE-IN TO EXISTING SINGLE-PLY</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p>
	<p>● APPROVED INSULATION</p>			<p><b>U-13C</b></p>
<p><b>0</b></p>	<p>● SEE NOTE(S)</p>	<p>THERMOPLASTIC UNIVERSAL</p>		





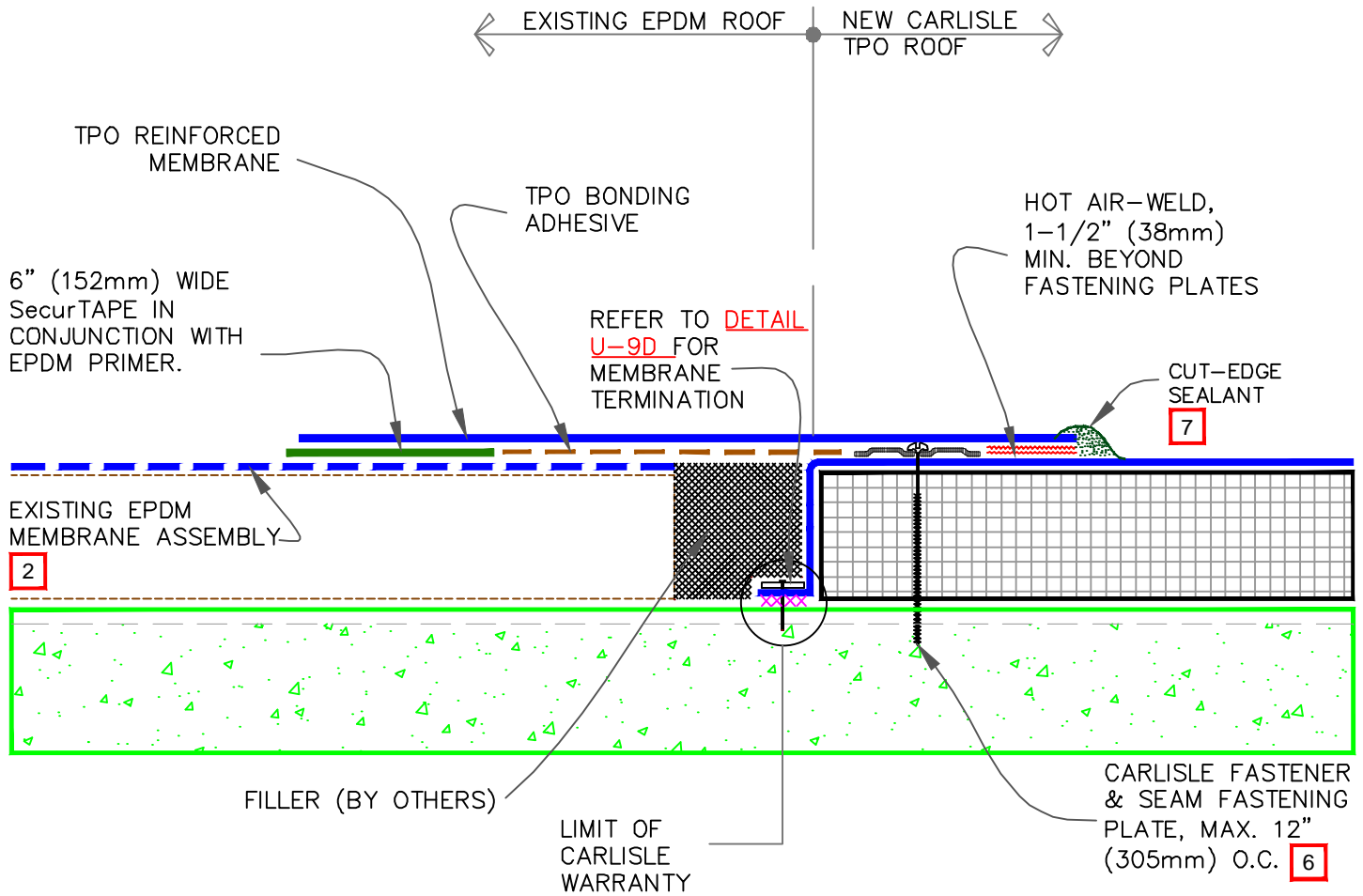
NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.
2. CONTACT MANUFACTURER OF EXISTING WARRANTED EPDM 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. DRILL A 3/8" (10mm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (152mm) MINIMUM TO 12" (305mm) MAXIMUM FROM THE SEAM FASTENING PLATE.
5. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL DECKS.

DIMENSIONS	mm		
(A)	6"	152	
(B)	6"	152	MIN.
	12"	305	MAX.



<p>—●— TPO MEMBRANE</p> <p>—■— APPROVED SUBSTRATE</p> <p>—○— SEE NOTE(S)</p>	<p><b>TPO TIE-IN TO EXISTING EPDM MEMBRANE</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-13D</b></p> <p>THERMOPLASTIC TPO</p>
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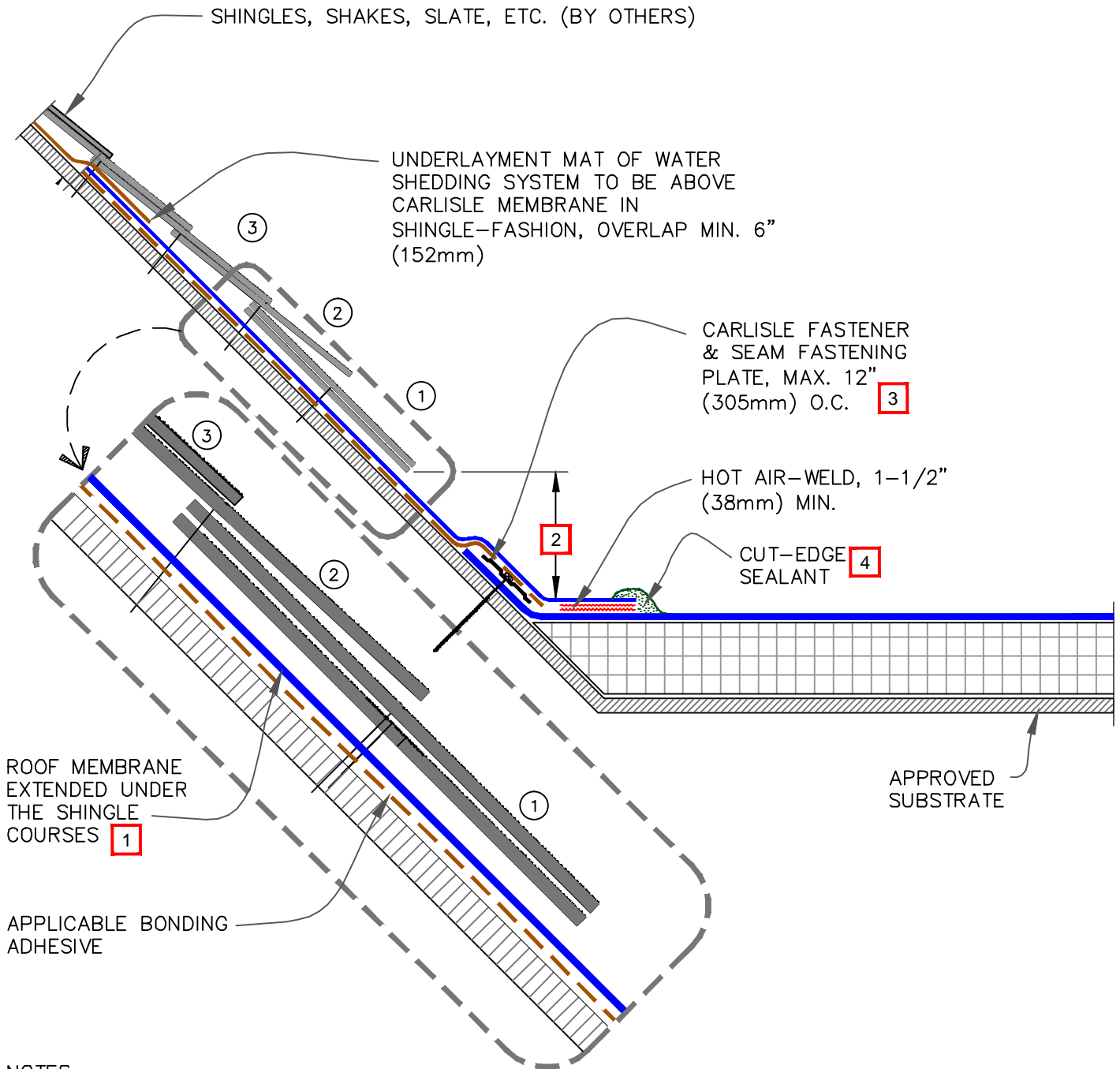


NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY.
2. CONTACT MANUFACTURER OF EXISTING WARRANTED EPDM MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN.
3. ON EXISTING BALLASTED ROOFING 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. ON MECHANICALLY FASTENED SYSTEMS, CD-10 OR HD 14-10 FASTENERS AND PIRANHA PLATES ARE REQUIRED OVER CONCRETE DECKS.
7. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



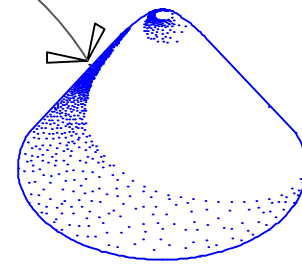
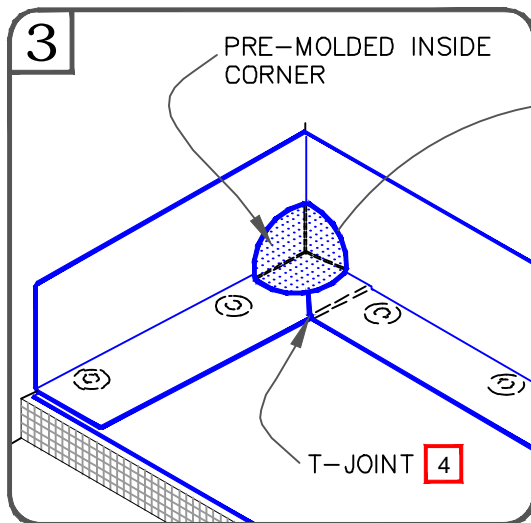
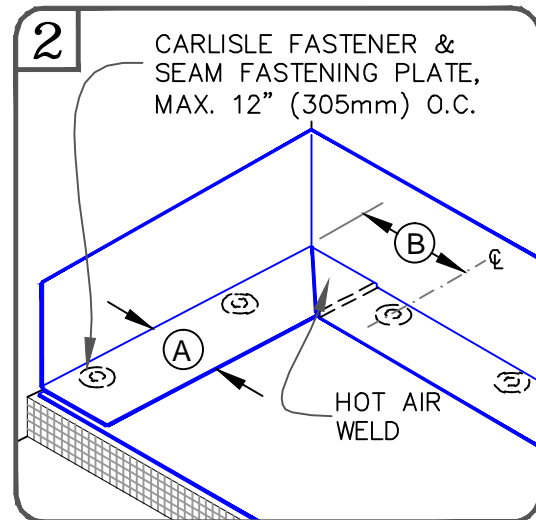
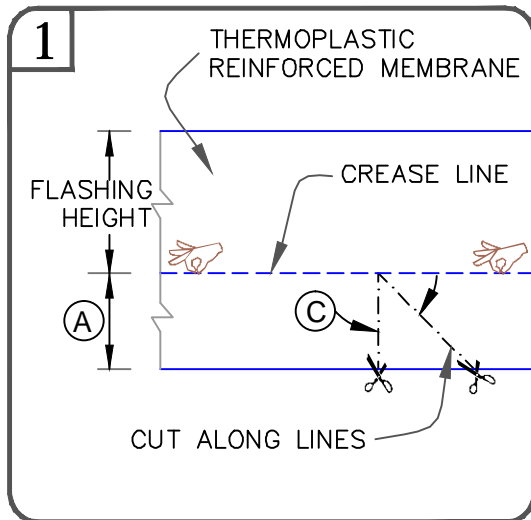
— TPO MEMBRANE — APPROVED SUBSTRATE — SEE NOTE(S)	<p>EPDM TIE-IN ON CONCRETE DECK</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-13E</b></p> <p>THERMOPLASTIC TPO</p>
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NOTES:

1. REGARDLESS OF MEMBRANE EXPOSURE EXTEND MEMBRANE UNDER FIRST 3 COURSES.
2. CARLISLE'S WARRANTY IS LIMITED TO EXPOSED PORTION OF ROOF MEMBRANE.
3. ON MECHANICALLY FASTENED SYSTEMS, HP-X FASTENERS AND PIRANHA PLATES OR HP-XTRA FASTENERS AND PIRANHA XTRA PLATES ARE REQUIRED OVER STEEL OR WOOD DECKS.
4. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p>TPO/PVC TIE-IN TO SHINGLED ROOF</p>		<p>DETAIL NO.</p>
	<p>● APPROVED INSULATION</p>			<p>U-13F</p>
<p>0</p>	<p>● SEE NOTE(S)</p>	<p>For additional information, refer to Specifications</p>	<p>THERMOPLASTIC UNIVERSAL</p>	



PRE-MOLDED INSIDE CORNER BEFORE INSTALLATION

NOTES:

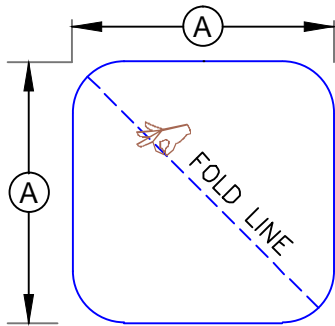
1. POSITION FASTENING PLATES 6" TO 9" (152 TO 229mm) FROM THE CORNER AND 1/2" TO 1" (13 TO 25mm) FROM EDGE OF MEMBRANE.
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
3. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
4. WHEN USING 60 OR 80-MIL MEMBRANE, APPLY A 4-1/2" (114mm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

DIMENSIONS		mm	
(A)	6"	152	APPROX.
(B)	6"-9"	152-229	
(C)	45-DEGREES APPROX.		

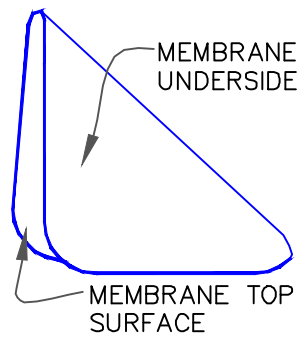
<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p> SEE NOTE(S)</p>	<p><b>PRE-MOLDED INSIDE CORNER FLASHING</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-15A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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CAUTION

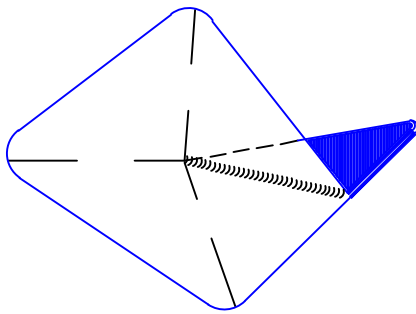
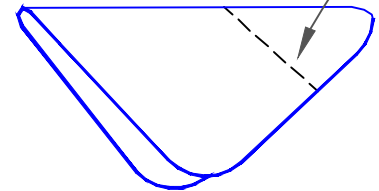
DETAIL NOT FOR USE ON 25 OR 30-YEAR WARRANTY PROJECTS, PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH THERMOPLASTIC UNIVERSAL DETAIL U-15A.



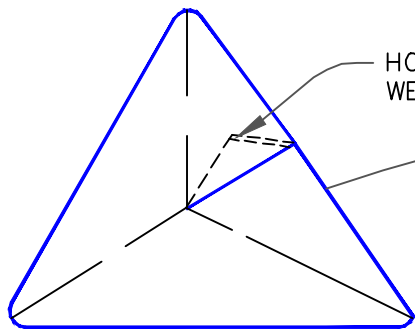
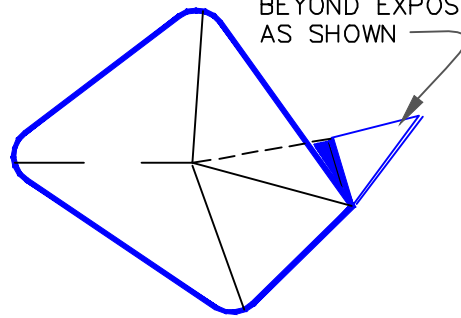
CUT A SECTION OF THERMOPLASTIC NON-REINFORCED MEMBRANE WITH ROUNDED CORNERS



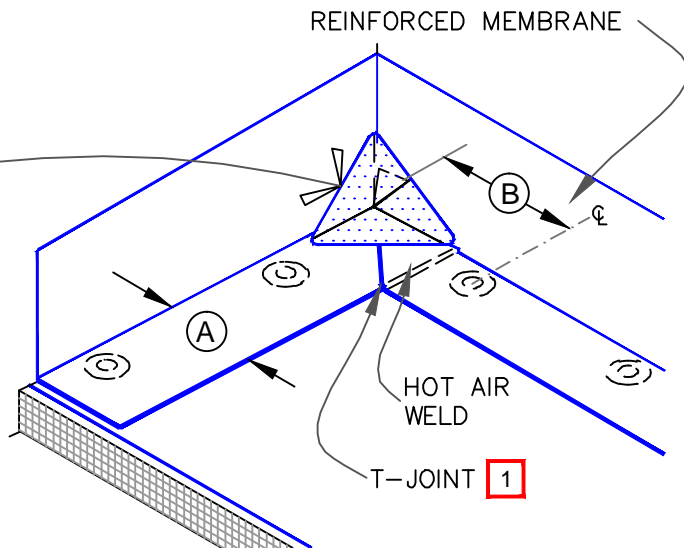
HEAT WELD APPROX. 1/4 OF AREA AS SHOWN



TRIM TRIANGULAR FLAP BEYOND EXPOSED CORNER AS SHOWN



POSITION AND HEAT WELD CORNER IN PLACE AS SHOWN



DIMENSIONS	mm	
(A)	6"	152 APPROX.
(B)	6"-9"	152-229

NOTES:

1. WHEN USING 60 OR 80-MIL MEMBRANE, APPLY A 4 1/2" (114mm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

FIELD FABRICATED INSIDE CORNER FLASHING

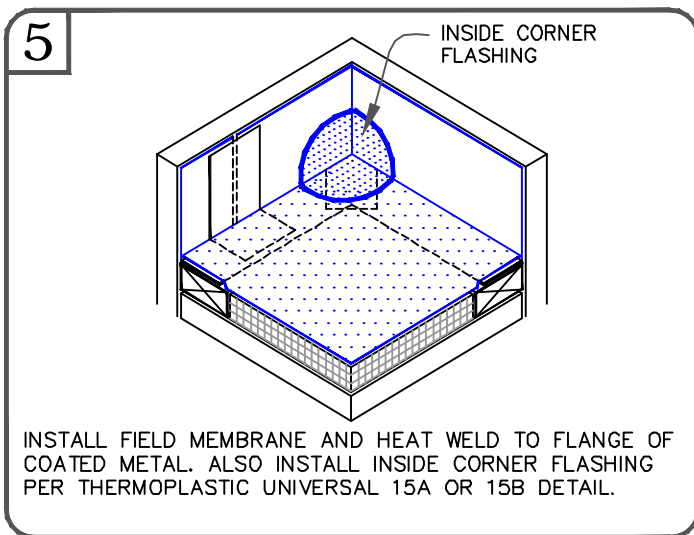
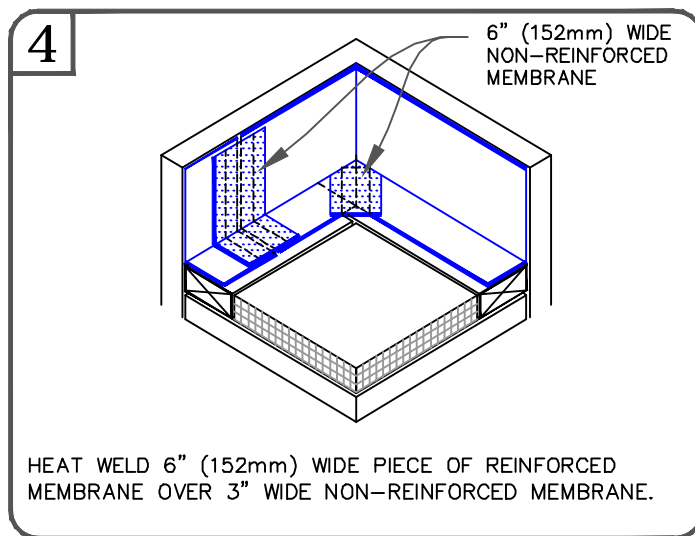
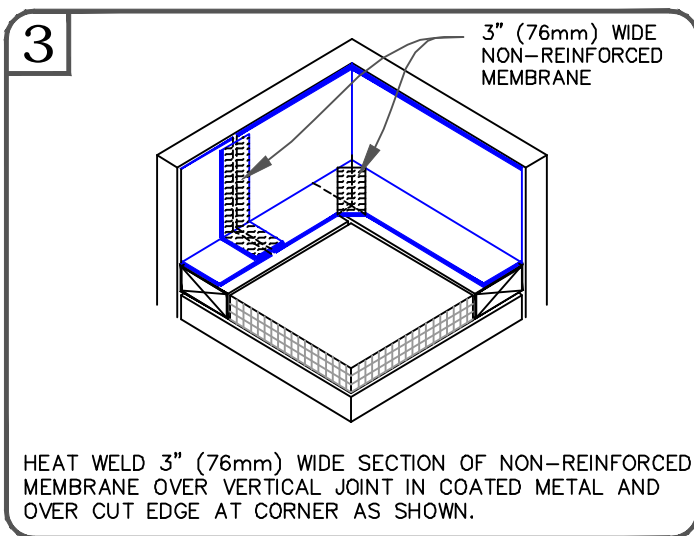
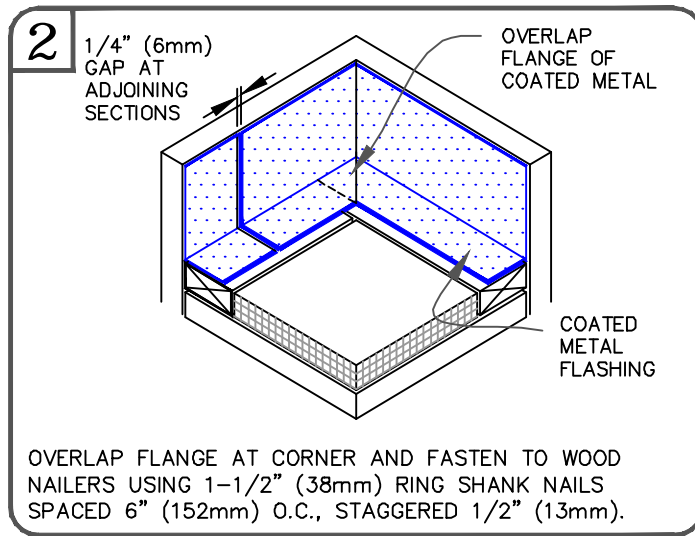
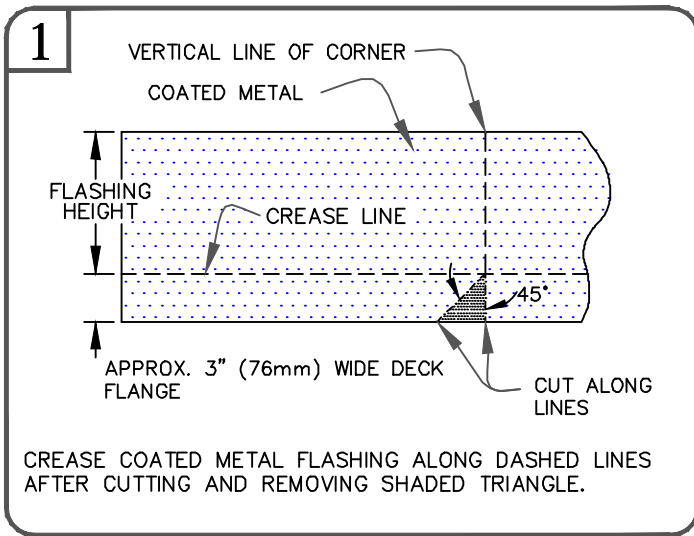
For additional information, refer to Specifications



DETAIL NO.

U-15B

THERMOPLASTIC UNIVERSAL



NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (38mm) MIN. RING SHANK NAILS SPACED 6" (152mm) ON CENTER AND STAGGERED APPROX. 1/2" (13mm).
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

	● THERMOPLASTIC REINFORCED MEMBRANE
	● APPROVED INSULATION
	● SEE NOTE(S)

INSIDE CORNER WITH COATED METAL WALL FLASHING

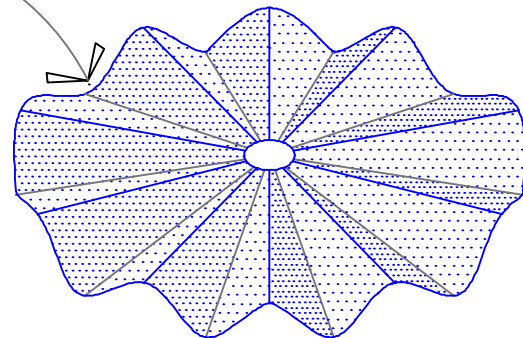
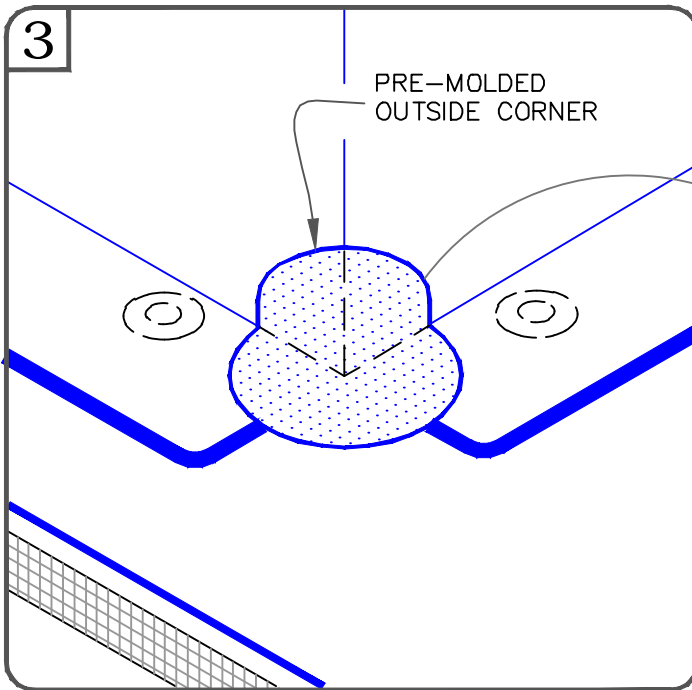
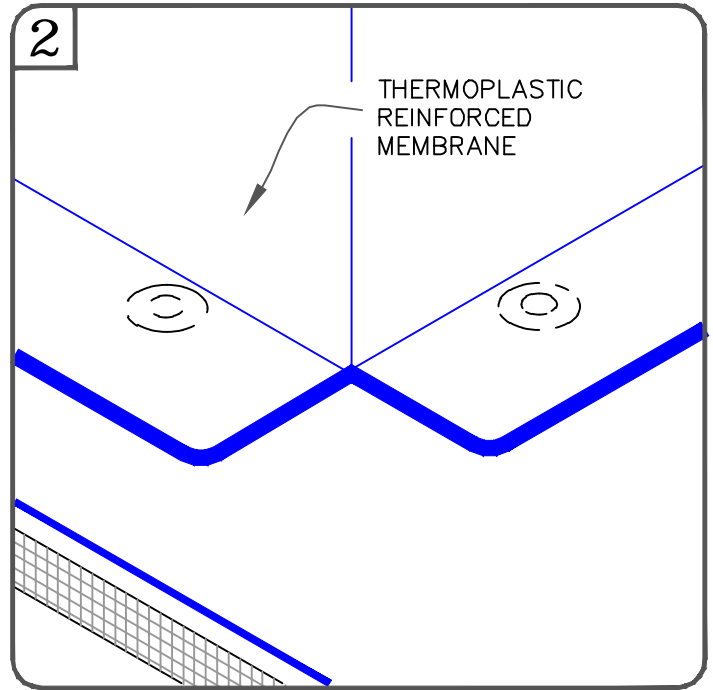
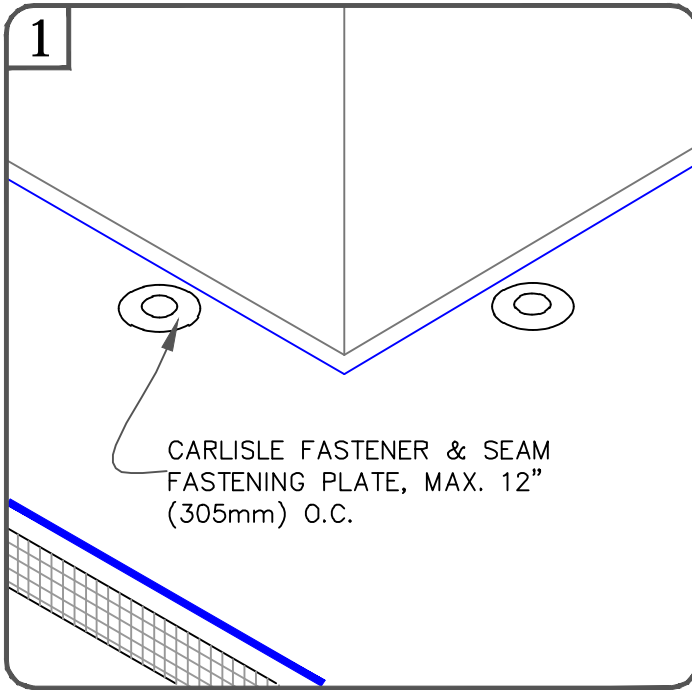
For additional information, refer to Specifications



DETAIL NO.

U-15C

THERMOPLASTIC UNIVERSAL



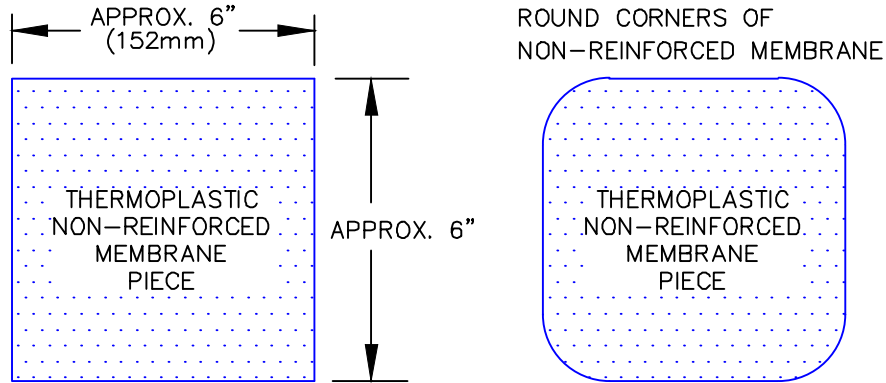
PRE-MOLDED OUTSIDE CORNER BEFORE INSTALLATION

NOTES:

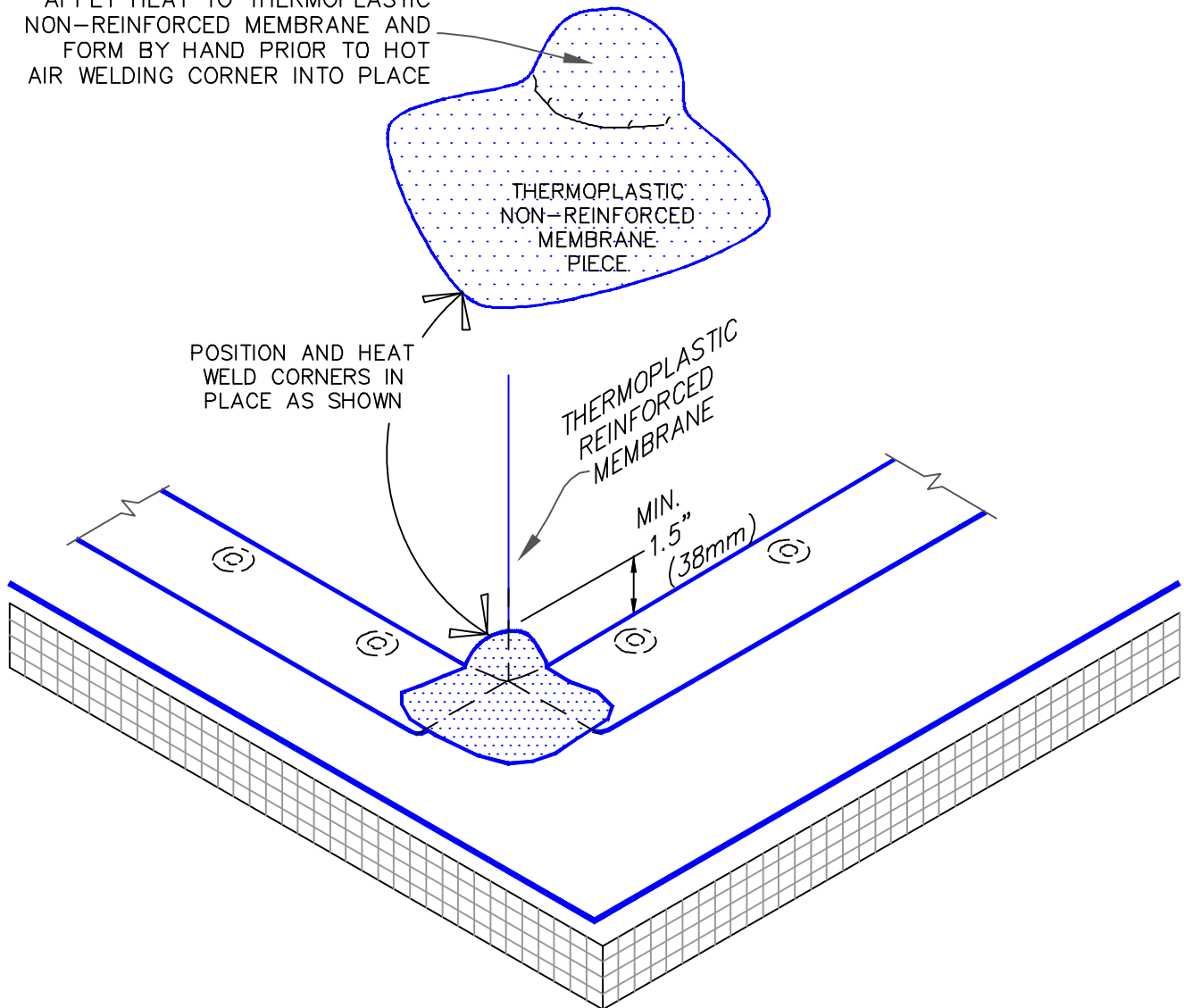
1. POSITION FASTENING PLATES 6"(152mm) FROM THE CORNER AND 1/2" TO 1" (13 TO 25mm) FROM EDGE OF MEMBRANE.
2. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
3. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p> <p>● APPROVED INSULATION</p> <p>● SEE NOTE(S)</p>	<p><b>PRE-MOLDED OUTSIDE CORNER FLASHING</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-15D</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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**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 THERMOPLASTIC UNIVERSAL DETAIL U-15D.

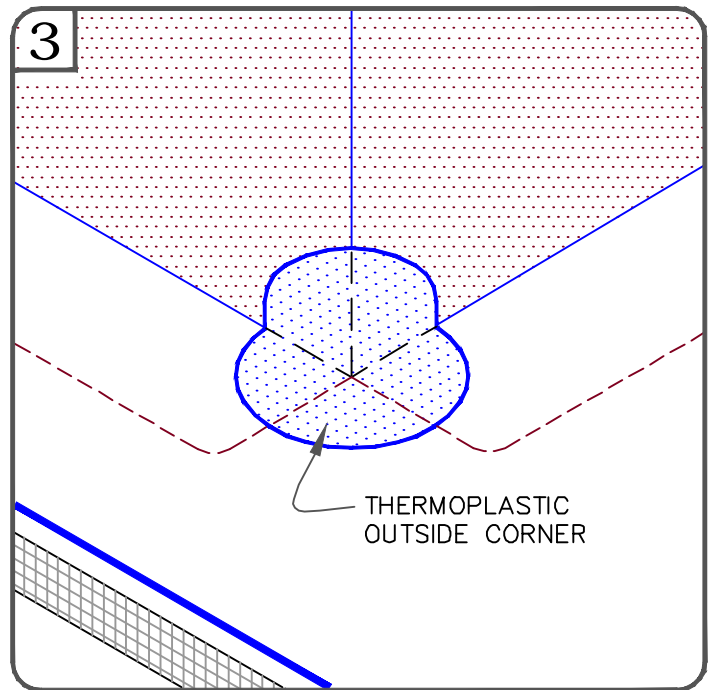
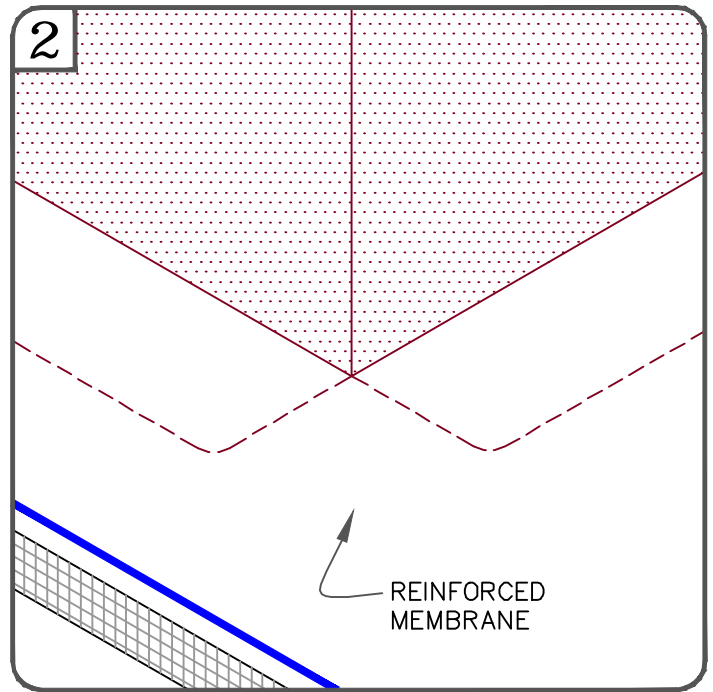
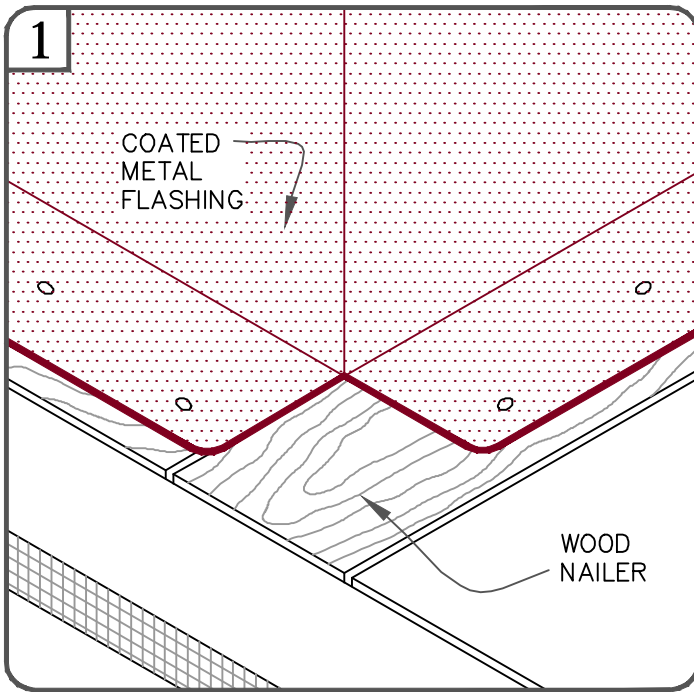


APPLY HEAT TO THERMOPLASTIC NON-REINFORCED MEMBRANE AND FORM BY HAND PRIOR TO HOT AIR WELDING CORNER INTO PLACE



THERMOPLASTIC REINFORCED MEMBRANE	<p><b>FIELD FABRICATED OUTSIDE CORNER FLASHING</b></p> <p>For additional information, refer to Specifications</p>		DETAIL NO.
APPROVED INSULATION			<p><b>U-15E</b></p>
SEE NOTE(S)	THERMOPLASTIC UNIVERSAL		





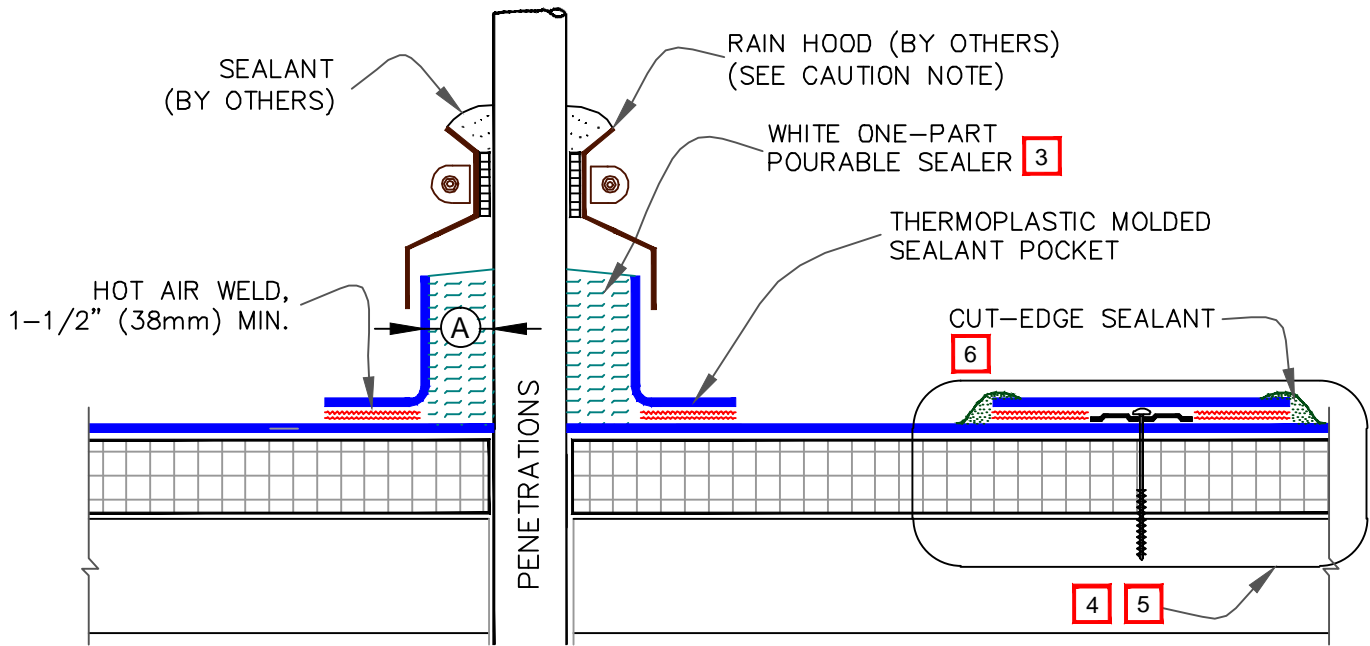
NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (38mm) MIN. RING SHANK NAILS SPACED 6" (152mm) ON CENTER AND STAGGERED APPROX. 1/2" (13mm).
2. REFER TO THERMOPLASTIC U-15C DETAIL FOR FLASHING VERTICAL JOINTS IN COATED METAL.

THERMOPLASTIC REINFORCED MEMBRANE	<p>OUTSIDE CORNER WITH COATED METAL WALL FLASHING</p> <p>For additional information, refer to Specifications</p>			DETAIL NO.
APPROVED INSULATION				U-15F
SEE NOTE(S)			THERMOPLASTIC UNIVERSAL	

CAUTION

MOLDED SEALANT POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES.

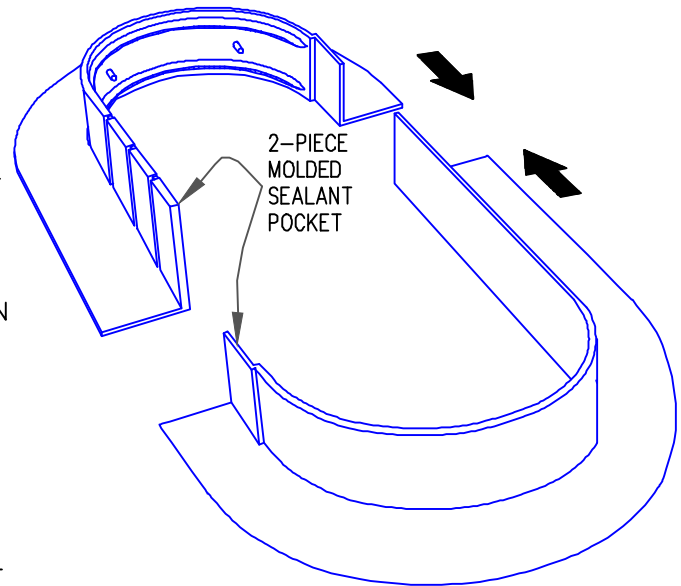


NOTES:

- TEMPERATURE OF PIPE MUST NOT EXCEED 160° F (71° C).
- WHEN USING TPO MOLDED SEALANT POCKET, TPO PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT.
- FILL POCKET COMPLETELY WITH WHITE ONE-PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
- ON MECHANICALLY-FASTENED 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" (305 mm) ON CENTER MAXIMUM. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS SEALANT POCKET DIAMETER EXCEEDS 12" (305mm).
- REFER TO CARLISLE SPECIFICATIONS FOR PROPER FASTENERS AND PLATES.
- APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.

DIMENSION	mm	
(A)	1"	25 MIN.

PLACE MOLDED THERMOPLASTIC SEALANT POCKET AROUND PENETRATION AND OVERLAP THE TWO SECTIONS

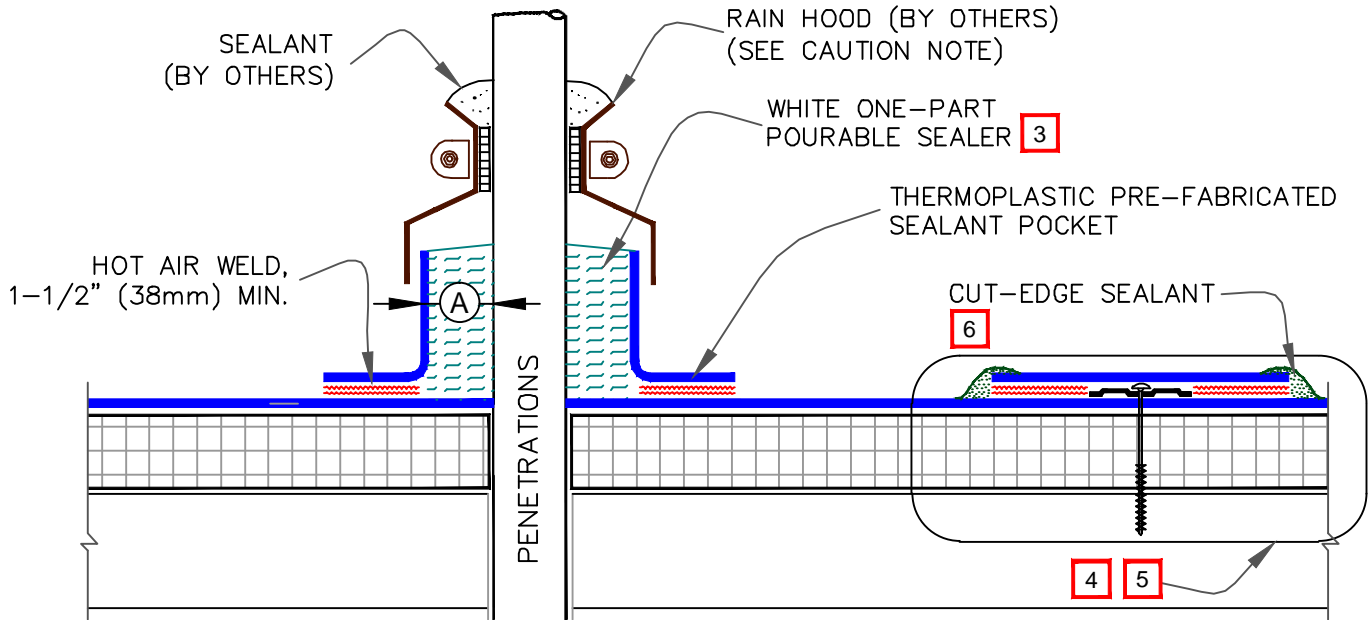


REFER TO PRODUCT DATA SHEET FOR STEP-BY-STEP INSTALLATION PROCEDURES

<p>  THERMOPLASTIC REINFORCED MEMBRANE   APPROVED INSULATION   SEE NOTE(S)                 </p>	<p><b>MOLDED SEALANT POCKET</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-16A</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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CAUTION

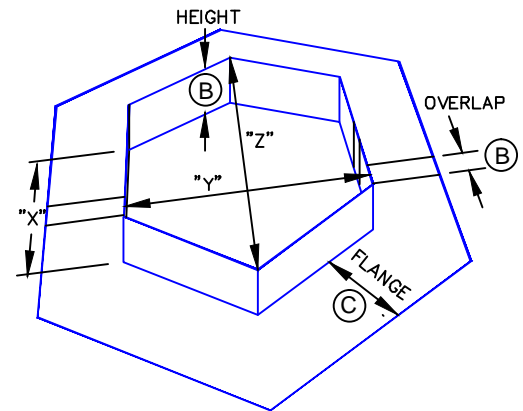
PRE-FABRICATED SEALANT POCKETS MUST BE USED IN CONJUNCTION WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30-YEAR WARRANTIES.



NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 160° F (71° C).
2. WHEN USING TPO SEALANT POCKET, APPLY TPO PRIMER TO THE TPO MEMBRANE AND PENETRATION(S) SURFACES ONLY. DO NOT APPLY TPO PRIMER TO THE GALVANIZED METAL SURFACE ON THE INSIDE OF THE SEALANT POCKET.
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" (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 12" (305mm).
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER FASTENERS AND PLATES.
6. APPROXIMATELY 1/8" (3mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE AND RECOMMENDED ON CUT EDGES OF SURE-FLEX PVC MEMBRANE.
7. CUSTOM SIZES ARE AVAILABLE FOR BOTH TPO AND PVC SEALANT POCKETS.

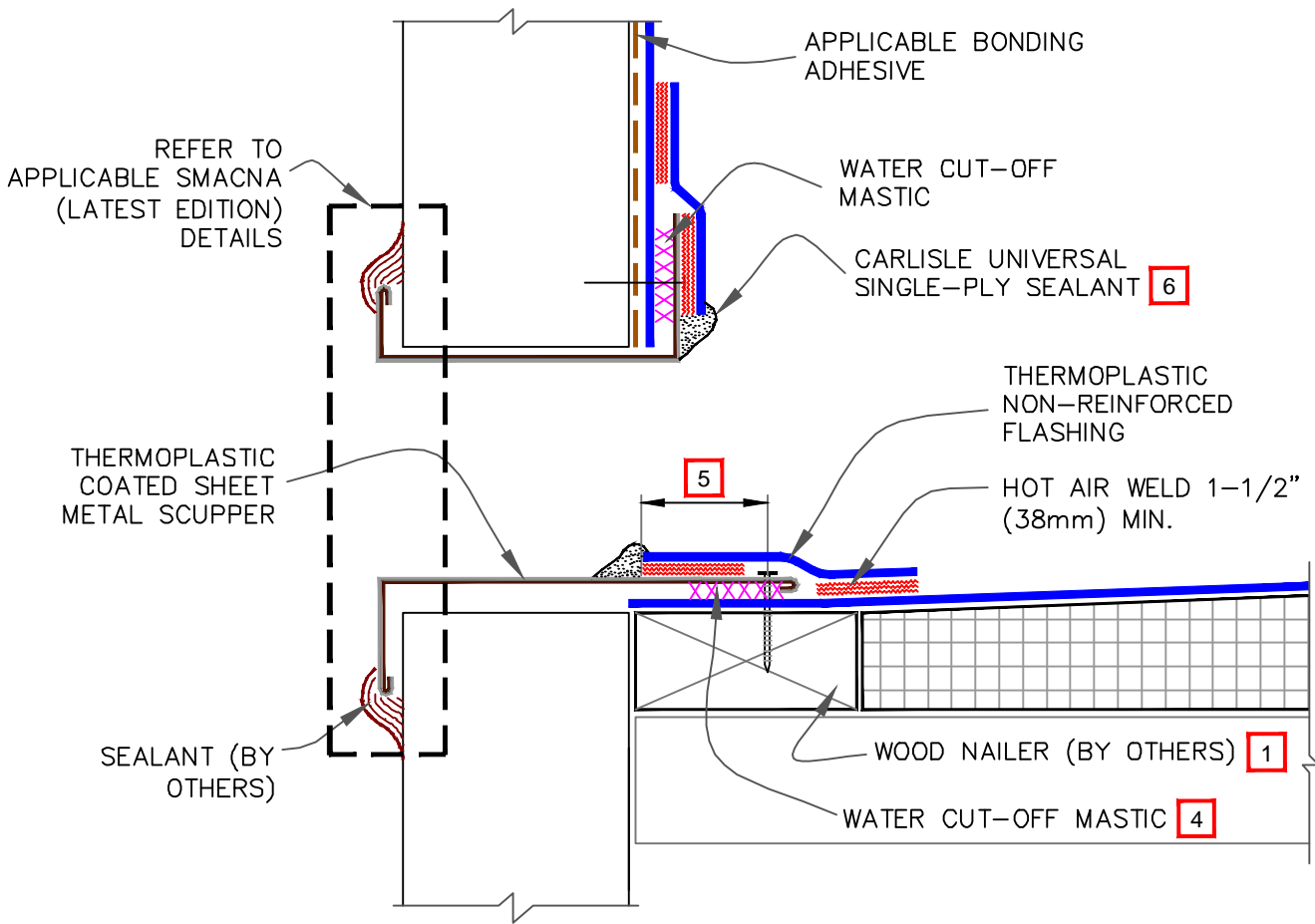
DIMENSIONS	mm		
(A)	1"	25	MIN.
(B)	2"	51	MIN.
(C)	4"	102	MIN.



POCKET SIZE	DIMENSIONS		
	"X"	"Y"	"Z"
12"(305mm)	12"(305mm)	12"(305mm)	24"(607mm)

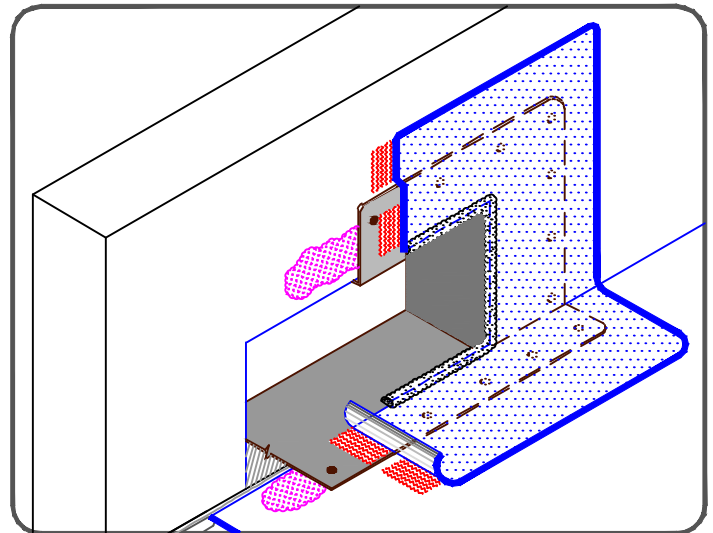
SEALANT POCKET EXTENSION LEGS CAN BE USED TO EXTEND THE LENGTH IN 10" (254mm) INCREMENTS. REFER TO PRODUCT DATA SHEET (PDS) FOR STEP-BY-STEP INSTALLATION PROCEDURES

<p>— THERMOPLASTIC REINFORCED MEMBRANE</p> <p>— APPROVED INSULATION</p> <p>0 — SEE NOTE(S)</p>	<p><b>PRE-FABRICATED SEALANT POCKET</b></p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p><b>U-16B</b></p> <p>THERMOPLASTIC UNIVERSAL</p>
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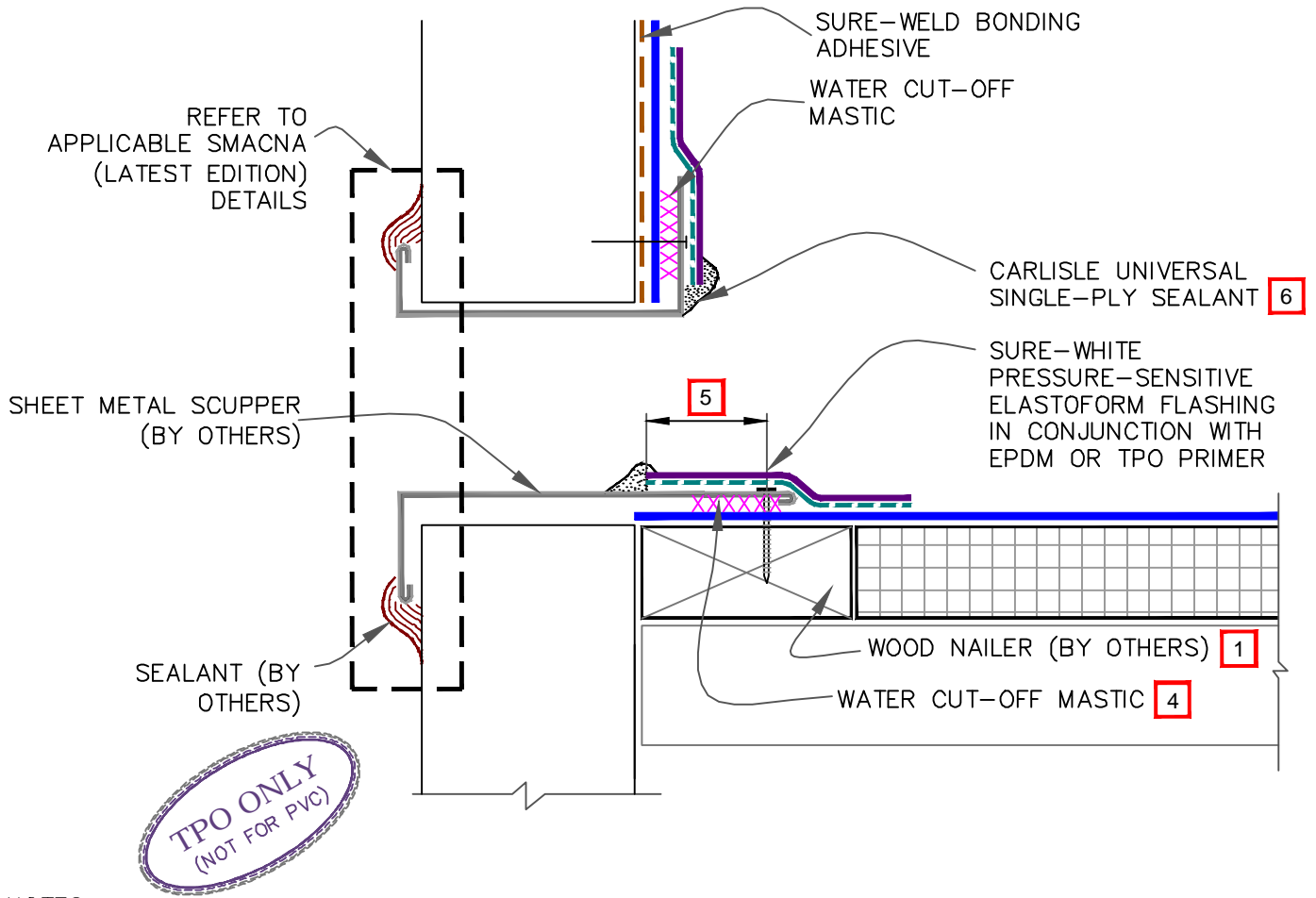


NOTES:

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.
4. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGE MUST BE UNDER CONSTANT COMPRESSION.
5. SCUPPER FLANGES MUST BE TOTALLY COVERED BY NON-REINFORCED FLASHING WITH MINIMUM 2" (51mm) COVERAGE PAST NAIL HEAD.
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.

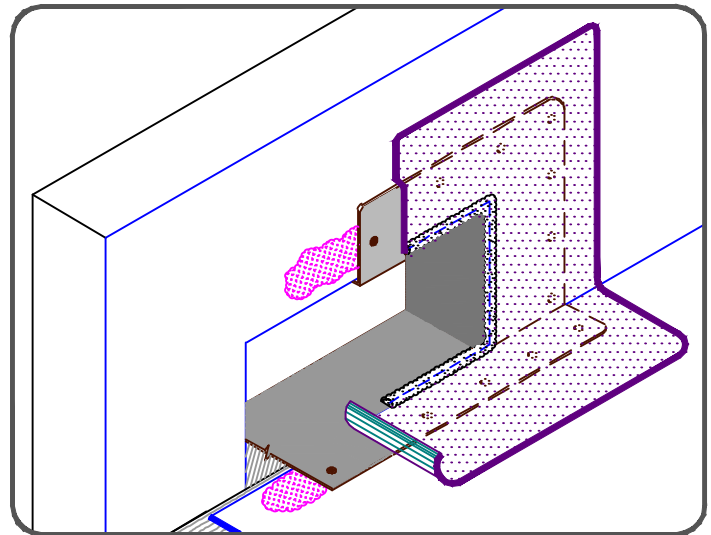


	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p><b>SCUPPER WITH COATED METAL</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p>
	<p>● APPROVED INSULATION</p>			<p><b>U-18A</b></p>
<p style="border: 1px solid red; padding: 2px;">0</p>	<p>● SEE NOTE(S)</p>			<p>THERMOPLASTIC UNIVERSAL</p>

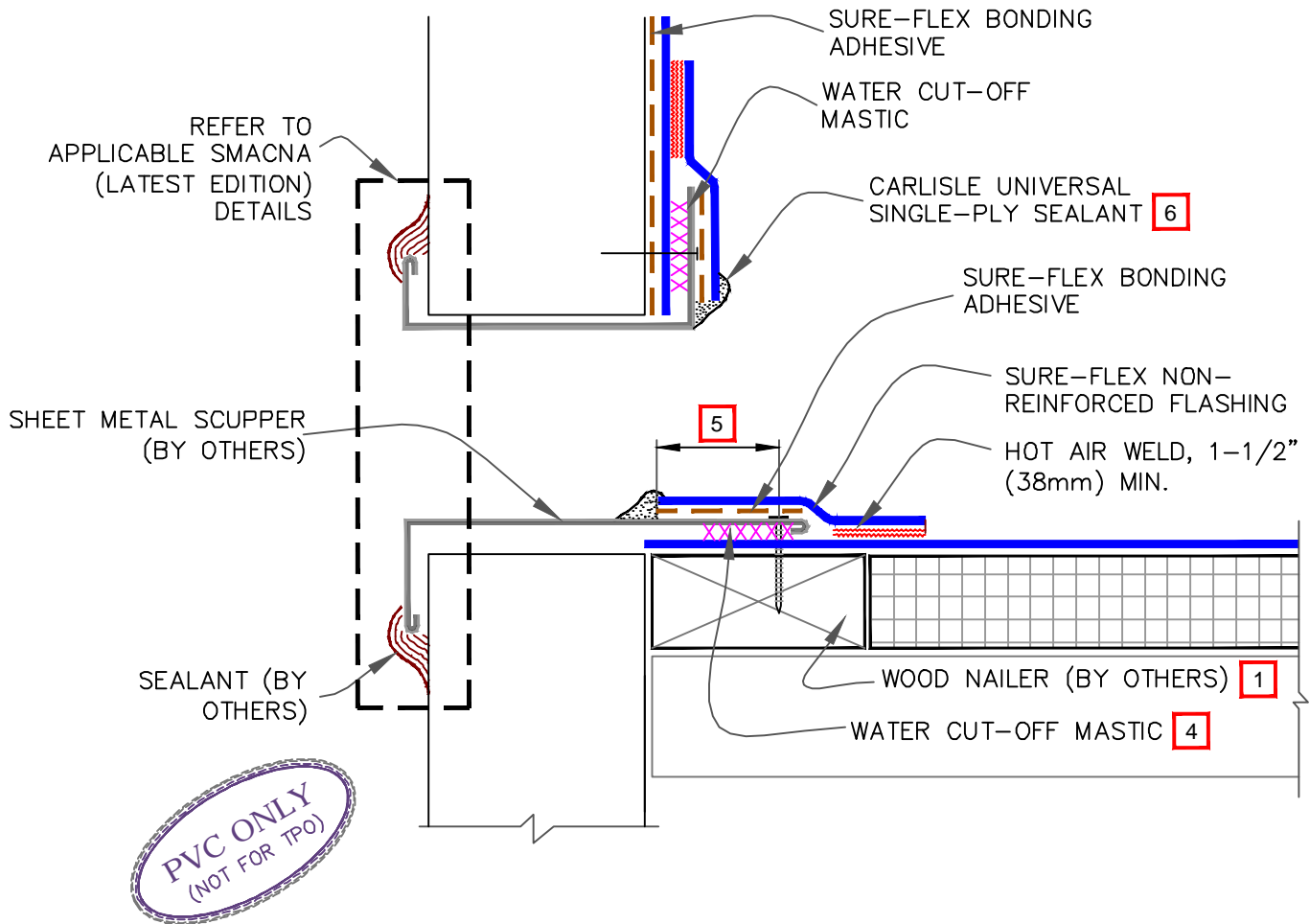


NOTES:

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" (51mm) 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.



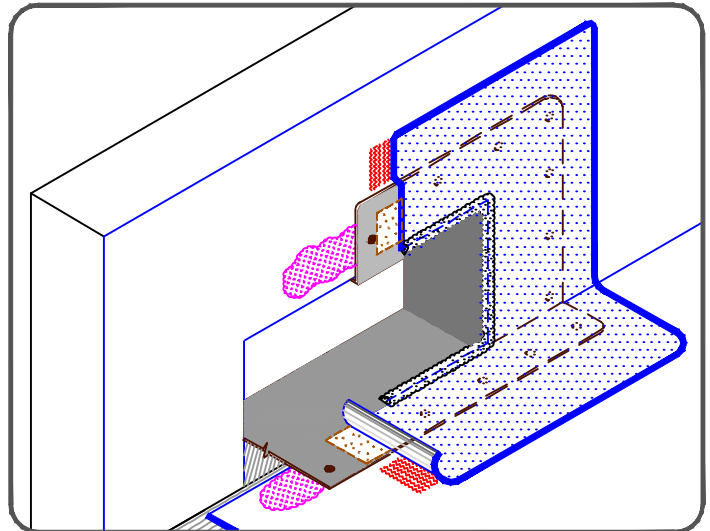
<p>—●— TPO MEMBRANE</p> <p>—■— APPROVED SUBSTRATE</p> <p>0 —●— SEE NOTE(S)</p>	<p>SCUPPER AT DECK- TPO</p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p><b>U-18B</b></p> <p>THERMOPLASTIC TPO</p>
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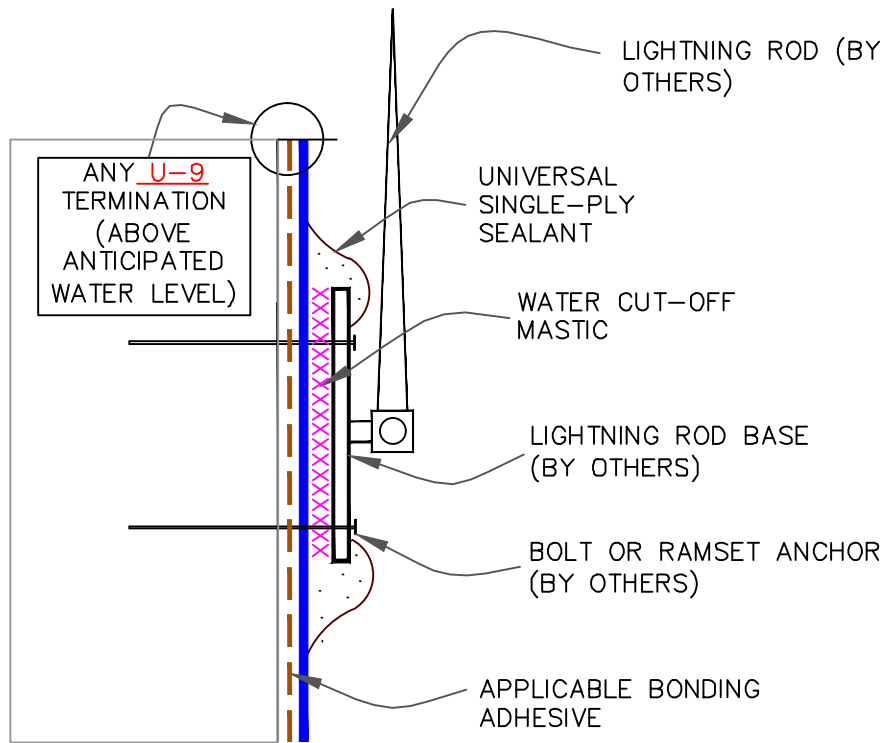
**PVC ONLY**  
(NOT FOR TPO)

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 PVC FLASHING WITH MINIMUM 2" (51mm) COVERAGE PAST NAIL HEAD.
6. UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE.



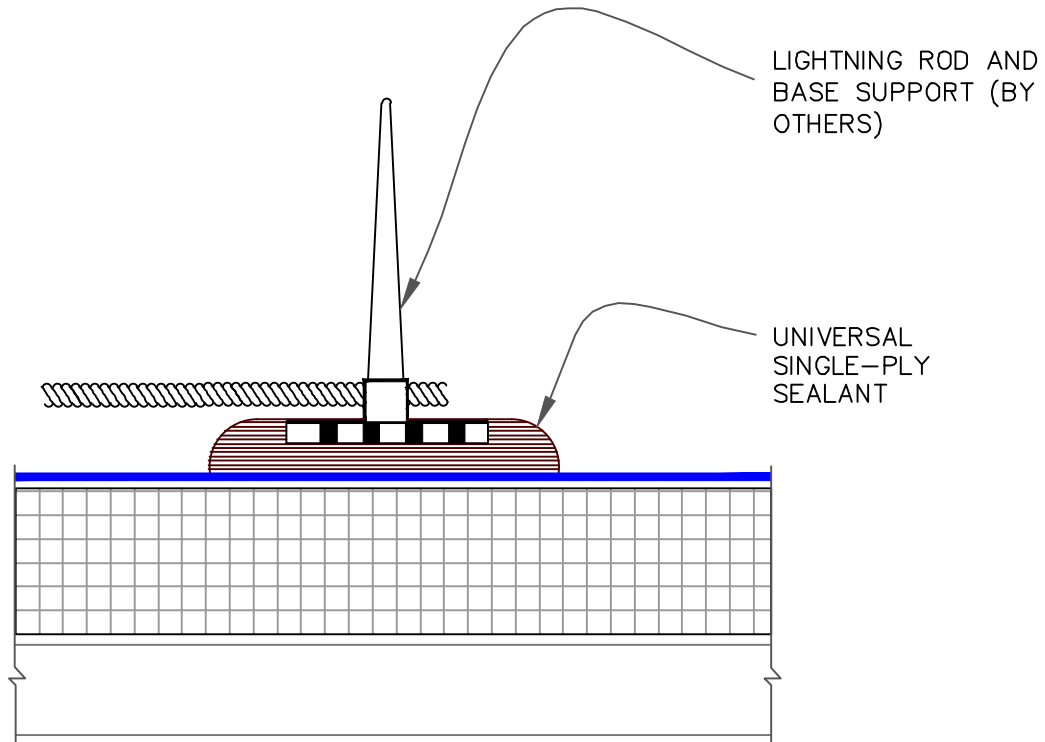
	PVC MEMBRANE	SCUPPER AT DECK- PVC		DETAIL NO.	
	APPROVED SUBSTRATE		<b>U-18C</b>		
<span style="border: 1px solid red; padding: 2px;">0</span>	SEE NOTE(S)		THERMOPLASTIC PVC		



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.

<p> THERMOPLASTIC REINFORCED MEMBRANE</p> <p> APPROVED INSULATION</p> <p><span style="border: 1px solid red; padding: 2px;">0</span> SEE NOTE(S)</p>	<p><b>LIGHTNING ROD AT PARAPET (VERTICAL ATTACHMENT)</b></p> <p>For additional information, refer to Specifications</p>		<p>DETAIL NO.</p> <p style="font-size: 24pt; font-weight: bold;">U-20A</p> <p>THERMOPLASTIC UNIVERSAL</p>
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NOTES:

1. CLEAN EXPOSED MEMBRANE SURFACE WITH WEATHERED MEMBRANE CLEANER (WHEN USING TPO) AND PVC MEMBRANE CLEANER (WHEN USING PVC) 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.

	<p>● THERMOPLASTIC REINFORCED MEMBRANE</p>	<p>LIGHTNING ROD AT DECK LEVEL</p>		<p>DETAIL NO.</p>
	<p>● APPROVED INSULATION</p>			<p>U-20B</p>
<p>0</p>	<p>● SEE NOTE(S)</p>	<p>For additional information, refer to Specifications</p>	<p>THERMOPLASTIC UNIVERSAL</p>	