Sure-Weld® TPO
Roofing Systems

Sure-Weld®
Mechanically Fastened and Adhered Roofing Systems

TABLE OF CONTENTS
July 2026

Part I – General
1.01 Description 3
1.02 General Design Considerations 4
1.03 Quality Assurance 5
1.04 Submittals 6
1.05 Warranty 7
TABLE I – Warranty Options and Minimum Membrane Thickness 9
TABLE II – Adhered Roofing System with top layer fastened – Up to a 25-Year Warranty 10
TABLE III – Adhered Roofing System with top layer fastened – 30-Year Warranty 12
TABLE IV – Up to a 25-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation / Substrate Attachment (New Construction or Tear - Off) 14
TABLE V – 30-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation / Substrate Attachment (New Construction or Tear - Off) 16
TABLE VI – Light Deck – Adhered Roofing Systems with top layer fastened – Up to a 20 Year Warranty 18
TABLE VII – Flexible FAST Bead Spacing and Perimeter Width – Minimum Perimeter Width for Insulation Attachment for All Warranties 19
TABLE VIII – Up to a 20-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing on Re-Cover Projects 20
TABLE IX – Up to a 20-Year TPO Mechanically Fastened Roofing System – Deck Type: 22- Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete 22
TABLE X – TPO – Maximum 20-Year Mechanically Fastened Roofing System – Deck Type: 7/16", 5/8", 3/4" OSB 24
TABLE XI – TPO – Maximum 20-Year Mechanically Fastened Roofing System – Deck Type: LWC over Steel, Gypsum and Cementitious Wood Fiber (Tectum) 26
1.06 Job Conditions 27
1.07 Product Delivery Storage and Handling 27

Part II – Product
2.01 General 29
2.02 Membranes 29
2.03 Insulations/Underlayments 31
2.04 Related Materials 38
2.05 Fastening Components 41
2.06 Insulation Securement Adhesive 42
2.07 Vapor/ Air Barrier 43
2.08 Edgings/Terminations 44
2.09 Roof Walkways 46
2.10 Other Carlisle Accessories 46

Part III – Execution
3.01 General 47
3.02 Roof Deck/Substrate Criteria 47
3.03 Insulation/Underlayment 48
3.04 Insulation Attachment 49
3.05 Membrane Placement and Securement Criteria 51
3.06 Heat Welding Procedures 55
3.07 Welding Problems/Repairs 57
3.08 Flashings 57
3.09 Roof Walkways 60
3.10 Daily Seal 60

ATTACHMENTS
Attachment I – Induction Welding Attachment Method 61
TABLE XII – Up to 20-Year TPO Induction Welded – Induction Plate Density Roofing System – Deck Type: 22- Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete 62
TABLE XIII – 25/30-Year Induction Welded – TPO Induction Plate Density Roofing System – Deck Type: 22- Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete 64
TABEL XIV – Maximum 20-Year TPO Induction Welded – Induction Plate Density Roofing System - Deck Type: 7/16", 5/8", 3/4" OSB 66

CARLISLE SYNTEC SYSTEMS

Attachment II – TPO Flashing Procedures utilizing Sure-White EPDM Flashing Products 79
Attachment III – Sure-Weld TPO (16’ Wide) Mechanically Fastened Roofing Systems Utilizing Standard Mechanical Fasteners and Induction Welding (RhinoBond \ Isoweld Attachment Method 97
Installation Details 109

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

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

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

Part I – GENERAL

1.01 Description

A. Mechanically Fastened Systems (Sure-Weld)

1. The **Sure-Weld Mechanically Fastened Roofing System** incorporates 12', 10' or 8' wide, white, tan or gray in 45, 60 or 80-mil thick scrim-reinforced, Sure-Weld Thermoplastic Polyolefin (TPO) membrane field sheets (also available in special colors in 60-mil thick, maximum 10' wide sheets). The Spectro-Weld™ Mechanically Fastened Roofing System incorporates 10' or 6' wide, white, 60 or 80-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane field sheets. Insulation is mechanically fastened to an acceptable roof deck. Sure-Weld perimeter sheets (6' used with 10' and 12' wide field sheets; 4' used with 8' wide field sheets) are installed along building edges and field membrane sheets are mechanically fastened to the roof deck with the appropriate Carlisle fasteners and fastening plates. Adjoining sheets of Sure-Weld membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld. For factory clean seams when welding, use SeamShield on all 10', 12' and 16' Sure-Weld TPO. Membrane fastening requirements are outlined in Warranty Tables in Paragraph 1.05 of this Specification.

   NOTE: The **Sure-Weld Mechanically Fastened** Roofing System may be specified using over an existing standing seam, flat seam or corrugated metal roof (mechanically fastened systems incorporate membrane securement into the structural purlins). **Refer to the Metal Retrofit Roofing System Specification**, published separately, for applicable requirements.

B. Adhered Roofing Systems (Sure-Weld / Sure-Weld SAT™)

1. The **Sure-Weld Adhered Roofing System** incorporates maximum 16' wide white, gray or tan 45, 60 or 80-mil thick scrim-reinforced Sure-Weld Thermoplastic Polyolefin (TPO) membrane and special colors in 60-mil thick, 5' and 10' wide sheets). The Spectro-Weld™ Adhered Roofing System incorporates 10' wide, white, 60 or 80-mil thick scrim-reinforced Thermoplastic Polyolefin (TPO) membrane field sheets. Carlisle Insulation is mechanically fastened to the roof deck or secured with Flexible FAST™ Adhesive, OlyBond 500 BA, or OlyBond Spot Shot Adhesive and the membrane is fully adhered to the insulation with the appropriate Sure-Weld Bonding Adhesive. Adjoining sheets of membrane are overlapped approximately 2" and joined together with a minimum 1-1/2" wide heat weld. For factory clean seams when welding, use SeamShield on all 10', 12' and 16' Sure-Weld TPO.

2. The **Sure-Weld SAT™ (Self Adhering Technology) membrane** is a heat-weldable single-ply thermoplastic

polyolefin (TPO) sheet available in 10’ and 12’ wide, (white, tan or gray) 60 or 80-mil thick reinforced TPO membrane laminated to an elastomeric pressure-sensitive adhesive.

1.02 General Design Considerations

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

A. The maximum roof slope for Mechanically Fastened Roofing Systems is 18" in one horizontal foot. There are no maximum slope restrictions for the application of the Adhered Roofing System.

B. The mechanically fastened roofing system is **not acceptable** for installations on steel decks lighter than 22 gauge unless the steel deck is used in conjunction with lightweight concrete and a minimum of 360 pounds pullout per fastener is achieved with HP-X Fasteners into the steel deck below. An Adhered Roofing System may be specified or refer to the Metal Retrofit Roofing System Specification, published separately for other roofing options.

C. Certain petroleum based products, chemicals, and waste products may not be compatible with this roofing system. Contact Carlisle for verification of compatibility and recommendations concerning an acceptable roofing assembly.

D. Metal-Edge Systems and Copings should be designed in compliance with Section 1504.5 of the International Building Code and shall be tested in accordance with ANSI/SPRI ES-1.

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

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

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

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

I. **Construction Generated Moisture / Vapor Drive**

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

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

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

J. **Drainage**

1. Drainage must be evaluated by the specifier in accordance with all applicable codes. Slopes may be provided by tapering the structure or through the use of tapered insulation; a sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.

Carlisle specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building owner or the owner's design professional.

2. Small incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly **should be designed to prevent ponding** of water on the roof for prolonged periods (longer than 48 hours). Good roofing practice dictates proper drainage to

prevent possible excessive live load and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.

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

4. Subject to code requirement, it is recommended that a minimum roof slope of 1/8" per horizontal foot be provided to serve long-term aesthetics. On New Construction projects, roof drains should be positioned in areas where maximum deflection is anticipated. Slopes greater than 1/8" per foot should be considered due to possible roof deflection.

K. **Vapor Retarders**

1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly including insulation, underlayment and adhesives.

2. The following criteria should be considered by the specifier:

   1) 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.

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

   3) 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. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

   4) All Carlisle roofing membranes are tested and pass in accordance with ASTM E 2178 and shall qualify as an air barrier when following Carlisle specifications and details for roofing applications.

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

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

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

3. If total removal of existing non-reinforced PVC membrane is not specified, existing membrane may be cut into maximum 10' x 10' sections, when the new insulation or membrane underlayment is to be mechanically fastened.

4. Regardless of the type of membrane or assembly selected, any loose flashings at the perimeter, roof drains and roof penetrations must be removed.

1.03 Quality Assurance

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

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

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

B. Carlisle recommends the use of Carlisle supplied products for use with Sure-Weld Roofing Systems. The performance or integrity of products by others, **when selected by the specifier and accepted as compatible by Carlisle**, is not the responsibility of Carlisle and is **expressly disclaimed** by the Carlisle warranty.

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

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

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

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

G. Provide TPO membrane and polyisocyanurate insulation from ISO 14001 (Environmental Management System) Certified Facilities.

H. 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.

I. 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.

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

1.04 Submittals

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

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

2. Cold storage buildings and freezer facilities.

3. Adhered Roofing System over 250' in height for projects with warranties up to 15 years.

4. Adhered Roofing System over 100' in height for projects with warranties greater than 15 years.

5. Mechanically Fastened Roofing System projects over 100' in height regardless of warranty duration.

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

7. Mechanically Fastened systems specified with a fastener length exceeding 12 inches.

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

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

Shop drawings must include:

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

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

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

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

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

1. Must conform to Carlisle's most current published specifications and details applicable at the time of bid.
2. Must be submitted along with a completely executed Notice of Completion.
3. Must include the items identified in Paragraph 1.04.C.

NOTE: As-Built projects are not recommended for those projects referenced in Paragraph 1.04A in order to ensure Carlisle warranty requirements have been met.

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

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

1.05 Warranty

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

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

1. **TABLE I - Minimum Membrane Thickness for Various Warranty Options** Identifies minimum membrane thickness for Reinforced membranes used in adhered or mechanically fastened roofing systems.
2. **TABLE II – Adhered Roofing System with top layer fastened – Up to a 25-Year Warranty** Identifies mechanical fastening densities with various underlayments for adhered roofing systems with Warranties Up to 25 year based on the various warranty wind speed coverages and insulation board sizes.
3. **TABLE III – Adhered Roofing System with top layer fastened – 30-Year Warranty** Identifies mechanical fastening densities with various underlayments for adhered roofing systems with Warranties 30 year based on the various warranty wind speed coverages and insulation board sizes.
4. **TABLE IV – Up to a 25-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation / Substrate Attachment (New Construction or Tear - Off)** Identifies

insulation bead spacing and mechanical fastening densities with various insulations and substrate boards for adhered roofing systems with Up to 25-Year Warranties based on the various warranty wind speed coverages and insulation board sizes.

5. **TABLE V – 30-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation / Substrate Attachment (New Construction or Tear - Off)** Identifies insulation bead spacing and mechanical fastening densities with various insulations and substrate boards for adhered roofing systems with Up to 25-Year Warranties based on the various warranty wind speed coverages and insulation board sizes.
6. **TABLE VI – Light Deck – Adhered Roofing Systems with top layer fastened – Up to a 20 Year Warranty** Identifies mechanical fastening densities with various underlayments for adhered roofing systems and light decks with Warranties Up to 20 year based on the various warranty wind speed coverages and insulation board sizes.
7. **TABLE VII – Flexible FAST Bead Spacing and Perimeter Width – Minimum Perimeter Width for Insulation Attachment for All Warranties** Identifies minimum perimeter width for insulation attachment for all warranties.
8. **TABLE VIII – Up to a 20-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing on Re-Cover Projects** Identifies insulation bead spacing with various insulations and cover boards for Recover Projects with Up to a 20-Year Warranty based on the various warranty wind speed coverages and insulation board sizes.
9. **TABLE IX – Up to a 20-Year TPO Mechanically Fastened Roofing System – Deck Type: 22- Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete -** 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.
10. **TABLE X – TPO – Maximum 20-Year Mechanically Fastened Roofing System – Deck Type: 7/16", 5/8", 3/4" OSB -** 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.
11. **TABLE XI – TPO – Maximum 20-Year Mechanically Fastened Roofing System – Deck Type: LWC over Steel, Gypsum and Cementitious Wood Fiber (Tectum) -** 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 I

Mechanically Fastened or Adhered Membrane Systems
Warranty Options (6)

Warranty Duration	Sure-Weld TPO Membranes								
	Warranty Wind Speed Coverage						Minimum Membrane Thickness (2)	Additional Membrane Coverage	
	55, 72, 80 or 90 mph		100 mph		110 to 120 mph				
	Adhered	Mech. Fastened	Adhered	Mech. Fastened	Adhered	Mech. Fastened		Additional Puncture	Hail
5,10, or 15 year	√	√	√	N/A (1)	√	N/A	Sure-Weld 45-mil	See Below	See Below
20 year	√ (3)	√	√	N/A	√	N/A	Sure-Weld 60-mil (4)	See Below	See Below
25 year (6)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5)	See Below	See Below
30 year (6)	√	√	√	N/A	N/A	N/A	Sure-Weld 80-mil (5)	See Below	See Below

Notes: N/A = Not Acceptable √= Acceptable

(1) Contact Carlisle for specific requirements.
(2) All "T-Joints" must be overlaid with appropriate flashing material when using 60- or 80-mil TPO.
(3) Aqua Base 120 adhesive may be used for projects with 20 year maximum warranty and wind speed coverage up to 72 mph.
(4) Spectro-Weld OR Sure-Weld SAT TPO 60-mil membranes may be used in lieu of Sure-Weld 60-mil membrane.
(5) Spectro-Weld 80-mil membrane OR Sure-Weld SAT TPO 80-mil membrane can be used in lieu of Sure-Weld 80-mil membrane. Sure-Weld 80-mil TPO in Special Colors are limited to Warranties Up to 20 Year.
(6) 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, SecurShield HD Eco, SecurShield HD Plus, or StormBase Composite, DensDeck Prime, DensDeck® ProFast™ Prime, DensDeck StormX Prime, Securock® Weather Defense™ or Securock, DEXcell® Glass Mat, DEXcell FA™ Glass Mat, DEXcell FA VSH®, DEXcell® Cement Board – Adhered Only).

Puncture
- Minimum 80-mil TPO Adhered or Mechanically Fastened.
- Carlisle's Accidental Puncture Warranty covers labor hours and material used during the repair. Maximum labor and material hours are dependent upon system design. Refer to the Warranty Availability Quick Reference Guide for coverage.

Table II

Adhered Roofing System with top layer fastened - Up to a 25-Year Warranty

Refer to Table (I) for Maximum Warranty Duration by Membrane Type and Thickness

Membrane Underlayment	Thickness	55-mph and 72-mph		80-mph		90-mph		100-mph	110-mph	120-mph
		4'x 8' board	4'x 12' board	4'x 8' board	4'x 12' board	4'x 8' board	4'x 12' board	4'x 8' board	4'x 8' board	4'x 8' board
20 or 25 psi InsulBase/InsulBase ECO (1), InsulBase RL (8), ThermaThin 7 GRF (9)	1.0" to 1.4"	16		**	**	**	**	**	**	**
	1.5" to 1.9"	10	15	10	15	12	20	**	**	**
	2.0" or greater	8	12	8	12	12	20	**	**	**
20 or 25 psi SecurShield/SecurShield ECO, SecurShield RL (8), ThermaThin 7 CGF (9)	1.0" to 1.4"	16		**		**		**	**	**
	1.5" to 1.9"	10		10		12		**	**	**
	2.0" or Greater	8		8		8		16	**	**
SecurShield HD Composite and SecurShield HD RL Composite (5)	1.5" (4)	6		6		6		**	**	**
	2.0" or Greater	6		6		6		8	12	16
SecurShield HD EPS Composite	2.0" or Greater	8		8		12		16	**	**
StormBase (OSB/ISO composite)	1.5" or Greater	8		8		8		12	16	16
SecurShield HD, SecurShield HD RL	1/2" (2)	8		10		12		20 (5)	(5)	(5)
SecurShield HD Plus, SecurShield HD Plus ECO	1/2" (2)	8		8		10		12	16	20
DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber, Securock Ultra Light Coated Glass Mat, 5/8" Securock Weather Defense Roof Board, DEXcell FA Glass Mat, 5/8" DEXcell FA VSH Glass Mat, DEXcell Cement Roof Board	1/4" (2)	10		12		16		**	**	**
	3/8" (2)	8		12		**		**	**	**
	7/16" (2)	8		8		12		16	**	**
	1/2"	8		8		12		16	(6)	(6)
	5/8"	8		8		8		12	12	16
EcoStorm VSH	1/2" (2)	8		8		8		12	16	16
HP Recovery Board (Wood Fiberboard) (6)(7)	1/2" (2)	16		**		**		**	**	**
InsulFoam SP (TPO SAT and reflective FleeceBACK membrane adhered with Flexible FAST)	2.0" or greater	12		16		16		**	**	**
Definitions: SAT = Self -Adhered Technology; RL = Rapid Lock; VSH = Very Severe Hail, ** = Do not Install										
Contact Carlisle's Technical Team at 877-797-8370 Option 3										

1) 4' x 12' boards in this system are only available in 20 psi compressive strength.

2) Over steel decks: Install a minimum 1.0" Carlisle-approved insulation under noted cover boards. Do not install noted cover boards directly over bare steel deck.

3) Note not used.

4) 1.5" SecurShield® HD Composite: Maximum wind speed warranty is **90 mph** for this board. For higher wind speeds, use a minimum 2.0".

5) 1/2" SecurShield HD, 1/2" SecurShield HD RL and listed 1/2" Gypsum boards **may be adhered** to approved insulation using Flexible FAST ribbons spaced 4-inches on center or Rig splatter for **100-mph to 120-mph wind speed warranties**.

6) HP Recovery Board: When installed directly over an existing roof, the maximum warranty duration is **15 years.**

7) HP Recovery Board: Do not install SAT membranes or use CAV-GRIP III Adhesive/Primer directly over wood fiberboard.

8) InsulBase RL / SecurShield RL only available and approved in 4' x 8' board size for this system.

9)ThermaThin 7 GRF / ThermaThin 7 CGF only available in 4' x 8' board size.

Additional Design Considerations

A) For building heights between 61' and 100': Increase fastening/adhesive in the 12'-wide perimeter and corner zones with 50% more fasteners and plates.

B) Projects **exceeding 100-feet tal**l are to be reviewed by Carlisle prior to warranty submission or installation.

C) Acceptable decks for all listed wind-speed warranties include: minimum 22-gauge steel, structural concrete, 1-1/2" wood plank, and minimum 5/8" plywood.

D) Minimum, 15/32" Plywood limited to 90-mph wind speed warranty.

E) For OSB, Gypsum, Cementitious wood fiber (Tectum), Lightweight Insulated Concrete over less than 22-gauge steel. Refer to Table (V**I**) for fastening and wind speed warranty limitations.

F) 5/8" OSB with minimum of 300 lb. pullout values using HP-X fasteners will be eligible for **reduced fastening** rate of 8 per 4'x8' board where cover board/Insulation qualifies for reduced fastening and will be limited to a maximum warranty duration of **20-years and a 55-mph** wind speed warranty.

G) Aqua Base 120 bonding adhesive limited to **20-year 72** mph wind speed warranties.

H) New Construction and Re-Roof with tear-off. Refer to Table (VIII) for Re-cover options.

I) For Cover Board and Insulation bead spacing please refer to Table (IV) for applicable warranty bead spacing.

J) For FleeceBACK membrane bead spacing please refer to Table (VII) for applicable warranty bead spacing.

K) Custom colors for TPO are limited to maximum 20-years

Table III

Adhered Roofing System with top layer fastened - 30 Year Warranty

Refer to Table (I) for Maximum Warranty Duration by Membrane Type and Thickness

Membrane Underlayment	Thickness	55-mph and 72-mph		80-mph		90-mph		100-mph	110-mph	120-mph
		4'x 8' board	4'x 12' board	4'x 8' board	4'x 12' board	4'x 8' board	4'x 12' board	4'x 8' board	4'x 8' board	4'x 8' board
20/25 PSI InsulBase/InsulBase ECO (1), InsulBase RL (6), ThermaThin 7 GRF (7)	1.0" to 1.4"	16	16	**	**	**	**	**	**	**
	1.5" to 1.9"	16	24	**	**	**	**	**	**	**
	2.0" or Greater	12	20	16	24	16	24	**	**	**
20/25 PSI SecurShield/SecurShield ECO, SecurShield RL (6), ThermaThin 7 CGF (7)	1.0" to 1.4"	16		**		**		**	**	**
	1.5" to 1.9"	16		20		24		**	**	**
	2.0" or Greater	12		16		16		24	**	**
SecurShield HD Composite and SecurShield HD RL Composite (5)	2.0" or Greater	8		10		12		16	16	16
SecurShield HD EPS Composite (4)	2.0" or Greater	12		12		16		**	**	**
StormBase (OSB/ISO composite)	1.5" or Greater	10		12		12		16	16	16
SecurShield HD, SecurShield HD RL	1/2" (2)	12		16		24		(5)	(5)	(5)
SecurShield HD Plus	1/2" (2)	10		12		16		20	24	24
DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber or Securock Ultra Light Coated Glass Mat, 5/8" Securock Weather Defense Roof Board,DEXcell FA Glass Mat, DEXcell FA VSH Glass Mat	1/4" (2)	16		**		**		**	**	**
	3/8" (2)	16		18		**		**	**	**
	7/16" (2)	16		16		**		**	**	**
	1/2"	12		16		18		(6)	(6)	(6)
	5/8"	10		12		12		16	16	16
EcoStorm VSH	1/2" (2)	10		12		16		16	24	24
InsulFoam SP (80-mil Sure-Weld SAT, 135-mil and 145-mil reflective FleeceBACK adhered with Flexible FAST)	2.0" or greater min 1.5 lb. Density	16		18		**		**	**	**

Definitions: SAT = Self -Adhered Technology; RL = Rapid Lock; VSH = Very Severe Hail, ** = Do not Install

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

1) 4' x 12' boards in this system are only available in 20 psi compressive strength.

2) Over steel decks: Install a minimum 1.0" Carlisle-approved insulation under noted cover boards. Do not install noted cover boards directly over bare steel deck.

3) Note not used.

4) SecurShield® HD Composite: 30-year warranties require a minimum of 2.0"

5) 1/2" SecurShield HD, 1/2" SecurShield HD RL and listed 1/2" Gypsum boards may be adhered to approved insulation using Flexible FAST ribbons spaced 4-inches on center or Rig splatter for **100-mph to 120-mph wind speed warranties**.

6) InsulBase RL / SecurShield RL only available and approved in 4' x 8' board size for this system.

7)ThermaThin 7 GRF / ThermaThin 7 CGF only available in 4' x 8' board size.

Additional Design Considerations

A) For building heights between 61' and 100': Increase fastening/adhesive in the 12'-wide perimeter and corner zones with 50% more fasteners and plates.

B) Projects **exceeding 100-feet tal**l are to be reviewed by Carlisle prior to warranty submission or installation

C) Acceptable decks for all listed wind-speed warranties include: minimum 22-gauge steel, structural concrete, 1-1/2" wood plank, and minimum 5/8" plywood.

D) Minimum, 15/32" Plywood limited to 90-mph wind speed warranty.

E) OSB Decking does not Qualify for a 30-year warranty.

F) Aqua Base 120 bonding adhesive limited to **20-year 72** mph wind speed warranties.

G) New Construction and Re-Roof with tear-off. Contact Carlisle Technical Team for recover projects.

H) For Cover Board and Insulation bead spacing please refer to Table (V) for applicable warranty bead spacing.

I) For FleeceBACK membrane bead spacing please refer to Table (VII) for applicable warranty bead spacing.

J) Custom colors for TPO are limited to maximum 20-years.

Table IV

Up to a 25-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation / Substrate Attachment (New Construction or Tear - Off) (3)

Applies to: Mechanically fastened substrate with adhered cover board/insulation under single-ply membrane

Refer to Table I for Maximum Warranty Duration by Membrane Thickness

Peak Gust Wind Speed Warranty			55-mph and 72-mph		80-mph		90-mph		100-mph		110-mph		120-mph	
Adhered Coverboard/Insulation	Insulation Board Size (Max.)		4'x 4'		4'x 4'		4'x 4'		4'x4' or 4'x8'		4'x4' or 4'x8'		4'x4' or 4'x8'	
	Bead Spacing for Approved Cover Boards/Insulation (2) (6) Refer to Table number (II) for approved cover boards for each wind speed category	Field	12"		12"		12"		6"		4"		4"	
		Perimeter	6"		6"		6"		4"		4"		4"	
		Corner	6"		6"		4"		4"		4"		4"	
Approved Board Insulation		Thickness	Substrate Fastening (# of fasteners per 4' x 8' board / 4' x 12' boards)											
			4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'
Mechanical Attachment of Substrate to Deck	20 or 25 psi InsulBase/InsulBase ECO (1) (4) (5), ThermaThin 7 GRF (9), InsulBase RL (8), 20 or 25 psi SecurShield/SecurShield ECO, SecurShield RL (8), ThermaThin 7 CGF (9)	1.0" to 1.4"	16	20	16	20	16	20	16	24	16	24	16	24
		1.5" to 1.9"	10	15	10	15	12	18	16	24	16	24	16	24
		2.0" or Greater	8	12	8	12	12	18	16	24	16	24	16	24
	Approved Thermal Barriers / Substrate Boards (7)													
	DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber, Securock Ultra Light Coated Glass Mat, 5/8" Securock Weather Defense Roof Board, DEXcell FA Glass Mat, 5/8" DEXcell FA VSH Glass Mat, DEXcell Cement Roof Board	1/4"	10		12		16		**		**		**	
		3/8"	8		12		16		**		**		**	
		7/16"	8		12		16		**		**		**	
		1/2"	8		8		12		16		16		16	
		5/8"	8		8		8		12		12		16	

Definitions: RL = Rapid Lock; VSH = Very Severe Hail, ** = Do not Install

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

1) 4' x 12' boards in this system are only available in 20 psi compressive strength.

2) Rig Splatter of Flexible FAST may be substituted for extruded beads in all roof zones.

3) See Table (II) for approved **cover boards** for appropriate **Wind Speed Warranty**.

4) If using **4'x 8' or 4' x 12'** boards bead spacing is **6" on center** in all roof zones up to **90-mph**

5) 16-fasteners and insulation plates per 4'x8' board for **OSB, Gypsum, Cementitious wood fiber (Tectum), Lightweight Insulated Concrete over less than 22-gauge steel**. These decks are limited to maximum **20-year, 72-**mph warranty wind speed without further review from Carlisle.

6) 5/8" OSB with minimum of 300 lb. pullout values using **HP-X fasteners** will be eligible for reduced fastening rate of 8 per 4'x8' board where cover board/Insulation qualifies for reduced fastening and will be **limited** to a maximum warranty duration of **20-years and a 55-mph** wind speed warranty.

7) Fastening of substrate boards when **Vapor Barrier or insulation are to be adhered to listed boards.**

8) InsulBase RL / SecurShield RL only available and approved in 4' x 8' board size for this system.

9)ThermaThin 7 GRF / ThermaThin 7 CGF only available in 4' x 8' board size.

Additional Design Considerations

A) For building heights between 61' and 100', enhance 12-foot-wide perimeters and corners with 50% more **fasteners and plates when substrate** is being mechanically fastened.

B) Projects exceeding 100-feet tall are to be reviewed by Carlisle prior to warranty submission or installation.

C) Acceptable Decking for all wind speed warranties : 22-gauge or heavier steel, Structural concrete, 1-1/2" Wood Plank, 5/8" Plywood.

D) Minimum, **15/32" Plywood** limited to **90-mph** wind speed warranty.

E) Aqua Base 120 bonding adhesive limited to **20-year 72** mph wind speed warranties.

Table V

30-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing and Mechanically Fastened Insulation Substrate Attachment (New Construction or Tear - Off) (3)

Applies to: Mechanically fastened substrate with adhered cover board/insulation under single-ply membrane. Refer to Table (I) for membrane warranty duration.

Refer to Table I for Maximum Warranty Duration by membrane thickness

Peak Gust Wind Speed Warranty			55-mph, 72-mph		80-mph		90-mph		100-mph		110-mph		120-mph	
Adhered Coverboard/Insulation	Insulation Board Size (Max.)		4'x4'		4'x4'		4'x4'		4'x 4' or 4'x8'		4'x4' or 4'x8'		4'x4' or 4'x8'	
	Ribbon Spacing for Approved Cover Boards/Insulation Refer to Chart number (III) for approved cover boards for each wind speed category (2)	Field	12"		12"		6"		6"		4"		4"	
		Perimeter	6"		6"		6"		4"		4"		4"	
		Corners	4"		4"		4"		4"		4"		4"	
Approved Board Insulation		Thickness	Substrate Fastening (# of fasteners per 4' x 8' or 4'x12' board)											
			4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'	4'x8'	4'x12'
Mechanical Attachment of Substrate to Deck	20 or 25 psi InsulBase/InsulBase ECO (1) (4), ThermaThin 7 GRF (6), InsulBase RL (5), 20 or 25 psi SecurShield/SecurShield ECO, SecurShield RL (5),ThermaThin 7 CGF (6)	1.0" to 1.4"	16	N/A	16	N/A	16	N/A	16	N/A	16	N/A	16	N/A
		1.5" to 1.9"	16	24	16	24	16	24	16	24	16	24	16	24
		2.0" or Greater	12	18	16	24	16	24	16	24	16	24	16	24
	Approved Thermal Barriers / Substrate Boards (1)													
	DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber or Securock Ultra Light Coated Glass Mat, 5/8" Securock Weather Defense Roof Board DEXcell FA Glass Mat, 5/8" DEXcell FA VSH Glass Mat, DEXcell Cement Board	1/4"	16		**		**		**		**		**	
		3/8"	16		18		**		**		**		**	
		7/16"	**		**		**		**		**		**	
		1/2"	12		16		16		16		16		16	
		5/8"	10		12		12		16		16		16	

Definitions: RL = Rapid Lock; VSH = Very Severe Hail, ** = Do not Install

This chart is for use of Coverboards as Top Layers adhered to Secondary layer which has been Adhered or Mechanically Fastened to Substrate. Refer to Table (III) for Mechanically Fastened Cover Boards as the Top Layer of Roofing Assembly.

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

1) 4' x 12' boards in this system are only available in 20 psi compressive strength.

2) Rig Splatter of Flexible FAST may be substituted for extruded beads in all roof zones.

3) See Table (II) for approved **cover boards** for appropriate **Wind Speed Warranty**.

4) If using **4'x 8' or 4' x 12**' boards bead spacing is **6" on center** in all roof zones up to **90-mph**.

5) InsulBase RL / SecurShield RL only available and approved in 4' x 8' board size for this system.

6)ThermaThin 7 GRF / ThermaThin 7 CGF only available in 4' x 8' board size.

Additional Design Considerations

A) For building heights between 61' and 100': Increase fastening/adhesive in the 12'-wide perimeter and corner zones with 50% more fasteners and plates.

B) Projects exceeding 100-feet tall are to be reviewed by Carlisle prior to warranty submission or installation.

C) Acceptable Decking for all wind speed warranties : 22-gauge or heavier steel, Structural concrete, 1-1/2" Wood Plank, 5/8" Plywood.

D) Minimum, 15/32" Plywood limited to **90-mph** wind speed warranty.

E) OSB Decking does not Qualify for a 30-year warranty.

F) Aqua Base 120 bonding adhesive limited to **20-year 72** mph wind speed warranties.

Table VI

Light Deck - Adhered Roofing Systems with top layer fastened - Up to a 20-Year Warranty

Refer to Table (I) for Maximum Warranty Duration by membrane thickness limited to 20-year warranties

Light Deck Types			OSB, Tectum, Gypsum, Less Than 22-gauge steel (24 & 26 gauge), Lightweight Insulating Concrete over less than 22-gauge steel	Reduced Fastening		
				Gypsum Decks - if pullouts meet requirements (2)	Gypsum Decks - if pullouts meet requirements (2)	Less Than 22-gauge steel (24 & 26 gauge) on Metal Retrofits Decks - when pullouts meet requirements (1)
Peak Gust Wind Speed Warranty			**55-mph and 72-mph**	**55-mph**	**72-mph**	**55-mph**
Insulation Board Size (max.)		**Thickness**	**4'x8' board**	**4'x8' board**	**4'x8' board**	**4'x8' board**
Membrane Underlayment (A)	20 or 25 psi InsulBase, InsulBase ECO , InsulBase RL, ThermaThin 7 GRF/CGF, 20 or 25 psi SecurShield, SecurShield ECO, SecurShield HD RL	1.0" to 1.4"	16	**	**	**
		1.5" to 1.9"	16	10	10	10
		2.0" or Greater	16	8	10	8
	SecurShield HD Composite	1.5" or Greater	16	8	10	8
	SecurShield HD EPS Composite	1.5" or Greater	16	8	10	8
	StormBase (OSB/ISO composite)	1.5" or Greater	16	**	**	**
	SecurShield HD, SecurShield HD RL	1/2"	16	12	12	12
	SecurShield HD Plus	1/2"	16	8	10	8
	DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber or Securock Ultra Light Coated Glass Mat, Securock Weather Defense Roof Board, DEXcell FA Glass Mat, DEXcell FA VSH Glass Mat, DEXcell Cement Board	1/4"	16	**	**	**
		3/8"	16	12	12	12
		7/16"	16	12	12	12
		1/2"	16	8	10	8
		5/8"	16	8	10	8
	EcoStorm VSH	1/2"	16	8	10	8
	HP Recovery Board (Wood Fiberboard) (4)(5)	1/2"	16	16	16	16
	InsulFoam SP (TPO SAT and All FleeceBACK adhered with Flexible FAST)	2.0" or Greater	16	**	**	**

Definitions: RL= RapidLock; VSH = Very Severe Hail; ** = Not applicable for reduced fastening - will be 16 per 4x8 board.

Contact Carlisle's Technical Team at 877-797-8370 Option 3
1) For **reduced fastening on Metal Retrofit systems** - required to achieve **360-lb pullout with HP-X** fasteners. Refer to Reduced Insulation Fastening Pattern for Metal Retrofit on Website. Refer to QR code below.
2) For **reduced fastening on Gypsum roof decks** - required to achieve **300-lb pullout with GypTec or LiteDeck fasteners**. Refer to Reduced Insulation Fastening Pattern for Gypsum Deck on Website. Refer to QR code below.
3) Note Not Used.
4) HP Recovery Board: When installed directly over an existing roof, the maximum warranty duration is 15 years.
5) HP Recovery Board: Do not install SAT membranes or use CAV-GRIP III or PVC CAV-GRIP over this cover board.

Additional Design Considerations
A) For building heights between 61' and 100', enhance 12-foot-wide perimeters and corners with 50% more fasteners and plates.
B) Projects **exceeding 100-feet** tall are to be reviewed by Carlisle prior to warranty submission or installation.
C) Projects **exceeding 72-mph** require prior approval from Carlisle.

Table VII

Flexible FAST Bead Spacing and Perimeter Width

Minimum Perimeter Width for Insulation Attachment for all Warranties	
Roof Height	**Width of Perimeter**
0 to 25-feet	4-feet
26 to 50-feet	8-feet
51 to 75-feet	12-feet
76 to 100-feet	16-feet
101 to 150-feet	20-feet
Greater than 150-feet	24-feet
Contact Carlisle's Technical Team at 877-797-8370 Option 3	

Additional Design Considerations
A) Rig Splatter or full spray are acceptable for all warranties and all roof zones
B) Dual Tank Splatter is not acceptable for Insulation Attachment.

Table VIII

Up to a 20-Year Warranty with an Adhered Cover Board / Insulation Bead Spacing on Re-Cover Projects (1) (2)

Refer to Table I for Maximum Warranty Duration by membrane thickness

Peak Gust Wind Speed Warranty		55-mph and 72-mph	80-mph
Existing Roofing Assembly (Insulation Board Size (Max.))		4'x 4'	4'x 4'
Smooth Surface BUR / Mineral Surface Cap Sheet/ Modified Bitumen (3)	**Field**	12"	12"
	Perimeter	6"	6"
	Corner	6"	4"
Gravel Surface BUR / Coal Tar Pitch (4) (5)	**Field**	6"	4"
	Perimeter	4"	4"
	Corner	4"	4"
Existing EPDM, TPO or Hypalon (6)	**Field**	12"	6"
	Perimeter	6"	4"
	Corner	6"	4"
Approved Board Insulation	**Thickness**		
20 or 25 psi InsulBase/InsulBase ECO, ThermaThin 7 GRF/CGF, InsulBase RL 20 or 25 psi SecurShield/SecurShield ECO, SecurShield RL	1.0" to 1.4"	✓	✓
	1.5" to 1.9"	✓	✓
	2.0" or Greater	✓	✓
Approved Cover Boards	**Thickness**		
DensDeck Prime, 3/8" DensDeck ProFast Prime, 5/8" DensDeck StormX Prime, Securock Gypsum Fiber or Securock Ultra Light Coated Glass Mat, 5/8" Securock Weather Defense Roof Board DEXcell FA Glass Mat, 5/8" DEXcell FA VSH Glass Mat, DEXcell Cement Board	1/4"	**	**
	3/8"	**	**
	7/16"	**	**
	1/2" (4)	✓	✓
	5/8" (4)	✓	✓
SecurShield HD, SecurShield HD Plus, SecurShield HD RL	1/2" (4)	✓	✓
✓ = Available **- Not Available			

Perimeter Width Requirements
0 to 25' tall - 4-foot wide perimeter zone
26' to 50' tall - 8 foot perimeter zone
51' to 75' tall - 12-foot perimeter zone
61' to 100' tall - 16-foot perimeter zone
Contact Carlisle for projects over 100' tall

Definitions: SAT = Self -Adhered Technology; RL = Rapid Lock; VSH = Very Severe Hail
Contact Carlisle's Technical Team at 877-797-8370 Option 3
1) When **fastening insulation/cover board** please refer to table (II) for appropriate fastening requirements.
2) CAV-GRIP III is to be applied to **un-weathered asphalt** roof decks.
3) Flexible FAST is not approved on **Smooth Surface Modified Bitumen APP** systems.
4) Existing **Coal Tar Pitch** Roofing systems require minimum 1-inch of insulation under approved cover boards with reflective membranes. Dark colored membranes require minimum 1-1/2" of insulation.
5) On **gravel surface BUR**'s loose gravel must be **removed**.
6) Existing roofing systems should have minimum **3/4" holes cut** out of the existing roofing membrane every 10'x10' area.

Table IX

Up to 20-Year TPO Mechanically Fastening Roofing System

Deck Type: 22-Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete

15 Year Warranty - 45-mil Sure-Weld TPO - 12', 10' & 8' Field and 6' & 4' Perimeter sheets					
20 Year Warranty - 60-mil Sure-Weld TPO - 12', 10' & 8' Field and 6' & 4' Perimeter sheets					
Add an extra perimeter sheet and 10' max sheet width 25/30-Year TPO Mechanically System					
25/30 Year Warranty - 80-mil Sure-Weld TPO - 10' & 8' Field and 6' & 4' Perimeter sheets					
Peak Gust Wind Speed Warranty	**Max. Building Height**	**Field Membrane Width**	**Minimum Number of Perimeter sheets by Building location from Coastline or Large Body of Water**		**Perimeter Sheet Width**
		TPO	Greater than 4 Miles	4 miles or less	TPO
55-MPH	**Up to 60'**	10' or 12'	1 @ 12" o.c	2 @ 12" o.c	6'
		8'	1 @ 12" o.c	2 @ 12" o.c	4'
	61' to 100'	10'	2 @ 6" o.c*	3 @ 6" o.c*	6'
		8'	2 @ 12" o.c	3 @ 12" o.c	4'
72-MPH	**Up to 60'**	10' or 12'	2 @ 12" o.c	3 @ 12" o.c	6'
		8'	2 @ 12" o.c	3 @ 12" o.c	4'
	61' to 100'	10'	3 @ 6" o.c *	4 @ 6" o.c *	6'
		8'	3 @ 12" o.c	4 @ 12" o.c	4'
80-MPH	**Up to 60'**	10'	2 @ 12" o.c	3 @ 12" o.c	6'
		8'	2 @ 12" o.c	3 @ 12" o.c	4'
	61' to 100'	10'	3 @ 6" o.c *	4 @ 12" o.c *	6'
		8'	3 @ 12" o.c	4 @ 12" o.c	4'
90-MPH	**Up to 60'**	10'	3 @ 12" o.c	4 @ 12" o.c	6'
		8'	3 @ 12" o.c	4 @ 12" o.c	4'
	61' to 100'	10'	4 @ 6" o.c *	5 @ 6" o.c *	6'
		8'	4 @ 12" o.c	5 @ 12" o.c	4'
100-MPH	**Up to 60'**	10'	4 @ 12" o.c	6 @ 12" o.c	6'
		8'	4 @ 12" o.c	6 @ 12" o.c	4'
	61' to 100'	10'	5 @ 6" o.c*	6 @ 6" o.c*	6'

New Assembly all Warranties
1.0" to 1.4" = 6 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 4 per 4' x 8' board
All cover boards = 5 per 4'x8' board
Recover over Smooth Surface (Up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 5 per 4' x 8' board
1/2" Gypsum & 1/2" InsulBase HD = 8 per 4' x 8' board
1/2" R-Tech Fanfold follows Detail MF-27C
1/2" HP Recovery board has max 15-year installed over an existing Smooth Surface. 1/4" Gypsum boards are not acceptable over an existing system.
Recover over Gravel BUR Surface (Remove all loose gravel)(Up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**

		8'	5 @ 12" o.c	6 @ 12" o.c	4'
110-MPH	**Up to 60'**	All 6' Wide Sheets fastened at 12" o.c across the entire roof.			
	61' to 100'	All 6' Wide Sheets fastened at 6" o.c across the entire roof.			
120-MPH	**Up to 60'**	All 6' Wide Sheets fastened at 6" o.c across the entire roof.			
	61' to 100'	All 6' Wide Sheets fastened at 6" o.c across the entire roof.			
*10' wide field sheet utilizing HP-Xtra fasteners require a fastening rate of 12" on center.					
Contact Carlisle's Project Review Team at 877-797-8370 Option 3					

1/2" SecurShield HD = 5 per 4' x 8' board
1/2" InsulBase HD = 8 per 4' x 8' board

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use HP-X fasteners and Piranha Plates into 22-Gauge Steel, 3/4", 5/8" and 15/32" Plywood, Wood Plank and HD 14-10 or CD-10 and Piranha Plates into Structural Concrete Decks

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

(C) 1/2" Gypsum boards are eligible for a maximum 15-year warranty for Gravel BUR recovers.

(D) 1/2" HP Recovery board and 1/4" Gypsum boards are not acceptable over an existing Gravel BUR systems.

(E) A cover board is needed if the insulation thickness exceeds 12 inches in thickness

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

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

Table X

TPO - Maximum 20-Year Mechanically Fastening Roofing System

Deck Type: 7/16", 5/8" 3/4" OSB

15 Year Warranty - 45-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
20 Year Warranty - 60-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
20 Year Warranty - 80-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
Peak Gust Wind Speed Warranty	**Max. Building Height**	**Deck Type and Thickness**	**Field Membrane Width**	**Minimum Number of Perimeter sheets by Building location from Coastline or Large Body of Water**		**Perimeter Sheet Width**
			TPO	Greater than 4 Miles	4 miles or less	TPO
55-MPH	**Up to 60'**	7/16"& 1/2" OSB	10'	2 @ 9" o.c	3 @ 9" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		5/8" OSB	10'	2 @ 12" o.c	3 @ 12" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		3/4" OSB	10'	2 @ 12" o.c	3 @ 12" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
	61' to 100'	7/16"& 1/2" OSB	10'	2 @6" o.c	3 @6" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		5/8" OSB	10'	2 @6" o.c	3 @6" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		3/4" OSB	10'	2 @6" o.c	3 @6" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
72-MPH	**Up to 60'**	7/16"& 1/2" OSB	10'	3 @ 9" o.c	4 @ 9" o.c	6'
			8'	3 @ 12" o.c	4 @ 12" o.c	4'
		5/8" OSB	10'	2 @ 12" o.c	3 @ 12" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		3/4" OSB	10'	2 @ 12" o.c	3 @ 12" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
	61' to 100'	7/16"& 1/2" OSB	10'	3 @6" o.c	4 @6" o.c	5' or 6.5'
			8'	3 @ 9" o.c	4 @ 9" o.c	5'
		5/8" OSB	10'	3 @6" o.c	4 @6" o.c	5' or 6.5'
			8'	3 @ 12" o.c	4 @ 12" o.c	5'
		3/4" OSB	10'	3 @6" o.c	4 @6" o.c	5' or 6.5'
			8'	3 @ 12" o.c	4 @ 12" o.c	5'
80-MPH	**Up to 60'**	5/8" OSB	8'	3 @ 12" o.c	4 @ 12" o.c	4'
		3/4" OSB	8'	3 @ 12" o.c	4 @ 12" o.c	4'
	61' to 100'	5/8" OSB	8'	3 @ 12" o.c	4 @ 12" o.c	4'
		3/4" OSB	8'	3 @ 12" o.c	4 @ 12" o.c	4'
90-MPH	**Up to 60'**	3/4" OSB	8'	3 @ 12" o.c	4 @ 12" o.c	4'

New Assembly all Warranties
1.0" to 1.4" = 6 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12'** board
1/2" SecurShield HD = 4 per 4' x 8' board
All cover boards = 5 per 4'x8' board
Recover over Smooth Surface (up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 5 per 4' x 8' board
1/2" Gypsum & 1/2" InsulBase HD = 8 per 4' x 8' board
1/2" R-Tech Fanfold follows Detail MF-27C
1/2" HP Recovery board has max 15-year installed over an existing Smooth Surface. 1/4" Gypsum boards are not acceptable over an existing system.
Recover over Gravel BUR Surface Remove all loose gravel (up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 5 per 4' x 8' board
1/2" InsulBase HD = 8 per 4' x 8' board

	61' to 100'	3/4" OSB	8'	4 @ 6" o.c	5 @ 6" o.c	4'

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

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use HP-X fasteners and Piranha Plates for TPO Membrane into Wood decks.

(B) Only the deck types and thicknesses listed are eligible for the specific wind speed listed.

(C) Maximum duration for OSB NOT to exceed 20 Years.
(D) Approvals are based upon the Withdrawal Resistance Criteria for the minimum pullout value based upon deck type.

(E) 1/2" Gypsum boards are eligible for a maximum 15-year warranty for Gravel BUR recovers.

(F) 1/2" HP Recovery board and 1/4" Gypsum boards are not acceptable over an existing Gravel BUR systems.

(G) A cover board is needed if the insulation thickness exceeds 12 inches in thickness.

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

Link to the Design Reference DR-06: ..\Letters\Carlisle DR-06 Withdrawal Resistance Criteria.pdf

Table XI

TPO - Maximum 20-Year Mechanically Fastening Roofing System

Deck Type: LWC over Steel, Gypsum and Cementitious Wood Fiber (Tectum)

15 Year Warranty - 45-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
20 Year Warranty - 60-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
20 Year Warranty - 80-mil Sure-Weld - 12', 10' & 8' Field and 6' and 4' Perimeter sheets						
Peak Gust Wind Speed Warranty	**Max. Building Height**	**Deck Type and Thickness**	**Field Membrane Width**	**Minimum Number of Perimeter sheets by Building location from Coastline or Large Body of Water**		**Perimeter Sheet Width**
			TPO	Greater than 4 Miles	4 miles or less	TPO
55-MPH	**Up to 60'**	LWC over Steel	12' & 10'	1 @ 12" o.c	2 @ 12" o.c	6'
			8'	1 @ 12" o.c	2 @ 12" o.c	4'
		Gypsum	10'	2 @ 9" o.c	3 @ 9" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
		Tectum	10'	2 @ 9" o.c	3 @ 9" o.c	6'
			8'	2 @ 12" o.c	3 @ 12" o.c	4'
72-MPH	**Up to 60'**	LWC over Steel	8'	2 @ 12" o.c	3 @ 12" o.c	4'
		Gypsum	10'	3 @ 12" o.c	4 @ 12" o.c	5' or 6.5'
		Tectum	8'	3 @ 12" o.c	4 @ 12" o.c	5'
Contact Carlisle's Project Review Team at 877-797-8370 Option 3						

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use HP-X Fasteners and Piranha Plates **fastened through LWC into the Steel deck. Note: Fasten through LWC into the deck below.**

(B) Gyptec Fasteners and Gyptec Plates for Gypsum and Tectum decks.

(C) Only the deck types and thicknesses listed are eligible for the specific wind speed listed.

(D) Approvals are based upon the Withdrawal Resistance Criteria for the minimum pullout value based upon deck type.

(E) 1/2" Gypsum boards are eligible for a maximum 15-year warranty for Gravel BUR recovers.

(F) 1/2" HP Recovery board and 1/4" Gypsum boards are not acceptable over an existing Gravel BUR systems.

(G) A cover board is needed if the insulation thickness exceeds 12 inches in thickness.

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

Link to the Design Reference DR-06: ..\Letters\Carlisle DR-06 Withdrawal Resistance Criteria.pdf

New Assembly all Warranties
1.0" to 1.4" = 6 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12'** board
1/2" SecurShield HD = 4 per 4' x 8' board
All cover boards = 5 per 4'x8' board
Recover over Smooth Surface (up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 5 per 4' x 8' board
1/2" Gypsum & 1/2" InsulBase HD = 8 per 4' x 8' board
1/2" R-Tech Fanfold follows Detail MF-27C
1/2" HP Recovery board has max 15-year installed over an existing Smooth Surface. 1/4" Gypsum boards are not acceptable over an existing system.
Recover over Gravel BUR Surface Remove all loose gravel (up to 20-year Warranty)
1.0" to 1.4" = 8 per 4' x 8' board
1.5" or greater = 5 per 4' x 8' board
1.5" or greater = 6 per **4' x 12' board**
1/2" SecurShield HD = 5 per 4' x 8' board
1/2" InsulBase HD = 8 per 4' x 8' board

B. **Access for warranty service**

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

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

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

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

4. Severely ponded conditions.

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

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

1.06 Job Conditions

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

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

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

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

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

F. 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.

G. On new construction projects, located in colder climates, special consideration should be given to construction practices and the possible migration of hot, humid air and moisture generated during construction. Refer to Paragraph 1.02 I and **Design Reference DR-01 "Construction Generated Moisture".**

1.07 Product, Delivery, Storage and Handling

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

B. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must comply with the requirements

of the specifier/owner to prevent overloading and possible disturbance to the building structure.

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

D. When the temperature is expected to fall below 40° F (4° C), outside storage boxes should be provided on the roof for temporary storage of liquid adhesives and sealants. Adhesive and sealant containers should be rotated to maintain their temperature above 40° F (4° C). Refer to Product Data Sheets for individual products for temperature restrictions.

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

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

G. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store bundles flat and upright with the bottom of the bundles elevated (2” or more) above the finished surface.

H. Slit the insulation bundle packaging vertically down the center of the two short sides to prevent moisture accumulation within the package. Completely cover the bundle with a waterproof tarp and secure to prevent wind damage and/or displacement.

Part II – PRODUCTS

2.01 General

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

2.02 Membranes

A. Sure-Weld Membranes

1. General

   a. Sure-Weld TPO Membrane meets or exceeds the requirements of ASTM D6878-17, standard specification for Thermoplastic Polyolefin Based Sheet Roofing. In addition to the physical properties listed below, refer to the Sure-Weld Membrane Product Data Sheets for Cool Roof Rating Council (CRRC) 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) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.90 was achieved and an SRI (solar reflectance index) of 99 was calculated using ASTM E1980.

   c. The Spectro-Weld TPO membrane (white) meets the emittance requirements set forth by the USGBC (US Green Building Council) for their LEED (Leadership in Energy and Environmental Designs) Program. When tested in accordance with ASTM E408, an emittance of 0.89 was achieved and an SRI (solar reflectance index) of 111 was calculated using ASTM E1980.

2. Sure-Weld 45 or 60-mil thick Reinforced Thermoplastic Polyolefin (TPO) membrane, Sure-Weld SAT (Self-Adhering Technology) 60 or 80-mil thick Reinforced Thermoplastic Polyolefin (TPO) membrane and Sure-Weld 80-mil thick Reinforced EXTRA™ Thermoplastic Polyolefin (TPO) conforms to the following physical properties. Sure-Weld SAT (white, tan or gray) membrane is available in 10’ and 12’ wide by 50’ or 100’ long rolls and Sure-Weld Standard / HS membrane available in field sheets in rolls 16’, 12', 10' or 8' wide by 100' long. Perimeter membrane sheets are available in widths of 6' (used with 12' and 10' wide field sheets) or 4' (used with 8' wide field sheets) by 100' long. Sure-Weld Membrane is available in white, gray or tan. Special Color TPO membrane is available in 5 colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) in 60-mil field sheets in rolls 5’ or 10’ wide by 100’ long and 80-mil field sheets in 10’ wide by 100’ long. Special Color TPO is a special order product and may require a lead time.

   OPTION 1 - APEEL: 60- or 80-mil Sure-Weld TPO (white, tan or gray) reinforced membrane is available with an optional APEEL Protective Film. APEEL Protective Film can be left in place for up to 90 days without affecting the integrity of the film, guarding the TPO membrane’s surface from scuffs and dirt accumulation during installation. Durable and easy to remove, APEEL Protective Film improves aesthetics and long-term reflectivity. Available 4’, 6’, 8’, 10’ and 12’ widths by 100’ long rolls. Some sizes and colors of Sure-Weld SAT with APEEL require a minimum order of 200 squares and 2-3 week lead time. Also available, APEEL 6” Cover Tape, allowing 100% coverage of the TPO surface. APEEL Cover Tape rolls are 1,640 feet long.

   OPTION 2 - SeamShield: 60-, or 80-mil Sure-Weld TPO in 10’, 12’ and 16’ wide (white, tan or gray) reinforced membrane is available with an optional SeamShield protective film. A factory applied protective film applied to both the top and bottom lap area of TPO sheets, serving as a safeguard for the welded areas of the TPO sheet throughout the installation process. It eliminates the use of Weathered Membrane Cleaner and is removed just prior to seam welding.

   Note: Sure-Weld HS and Special Color TPO Membrane is specially formulated with higher fire retardancy to accommodate steep slope roof conditions.

`	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.

2.03 Insulations/Underlayments

A. **General**

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

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

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

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

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

B. **Carlisle Polyisocyanurate**

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

Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability		
			Adhered	Mechanically Fastened	Ballasted
Carlisle InsulBase Polyisocyanurate, Carlisle InsulBase Eco, Carlisle InsulBase HD Eco	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle InsulBase NH Polyisocyanurate	*1.5"	C1289, Type II, Class 1, Grade 2 or 3	√	√	√
Carlisle ThermaThin 7™ GRF	1.5"	C1289, Type II, Class 1, Grade 2	√	√	√
Carlisle SecurShield Polyisocyanurate, Carlisle SecurShield Eco	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle SecurShield NH Polyisocyanurate	*1.5"	C1289, Type II, Class 2, Grade 2 or 3	√	√	√
Carlisle ThermaThin 7™ CGF	1.5"	C1289, Type II, Class 2, Grade 2	√	√	√
Carlisle SecurShield HD Composite Polyisocyanurate (SS HD)	2"	C1289, Type IV, Grade 2 or 3	√	√	N/A
Carlisle StormBase Composite (OSB)	1.5"	C1289, Type V, Grade 2 or 3	√	√	N/A

Design Restrictions

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

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

Notes: N/A = Not Acceptable √ = Acceptable

SecurShield HD is listed in Paragraph E4 below.

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

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

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

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

5. **Carlisle ThermaThin 7™ GRF Polyisocyanurate** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from 1.45 to 2.5 inches. ThermaThin 7™ GRF Polyisocyanurate formulation has approximately 30 percent higher R-Value per inch than standard Polyisocyanurate.

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

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

8. **Carlisle ThermaThin 7™ CGF Polyisocyanurate** – A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289, Type II, Class 2, Grade 2 (20 psi). The product is available in 4’ x 4’ and 4’ x 8’ standard size with a thickness from 1.45 to 2.5 inches. These flat board products feature a dark-colored coated-glass facer (CGF) on one side of the insulation board and a light-colored CGF on the other, labeled Ready Flash. Ready Flash Technology allows applicators to manage adhesive flash-off times by choosing between two different-colored facers on every board. ThermaThin 7™ CGF Polyisocyanurate formulation has approximately 30 percent higher R-Value per inch than standard Polyisocyanurate.

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

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

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

C. **EPS: Expanded Polystyrene**

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

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

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

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

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

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

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

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

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

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

Table D1 **XPS: Extruded Polystyrene** (See below for product descriptions)

Insulations / Underlayment	Minimum Thickness	ASTM	Roofing System Acceptability		
			Adhered	Mechanically Fastened	Ballasted
Thermapink 18	.75"	Refer to Product Data Sheet	N/A	N/A	√
Thermapink 25	1"	Refer to Product Data Sheet	N/A	N/A	√
Foamular 400	1"	Refer to Product Data Sheet	N/A	N/A	√
Dow Styrofoam Deckmate Plus	1"	Refer to Product Data Sheet	N/A	N/A	√

Design Restrictions

- Local Codes must be consulted regarding the acceptance of expanded insulation directly over steel decks. When specified, minimum thickness shall be designated by the manufacturer.
- Expanded polystyrene roof insulations cannot be installed directly over coal-tar pitch roof surfaces or existing PVC membranes. A separation layer of minimum 1/2" SecurShield HD, HP Recovery Board or Polyiso Insulation shall be used.
- Refer to related products listed in **Spec Supplement P-01 "Related Products"** for other products which may be suitable for use. Carlisle must be contacted for specific requirements.

Notes: N/A = Not Acceptable √ = Acceptable

1. **Thermapink 18 or 25 Extruded Polystyrene**

2. **Foamular 400 Extruded Polystyrene**

3. **Dow Styrofoam Deckmate Plus Extruded Polystyrene**

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

Table E1 **Vacuum Insulated Panel (VIP)** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**	
			Adhered	**Mechanically Attached**
Carlisle OPTIM-R® VIP	*1.6"	C1484	√	N/A
ADVANC-R® VIP	0.94”	C1484	√	N/A
Design Restrictions				
*2.6” minimum for total installed system including an additional 2 layers of 1/2” SecurShield HD panels; 1 layer on top and 1 layer on bottom of OPTIM-R®. For adhered systems only. Note: OPTIM-R® VIP & ADVANC-R® VIP cannot be cut or punctured. Notes: N/A = Not Acceptable √ = Acceptable				

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

2. **ADVANC-R® VIP –** a thin, rigid, high R-value, non-structural vacuum insulated panel. Provides a low-profile solution for height restricted roof conditions such as penthouse doors, windowsills, equipment curbs and parapet walls. Provides a R-66 insulating value in a 0.94” thick panel. Available in 22.4” x 24.0” and 22.4” x 48.0” panel sizes.

F. **Cover Boards / Slip Sheets**

Table F1	**Cover Boards** (See below for product descriptions)				
Insulations / Underlayment	**Minimum Thickness**	**ASTM**	**Roofing System Acceptability**		
			Adhered	**Mechanically Fastened**	**Ballasted**
SecurShield HD, SecurShield HD Eco	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
SecurShield HD Plus	.5"	C1289-06, Type II, Class 4 (109 psi max)	√	√	N/A(2)
InsulBase HD, InsulBase HD Eco	.5"	C1289-06, Type II, Class 1, Grade 3	N/A	√	N/A
Securock Roof Board	.25"	C1177	√	√	N/A
Securock Weather Defense	.625"	C1177	√	√	N/A
Securock UltraLight Glass-Mat Roof Board	.25"	C1177	N/A	√	N/A
Securock UltraLight Coated Glass-Mat Roof Board	.25"	C1177	√	√	N/A
EcoStorm VSH	.5"	Refer to Product Data Sheet	√	√	N/A
HP Recovery Board	.5"	C208 Grade 2	√	√	√
DensDeck StormX Prime	.625"	C1177	√	√ (1)	N/A
DensDeck Prime	.25"	C1177	√	√ (1)	N/A
DensDeck	.25"	C1177	N/A	√ (1)	N/A
DensDeck ProFast Prime	.375"	C1177	√	√	N/A
R-Tech Fanfold Recovery Board	.5"	C578 Type (I, VIII, II. or IX)	N/A	√	√
HP Protection Mat	6 oz	Refer to Product Data Sheets	N/A	√	√
DEXcell® Glass Mat	.25"	C1177	N/A	√	N/A
DEXcell FA®	.25"	C1177	√	√	N/A
DEXcell® Cement Roof Board	.4375"	C1325	√	√	N/A
DEXcell FA VSH®	.625"	C1177	√	√ (1)	N/A

Design Restrictions

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

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

Notes: N/A = Not Acceptable √ = Acceptable

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

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

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

3. **SecurShield HD Plus** - a rigid insulation panel composed of a high-density (109 psi max), closed-cell polyisocyanurate foam core laminated to premium-performance coated-glass fiber-mat facer, meeting ASTM C1289,

Type II, Class 4, Grade 1. Specifically designed for use as a cover board or recover board. Available 1/2" thick 4' x 4' (6.5 lbs) and 4' x 8' panel (13 lbs) with an R-value of 2.5. Meets an FM 1-90 using only 8 fasteners per 4' x 8' board.

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

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

6. **Securock Roof Board –** A uniform composition of fiber-reinforced gypsum, without a facer, for use as a cover board or a thermal barrier in mechanically fastened and fully adhered roofing systems. Meets ASTM E84 for flame spread and smoke development; Class A fire performance per UL 790. Available in 1/4" to 5/8" thick and 4' x 4' or 4' x 8' size boards. 5/8" meets requirements of Type X per ASTM C1177. Long uninterrupted runs (>200') may require slight gapping due to thermal expansion.

7. **Securock UltraLight Glass-Mat Roof Board –** A fire-resistant, moisture and mold-resistant roof board used in mechanically fastened, low-slope roofing systems, featuring a specially treated lightweight core and high-performance glass-mat facer. Meets ASTM E84 for flame spread and smoke development; Class A fire performance per UL 790. Available in 4' x 8' size boards; 1/4", 1/2" and 5/8" thicknesses available. 5/8" meets requirements of Type X per ASTM C1177.

8. **Securock UltraLight Coated Glass-Mat Roof Board -** A fire-resistant, moisture and mold-resistant roof board used in fully adhered or mechanically fastened, low-slope roofing systems, featuring a specially treated lightweight core. The special coating on the high-performance glass-mat facer provides an exceptional adhesive bond and reduces facer delamination. Meets ASTM E84 for flame spread and smoke development; Class A fire performance per UL 790. Available in 1/4", 1/2" and 5/8" Type X and 4' x 8' size boards. 5/8" meets requirements of Type X per ASTM C1177.

9. **Securock® Weather Defense™ Roof Board** - A reinforced gypsum cover board with an enhanced, moisture-resistant core and high-performance, coated glass mat facers (CGF) 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. Securock® Weather Defense™ Roof Board is extremely durable and is approved for use in assemblies meeting FM's Very Severe Hail (VSH) Classification. Available in 5/8" thickness and 4' x 4' or 4' x 8' size boards. Meets requirements of Type X per ASTM C1177. Meets ASTM E84 for flame spread and smoke development; Class A fire performance per UL 790; FM Approvals Class 1.

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

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

12. **DensDeck® ProFast™ Prime Roof Board** - A fire-resistant, moisture and mold-resistant roof board used in fully adhered or mechanically fastened, low-slope roofing systems, featuring a specially treated lightweight core. (20% lighter than 1/2" gypsum boards). The special coating on the high-performance glass-mat facer provides an exceptional adhesive bond and reduces facer delamination. Non-combustible per ASTM E108 and meets ASTM E84 for flame spread and smoke development; Class A fire performance per UL 790. Available in 3/8" thickness and 4' x 8' size boards.

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

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

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

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

17. **DEXcell® Glass Mat** – A mold & mildew resistant, gypsum substrate board with coated fiberglass facers, used for thermal protection and acoustical enhancement of roof systems. May be used as a substrate for a vapor retarder and /or the continuous substrate for the application of commercial roofing applications. Available in 1/4”, 1/2” and 5/8” thicknesses in 4’ x 8’ boards.

18. **DEXcell FA™ Glass Mat**– A mold & mildew resistant, gypsum substrate board with heavy duty, coated fiberglass facers, used for thermal protection and acoustical enhancement of roof systems. May be used as a substrate for a vapor retarder and /or the continuous substrate for the application of commercial roofing applications. The precoated, fiberglass facers are designed to increase adhesive coverage and enhance performance of the bond strength of the system. Available in 1/4”, 1/2” and 5/8” thicknesses in 4’ x 4’ and 4’ x 8’ boards.

19. **DEXcell® Cement Roof Board** – A mold & mildew resistant, Portland Cement, lightweight aggregate roof board with heavy-duty fiberglass mesh facers used as a substrate board, thermal barrier and cover board for commercial roofing applications. Available in 7/16” and 5/8” thicknesses in 4’ x 4’ and 4’ x 8’ boards.

20. **DEXcell FA VSH®** – A reinforced gypsum panel with enhanced moisture resistant gypsum core and heavy duty coated glass facers used as a substrate board, thermal barrier and cover board for commercial roofing applications, approved for use in single-ply and multi-ply assemblies meeting FM Very Severe Hail rating. Available in 5/8” thickness in 4’ x 4’ and 4’ x 8’ boards.

2.04 RELATED MATERIALS

A. **Sure-Weld Flashing (for use with Sure-Weld Adhered, Mechanically Fastened and Self Adhered Membrane Assemblies)**

1. **Sure-Weld Flashing:** Sure-Weld **non-reinforced flashing** is available in rolls **12" and 24" wide by 50' long**. Flashing is used for inside/outside corners and field fabricated pipe flashings when the use of pre-molded or pre-fabricated accessories is not feasible. In addition, **45-mil by 6" wide by 100' long**, **60-mil by 6" wide by 100' long, 9” wide by 50’ long and 80-mil by 9” wide by 50’ long** Sure-Weld **reinforced membrane** is available for overlaying fasteners and fastening plates.

2. **Sure-Weld Pressure-Sensitive Cover Strip:** A nominal 30-mil thick non-reinforced TPO membrane laminated to nominal 30-mil thick cured synthetic rubber pressure-sensitive adhesive used in conjunction with TPO Primer or Low-VOC TPO Primer to strip in flat metal flanges (i.e., drip edges). Available in rolls 6" wide by 100' long in colors of white, gray or tan. Not for use on 25—year or 30-year Warranty projects.

3. **Sure-Weld TPO Reinforced Overlayment Strip:** A heat-weldable, reinforced thermoplastic polyolefin membrane. It is available in 45-mil 6" x 100' and 60-mil 6" x 100' and 9" x 50' rolls in colors of white, gray or tan. It can be used to cover end laps on FleeceBACK and SAT TPO systems and to strip in flat metal flanges on details such as TPO coated drip edges, gravel stops, and scuppers.

4. **APEEL Cover Tape:** A 6"-wide, 1,640' long roll of APEEL Protective Film used to protect areas of Sure-Weld TPO membranes where APEEL Protective Film has been removed (around details) or was not factory applied (seams). APEEL Cover Tape allows contractors to keep 100 percent of the TPO surface clean during installation and is applied using the APEEL Cover Tape Applicator.

5. **Sure-Weld TPO Pressure-Sensitive RUSS:** A nominal 6" and 10" wide, 45-mil thick reinforced TPO membrane with nominal 3" wide 35-mil thick cured synthetic rubber pressure-sensitive tape adhesive laminated along one edge on 6" wide RUSS and along both edges on 10" wide RUSS. Used in conjunction with TPO Primer or Low-VOC TPO Primer. 6" wide RUSS is used as a base membrane securement along walls, curbs, etc.; 10" wide RUSS is used to form perimeter sheets on Mechanically Fastened Systems.

6. **Sure-Weld TPO T-Joint Covers:** A 60-mil thick injection molded TPO flashing formed into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60, 72, and 80-mil TPO systems and on 45-mil systems where step-offs have not been properly sealed. Packaged in boxes of 100. Available in white, tan or gray.

7. **Yellow Pressure-Sensitive (PS) Warning Strip**: A nominal 30-mil-thick non-reinforced TPO flashing laminated to a nominal 30-mil-thick, fully cured synthetic rubber Pressure-Sensitive adhesive and is available in 6" wide by 100' long rolls. Yellow Pressure-Sensitive Warning Strip can be applied to EPDM, TPO or Hypalon roofing systems to provide a visual warning of an impending hazard (i.e. roof edge, deep drain sump, skylight).

8. **Sure-Weld TPO Contour Rib Profile:** Used to obtain the appearance of standing seam metal roofing with the performance of a TPO single-ply membrane. The Contour Rib Profile measures 1-1/4" tall and 1-3/4" wide, including the welding flanges, while the vertical profile is a substantial 3/8" thick. The profile has a continuous 1/8" diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8" fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray and tan, as well as Special Colors (Medium Bronze, Rock Brown, Terra Cotta, Slate Gray and Patina Green) in 10' lengths and packaged 20 per carton.

9. **Pre-Molded Accessories:**

    a. **Inside Corners**: A pre-molded corner flashing for inside corners. Available in white, gray or tan; 60-mil thick.

    b. **Outside Corners**: A one-piece injection molded corner flashing used for flashing outside corners. Available in white, gray or tan; 60-mil thick.

    c. **TPO Curb Wrap Corners**: A prefabricated flashing made of 60-mil thick reinforced Sure-Weld Detail membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height. Four sizes are available to fit curbs up to 6' by 6' in size. One curb requires 4 corners for a complete installation. TPO Curb Corners are packaged in boxes containing twelve corners. Custom sizes are available as a special order product requiring lead time.

    d. **TPO Universal Corners:** a pre-molded flashing for use in a variety of corner details, including inside and outside corners. Available in white, gray and tan and are 60-mil thick.

    e. **Pipe Flashings**: A pre-molded white, gray or tan pipe flashing used for pipe penetrations. Available for 3/4" –8" diameter pipes with clamping rings included.

    f. **Split Pipe Seals:** A prefabricated flashing consisting of 60-mil thick reinforced Sure-Weld Detail Membrane for pipes 1" – 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Custom sizes are available as a special order product requiring lead time.

    g. **TPO Square Tubing Wraps**: A prefabricated flashing made of 60-mil thick reinforced Sure-Weld Detail membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration. Available for 3", 4", 5" and 6" square tubing.

    h. **Molded TPO Sealant Pocket**: A pre-fabricated, interlocking, 2-piece, injection molded, flexible pocket with a rigid polypropylene vertical wall and pre-formed deck flanges. Pockets can be adjusted from 11.5" to 7.5" in length by 6" in width by following the cutting lines molded into the pocket. Used in conjunction with White One-Part Pourable Sealer for waterproofing pipe clusters or other odd shaped penetrations. Available in white, gray or tan.

    i. **Pre-fabricated Sealant Pocket**: A two-piece, pre-fabricated sealant pocket that utilizes reinforced 60-mil TPO membrane and coated metal to form a rigid, oversized sealant pocket with a weldable horizontal deck flange. Available in 12" (total volume of 1.87 gallons). Packaged 2 per carton and available in white only. Refer to the applicable Technical Data Bulletin for dimensions and installation instructions. Custom sizes are available as special order product.

j. **Sealant Pocket Extension Legs**: Designed for use with the TPO Molded Sealant Pocket and the Pre-Fabricated Sealant Pocket to extend the length in increments of 10". Fabricated from 60-mil thick reinforced TPO membrane and TPO coated metal. Can be used full length, cut to size for customized lengths or welded to each other for extra long applications. Packaged 10 legs per carton and available in white only.

B. PRIMERS, ADHESIVES, SEALANTS AND CLEANERS

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

1. Sure-Weld Products

a. **Sure-Weld Bonding Adhesive:** A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).

b. **Low-VOC Bonding Adhesive for TPO:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single-Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft2 per gallon finished surface. Available in 5 gallon pails**. This product does not comply with certain counties in the State of California which have additional restrictions on solvents.**

c. **Low-VOC Bonding Adhesive 1168:** This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single Ply Roofing Adhesives. A high strength, solvent-based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft2 per gallon finished surface. Available in 5-gallon cans. **This product complies with all counties in the State of California which have additional restrictions on solvents.**

d. **Aqua Base 120 Bonding Adhesive:** A semi pressure-sensitive, water based adhesive used as a two-sided contact adhesive. Coverage rate is 120 square feet per gallon finished surface (applied to membrane and substrate). Refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for Warranty limitations and other considerations.

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

f. **Cut-Edge Sealant:** A clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.

g. **Water Cut-Off Mastic:** Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).

h. **Universal Single-Ply Sealant:** A 100% solids, solvent free, v.o.c. free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white or gray in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.

i. **White One-Part Pourable Sealer**: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 122 cubic inches of volume within a sealant pocket.

j. **Weathered Membrane Cleaner:** Used to prepare membrane for heat welding that has been exposed to the

elements or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

k. **TPO Primer:** A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS.

l. **TPO Low-VOC Primer:** A solvent-based, low solids primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS. This Low-VOC product is ideal for use in states where environmental issues are a concern.

m. **CAV-PRIME Low VOC Primer:** A solvent-based, one-step primer for one-step priming of TPO surfaces prior to the application of Factory-Applied Tape, Coverstrip, SecurTape and all other pressure-sensitive products.

2.05 Fastening Components

A. Securement Strips (RUSS)

1. **Sure-Weld Pressure-Sensitive RUSS** (Reinforced Universal Securement Strip): A 6" or 10" wide, nominal 45-mil thick reinforced TPO membrane STRIP with a nominal 35-mil thick cured TPO splice tape adhesive laminated along one or both edges. (3" wide Factory-Applied TAPE laminated along one edge for the 6" wide RUSS and along both edges for the 10" wide RUSS.)

   a. 6" wide Pressure-Sensitive RUSS is used horizontally or vertically at the base of walls, curbs, etc., in conjunction with Seam Fastening Plates below the Sure-Weld TPO deck membrane for additional membrane securement. Available in rolls 100’ long, 2 per carton.

   b. 10" wide Pressure-Sensitive RUSS is utilized for perimeter membrane securement along the center of field sheets to form perimeter membranes. Available in rolls 100' long, 1 per carton

B. Fasteners

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

Insulation Fastening Criteria

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

Notes: N/A = Not Applicable

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

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most 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 Roofing Systems. Refer to the applicable specification for specific requirements.

1. **HP-X Fastener:** A heavy duty #15 threaded fastener with a #3 Phillips drive used with Carlisle's Piranha™ Fastening Plate to secure Mechanically Fastened Roofing Systems. It is used on minimum 22-gauge steel decks or minimum 15/32" CDX plywood decks. It is also designed to offer an optimum combination of driving performance, back-out and corrosion resistance with excellent pullout performance.

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

3. **HP Fastener:** A threaded E-coat square head fastener **for insulation attachment only**. Used into steel, wood plank, minimum 15/32" thick plywood or minimum 7/16" thick oriented strand board (OSB).

4. **Pre-Assembled ASAP Fastener**: Carlisle's InsulFast Fastener pre-assembled with a 3" diameter plastic plate used for **insulation attachment only** on Adhered and Mechanically Fastened Roofing Systems. Installed using OMG Roofing Products Fastening Tool.

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

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

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

8. **Polymer Gyptec Fastener:** A glass-filled nylon auger fastener designed for securing insulation and/or membrane to specialty decks such as cement wood fiber or gypsum.

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

C. **Fastening Plates**

1. **Piranha Plate**: A 2-3/8" diameter metal barbed fastening plate used with Carlisle HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement. This plate can be used for membrane or insulation securement on Mechanically Fastened Roofing Systems.

2. **Piranha Xtra Plate**: A 2-3/8" diameter metal barbed fastening plate with an oversized hole for use with Carlisle HP-Xtra Fasteners for membrane securement on Mechanically Fastened Roofing Systems.

3. **Seam Fastening Plate**: A 2" diameter metal plate used for insulation attachment on Mechanically Fastened Systems or membrane securement at angle changes on Adhered Systems in conjunction with the appropriate Carlisle Fastener.

4. **Insulation Fastening Plate**: A nominal 3-inch metal plate used for insulation attachment in conjunction with the appropriate Carlisle Fastener.

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

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

2.06 Insulation Securement Adhesive

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

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

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

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

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

2.07 Vapor/Air Barrier

A. **General**

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

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

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

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

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

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

F. **CCW-702WB** – a high-tack, water-based contact adhesive for promoting adhesion of Carlisle air/vapor barrier membranes and an approved substrate (i.e., concrete, DensDeck Prime, Securock and DEXcell). Applied by roller,

brush or spray with an application rate of approximately 200 sq. ft. per gallon. Available in 5-gallon containers. CCW-702WB Primer contains 57g/L VOCs and meets South Coast Air Quality Management District (SCAQMD) and Leadership in Energy and Environmental Design (LEED) Requirements for Volatile Organic Compounds.

2.08 Metal Accessories, Edgings, Coping, And Terminations

A. General

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

B. Products

1. Fascia Products

a. **SecurEdge CF Snap-on Fascia:** A two-part snap-on assembly including a base plate and decorative snap-on cover. Includes a 20-gauge retainer base plate with pre-slotted holes for fasteners. The fascia is available in 0.040” or .050” aluminum with mill-finish, anodized-finish or Kynar ® 500 finish or 22- or 24-gauge galvanized steel with Kynar ® 500 finish or acrylic coated galvalume finish. Available in a variety of standard colors. Custom colors are available upon request. Available in sizes from 3-1/2” to 12-1/4” face heights. ANSI/SPRI/FM-4435 ES-1 certified.

b. **SecurEdge One Fascia:** A snap-on edge system consisting of a 20-gauge galvanized steel formed rail with pre-punched slots, a 6” stainless steel spring clip. corrosion resistant fasteners with a 24-gauge galvanized steel or 0.040”, 0.050” or 0.063” Kynar® finished aluminum fascia cover. Available in a variety of standard colors. Custom colors are available upon request. Available in 12' standard lengths with face sizes of 4”, 5”, 6” and 8”. ANSI/SPRI/FM-4435 ES-1 certified.

c. **SecurEdge Snap-On Canted Fascia:** A snap-on edge system consisting of a 24-gauge galvanized metal water dam with pre-punched holes, a 24-gauge stainless steel spring clip and a snap-on cover. The cover is available in 0.040”, 0.050” or 0.063” thick mill-finish, anodized, or Kynar® 500 finish aluminum or 22- or 24-gauge steel with Kynar® 500 finish. The fascia is available in a variety of standard colors. Custom colors are available upon request. Available in 12' standard lengths and heights varying from 5" to 12-1/2". ANSI/SPRI/FM-4435 ES-1 certified.

d. **SecurEdge Crimp-On Canted Fascia:** A crimp-on edge system featuring a 24-gauge, galvanized metal water dam with pre-punched holes, a 24-gauge stainless steel spring clip and a snap-on cover. The fascia cover is available in 0.040”, 0.050” or 0.063” thick mill-finish, anodized, or Kynar® 500 finish aluminum or 22- or 24-gauge steel with Kynar® 500 finish. The fascia is available in a variety of standard colors. Custom colors are available upon request. Available in 12' standard lengths and heights varying from 5-1/4" to 12-3/4". ANSI/SPRI/FM-4435 ES-1 certified.

e. **SecurEdge EX Snap-On Fascia:** An anchor bar roof edge fascia system consisting of heavy 0.100" thick extruded aluminum bar, corrosion resistant stainless-steel fasteners and snap-on fascia cover used with Adhered, Mechanically Fastened assemblies. The fascia cover is available in 0.040”, 0.050” or 0.063” thick mill-finish, anodized, or Kynar® 500 finish aluminum or 22- or 24-gauge steel with Kynar® 500 finish. The fascia is available in a variety of standard colors. Custom colors are available upon request. Available in 12' standard lengths and 4”, 5-1/2”, 7” and 8-1/2” heights. ANSI/SPRI/FM-4435 ES-1 certified.

2. Coping Products

a. **SecurEdge Snap-on Coping:** A snap-on coping system that incorporates 20-gauge anchor cleats with pre-slotted holes, a concealed joint cover and 10' or 12' continuous sections of coping cap consisting of 40, 50 or 63-mil thick clear and colored anodized, and Kynar 500 finish or 24-gauge steel with Kynar® 500 finish. The coping cap is available in a variety of standard colors. Custom colors are available upon request. Also available in a variety of widths including custom pieces such as tees, crosses, radius copings, etc. ANSI/SPRI/FM-4435 ES-1 certified.

b. **SecurEdge Snap-on Gold Coping:** A snap-on coping system that incorporates 20-gauge, galvanized steel anchor clips and 12”, 20-gauge, factory-applied stainless-steel springs. Available with 22- and 24-gauge steel with Kynar® 500 finish or 0.040”, 0.050” and 0.063” mill-finish, anodized or Kynar® 500 coated aluminum. A variety of standard colors are available. Custom colors are available upon request. ANSI/SPRI/FM-4435 ES-1 Certified.

c. **SecurEdge CF Snap-on Coping:** A snap-on coping system that incorporates 20-gauge, galvanized steel anchor cleats with pre-slotted holes, a concealed joint cover and 0.040", 0.050" and 0.063" thick mill-finish, anodized or Kynar® 500 finish or 22- or 24-gauge Kynar 500® coated steel. The coping cap is available in a variety of colors and widths, including custom pieces such as tees, crosses, and radius copings. Custom colors are available upon request. Available in standard 12' lengths with 6" to 16" wall heights. ANSI/SPRI/FM-4435 ES-1 certified.

Also available in SecurEdge CF Gold Coping with 16-gauge anchor cleats for added performance.

d. **SecurEdge One Coping:** A mechanically fastened coping system consisting of a 22-gauge retainer bar (face side only), corrosion resistant fasteners and a .040", .050" or .063" mill-finish, anodized or Kynar® 500 coated aluminum and 22- or 24-gauge, Kynar® 500 coated steel coping cover. A variety of standard colors are available. Custom colors are available upon request. Available for wall thicknesses up to 12". ANSI/SPRI/FM-4435 ES-1 Certified.

e. **SecurEdge Continuous Cleat Coping:** An engineered coping system, featuring continuous, 20-gauge galvanized steel cleats on both the inside and outside face of the parapet. Available with 0.040", 0.050" and 0.063" mill-finish, anodized or Kynar® 500 coated aluminum and 22- and 24-gauge Kynar® 500 coated steel. A variety of standard colors are available. Custom colors are available upon request. Custom fabricated for specific project requirements. Cleat available in standard 12' lengths. ANSI/SPRI/FM 4435/ES-1 Certified. Miami-Dade approved.

3. **Water Control Products**

a. **SecurEdge Gravel Stop**: A two-piece assembly that consists of a continuous 22-gauge steel cleat with pre-punched holes and snap-on gravel stop cover. The gravel cover is available in 0.040", 0.050", and 0.063" mill-finish, anodized or Kynar® 500 coated aluminum or 22- and 24-gauge steel with galvanized Kynar® 500 coated or acrylic coated galvalume finish. Available in a variety of standard colors. Custom colors are available upon request. Available in 12' standard lengths with 3" to 10" heights and 1" and 3" flange widths. ANSI/SPRI/FM-4435 ES-1 Certified.

b. **SecurEdge Drip Edge**: Designed for use on Adhered and Mechanically Fastened Roofing Systems. Includes a 22-gauge continuous 12' pre-punched, 90-degree angle cleat and 10' or 12' long fascia sections, including concealed joint covers. Available in 0.032" or 0.040" mill-finish, anodized or Kynar® 500 coated aluminum or 24-gauge Kynar 500 coated steel. A variety of standard colors are available. Custom colors are available upon request. ANSI/SPRI/FM-4435 ES-1 Certified.

c. **SecurEdge EX Drip Edge:** Featuring an extruded aluminum anchor bar with pre-punched holes for roof membrane securement. The cover is manufactured from 0.040" aluminum with mill-finish, anodized or Kynar® 500 finish or 24-gauge steel with Kynar® 500 finish. Available in standard 12' lengths with sizes ranging from 3" to 7.5" face heights. A variety of standard colors are available. Custom colors are available upon request. ANSI/SPRI/FM 4435/ES-1 Certified. Miami-Dade approved.

d. **SecurWeld TPO Coated Drip Edge:** Prefabricated, non-reinforced, TPO-coated metal edging featuring a 22-gauge, 90-degree, angle cleat with pre-slotted holes and TPO-coated, and a 24-gauge metal cover used to heat-weld the roofing membrane directly to the metal edge. Available in standard TPO colors of white, gray or tan or special colors (Rock Brown, Slate Gray, Terra Cotta, Patina Green and Medium Bronze) Available in 12' standard lengths with a variety of sizes up to 8" fascia height. ANSI/SPRI/FM 4435/ES-1 Certified.

e. **SecurWeld TPO Skirted Drip Edge:** Prefabricated TPO-coated metal edging, featuring a 22-gauge, 90-degree, angle cleat with pre-slotted holes, a TPO coated, and a 24-gauge metal cover used to heat-weld the roofing membrane directly to the metal edge. Available in standard TPO colors of white, gray or tan or special colors (Rock Brown, Slate Gray, Terra Cotta, Patina Green and Medium Bronze) Available in 12' standard lengths with a variety of sizes up to 8" fascia height. ANSI/SPRI/FM 4435/ES-1 Certified.

f. **SecurEdge WR Gutter:** system incorporates 1" wide extruded internal gutter brackets and aluminum or galvanized steel gutter. Available in 0.040", 0.050 or 0.063" aluminum, and 22-gauge or 24-gauge with Kynar® 500 finish. Gutter support brackets are extruded aluminum. Available in box style, chamfer style, and offset profiles. ANSI/SPRI/FM 4435/ES-1 Certified.

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

h. **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.

i. **SureTite Snap-On Fascia Cleat:** Prefabricated, 22-gauge, Galvalume steel, continuous, snap-on cleat with pre-punched holes. Used for use on single ply roofing applications when Carlisle metal flat sheets are used to shop fabricate the fascia or coping cover. Available in 12' standard lengths and 4-1/4" to 8-1/4" face heights. ES-1 certified.

j. **SureTite Drip Edge Cleat:** Prefabricated, 22-gauge, Galvalume steel, continuous, cleat with pre-punched holes. Used for use on single ply roofing applications when Carlisle metal flat sheets are used to shop fabricate the drip edge, gravel stop or flat coping cover. Available in 12' standard lengths and 3", 5" 6" and 7" heights. ES-1 certified.

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

2.09 Roof Walkways

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

1. Walkway Types

a. **Sure-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 handheld heat welder. The diamond plate tread pattern offers superior slip resistance. The walk edges are trimmed in safety yellow to better define the designated traffic flow. Walkway Rolls are 34" wide by 50' long and are overall a nominal 180 mils thick. Available in white, tan or gray with safety yellow welding tabs along both edges.

NOTE: As an option, walkway rolls may be adhered to the membrane surface with SecurTAPE™/TPO Primer

c. **Sure-Weld TPO Crossgrip Walkway Rolls:** Manufactured from TPO and may be used in lieu of standard Sure-Weld TPO Walkway Rolls when a walkway is to be loose-laid and not secured to the membrane. Loose-laid Crossgrip TPO Walkway Rolls are effective for winds up to 55 mph. Rolls are 36" wide by 33' long, available in white, gray and yellow.

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

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

2.10 OTHER CARLISLE ACCESSORIES

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

Part III – EXECUTION

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

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

3.01 General

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

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

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

3.02 Roof Deck/Substrate Criteria

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

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

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

D. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation. (Migrating warm air through gaps left unsealed can result in condensation and weakening of the insulation bottom facer leading to possible board dislodgement.)

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

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

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

Roof Deck & Substrate Criteria

TPO Membrane		Acceptable Roof Deck/Substrate
Adhered	Mechanically Fastened	**NEW CONSTRUCTION**
Insulation	Insulation	Steel (min. 22 gauge) (1)(2), Wood Plank (3/4" min.), or Fibrous Cement
Direct Application	Insulation	Structural Concrete (min. 3000 psi)
Direct Application (5)	Direct Application (5)	Plywood (min. 15/32" thick) or Oriented Strand Board (min. 7/16" thick)
Direct Application (10)	Direct Application	Lightweight Insulating Concrete
Adhered	Mechanically Fastened	**RETROFIT / NO TEAR-OFF**
Direct Application (9) (11)	Direct Application (9) (11)	Existing Smooth Surface BUR (3)(8) or Mineral Surface Cap Sheet
Insulation	Insulation	Gravel Surfaced BUR (3)(4) or Coal Tar Pitch (3)(4)(12)
Direct Application (7)(9)	Direct Application (7)(9)	Modified Bitumen (11)
Insulation	Direct Application (6)	Existing Single-Ply (11)
Complete Tear-off Required	Complete Tear-off Required	Sprayed-in-place Urethane
Adhered	Mechanically Fastened	**RETROFIT / TEAR-OFF**
Insulation	Insulation	Existing roof material removed (regardless of deck type)

Notes:
(1) Local codes must be consulted regarding thermal barrier requirements.
(2) Mechanically Fastened Systems cannot be specified on steel decks less than 22 gauge or for corrugated steel decks, regardless of gauge. Refer to the Metal Retrofit Roofing System Specification, published separately, for installation options.
(3) Loose gravel must be removed to avoid entrapment of moisture.
(4) Existing coal tar could drip back into the building, especially when new insulation does not provide sufficient thermal value to prevent the surface of the coal tar from softening.
(5) Maximum Warranty Duration of 20 Years.
(6) An approved underlayment is required over existing ballasted (ballast removed) single-ply systems and PVC roofing systems of any type.
(7) Direct application permitted over smooth surfaced modified bitumen. To reduce the probability of cold welds, membrane shall be positioned with length of sheets parallel to modified bitumen field seams. At end laps or other locations where splices intersect modified bitumen field seams, 6" wide Sure-Weld Flashing must be heat welded over intersections.
(8) Existing Type III or IV smooth asphalt BUR Only.
(9) Possible staining/discoloration of the membrane may result when installing this system directly over existing smooth surfaced BUR or modified bitumen. If aesthetics are critical, an approved insulation should be specified beneath the membrane.
(10) New approved cellular lightweight insulating concrete must have a minimum compressive strength of 200 psi. Except when the lightweight concrete is poured over slotted steel decks, pressure relief vents must be installed every 2,000 square feet. Direct application is not permitted where lightweight concrete is poured over an existing roofing material. Equilibrium moisture content after hydration/curing shall not exceed 12%.
(11) Maximum warranty available 20 YR with 55 MPH peak gust wind speed coverage. Carlisle may be contacted for other warranty options.
(12) If insulation is specified to be secured to an existing coal tar pitch roof with Carlisle Flexible FAST Adhesive or hot asphalt, minimum 1.5” thick Polyisocyanurate is the required minimum thickness when white membrane is specified.

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

1. Entrapment of water between the old and new membrane can damage and deteriorate new insulation/underlayment between the two membranes. **If a vapor retarder or air barrier is not specified**, Carlisle recommends the existing membrane be perforated to avoid potential moisture accumulation and to

allow the detection of moisture to enable the building owner to take corrective action. This can be accomplished by drilling approximately 3/4" diameter holes every 100 square feet in the existing built-up roof or single-ply membrane (excluding 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.

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

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

5. Refer to table above for other Recover/Retro-fit considerations.

I. **Vapor Retarder Installation**

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

K. **Wood Nailers**

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

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

3.03 Insulation/Underlayment

A. **General**

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

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

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

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

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

6. Restrictions:

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

b. Fiberglass insulation cannot be specified even if overlaid with additional insulation or membrane underlayment.

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

3.04 Insulation Attachment

A. **General**

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

B. **Adhered Roofing Systems**

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

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

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

   c. On Reroof/No Tear off projects with a maximum roof height of 40', 1/2" SecurShield HD requires 12 fasteners per board. HP Recovery Board and Polyisocyanurate less than 1-1/2" thick require 16 fasteners per board.

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

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

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

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

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

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

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

   f. Allow the adhesive to rise up approximately 1/8" and develop strings prior to setting insulation boards into adhesive.

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

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

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

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

A person should be designated to walk/roll-in all boards and trim/slit or apply weight as needed to ensure adequate securement.

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

3. **Alternate attachment method**, the specifier may select an alternate insulation attachment that incorporates a solid mopping of the insulation with hot asphalt (ASTM D312, Type III or IV). If the attachment method is to be covered by the Carlisle Warranty, Carlisle must be contacted for specific requirements. Upon review and acceptance by Carlisle, the maximum warranty coverage available is limited to 15 Year with maximum Peak Gust Wind Speed Coverage of 55 mph, for other warranties contact Carlisle.

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

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

   c. On coal tar pitch, when deemed compatible by the specifier, minimum 1.5" Polyisocyanurate is the required membrane underlayment when using darker heat weldable membranes (tan or gray). If Sure-Weld white membrane is used, minimum 1" thick Polyisocyanurate is required.

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

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

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

   g. A grid shall be installed subdividing the roof in individual sections of 2400 square feet. Required for warranties up to 10 year with wind speed coverage up to 55mph.

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

C. **Mechanically Fastened Roofing Systems**

1. **Carlisle Fasteners and Fastening Plates are required for insulation securement**. Refer to Insulation Fastening Criteria Table in Paragraph 2.05, for appropriate fastener and deck penetration. The fastener can be used with either a 2" diameter Seam Fastening Plate or 2-3/8" diameter Pirahna/Pirahna Xtra Plates OR 3" diameter Insulation Fastening plate.

2. **Any Carlisle approved insulation or cover board** shall be mechanically fastened to the roof deck at the minimum rate of **1.25 fasteners and plates per every 8 square feet** (5 fasteners in a 4 x 8 board) for minimum 1-1/2" thick insulation and coverboards. Insulation less than 1-1/2" thick requires the use of 8 fasteners and plates in a 4' x 8' board (1 per 4 square feet).

   CAUTION: Carlisle Polyisocyanurate Insulation with a thickness less than 1.5" installed over an existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation.

3. Use of DensDeck, DensDeck Prime, Dens Deck StormX Prime, DensDeck ProFast Prime, Securock Weather Defense and DEXcell should be limited to assemblies with slopes greater than 2" per foot to ensure compliance

with external fire codes.

3.05 Membrane Placement and Securement

A. General

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

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

3. If aesthetics are of concern, protection should be specified to avoid discoloration of the white membrane surface resulting from adhesive residue or excess foot traffic.

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

B. Membrane Placement

Maximum 16’ wide Sure-Weld is fully adhered or (12’ wide) mechanically fastened to an approved insulation or substrate.

1. **Position** Sure-Weld membrane over the acceptable substrate. For a mechanically fastened assembly, ensure proper number of perimeter sheets are positioned along the perimeter of the roof as outlined in Paragraph 1.05 “Warranty Tables”.

2. **Position** field sheets perpendicular to the steel deck flutes in Mechanically Fastened Applications.

3. **Place** adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum overlap width. It is recommended all overlaps be shingled to avoid bucking of water.

C. Membrane Securement / Bonding - Adhered Roofing System

1. **Adhere** Sure-Weld membrane to an acceptable substrate with Carlisle Bonding Adhesive. CAV-GRIP III low-VOC aerosol adhesive may be utilized with Sure-Weld TPO membranes. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Adhesive must be applied to both the membrane and the surface to which it is being bonded.

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

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

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

5. **Apply** Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be heat welded over adjoining sheet.

   When using **Sure-Weld Bonding Adhesive**, a coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate) shall be achieved. **Apply** adhesive evenly, without globs or puddles with a plastic core, medium nap paint roller to achieve continuous coating of both surfaces. A 9-inch roller will easily fit into the 5-gallon containers.

   A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained. Backrolling is required.

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

NOTE: When Aqua Base 120 is specified refer to **Spec Supplement G-10 "Aqua Base 120 Bonding Adhesive"** for application methods and warranty requirements.

6. **Allow** adhesive to flash-off until it does not string but remains tacky to a dry finger touch.

   CAUTION: Care must be exercised to ensure proper drying. Avoid thin areas of adhesive because over drying can occur and proper adhesion may not be achieved.

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

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

9. **Fold** back the unbonded half of the sheet and repeat the bonding procedures. **Apply** Bonding Adhesive to the remaining exposed underside of membrane and adjacent substrate and complete this section as described above.

10. **Install** adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch heat weld. It is recommended that all splices be shingled to avoid bucking of water.

    CAUTION: If aesthetics are of concern, protect completed sections of the roof so Bonding Adhesive will not discolor the membrane surface. Do not place Bonding Adhesive containers or their lids directly on the surface of the Sure-Weld membrane, to avoid rust stains.

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

1. Sure-Weld TPO membranes shall be mechanically attached to the structural deck with specified Carlisle Fasteners and designated Plates, for fastening densities and numbers of perimeter sheets refer to Warranty Tables, Paragraph 1.05.
2. Membrane Fastening Selection Table:

Membrane Fastener Selection

Deck Type	Carlisle Fasteners*	Carlisle Plate	Min. Penetration
Steel or Lightweight Insulating Concrete over Steel	HP-X	Piranha Plates	3/4"
	HP-Xtra	Piranha-Xtra Plates	
Structural Concrete, rated 3,000 psi or greater	CD-10	Piranha Plates	1"
	HD 14-10	Piranha Plates	
Wood Plank, min. 15/32" thick Plywood or min. 7/16" OSB	HP-X	Piranha Plates	Min. 1"
	HP-Xtra	Piranha-Xtra Plates	
Cementitious Wood Fiber	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"
Gypsum	Polymer Gyptec	Gyptec Plates – 2" Dia.	1-1/2"

Refer to Warranty Tables in Paragraph 1.05 for fastening densities and number of perimeter sheets.
*Determine proper fastener length for deck penetration, refer to Table 2.05B.

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

4. Perimeter Sheets

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

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

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

For Sure-Weld membranes, perimeter sheets can be formed by using individual 4’ to 6’ wide sheets or by sub-dividing 8’ or 10’ wide field sheet using 10” wide Pressure-Sensitive RUSS strip or row of seam fastening plates as described below.

a. **Individual perimeter sheets** (TPO – 4’, 5’ or 6’ wide)

Position membrane along the perimeter of the roof over the acceptable insulation/underlayment. The perimeter membrane width from line of securement to line of securement should be approximately 3’-6” to 4’-0” wide.

b. **RUSS - Reinforced Universal Securement Strip Method (Sure-Weld Membrane Only)**

1) When **field sheets are positioned parallel to a roof perimeter, 10" wide Sure-Weld Pressure-Sensitive RUSS** (with 3” wide tape each side) shall be placed approximately down the center of the 8’-0”, 10'-0” or 12'-0” wide Sure-Weld TPO field membrane sheets. When a RUSS divides a field sheet in half, two perimeter sheets are created.

2) When field membrane sheets **extend perpendicular to the edge of the roof**, position the **10" wide Sure-Weld Pressure-Sensitive RUSS** beneath the membrane along the center of each field sheet extending a distance equal to 0.4 times the building height to create perimeter sheets.

CAUTION: 6" wide Sure-Weld Pressure-Sensitive RUSS is only available with 3” wide SecurTAPE on one side and therefore cannot be used to form perimeter sheets.

c. **Fastening Plates Method**

In lieu of the RUSS securement method, position a row of seam fastening plates in the locations identified in Paragraph 4.b.1 and 4.b.2, secure plates with appropriate fastener and overlay plates with 6” wide Pressure-Sensitive Sure-Weld Cover Strip (TPO Only) overlay the plates as follows:

1) Sure-Weld Installation – Warranties Up to 20 Years - 6” wide Pressure Sensitive Sure-Weld Cover Strip or 6” wide Sure-Weld membrane centered over the plates and heat welded to the field membrane. Seal cut edges of TPO overlay with TPO Cut-Edge Sealant to seal any exposed scrim.

2) Projects with Warranties greater than 20 Years, center 6” wide section of TPO membrane (equal thickness to the deck membrane) over the plates and heat weld the field sheets. All cut edges of TPO overlay must be sealed with TPO Cut-Edge Sealant to seal any exposed scrim.

Note: Perimeter sheets can also be formed by positioning Rhinobond plates placed along the center of a field membrane (if heat induction welder is available on job-site). Refer to “Attachment I” for additional information.

d. **Building with Special Conditions:**

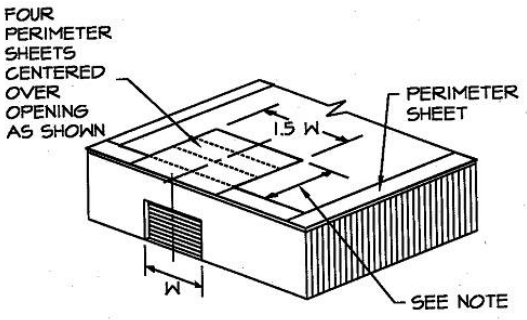
Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities) will typically require additional perimeter membrane securement,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

e. **Buildings with large openings**

When any wall contains major openings with a combined area which exceeds 10% of the total wall area on which the openings are located, four (4) perimeter sheets (centered over the opening) must be specified as

shown.

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

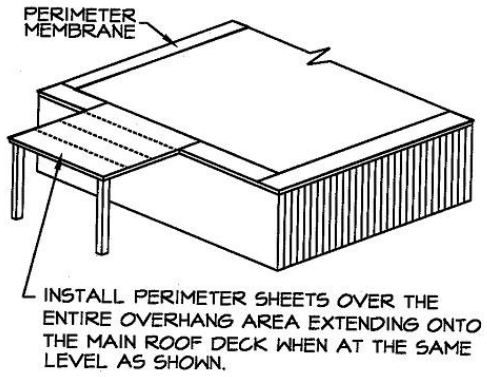


NOTE: Depth of perimeter area, noted above, shall not be less than 2.5 times the width of the opening.

f. **Buildings with overhangs**

The membrane must be specified with perimeter sheets installed over the entire overhang area extending onto the main roof deck when at the same level.

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



5. **Field Membrane**

a. **Position** adjoining field membrane sheets to allow an approximate overlap of 5-1/2" at those locations where Fastening Plates are located (along the length of the membrane); at the same time overlap end roll sections (the width of the membrane) a minimum of 2".

b. **Secure the membrane** at the approved fastening density with the required Carlisle Fastener and Fastening Plates.

c. For installation of membrane with fullness, tighten the sheet between fasteners as follows:

1) Unroll sheets and position.

2) Place a fastener and plate in one end of the sheet on the appropriate fastener mark. Go to the opposite end of the sheet, pull it tight and place a fastener and plate at the appropriate mark. Place the remaining fasteners into the sheet.

3) Proceed to weld the sheet in place and continue across the roof.

6. **Prevention of membrane distortion during windy conditions:**

a. Unroll sheet approximately 5' and position edge of membrane with overlap line on adjacent sheet.

b. Install fasteners along the 5' exposed edge.

c. While the 5' of exposed membrane is being fastened, begin welding the overlapped edge using the Automatic Heat Welder.

d. As sheet is being welded and fastened concurrently, unroll membrane. Unroll only enough membrane to stay a few feet ahead of welding and fastening process. This reduces amount of unsecured membrane to be distorted by wind.

e. Continue this process for each adjoining sheet.

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

10’ and 12’ wide Sure-Weld SAT is fully adhered to an approved insulation or substrate with Factory Applied Pressure-Sensitive Adhesive.

1. **Position** Sure-Weld SAT membrane over the acceptable substrate.

2. **Fold** membrane sheet back so half the underside is exposed.

3. **Remove** the release liner on one half of the sheet starting from the split in the liner at the middle of the sheet. The liner should be removed at an angle to reduce the risk of splitting or tearing.

4. **Broom** the membrane across the sheet, onto the substrate while avoiding wrinkles. To achieve the best adhesion, the membrane should also be rolled onto the substrate with a 30” wide, 150 lb. weighted, segmented roller. When applying the Carlisle Sure-Weld SAT TPO membrane, it is recommended to maintain a large curve on the leading edge of the membrane. This will help eliminate creases and bubbles that cannot be removed after the sheet is in place.

5. **Fold** back the remaining half of the sheet and repeat the above process.

F. Additional Membrane Securement

1. Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches to one horizontal foot, and at all penetrations as identified on the Carlisle details.

2. Securement may be achieved as follows:

a. On Mechanically Fastened Roofing Systems, Carlisle’s Piranha Fastening Plates are used to secure the membrane with the appropriate Carlisle Fastener at the base of walls and penetrations and flashed as shown on the applicable Carlisle detail (excluding OSB, cementitious wood fiber and gypsum decks where the required Carlisle Fastener is installed with the associated 2" diameter plate). On **Adhered Roofing Systems**, Carlisle standard 2" diameter Seam Fastening Plates may be used in lieu of Piranha Plates.

b. Securement of the membrane shall be a maximum of 12 inches on center. Fasteners shall be positioned 6 inches minimum to 9 inches maximum from the inside or outside corner.

c. On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

d. After securing the membrane, flash in accordance with the appropriate detail.

3.06 Heat Welding Procedures

A. **General**

1. APEEL Protective Film and SeamShield Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat welding, the APEEL Protective Film can be left in place for up to 90 days.

2. Heat weld the Sure-Weld membrane sheets using the Automatic Heat Welder or Hot Air Hand Welder and silicone roller.

3. When roof slope exceeds 5" per horizontal foot, use of the Automatic Heat Welding Machine may become more difficult; use of the Hand Held Hot Air Welder is recommended.

4. **Check the surfaces** of the membrane to be heat welded to ensure they are properly prepared.

   The surfaces to be heat welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned with Weathered Membrane Cleaner. No residual dirt or contaminants should be evident.

B. **Automatic and/or Hand Held Heat Welder Equipment**

1. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for:

   a. Temperature Settings.
   b. Equipment Set-up.
   c. Additional Information.

C. **Membrane Welding**

1. Prepare the Automatic Heat Welder and allow it to warm for approximately 5 to 10 minutes to reach operating temperature.

2. Position the Automatic Heat Welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam.

3. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap. Machine will begin moving along the seam immediately.

4. Weight plates provided on Automatic Welders must be utilized.

5. Proceed along the seam ensuring that the small guide wheel in front of the machine aligns with the edge of the top membrane sheet. Guide the machine from the front only.

   CAUTION: Ensure the power cord has plenty of slack to prevent dragging the machine off course (which could result from a tightly stretched cord).

6. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be pressed into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of Sure-Weld membrane sheets.

   When using **60-mil or 80-mil** Sure-Weld, a **TPO "T"-Joint Cover** must be applied over all "T" joint splice intersections.

7. To remove the Automatic Heat Welder from the finished splice, disengage and pull the nozzle from the seam area, the machine will stop automatically.

8. Mark the end of the heat welded seam with a water-soluble marker for easy identification. A Hand Held Welder will be necessary to complete the weld in the area between where the Automatic Heat Welder is stopped and restarted.

9. Perform a test weld, at least, at the start of work each morning and afternoon. Test welds should be made if any changes in substrate or weather conditions occur.

D. **Preventing Membrane Creeping During Welding**

1. The operator of automatic welding equipment must apply foot pressure to the membrane, keeping the membrane tight under the welder. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

E. **Test Cuts**

1. Perform a test weld at least at the start of work each morning and afternoon. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

F. **Seam Probing**

1. A cotter pin puller Carlisle TPO Seam Probe is recommended to probe all heat-welded seams. Probing seams must be done once heat welds have thoroughly cooled. Refer to **Supplemental Document T-01 "Heat Welding Equipment"** for additional information.

G. **Seam Sealing**

1. Apply **Cut-edge Sealant** on all cut edges of the reinforced Sure-Weld membrane (where the scrim reinforcement is exposed) **after seam probing** is completed. When a 1/8" diameter bead of TPO Cut-Edge Sealant is applied, approximately 225 – 275 linear feet of coverage per squeeze bottle can be achieved.

a) Cut-Edge Sealant is not required on vertical Sure-Weld splices.

3.07 Welding Problems/Repairs

A. A Hand Held Hot Air Welder and a 2" wide silicone roller must be used when repairing the Sure-Weld membrane. When the **entire** heat welded **seam** is to be **overlaid**, an **Automatic Heat Welder** may be used.

B. Prior to proceeding with any repair procedure, the area to be repaired must be cleaned with Weathered Membrane Cleaner. The membrane can typically be repaired with standard cleaning methods. In cases where the standard cleaning method is not sufficient, the following procedures must be used.

1. Scrub the area to be welded with a "Scotch Brite" Pad and Weathered Membrane Cleaner.

2. Clean all residue from the area to be welded with a Splice Wipe or a clean natural fiber (cotton) rag.

3. Weld the new membrane to the cleaned area using standard welding procedures.

C. Clean all residue from the area to be welded with a Splice Wipe or clean natural fiber (cotton) rag.

D. Weld the new membrane to the cleaned area using standard welding procedures.

E. Voids in welded seams can be repaired using a Hand Held Hot Air Welder and a silicone roller. Depending on conditions, a splice overlay may be required.

F. Position the hand held welder facing into void so hot air is forced between overlapping membranes. Roll the top membrane surface using positive pressure toward the outer edge until the heated membrane surfaces are fused.

G. Exposed scrim-reinforcement (resulting from scorching surface of membrane) and test weld areas must be repaired by overlaying the damaged area with a separate piece of Sure-Weld reinforced membrane with rounded corners. The overlay must extend a minimum of 2 inches past the area to be repaired.

H. **Probe** all edges of the overlay once cooled to ensure a proper weld has been achieved.

I. **Seal** all cut edges of Sure-Weld Reinforced membrane with TPO Cut-Edge Sealant.

Note: The same overlay repair procedures may be used for punctures in the Sure-Weld membrane.

3.08 Flashings

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

A. **General Considerations**

1. The height of new wall flashing must extend above the anticipated water level or slush line.

2. On 15 or 20-year Warranty projects, Carlisle's Termination Bar, in conjunction with Water Cut-Off Mastic, must be specified under all metal counterflashings and surface mounted reglets.

3. To comply with various warranty options, flashing material must equal the required minimum membrane thickness but shall not be less than 60-mils thick. For projects with 25 year or greater warranties Carlisle Pre-Fabricated accessories must be used unless prohibited by a specific field condition.

4. **On retrofit projects**

   Bitumen-based roof cement and asphaltic-based flashing material, if allowed to remain in contact with the membrane, will cause severe membrane discoloration. Existing wall and curb flashing must be removed or concealed with a new acceptable substrate.

   a. The specifier must examine structural supports for rooftop equipment to determine if reasonable access to the membrane beneath the equipment is provided. Carlisle should be consulted for clarification when access to the membrane system will be restricted.

   b. When hot pipes or other similar penetrations exceed 160° F (71° C), they must be designed to incorporate an insulated metal collar and rain hood designed to maintain a surface temperature less than 160° F (71° C) (TPO).

5. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld **reinforced** membrane. Sure-Weld non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets and scuppers as well as inside and outside corners when the use of pre-molded accessories is not feasible.

6. When possible, all reinforced membrane splices are heat welded with the Automatic Heat Welder. The Hand Held Hot Air Welder should be utilized in hard to reach areas, smaller curbs, vertical splices and when using non-reinforced membrane.

   a. The new Sure-Weld membrane flashing must not conceal weep holes or cover existing throughwall flashing.

   b. Install surface mounted reglets and compression bar terminations directly to the wall surface.

7. In areas where metal counterflashing or surface mounted reglets are used as vertical terminations, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

B. **Application of Bonding Adhesive**

1. Membrane shall be adhered to vertical surfaces with Sure-Weld Bonding Adhesive. CAV-GRIP III low-VOC aerosol adhesive may be utilized with Sure-Weld TPO membranes. Bonding Adhesive shall be applied continuously, without globs or puddles.

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

3. Roll the membrane into the adhesive.

4. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.

5. Terminate the edges of the installed membrane in accordance with Carlisle's applicable details.

6. When using TPO membrane flashing only, bonding adhesive is not required when the flashing height is 12” or less. When Carlisle termination bar is used beneath the counter-flashing, bonding adhesive can be eliminated when the flashing height is 18” or less.

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

The flashing height must be calculated so that the membrane flashing includes a minimum 1-1/2 inch heat weld beyond the Fastening Plates.

1. Fasten at angle change as identified in Paragraph 3.05, Additional Membrane Securement, with the required Carlisle Fastener and plate.

2. Flash the fasteners/plates with a separate piece of Sure-Weld reinforced membrane; apply heat and press the flashing into the angle change before attaching it to the vertical surface.

D. **Metal Edge Terminations**

Factory-fabricated metal edge systems must be secured to the wood nailer as specified by the manufacturer. Shop-fabricated edging must be installed in compliance with appropriate Carlisle Detail using Carlisle TPO Coated Metal in order to achieve ES-1 Compliance. Refer to the appropriate Universal Details for other flashing options and requirements.

E. **Roof Drains**

1. Sure-Weld membrane may extend into the drain sump when the slope of the sump is less than 3" to one horizontal foot.

   When the drain sump is greater than 3" to one horizontal foot, additional membrane securement must be installed.

2. Only drain strainers that have been approved by the specifier in accordance with applicable codes may be used.

F. **Sure-Weld Contour Rib Profiles**

1. The Contour Rib Profile is recommended for use with FleeceBACK® TPO adhered roofing systems.

2. The Sure-Weld Contour Rib Profiles should be positioned parallel to the laps of the installed TPO roofing system and parallel with the roof slope where possible.

3. Ensure that all welding surfaces are clean and dry. Inspect all seam areas for proper weld prior to installing Sure-Weld Contour Rib Profile.

4. Contour Rib Profile spacing can be individually determined to achieve the desired appearance.

5. Connecting multiple ribs is achieved by using fiberglass pins. Insert a pin half-way into the end of one profile. Connect the adjoining rib by inserting the exposed end of the pin into the alignment hole. Repeat previous steps for additional TPO Contour Rib profiles.

6. Consult the Sure-Weld Contour Rib Profile installation guides for instructions on proper installation techniques.

G. **Other Penetrations**

On Mechanically Fastened assemblies, additional membrane securement is required around pipes and sealant pockets as shown on the applicable detail. The plates must be positioned a maximum of 12" away from the penetration, spaced a maximum of 12" on center and flashed in accordance with the applicable Carlisle Detail.

1. **Pipes, Round Supports, etc.**

   a. Flash pipes with Molded Pipe Flashings or Split Pipe Seals where their installation is possible. Molded pipe flashings cannot be cut and patched; deck flanges cannot be overlapped or installed over angle changes.

   b. Where Molded Pipe Flashings or Split Pipe Seals cannot be installed, APPLY FIELD FABRICATED PIPE FLASHING using Sure-Weld non-reinforced membrane.

2. **Flexible Penetrations** (braided cables, conduits, wires, etc.) must be enclosed in a stable “goose neck.” Apply a Split Pipe Seal or field fabricated pipe flashing to flash the goose neck.

3. **Hot pipes** that exceed 160° F (71° C) (TPO), must utilize an insulated metal collar and rain hood, flashed with a field fabricated pipe flashing.

4. For **pipe clusters** or unusually shaped penetrations, a Molded Sealant Pocket and White One Part Sealant must be utilized.

5. **Existing Roof Tie-Ins** for TPO membranes refer to applicable Carlisle details for tie-ins.

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

H. **APEEL Protective Film (Optional)**

When the optional APEEL Protective Film is utilized on TPO, remove and discard the APEEL Protective Film after the installation of the entire TPO Roofing System is complete.

I. **SeamShield Protective Film (Optional)**

When the optional SeamShield Film is utilized on TPO, remove and discard the film from both surfaces prior to welding the seam.

3.09 Roof Walkways

Walkways are to be specified at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), and if regular maintenance (once a month or more) is necessary to service rooftop equipment. Refer to Spec Supplement G-06 “Roof Walkway Installation”.

3.10 Daily Seal

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

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Review the appropriate Carlisle warranty for specific warranty coverage, terms, conditions and limitations.

Specification
ATTACHMENT

Sure-Weld TPO Mechanically Fastened Roofing Systems
Induction Welding (RhinoBond / Isoweld) Attachment Method

"Attachment I"

July 2026

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

A. Description

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO coating. The RhinoBond or Isoweld Plates are installed with HP-X Fasteners to secure an acceptable insulation to minimum 22-gauge steel deck or minimum 15/32" thick plywood.

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

Induction Welding (Rhinobond/Isoweld) Attachment Method Limited to 30 Year Maximum Warranty and Wind Speed Coverage Up to 120 mph. Perimeter enhancements will be required on systems greater than 72 mph and/or projects over 50' in height. Contact Carlisle for requirements for enhancements.

Table I **Induction Welded - Membrane Systems Warranty Options**

Years	Sure-Weld TPO Membranes		
	Warranty Wind Speed 55, 72, 80, 90, 100, 110, or 120 mph	Minimum Membrane Thickness (1)	Additional Puncture Coverage (4)
5,10, or 15 year	√ (2)	Sure-Weld 45-mil	Not Available
20 year	√ (2)	Sure-Weld 60-mil	Not Available
25 or 30 year	√ (2)	Sure-Weld 80-mil	Available

Notes: √= Acceptable

(1) All "T-Joints" must be overlaid with appropriate flashing material when using 60- or 80-mil TPO.
(2) Perimeter calculation is .4 x height of building. The minimum perimeter width is 8-feet up to a 20-year warranty and 16-feet for 25-30 year warranty.
(3) Perimeter enhancements required for wind speed coverage greater than 72mph and/or projects over 50' in height. Contact Carlisle for requirements.
(4) Carlisle's Accidental Puncture Warranty covers labor hours and material used during the repair. Maximum labor and material hours are dependent upon system design. Refer to the Warranty Availability Quick Reference Guide for coverage.

Table XII

Up to 20-Year TPO Induction Welded - Induction Plate Density Roofing System

Deck Type: 22-Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete

15 Year Warranty - 45-mil Sure-Weld TPO								
20 Year Warranty - 60-mil Sure-Weld TPO								
Peak Gust Wind Speed Warranty	Max. Building Height	Minimum Perimeter Width	Induction Weld Plate Density (New Construction or Tear-off)					
			4' X 8' BOARDS			4' X 12' BOARDS		
			Field	Perimeter	Corners	Field	Perimeter	Corners
55-MPH	**Up to 60'**	8'	6	8	8	8	12	12
72-MPH	**Up to 60'**	8'	6	8	8	8	12	12
80-MPH	**Up to 60'**	8'	8	10	10	10	16	16
90-MPH	**Up to 60'**	8'	8	12	16	12	18	24
100-MPH	**Up to 60'**	8'	8	12	16	12	18	24
110-MPH	**Up to 60'**	8'	10	16	16	16	24	24
120-MPH	**Up to 60'**	8'	10	16	20	16	24	32

Smooth Surface Recovers with 55-mph & 72-mph		
Less than 1.5" thickness	Field = 8 per 4'x8'	Field = 8 per 4'x12'
All 1/2" Gypsum boards	Field = 8 per 4'x8'	N/A [4'x8' boards only]
1/2" InsulBase HD	Field = 8 per 4'x8'	N/A [4'x8' boards only]
Gravel BUR recovers for a maximum 15-year warranty,		
All 1/2" Gypsum boards	Field = 8 per 4'x8'	N/A [4'x8' boards only]

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

ADDITIONAL DESIGN CONSIDERATIONS

RhinoBond Perimeter widths	
Up to 20-Year Warranty	**Perimeter Width**
Up to 60' Tall	8' wide
61' to 80' Tall	12' wide
81' to 100' Tall	16' wide
Over 100' Tall	Perimeter fastening across the entire roof

(A) Use HP-X fasteners and RhinoBond or IsoWeld Plates for steel decks and HD 14-10 fastened into Structural Concrete Decks. **(B)** 1/2" HP Recovery board has max 15-year installed over an existing Smooth Surface. 1/4" Gypsum boards are not acceptable over an existing system. **(C)** Cardboard disc are needed underneath the RhinoBond Plates to protect the EPS.
Approvals are based upon the Withdrawal Resistance Criteria for the minimum pullout value based upon deck type (Design Reference DR-06). Click on this link to take you to the Design Reference DR-06: ..\Letters\Carlisle DR-06 Withdrawal Resistance Criteria.pdf

Table XIII

25/30-Year Induction Welded - TPO Induction Plate Density Roofing System

Deck Type: 22-Gauge Steel, 3/4", 5/8" & 15/32" Plywood, Wood Plank and Structural Concrete

25/30 Year Warranty - 80-mil Sure-Weld TPO								
Peak Gust Wind Speed Warranty	**Max. Building Height**	**Minimum Perimeter Width**	**Induction Weld Plate Density**					
			4' X 8' BOARDS			**4' X 12' BOARDS**		
			Field	Perimeter	Corners	Field	Perimeter	Corners
55-MPH	**Up to 60'**	**12'**	8	10	10	12	16	16
72-MPH	**Up to 60'**	**12'**	8	10	10	12	16	16
80-MPH	**Up to 60'**	**12'**	10	12	12	16	18	18
90-MPH	**Up to 60'**	**12'**	10	12	12	16	18	18
100-MPH	**Up to 60'**	**12'**	10	16	20	16	24	32
110-MPH	**Up to 60'**	**12'**	12	16	24	18	24	36
120-MPH	**Up to 60'**	**12'**	12	16	24	18	24	36
Contact Carlisle's Project Review Team at 877-797-8370 Option 3								

RhinoBond Perimeter Widths	
25/30-Year Warranty	Perimeter Width
Up to 60' Tall	12' wide
61' to 80' Tall	16' wide
81' to 100' Tall	18' wide
Over 100' Tall	Perimeter fastening across the entire roof

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use HP-X fasteners and RhinoBond or IsoWeld Plates for steel decks and HD 14-10 fastened into Structural Concrete Decks.

(B) Cardboard disc are needed underneath the RhinoBond Plates to protect the EPS.

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

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

Table XIV

Maximum 20-Year TPO Induction Welded - Induction Plate Density Roofing System

OSB Deck Type: 7/16", 15/32", 5/8" & 3/4"

15 Year Warranty - 45-mil Sure-Weld TPO									
20 Year Warranty - 60-mil Sure-Weld TPO									
Peak Gust Wind Speed Warranty	Max. Building Height	Roof deck type and Thickness	Minimum Perimeter Width	Induction Weld Plate Density					
				4' X 8' BOARDS			4' X 12' BOARDS		
				Field	Perimter	Corners	Field	Perimter	Corners
55-MPH	Up to 60'	7/16"& 1/2" OSB	12'	8	10	10	12	16	16
		5/8" OSB	12'	8	10	10	12	16	16
		3/4" OSB	12'	8	10	10	12	16	16
72-MPH	Up to 60'	7/16"& 1/2" OSB	12'	8	12	12	12	18	18
		5/8" OSB	12'	8	12	12	12	18	18
		3/4" OSB	12'	8	10	10	12	16	16
80-MPH	Up to 60'	3/4" OSB	12'	8	12	12	12	18	18
Contact Carlisle's Project Review Team at 877-797-8370 Option 3									

ADDITIONAL DESIGN CONSIDERATIONS

(A) Use HP-X fasteners and RhinoBond or IsoWeld Plates for the above decks.

(B) Only the deck types and thicknesses listed are eligible for the specific wind speed listed.

(C) Cardboard disc are needed underneath the RhinoBond Plates to protect the EPS.

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

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

B. Products/Heat Welding Equipment

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

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

2. **RhinoBond or Isoweld Induction Welding Tool**: An induction heating tool is used to emit the magnetic field that activates the hot melt coating on the top surface of the RhinoBond or Isoweld Welding Plate to fuse with the roofing membrane. Refer to RhinoBond or Isoweld Owner's Manual for additional information.

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

C. RhinoBond Induction Tool Calibration

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

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

2. Place membrane over the RhinoBond Plates.

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

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

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

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

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

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

D. Isoweld Induction Tool Calibration

Calibrate the Isoweld induction welding tool using the process outlined in the Owner's Manual.

E. Installation

Caution: To avoid false welds and ensure adequate membrane attachment to the plates, induction tool calibration and test welds (along with the proper positioning of the induction welder over the plate and placement of the magnet) must be performed prior to the start of work each day. All test welds must be completed using the exact components of the assembly to be installed.

1. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond or Isoweld Plates per 4' x 8' board in the designated field and eight HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area.

   Note: Avoiding fastener overdrive to prevent plate from deforming.

2. Place Sure-Weld membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.

3. Place RhinoBond Induction Tool over the RhinoBond TPO Welding Plate, under the roofing membrane OR Place the Isoweld Induction Tool over the Isoweld TPO Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

4. Activate induction welding tool and leave in place until heating cycle is complete.

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

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

F. Membrane Hot Air Welding Procedures & Additional Securement

1. Adjoin membrane sheets by overlapping and heat welding the seam following standard Hot Air Welding Procedures as outlined in the "Part III" of the Sure-Weld TPO Mechanically Fastened Roofing System Specification.

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

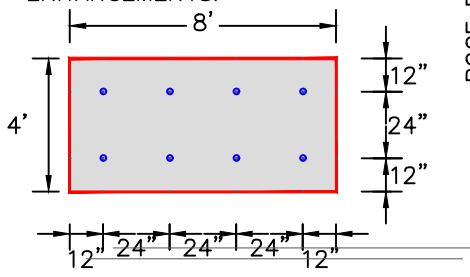
G. Associated Installation Details

RhinoBond Attachment Method – Number of Fasteners and Location RB-1
Angle Change Securement Method with RhinoBond Plates RB-2
Induction Welded Wall Attachment RB-3
Isoweld Attachment Method – Number of Fasteners and Location IW-1
Angle Change Securement Method with Isoweld Plates IW-2
Induction Welded Wall Attachment IW-3
Induction Welding Attachment Method – Fastening Patterns/Enhancements FP-1
Induction Welding Attachment Method – Fastening Patterns/Enhancements FP-2
Induction Welding Attachment Method – Fastening Patterns/Enhancements FP-3
Induction Welding Attachment Method – Fastening Patterns/Enhancements FP-4
Induction Welding Attachment Method – Fastening Patterns/Enhancements FP-5

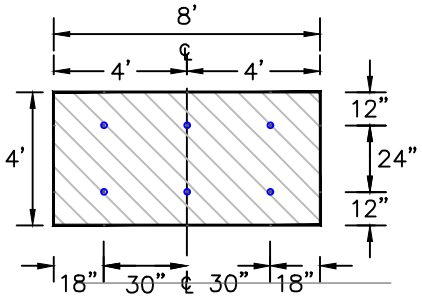
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NOTES:

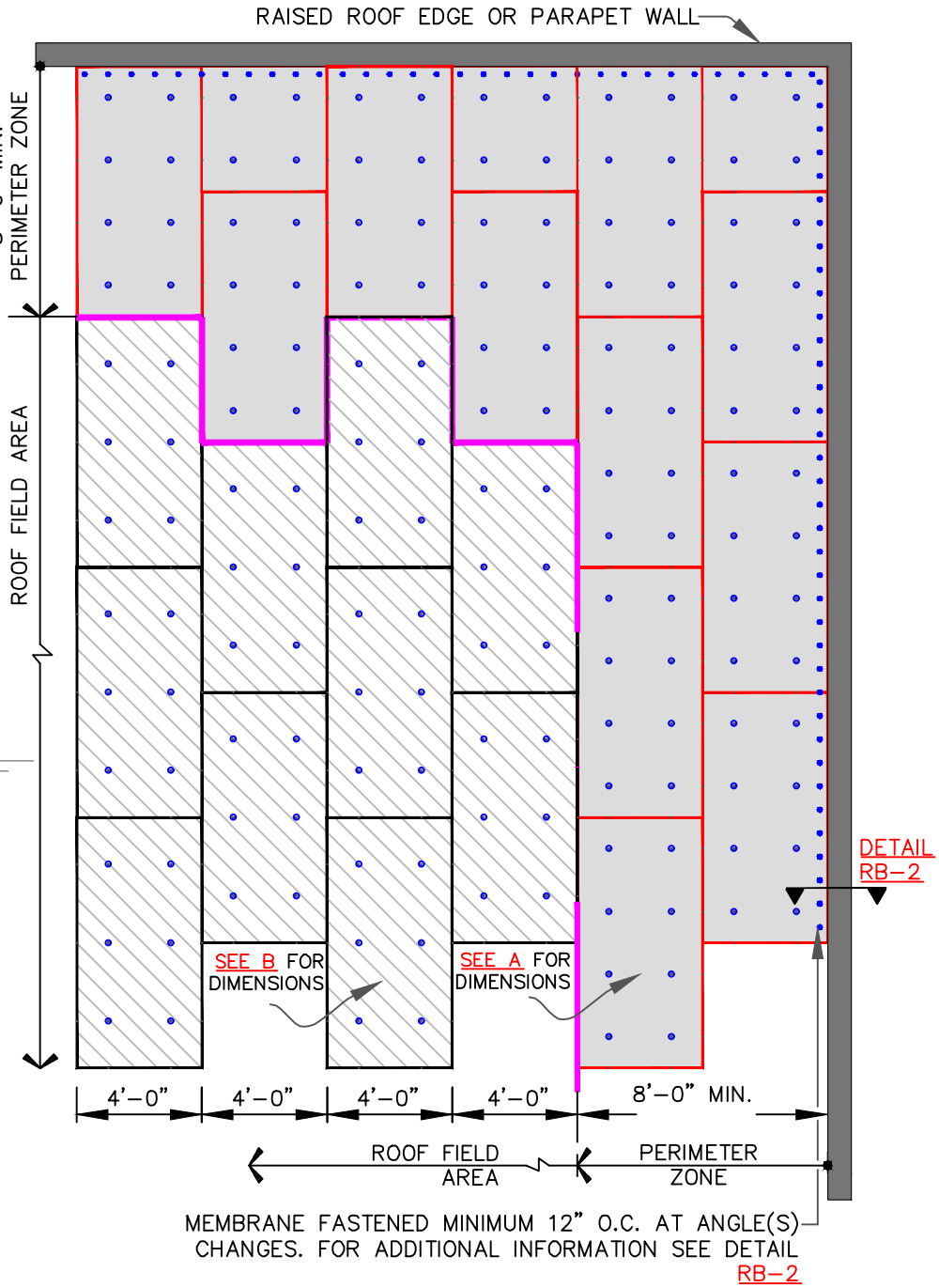
1. RhinoBond METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON–FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



A PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



B FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL RB–2

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & RhinoBond FASTENER PLATE

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP–X FASTENER	3–1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN–FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

RhinoBond ATTACHMENT METHOD – NUMBER OF FASTENERS AND LOCATIONS

For additional information, refer to Specifications

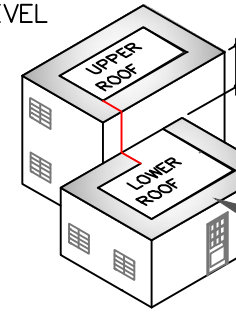
DETAIL NO. RB–1

RhinoBond

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ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

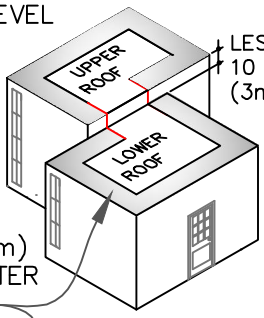
SPLIT LEVEL ROOFS



GREATER THAN 10 FEET (305cm)

8 (2.5m) PERIMETER WIDTH

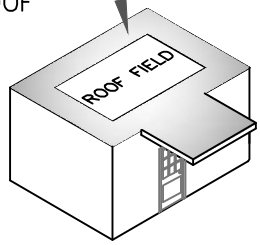
SPLIT LEVEL ROOFS



LESS THAN 10 FEET (3m)

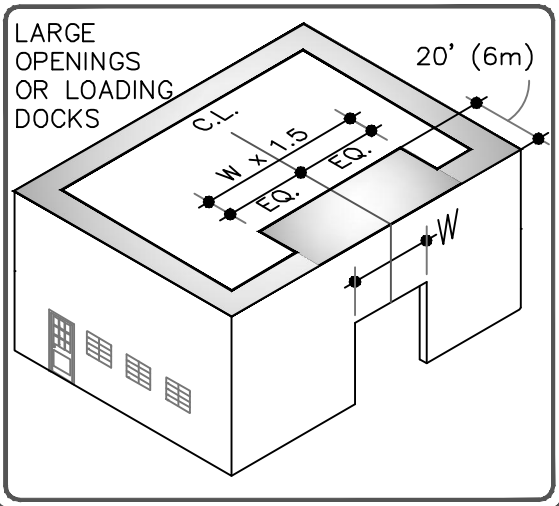
8' (2.5m) PERIMETER WIDTH

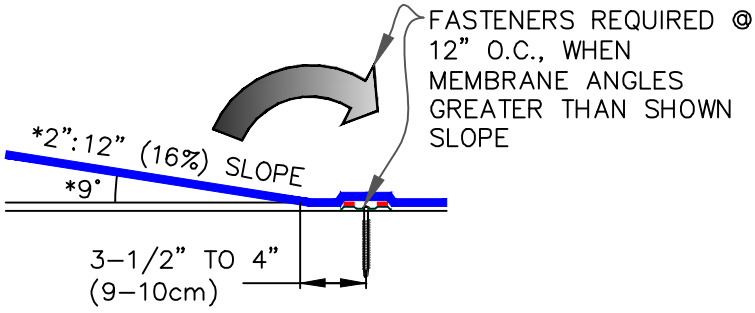
CANOPY ROOF



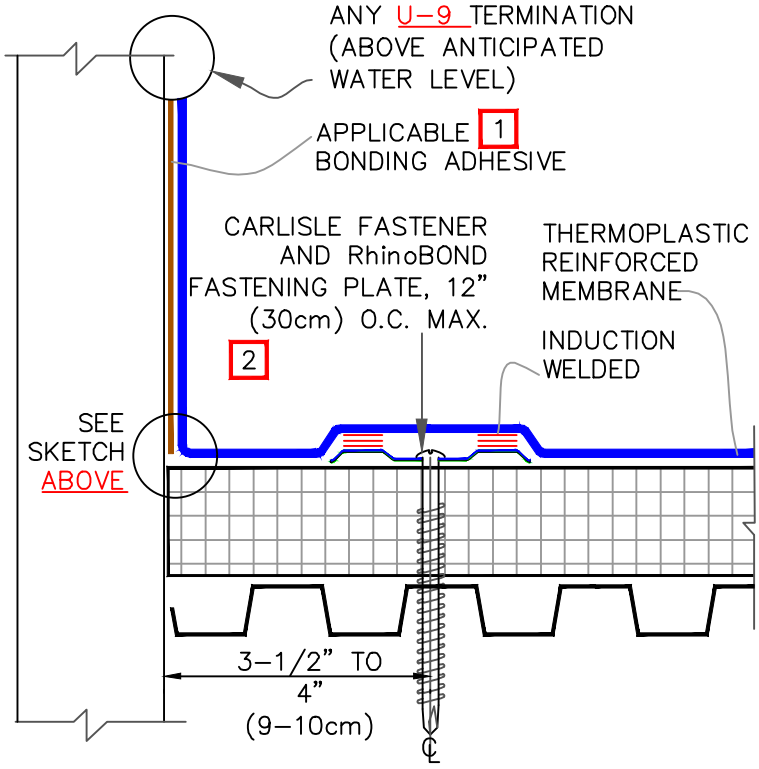
MAIN ROOF EXTENDING ON THE SAME LEVEL

LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



ANGLE CHANGE SECUREMENT

NOTES:

1. SURE–WELD MEMBRANE REQUIRES SURE–WELD BONDING ADHESIVE AND SURE–FLEX MEMBRANE REQUIRES SURE–FLEX BONDING ADHESIVE.

2. HP–X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

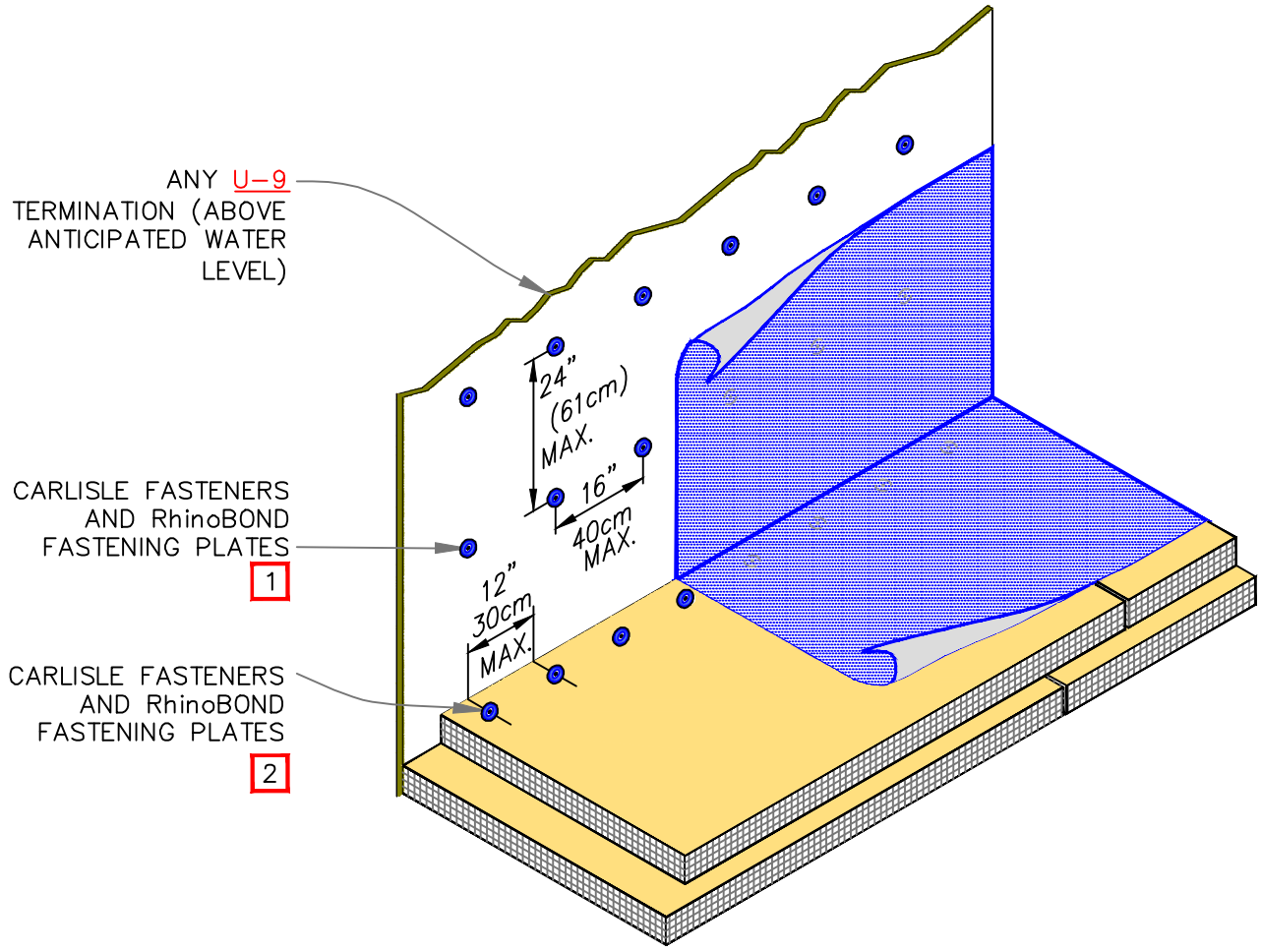
THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ANGLE CHANGE SECUREMENT METHOD WITH RhinoBond PLATES

For additional information, refer to Specifications

DETAIL NO.
RB–2
RhinoBond

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NOTES:

1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

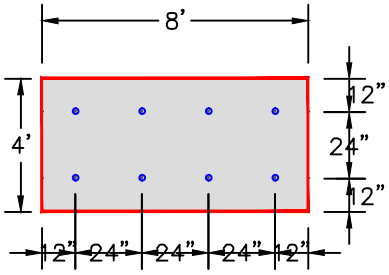
2. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	RhinoBond WALL ATTACHMENT For additional information, refer to Specifications	DETAIL NO. RB-3 RhinoBond

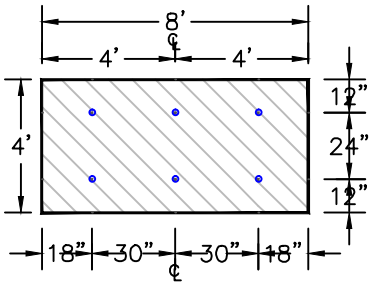
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NOTES:

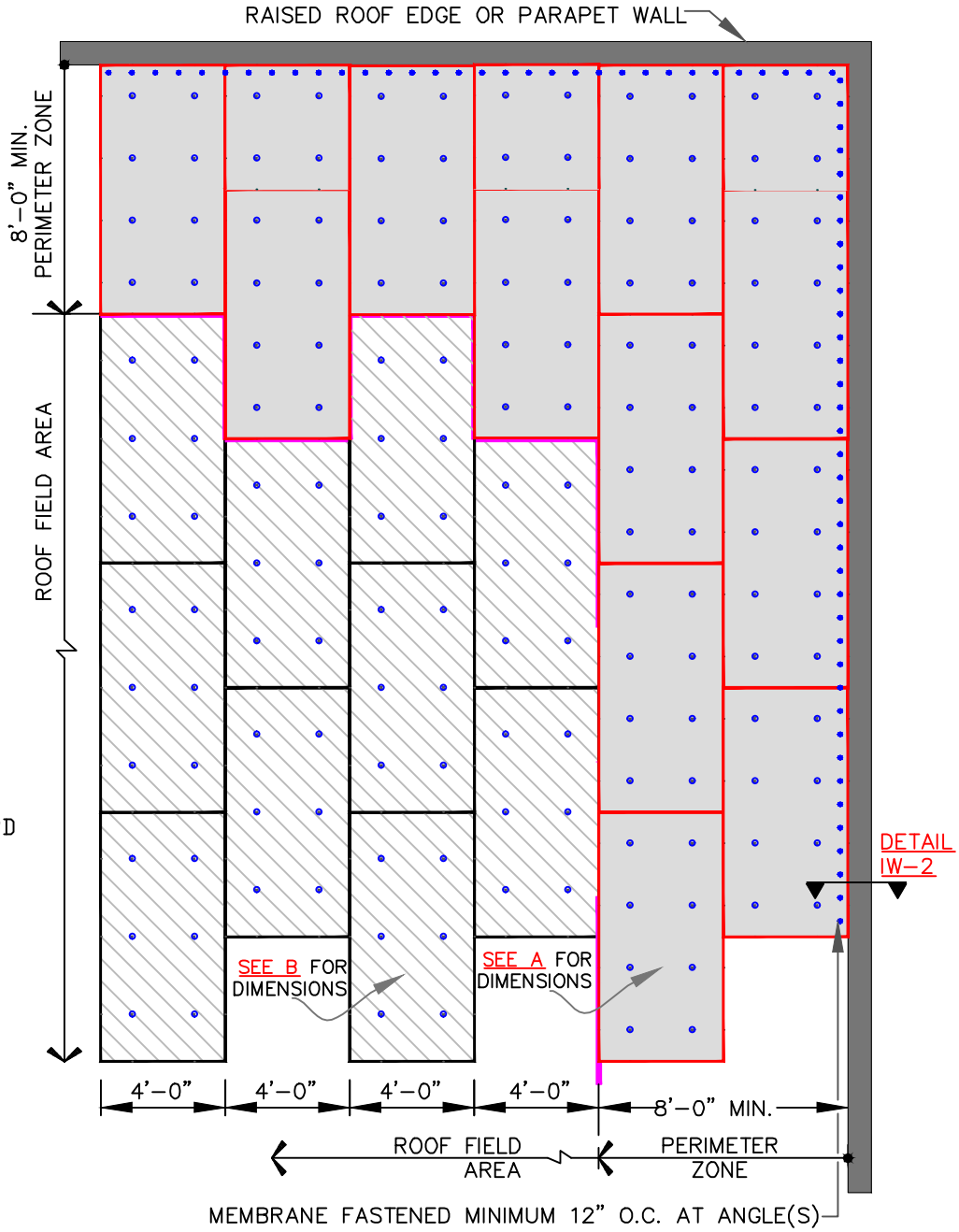
1. Isoweld METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.
2. PERIMETER ENHANCEMENTS REQUIRED FOR WIND SPEED COVERAGE GREATER THAN 72MPH. CONTACT CARLISLE FOR REQUIREMENTS.
3. ENHANCEMENTS SHOWN ARE FOR THE PURPOSE OF THE CARLISLE WARRANTY. FOR FM PROJECTS CONSULT FM GLOBAL FOR REQUIRED ENHANCEMENTS.



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD



(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL IW-2

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE(0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (8cm) DIAMETER
PLYWOOD	15/32" (12mm)		
NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.			

PERIMETER AREA

FIELD AREA

CARLISLE FASTENER & INDUCTION WELD FASTENER PLATE

INCHES TO CENTIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
cm	5	9	10	30	46	61	76

FEET TO CENTIMETERS			
FEET	1'	4'	8'
cm	30	120	250

THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ISOWLED ATTACHMENT METHOD – NUMBER OF FASTENERS AND LOCATIONS

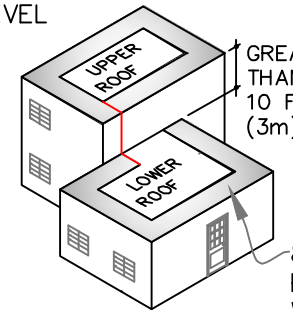
For additional information, refer to Specifications

DETAIL NO.
IW-1
Isoweld Attachment

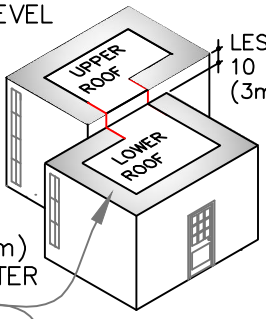
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ROOF ZONES FOR MINIMUM ONE FASTENER PER 4 SQUARE FEET (1 FASTENER/0.372 SQUARE METER)

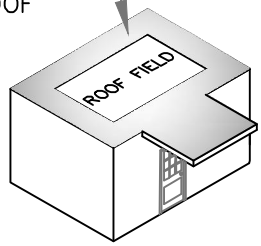
SPLIT LEVEL ROOFS



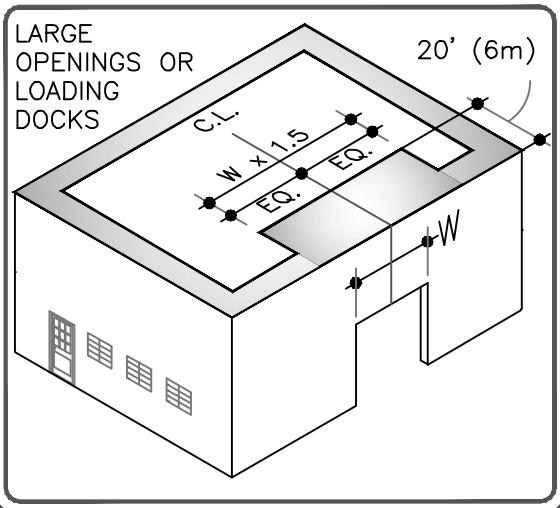
SPLIT LEVEL ROOFS

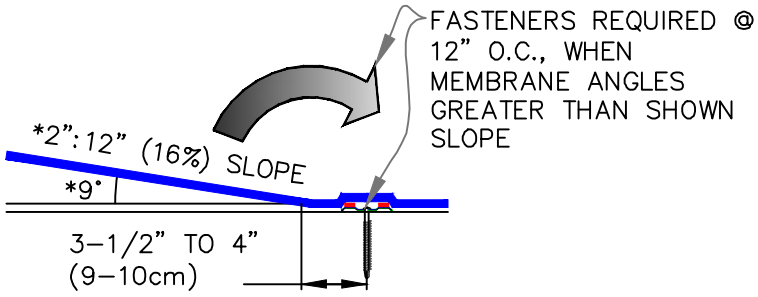


CANOPY ROOF

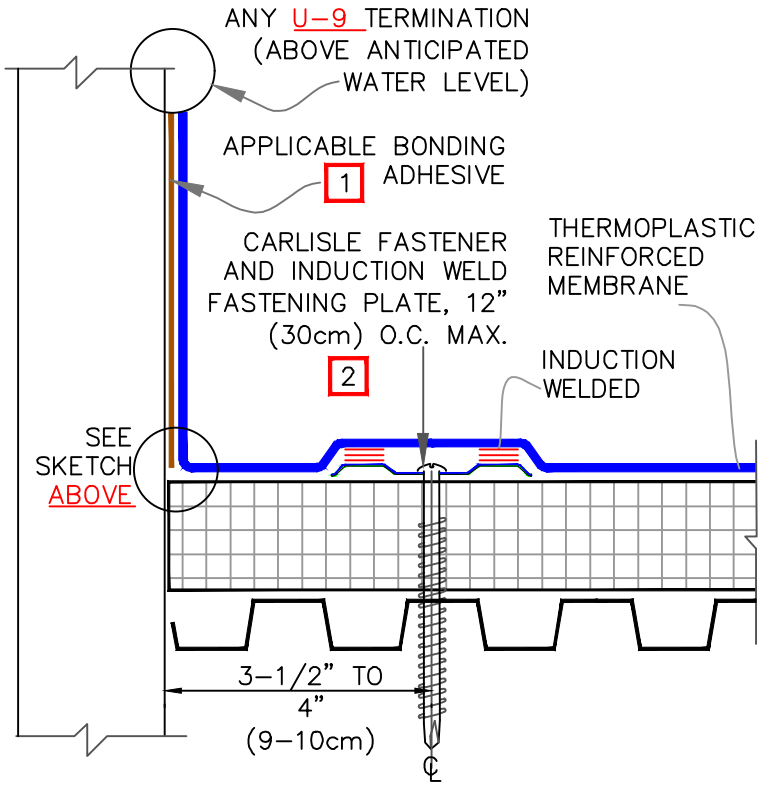


LARGE OPENINGS OR LOADING DOCKS





*10cm HORIZONTAL: 1.6cm VERTICAL



ANGLE CHANGE SECUREMENT

NOTES:

1. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.

2. HP-X FASTENERS AND INDUCTION WELD PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS. FOR WARRANTY WIND SPEEDS GREATER THAN 72 MPH PLEASE CONTACT CARLISLE FOR REQUIRED FASTENING ENHANCEMENTS.

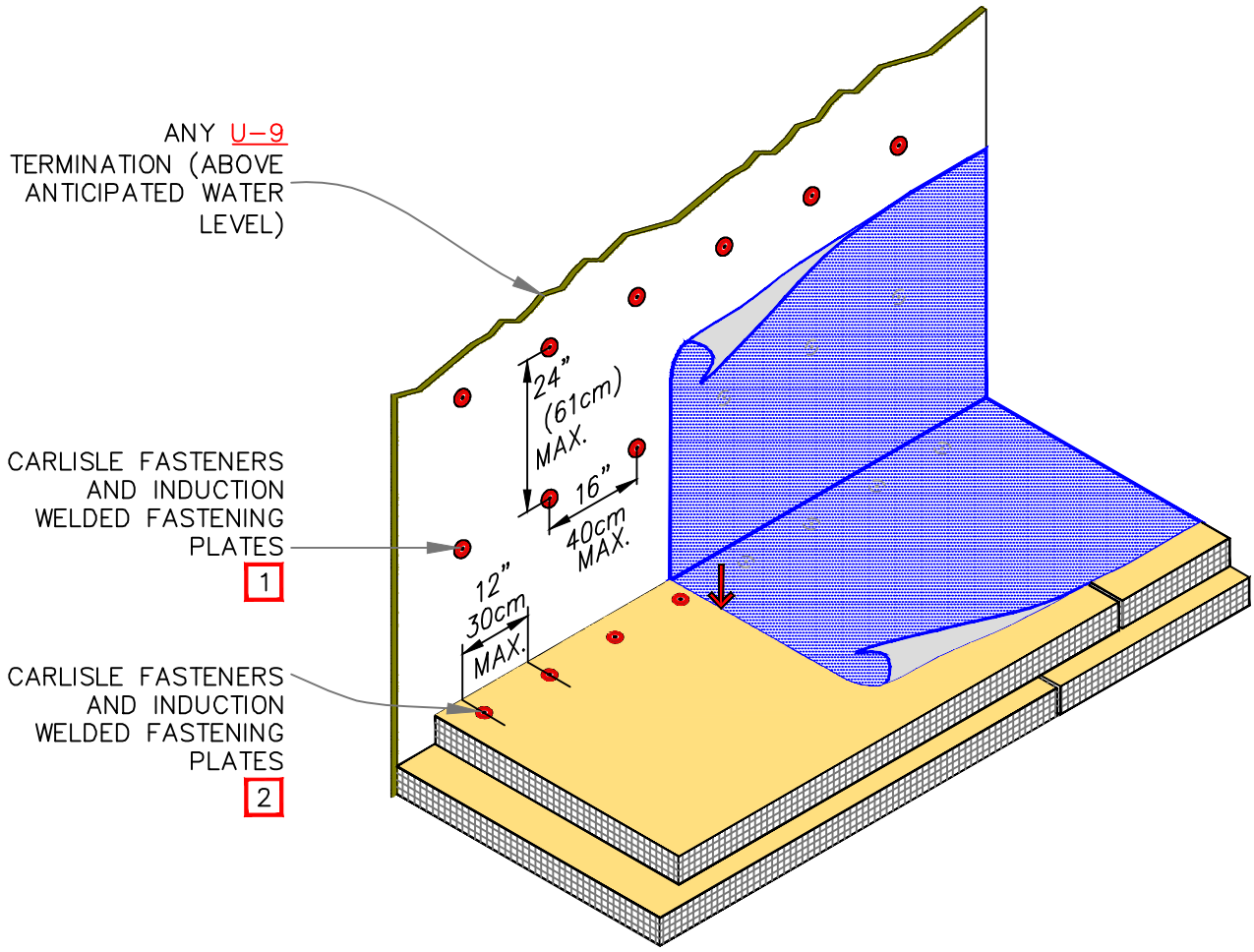
THERMOPLASTIC MEMBRANE
APPROVED SUBSTRATE
0 SEE NOTE(S)

ANGLE CHANGE SECUREMENT METHOD WITH ISOWELD PLATES

For additional information, refer to Specifications

DETAIL NO.
IW-2
Isoweld Attachment

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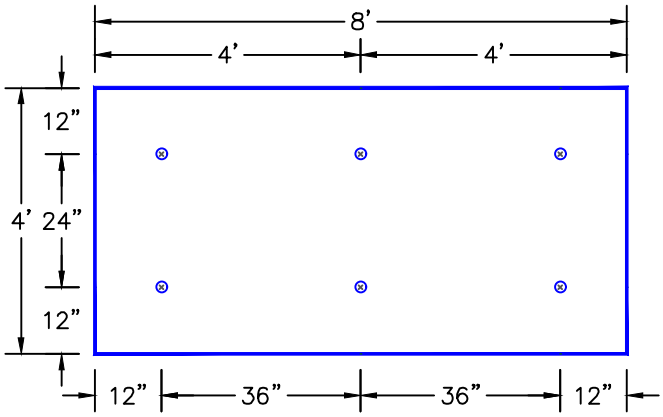
NOTES:

1. FASTENERS MUST PENETRATE INTO WOOD OR METAL STUDS, WHERE WALL IS BUILT WITH STUDS.

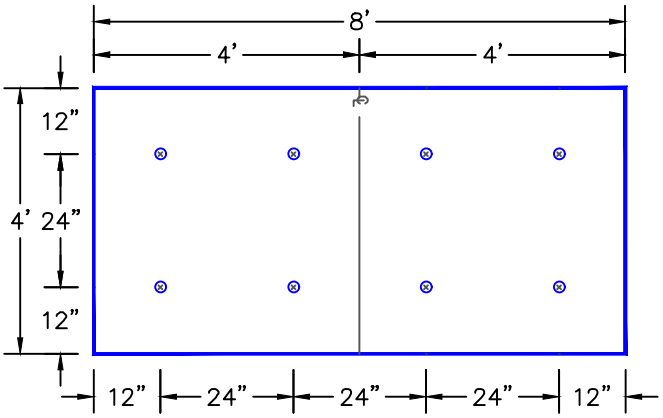
2. HP-X FASTENERS ARE REQUIRED OVER STEEL AND WOOD DECKS.

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	ISOWELD WALL ATTACHMENT For additional information, refer to Specifications		DETAIL NO. IW-3 Isoweld Attachment

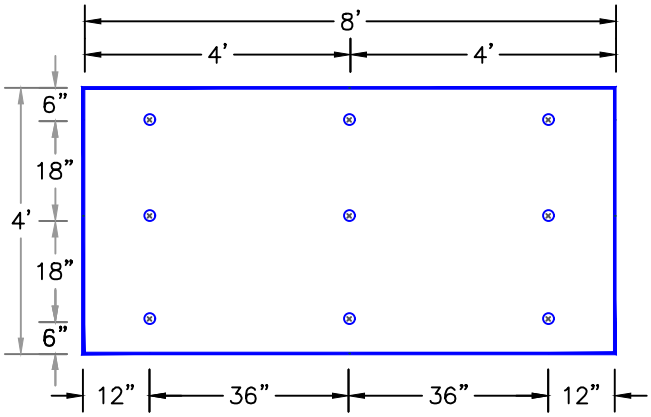
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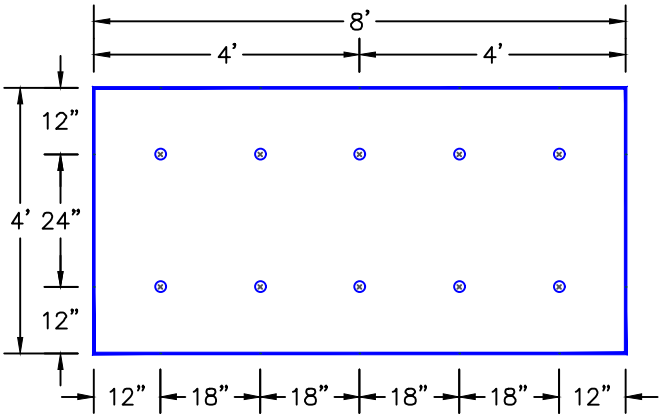
6 FASTENERS PER 4'X8' BOARD



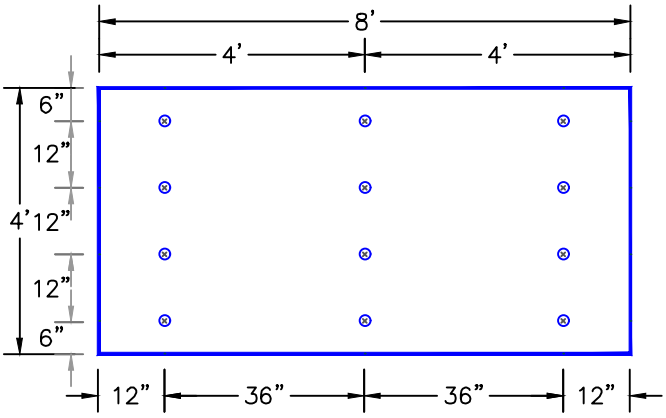
8 FASTENERS PER 4'X8' BOARD



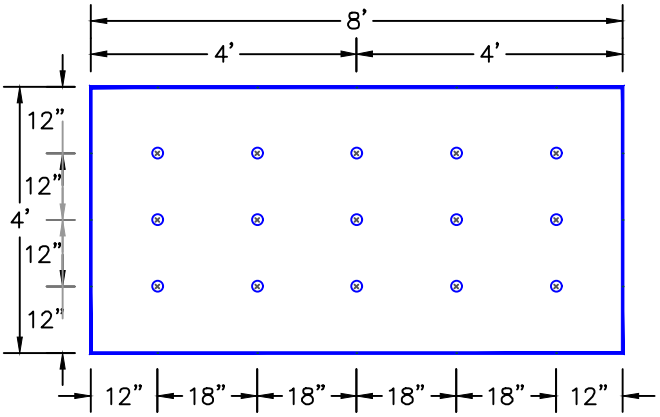
9 FASTENERS PER 4'X8' BOARD



10 FASTENERS PER 4'X8' BOARD



12 FASTENERS PER 4'X8' BOARD

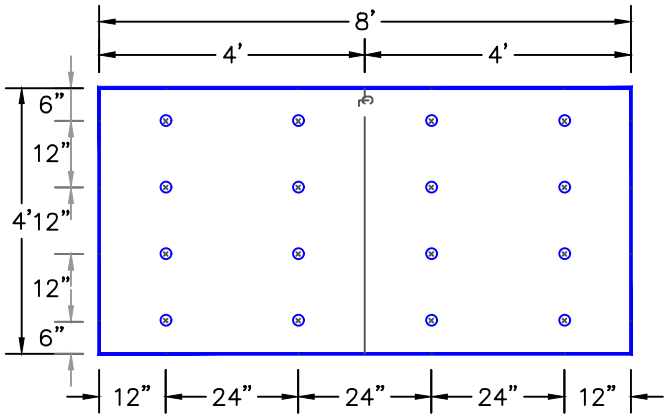


15 FASTENERS PER 4'X8' BOARD

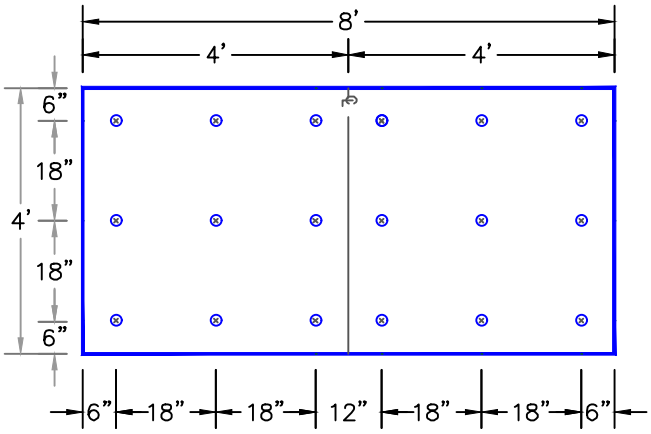
NOTE: FOR FM INSURED PROJECTS, CONSULT FM GLOBAL PRIOR TO INSTALLATION.

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–1 Induction Welding

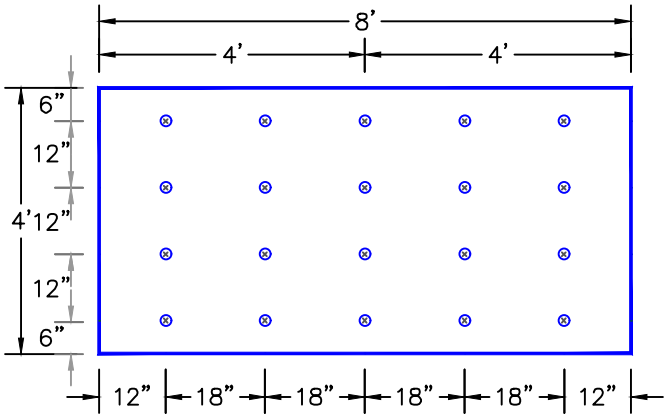
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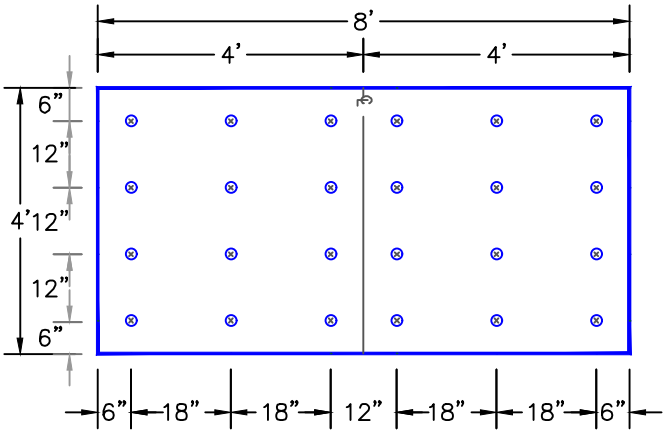
16 FASTENERS PER 4'X8' BOARD



18 FASTENERS PER 4'X8' BOARD



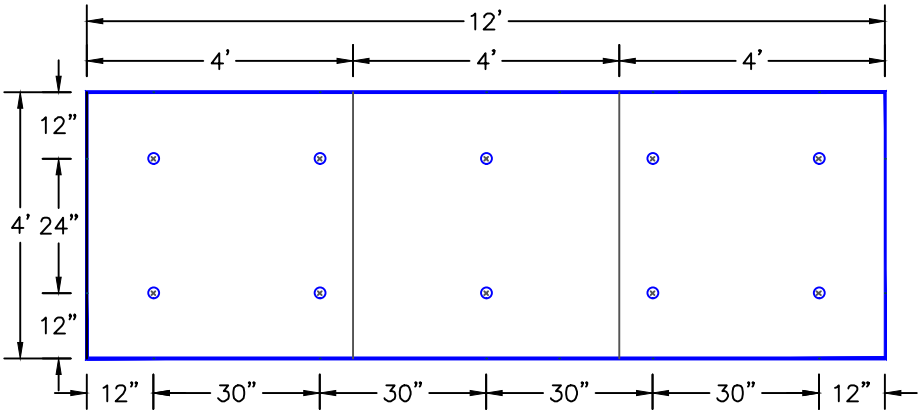
20 FASTENERS PER 4'X8' BOARD



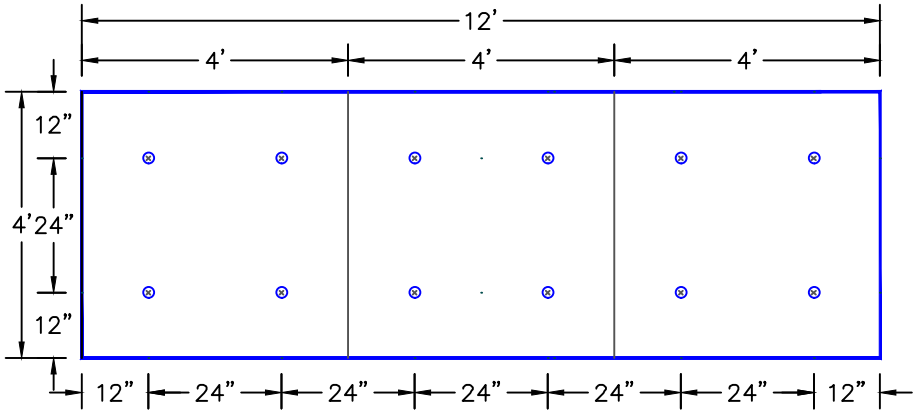
24 FASTENERS PER 4'X8' BOARD

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–2 Induction Welding

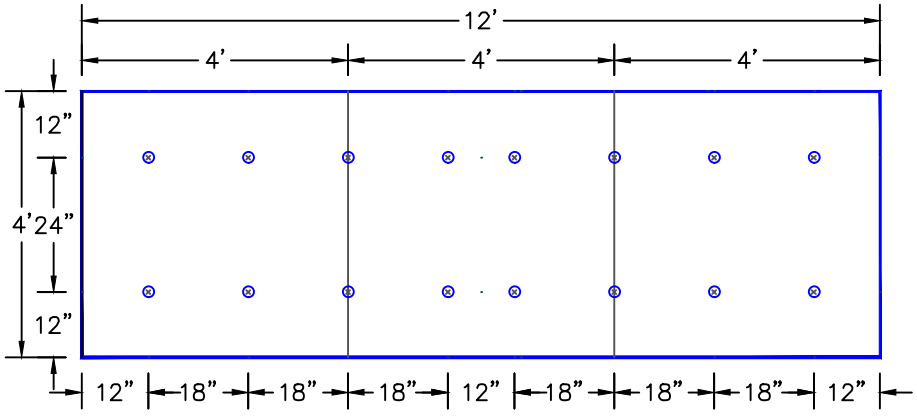
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10 Fasteners per 4' x 12'



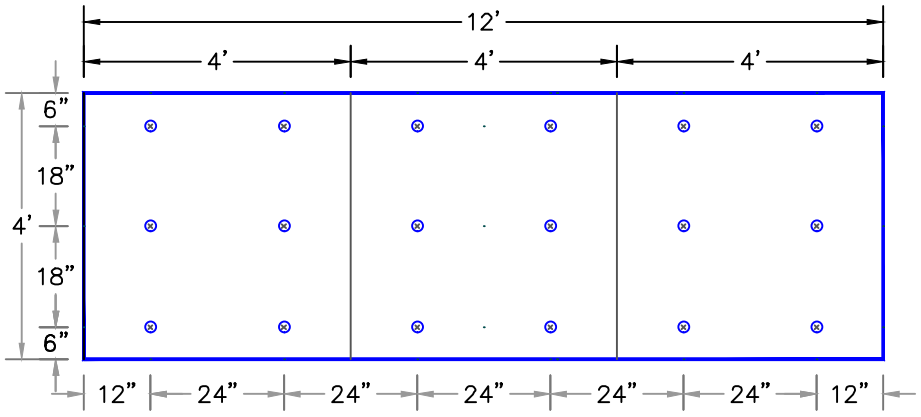
12 Fasteners per 4' x 12'



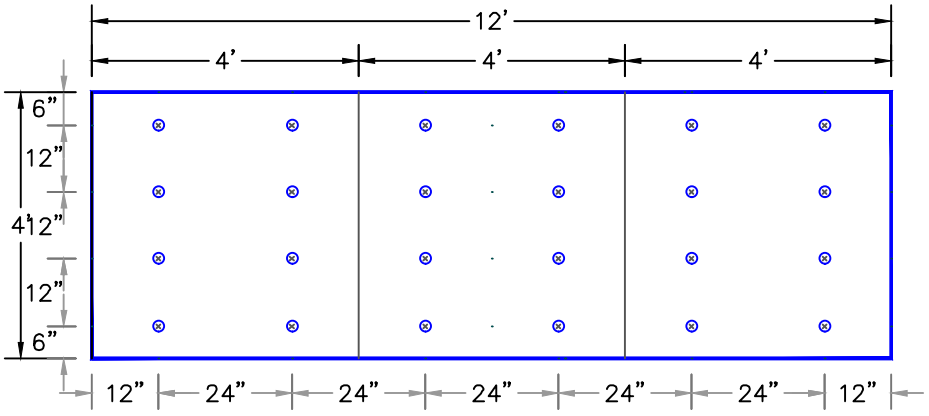
16 Fasteners per 4' x 12'

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–3 Induction Welding

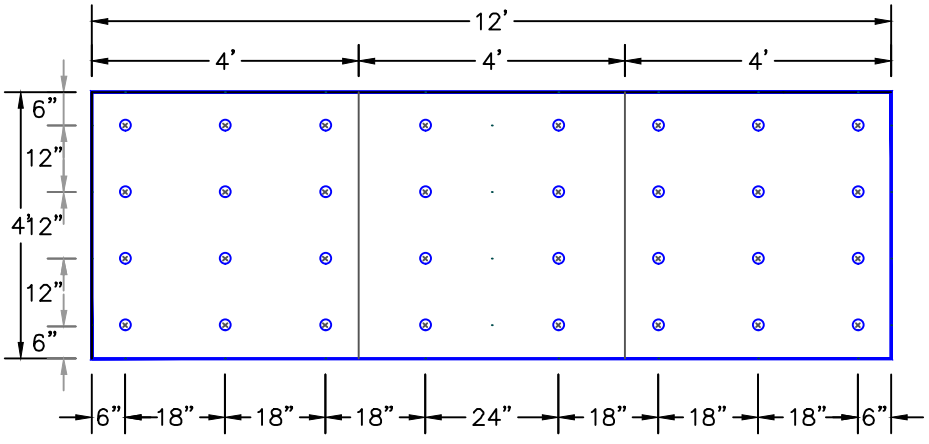
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18 Fasteners per 4' x 12'



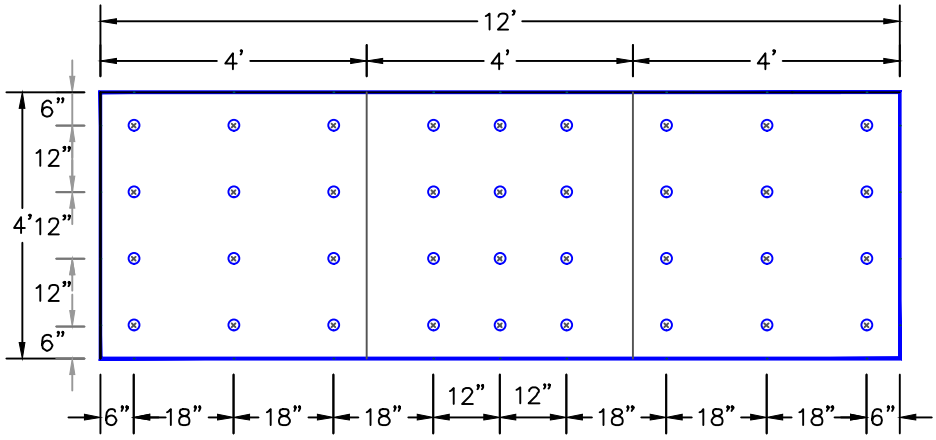
24 Fasteners per 4' x 12'



32 Fasteners per 4' x 12'

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications		DETAIL NO. FP–4 Induction Welding

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36 Fasteners per 4’ x 12’

THERMOPLASTIC MEMBRANE APPROVED SUBSTRATE 0 SEE NOTE(S)	INDUCTION WELDING ATTACHMENT METHOD – FASTENING PATTERNS/ENHANCEMENTS For additional information, refer to Specifications	DETAIL NO. FP–5 Induction Welding

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Specification
ATTACHMENT

Sure-Weld TPO Flashing Procedures Utilizing Sure-White or Sure-Seal Gray EPDM Flashing Products

"Attachment II"
July 2026

This is an alternate method for flashing **Carlisle's Sure-Weld TPO membrane ONLY** and is intended to be used in conjunction with the Carlisle Sure-Weld TPO Specification and Details.

A. Description

TPO flashing procedures utilizing Carlisle Sure-White or Sure-Seal Gray EPDM flashing products incorporate Pressure-Sensitive Elastoform Flashing, Pressure-Sensitive Inside/Outside Corners, Pressure Sensitive 'T'-Joint Covers, Pressure-Sensitive Pipe Seals, and Pressure-Sensitive Pourable Sealer Pockets. These Pressure-Sensitive products are used as an option and in lieu of welding TPO Flashing products for a **maximum warranty duration of 20 years**.

Carlisle's Sure-White EPDM Pressure-Sensitive products are comprised of uncured or cured White EPDM membrane laminated to fully cured Pressure-Sensitive adhesive.

Carlisle's Sure-Seal Gray EPDM Pressure-Sensitive products are comprised of uncured or cured Gray EPDM membrane laminated to fully cured Pressure-Sensitive adhesive.

B. Products

Products listed below can be used as part of this alternate flashing method in conjunction with **TPO Primer**.

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

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

2. **Sure-Seal Gray Pressure-Sensitive Elastoform Flashing: A** 12" wide by 50' long, 60-mil thick EPDM flashing laminated to a 30-mil Pressure-Sensitive TAPE used in conjunction with TPO Primer.

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

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

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

5. **Sure-White Pressure-Sensitive Cured Cover Strip:** A 6" or 9" wide and 100' long and 12" wide by 50' long Sure-White 60-mil cured EPDM membrane laminated to a nominal 30-mil cured Pressure-Sensitive TAPE. The Cured Cover Strip is for flashing Carlisle Seam Fastening Plates.

6. **Sure-Seal Gray Pressure-Sensitive Cured Cover Strip:** A 6" or 9" wide and 100' long and 12" wide by 50' long

Sure-Seal Gray 60-mil cured EPDM membrane laminated to a nominal 30-mil cured Pressure-Sensitive TAPE. The Cured Cover Strip is for flashing Carlisle Seam Fastening Plates.

7. **Sure-White Pressure-Sensitive Pipe Seals** with Pressure-Sensitive TAPE on the deck flange. Pipe Seals are available in one size: 1” to 6”.

8. **Sure-Seal Gray Pressure-Sensitive Pipe Seals** with Pressure-Sensitive TAPE on the deck flange. Pipe Seals are available in one size: 1” to 6”.

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

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

11. **Sure-White Pourable Sealer Pocket**: A pre-fabricated Pourable Sealer Pocket which consists of a 2" wide plastic support strip with Pressure-Sensitive, adhesive backed uncured Elastoform Flashing; available in 6” diameter.

12. **Sure-Seal Gray Pourable Sealer Pocket**: A pre-fabricated Pourable Sealer Pocket which consists of a 2" wide plastic support strip with Pressure-Sensitive, adhesive backed uncured Elastoform Flashing; available in 6” diameter.

13. **Sure-White SecurTAPE:** A 3" or 6" wide by 100' long splice tape used to bond Sure-White or Sure-Seal Gray EPDM or Sure-Weld TPO membrane to Sure-Weld TPO membrane when flashing a curb or a wall with a separate section of membrane.

14. **Low-VOC EPDM and TPO Primer -** A Low-VOC (volatile organic compound) primer (less than 250 grams/liter) for priming of EPDM or TPO surfaces prior to application of FAT, Cover strip, SecurTAPE and all other pressure-sensitive products. Available in 1-gallon pails.

C. Sure-White or Sure-Seal Gray EPDM Flashing Installation Criteria

General

1. When using Sure-White **or Sure-Seal Gray** Pressure-Sensitive EPDM products on TPO membrane, TPO primer should be used to prepare the TPO membrane surface.

2. Sure-White Pressure-Sensitive Seam Tape is not to be used for field membrane seaming.

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

   Note: Even when working in warmer temperatures, in most cases a heat gun will be required to elevate the temperature of Pressure-Sensitive Uncured Flashing between 105°F and 110°F (40°C and 43°C) to permit proper forming of the uncured flashing.

4. **Inside/Outside Corners and ‘T’-Joint Covers**

   a. Pressure-Sensitive Inside/Outside Corners and ‘T’-Joint Covers are installed on both inside and outside corners in conjunction with TPO Primer.
   b. T-Joint Covers are installed at field splice intersections or at horizontal to vertical transitions of field splices in conjunction with TPO Primer.

5. **Other Penetrations**

   a. Flash pipes and round supports with Pressure-Sensitive Pipe Seals, when feasible, in accordance with the applicable detail.

   b. Form Field Fabricated Pipe Seals using Pressure-Sensitive Uncured Elastoform Flashing around pipes, round supports and structural steel tubing with corner radius greater than 1/4".

   c. When flashing seamless metal posts, maximum 4" by 4", with a corner radius less than 1/4", apply a field fabricated pipe flashing with a double vertical wrapping.

d. For pipe clusters or unusually shaped penetrations, a pourable sealer pocket must be utilized.

D. Associated Installation Details

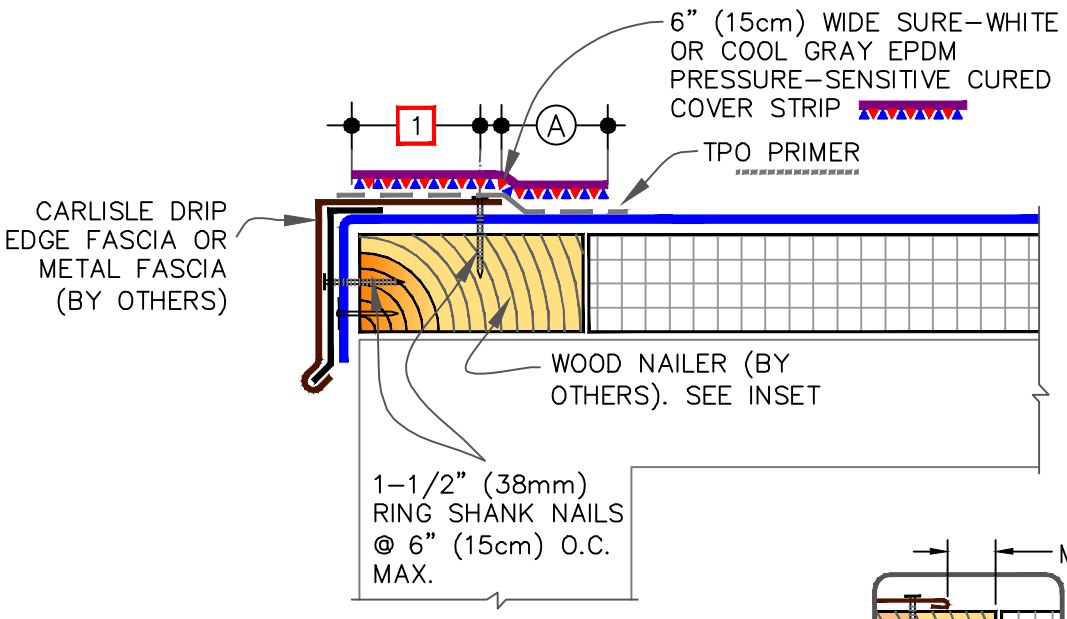
SecurSeal Drip Edge Fascia with EPDM Flashing U-1AT
Curb/Wall with EPDM Flashing U-5AT
Curb with Pressure-Sensitive EPDM Cured Flashing U-5BT
Pipe: Pre-Molded Pressure-Sensitive EPDM Pipe Seal U-8AT
Field-Fabricated Pipe Seal with EPDM Flashing U-8BT
Hot Stack: Field Fabricated Flashing with EPDM Pressure-Sensitive Elastoform U-8DT
Parapet/Curb with Sure-White or Cool Gray EPDM and Sure-White SecurTAPE U-12AT
EPDM Pressure-Sensitive Inside Corner with Continuous TPO Wall Flashing U-15CT
Outside Corner with Pre-Cut Pressure-Sensitive EPDM Flashing (Option 1) U-15ET
Outside Corner with EPDM Pressure-Sensitive Elastoform Flashing (Option 2) U-15GT
Pressure-Sensitive Pourable Sealer Pocket U-16BT
Scupper with EPDM Flashing U-18BT
Scupper with EPDM Flashing (1 OF 2) U-18CT
Scupper with EPDM Flashing (2 OF 2) U-18CT

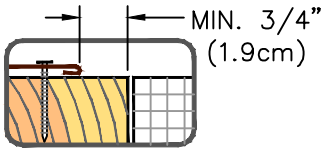
End of Section

CAUTIONS

- THIS DETAIL IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM THE GUTTER /EDGE. REFER TO DETAILS U-1B OR U-1C.
- FOR 30-YEAR WARRANTY PROJECTS, SEE DETAILS U-1.B, U-1C, U-1D, U-1E OR U-1F.

TPO WITH EPDM FLASHING

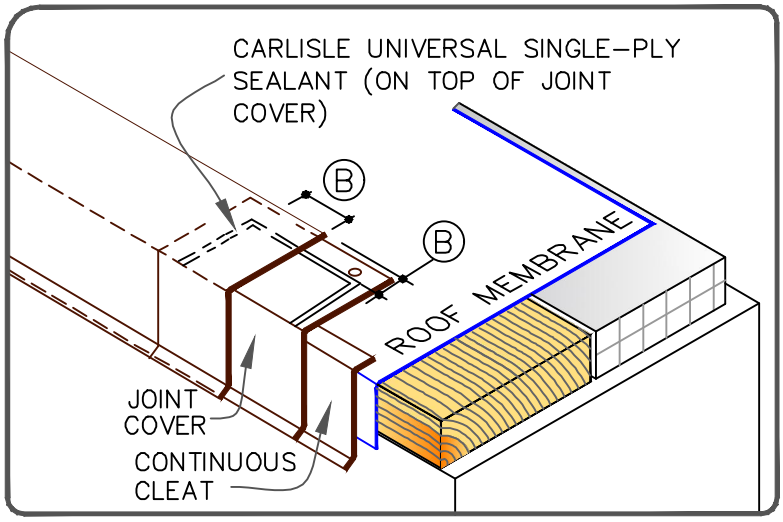




DIMENSIONS		cm	
A	2"	5	MIN.
B	1/2" - 1"	1.5-2.5	

NOTES:

1. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY SURE-WHITE OR COOL GRAY PRESSURE-SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING TPO PRIMER.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
4. T-JOINT COVERS ARE REQUIRED AT INTERSECTIONS WITH 60-MIL (1.52mm) OR 80-MIL (2.03mm) MEMBRANES.



CARLISLE SYNTEC SYSTEMS

DRIP EDGE FASCIA WITH EPDM FLASHING

MAXIMUM WARRANTY: 20 YEARS

TPO

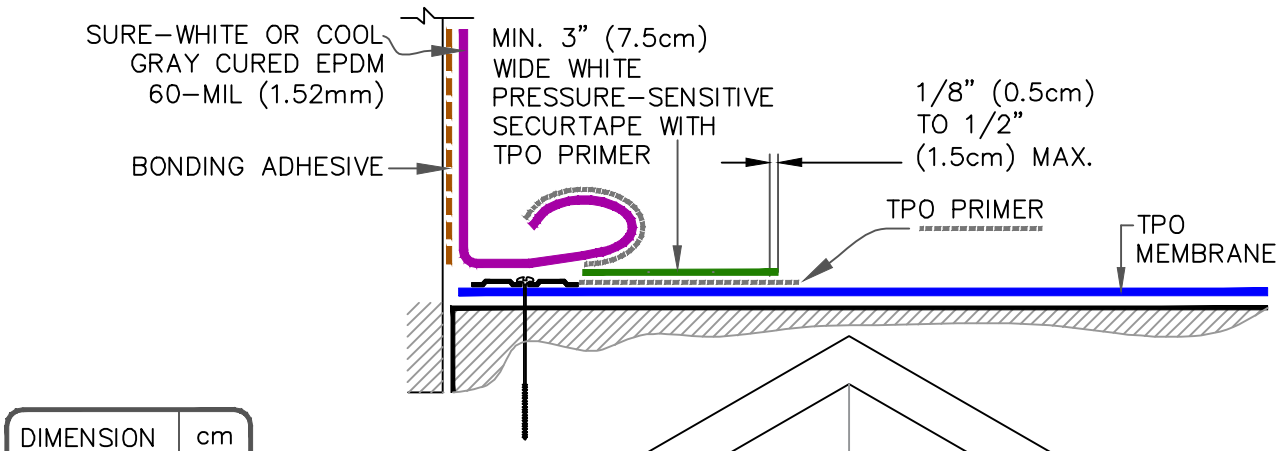
DETAIL NO. U-1AT

U (Universal Detail)

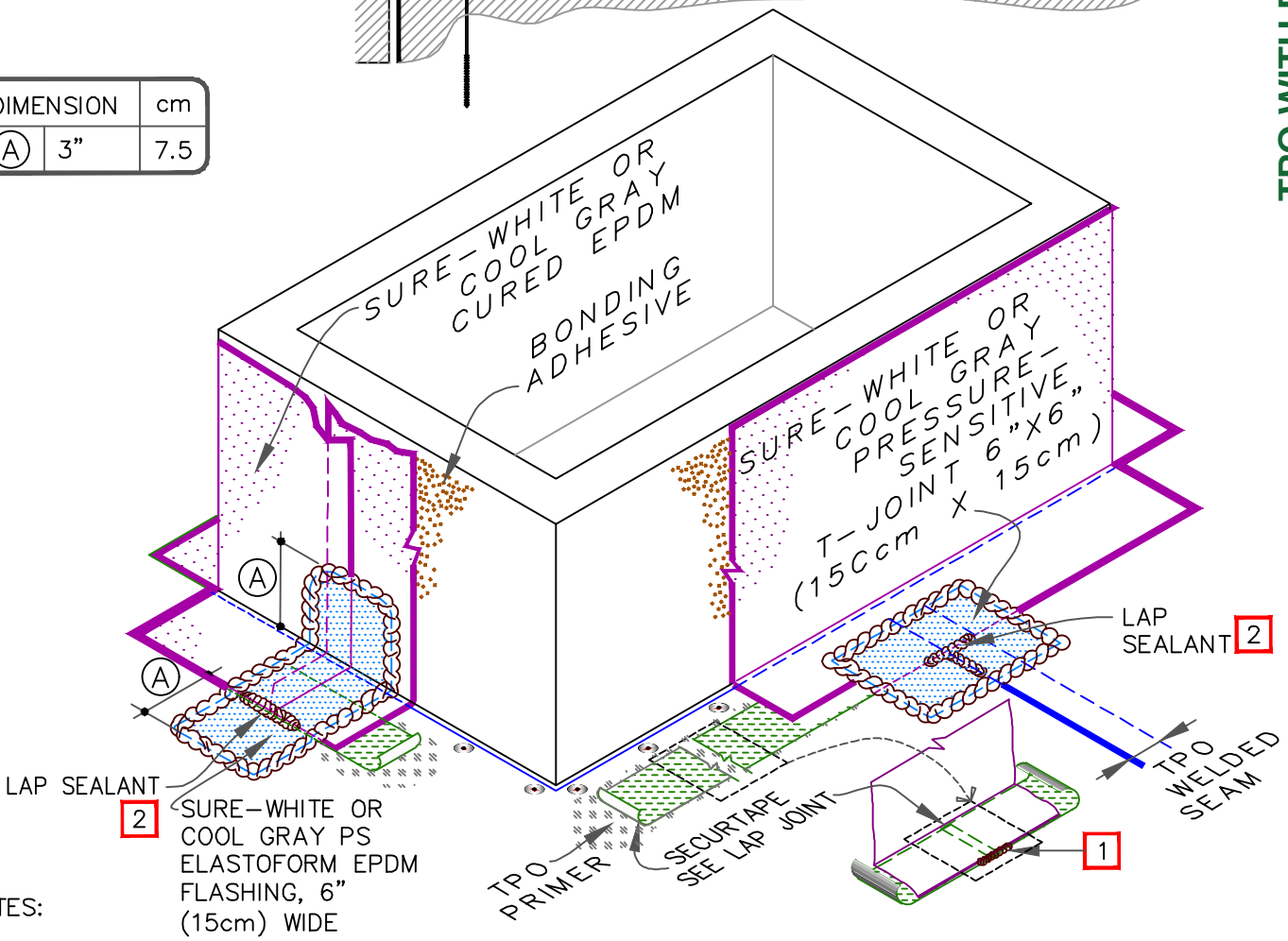
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WARRANTY REQUIREMENTS			
	20 YEAR WARRANTY	USE MIN 3" (7.5cm) WIDE FACTORY-APPLIED TAPE OR	MIN 3" (7.5cm) WIDE FIELD-APPLIED SURE-WHITE SECURTAPE
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL TPO DETAIL U-2A.	

TPO WITH EPDM FLASHING



DIMENSION	cm
Ⓐ 3"	7.5



NOTES:

1. FIELD APPLIED SURE-WHITE OR COOL GRAY PRESSURE-SENSITIVE SEAM TAPE IS TO BE OVERLAPPED A MINIMUM OF 1" (2.5cm) AT THE ENDS OF EACH CUT PIECE. APPLY LAP SEALANT AT TAPE OVERLAPS 2" (5cm) IN BOTH DIRECTIONS.
2. APPLY CARLISLE WHITE LAP SEALANT OR GRAY UNIVERSAL SEALANT ALONG THE LEADING EDGE OF THE MEMBRANE SPLICE UNDER THE T-JOINT COVER, COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN ALL DIRECTIONS FROM THE SPLICE INTERSECTION.
3. INSTALL OUTSIDE CORNERS PER DETAIL U-15ET OR U-15GT.

CARLISLE SYNTEC SYSTEMS

CURB/WALL WITH EPDM FLASHING

MAXIMUM WARRANTY: SEE WARRANTY REQUIREMENT ON TOP

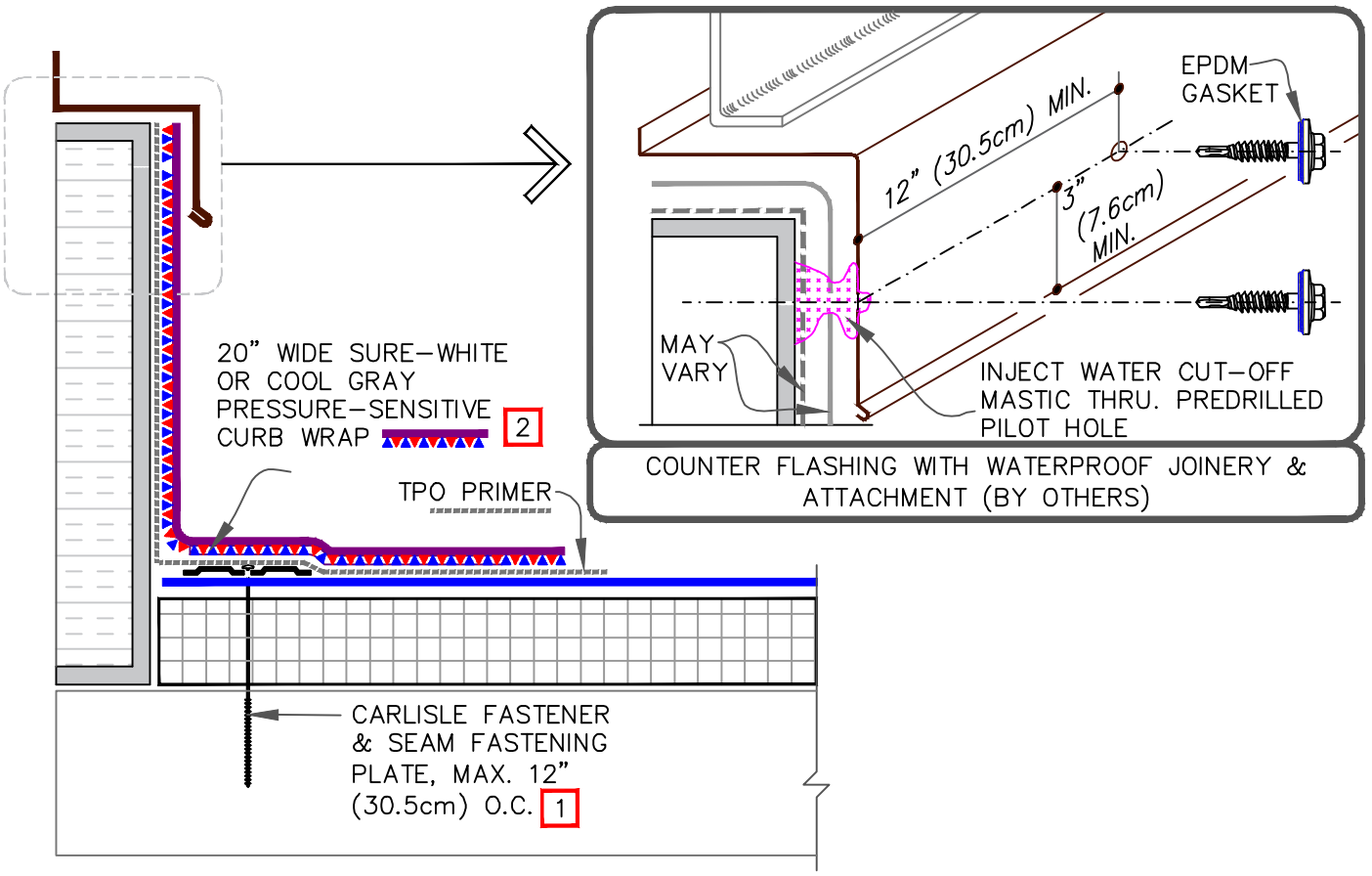
TPO

DETAIL NO. U-5AT

U (Universal Detail)

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WARRANTY REQUIREMENTS		
	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL APPLICABLE TPO DETAIL(S) U-5A, U-5B & U-5C FOR REQUIRED CURB DETAIL



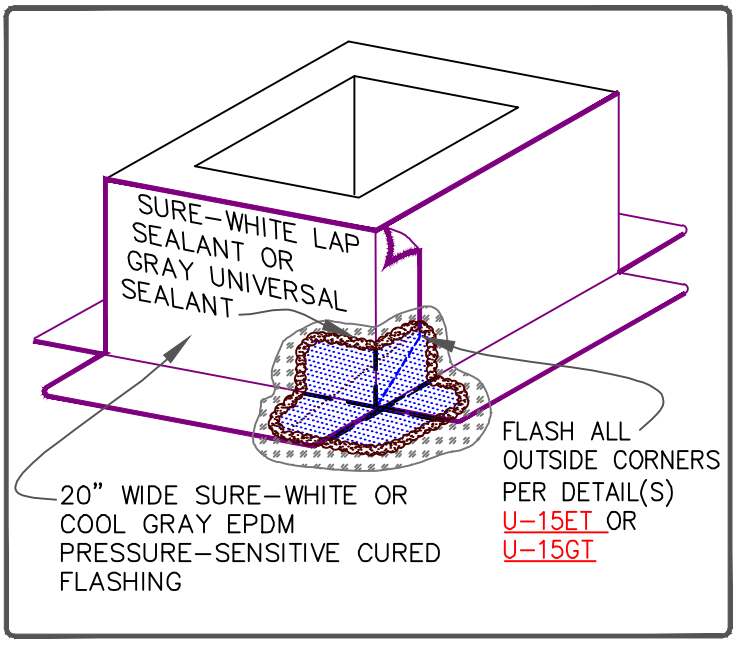
TPO WITH EPDM FLASHING

NOTES:

1. SEAM FASTENING PLATES/FASTENERS MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
2. IF THE VERTICAL SPLICE ON THE CURB FLASHING IS NOT LOCATED AT THE CORNER, A 6" (15cm) WIDE PRESSURE-SENSITIVE UNCURED OR A T-JOINT FLASHING, IN CONJUNCTION WITH TPO PRIMER MUST BE CENTERED OVER FIELD SPLICE AT ANGLE CHANGE.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA



CARLISLE SYNTEC SYSTEMS

CURB WITH PRESSURE-SENSITIVE EPDM CURB WRAP FLASHING

FOR WARRANTY, SEE TABLE ON TOP OF PAGE.

TPO

DETAIL NO. U-5BT

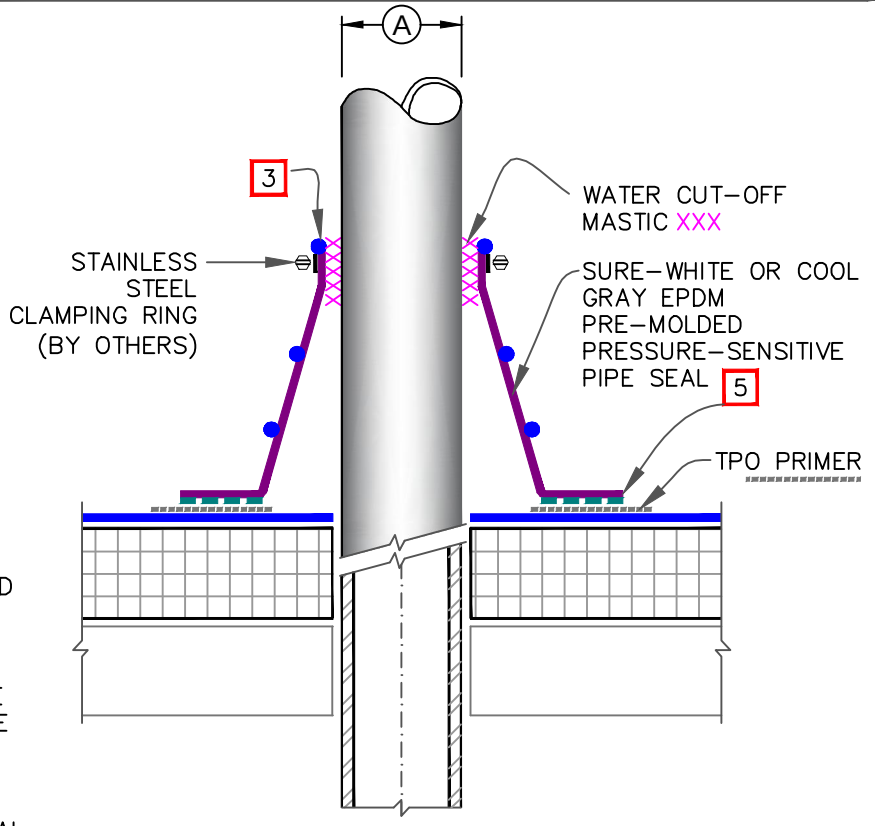
U (Universal Detail)

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WARRANTY REQUIREMENTS		
	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TYPICAL TPO DETAIL U-8A. NO FIELD-FABRICATION ALLOWED FOR 25/30 YEAR ROOF.

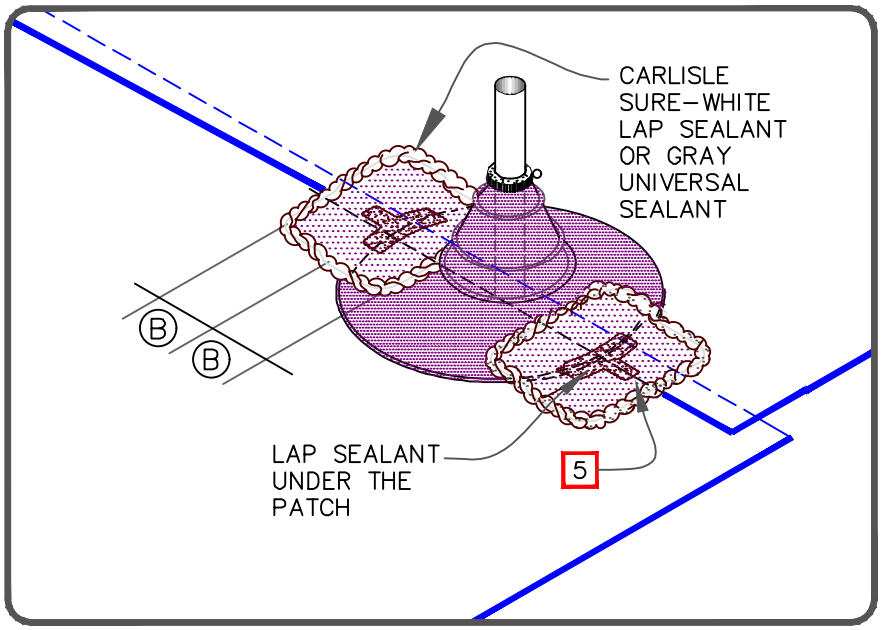
TPO WITH EPDM FLASHING

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



NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE-SENSITIVE PIPE SEAL.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. PRE-MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. DECK FLANGES OF THE PRESSURE-SENSITIVE PIPE SEAL SHALL NOT BE OVERLAPPED, CUT OR APPLIED OVER ANY ANGLE CHANGE.
5. WHEN A FIELD SPLICE INTERSECTS A PIPE SEAL, APPLY SURE-WHITE LAP SEALANT OR GRAY UNIVERSAL SEALANT ALONG THE EDGE OF THE MEMBRANE SPLICE COVERING THE EXPOSED SPLICE TAPE 1/2" (1.5cm) IN EACH DIRECTION FROM THE SPLICE INTERSECTION & OVERLAY WITH A 7"X9" (18cm X 23cm) T-JOINT COVER.
6. ON MECHANICALLY-FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED. REFER TO DETAIL U-8A & TABLE ON THIS PAGE.



CARLISLE SYNTEC SYSTEMS

PIPE: PRE-MOLDED PRESSURE-SENSITIVE EPDM PIPE SEAL

SEE WARRANTY REQUIREMENT TABLE ON TOP OF PAGE.

TPO

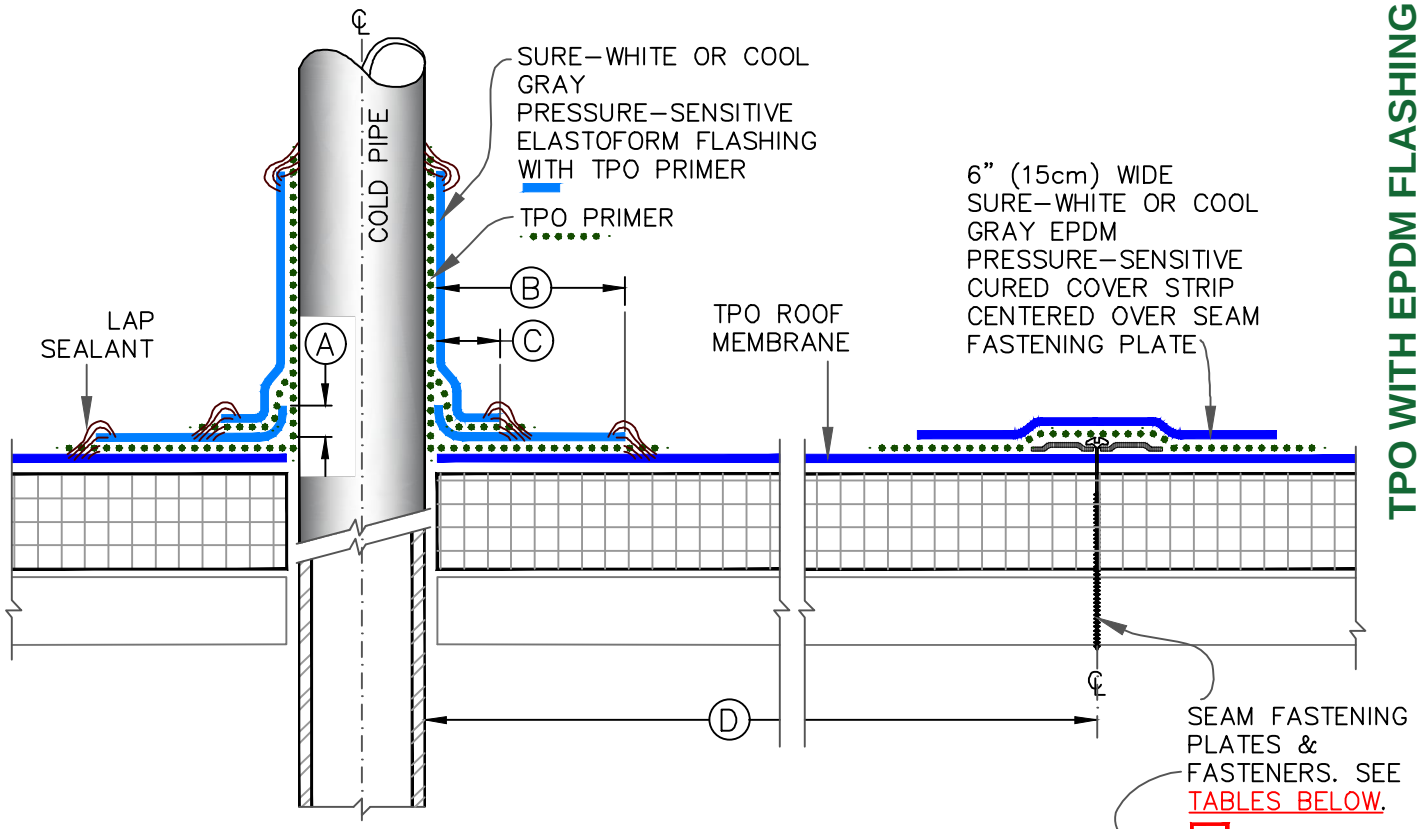
DETAIL NO. U-8AT

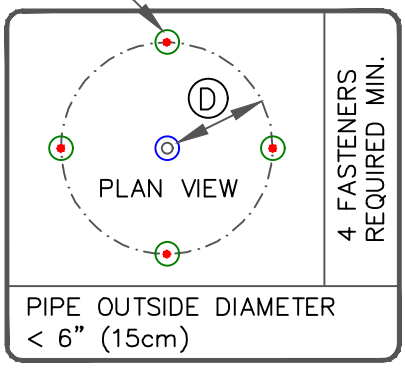
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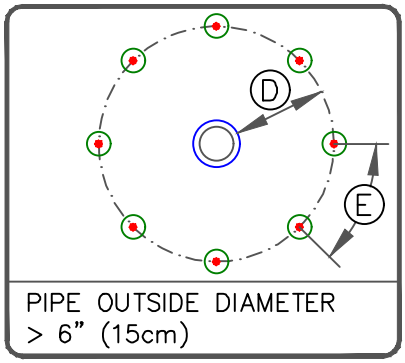
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WARRANTY REQUIREMENTS		
	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	USE ONLY TPO PREFABRICATED ACCESSORIES

TPO WITH EPDM FLASHING







NOTES:

1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING PRESSURE-SENSITIVE ELASTOFORM FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 180°F (82°C).
3. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).
4. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING.

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

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED PIPE SEAL WITH EPDM FLASHING

SEE WARRANTY REQUIREMENTS.

TPO

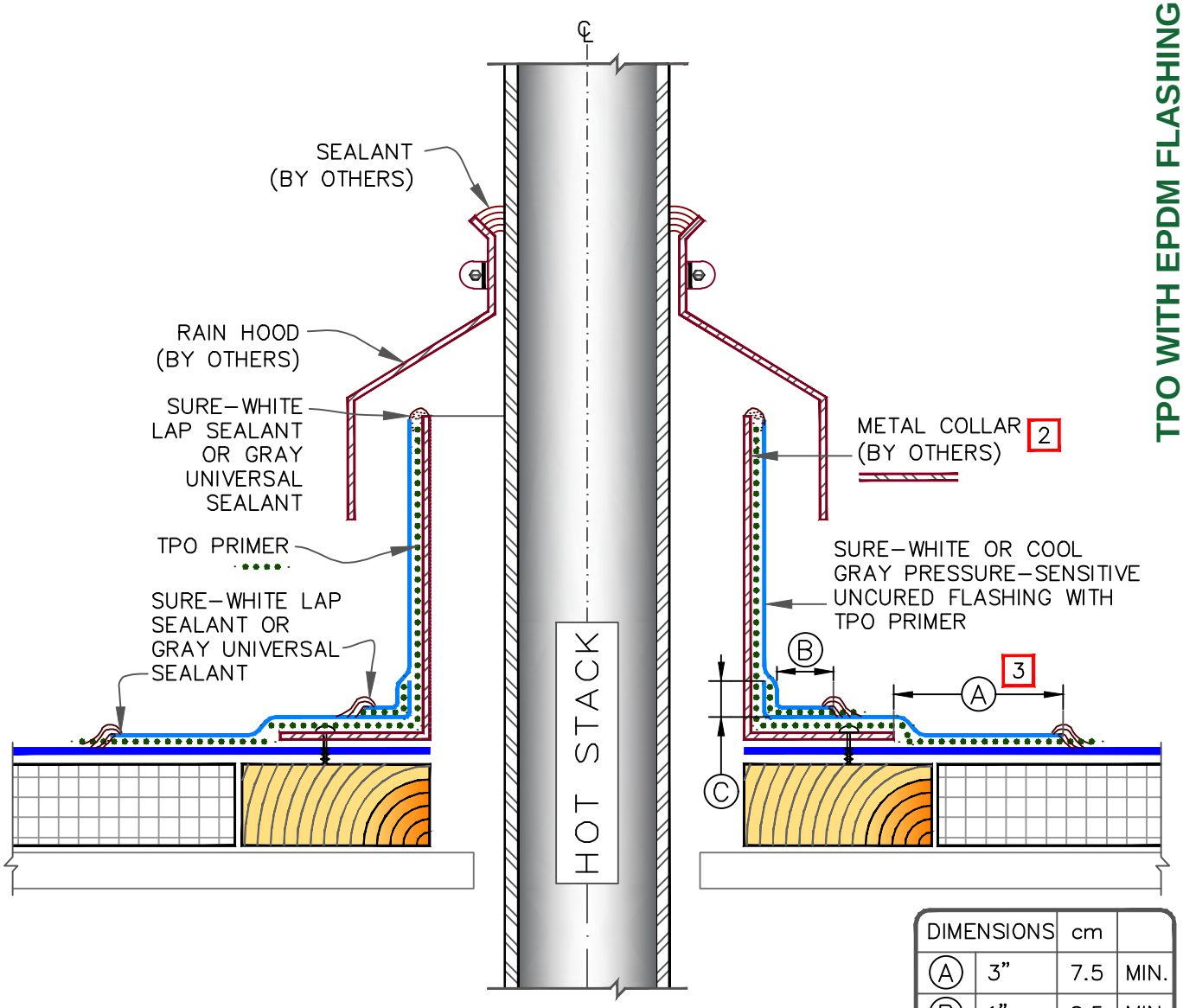
DETAIL NO. U-8BT

THERMOPLASTIC TPO

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WARRANTY REQUIREMENTS	20 YEAR WARRANTY	SEE DETAIL BELOW
	25 OR 30 YEAR WARRANTY	REFER TO CARLISLE TPO DETAIL U 8.6.

TPO WITH EPDM FLASHING



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

NOTES:

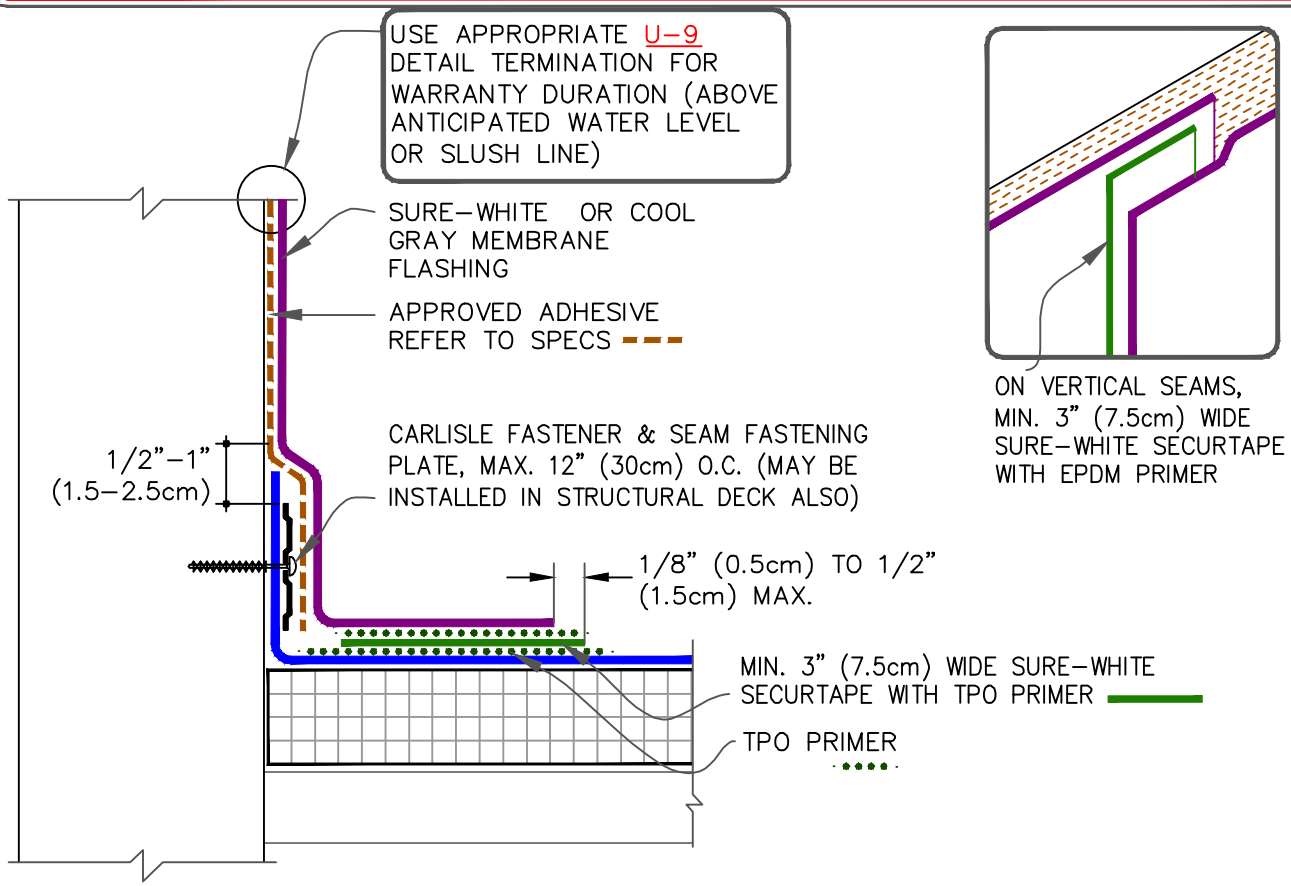
1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.
2. TEMPERATURE OF METAL COLLAR MUST NOT EXCEED 180°F (82°C).
3. TPO PRIMER MUST BE APPLIED TO THE MATING SURFACES PRIOR TO APPLYING SURE–WHITE OR COOL GRAY PRESSURE–SENSITIVE UNCURED FLASHING.
4. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE–SENSITIVE UNCURED FLASHING.

CARLISLE SYNTEC SYSTEMS	HOT STACK: FIELD FABRICATED FLASHING WITH EPDM PS ELASTOFORM FLASHING WARRANTY: SEE TABLE ON TOP OF PAGE	TPO DETAIL NO. U–8DT U (Universal Detail)

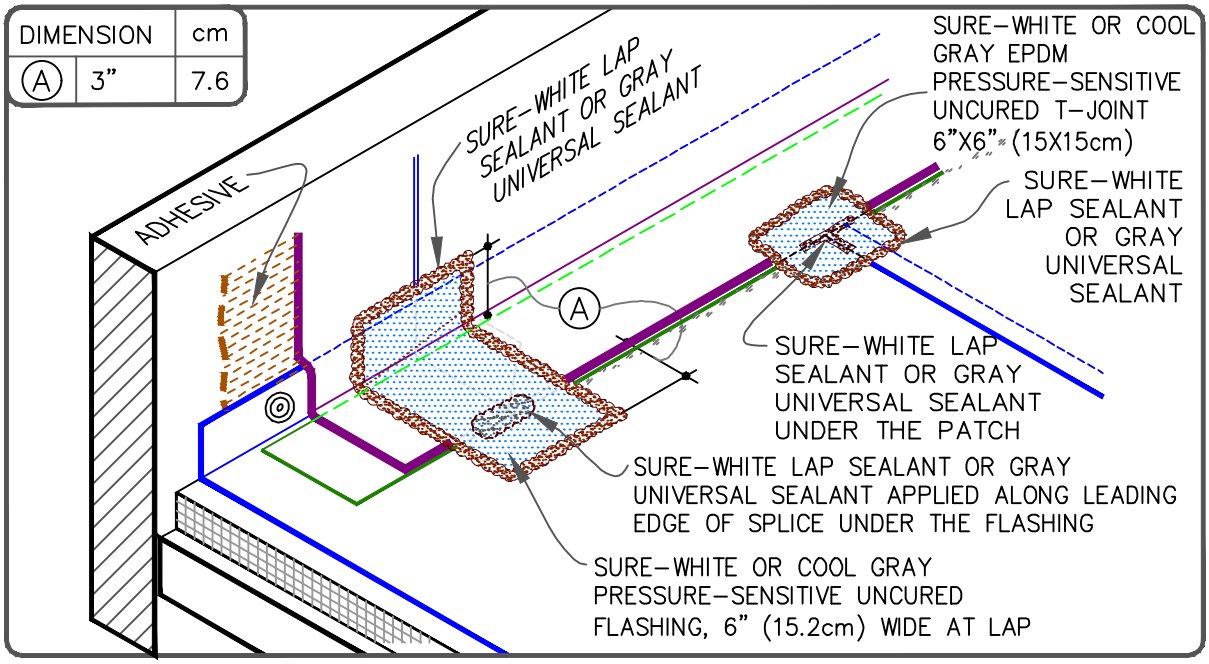
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WARRANTY REQUIREMENTS	DETAIL IS LIMITED TO 20-YEAR WARRANTY.
	FASTENERS AND PLATES ARE REQUIRED AT 6" (15cm) O.C. FOR ADHERED SYSTEMS WITH WARRANTY WIND SPEED COVERAGE GREATER THAN 90 MPH AND FOR ALL PROJECTS WITH WARRANTIES GREATER THAN 20 YEARS.

TPO WITH EPDM FLASHING



DIMENSION	cm
A 3"	7.6



CARLISLE SYNTEC SYSTEMS

PARAPET/CURB WITH SURE-WHITE OR COOL GRAY EPDM & SURE-WHITE SecurTAPE

WARRANTY: SEE WARRANTY REQUIREMENTS ON TOP OF PAGE.

TPO

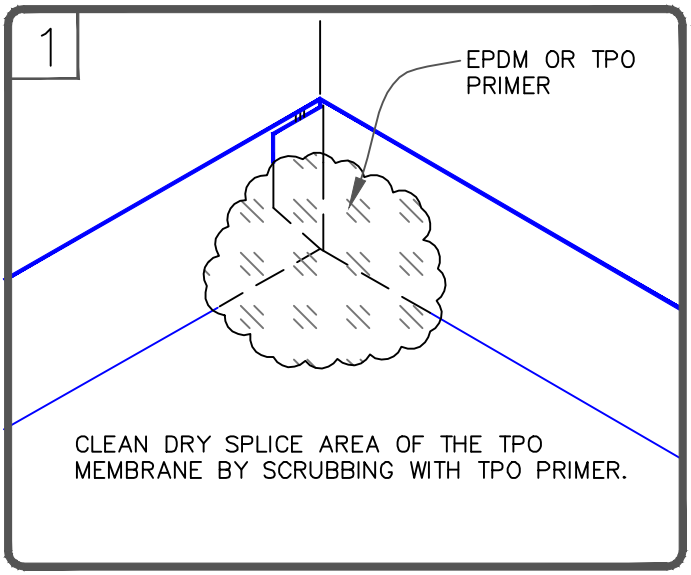
DETAIL NO. U-12AT

U (Universal Detail)

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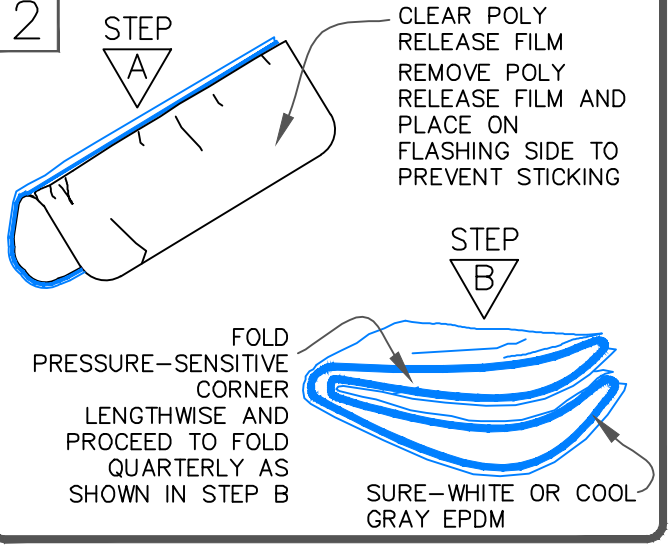
TPO WITH EPDM FLASHING

1

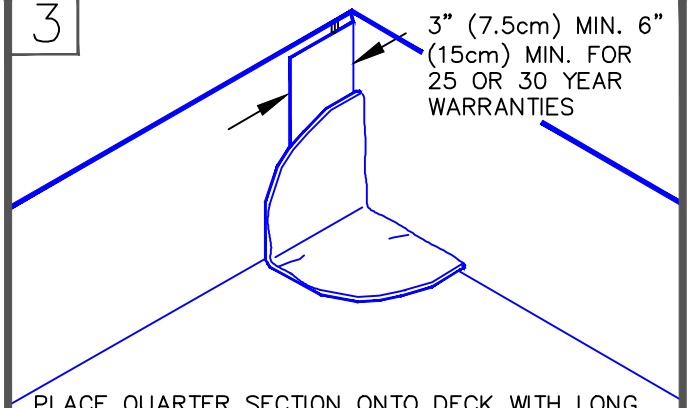


CLEAN DRY SPLICE AREA OF THE TPO MEMBRANE BY SCRUBBING WITH TPO PRIMER.

2

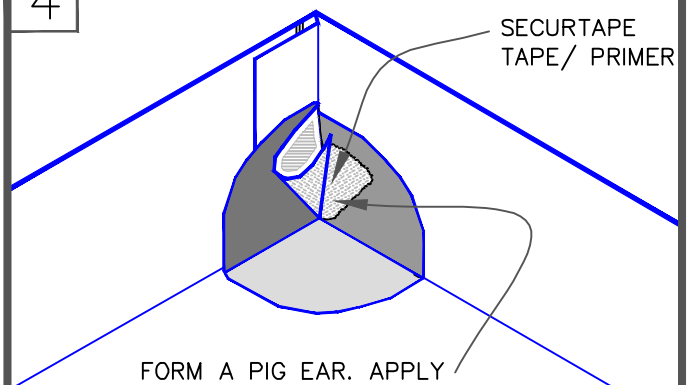


3



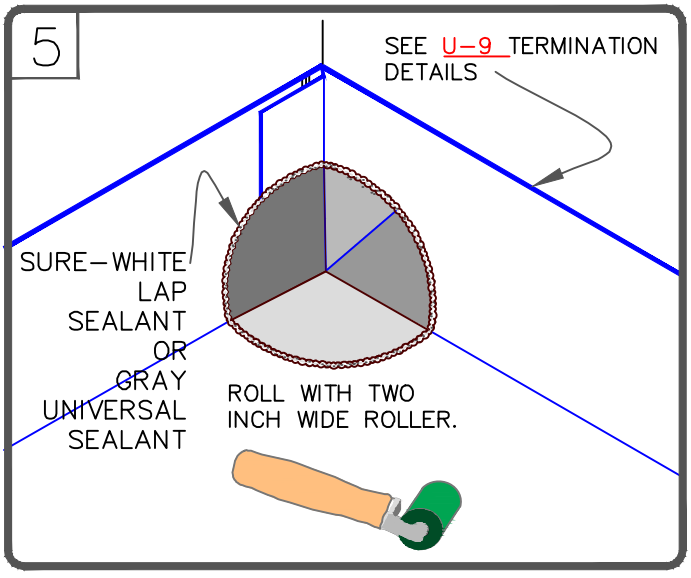
PLACE QUARTER SECTION ONTO DECK WITH LONG FOLDED SIDE FACING THE WALL. REMOVE REMAINING RELEASE PAPER. PRESS FIRMLY AND PROCEED WITH SECOND QUARTER GOING UP THE VERTICAL WALL BY PRESSING FIRMLY INTO CORNER.

4



FORM A PIG EAR. APPLY PRIMER/SECURTAPE TAPE TO THE PIG EAR AND ADHERE TO THE WALL.

5



NOTE:

1. TPO PRIMER MUST BE APPLIED TO ALL SPLICE AREAS AND FOR EACH LAYER OF PRESSURE-SENSITIVE FLASHING.

CARLISLE SYNTEC SYSTEMS

EPDM PRESSURE-SENSITIVE INSIDE CORNER WITH CONTINUOUS TPO WALL FLASHING

MAXIMUM WARRANTY: 20 YEARS

TPO

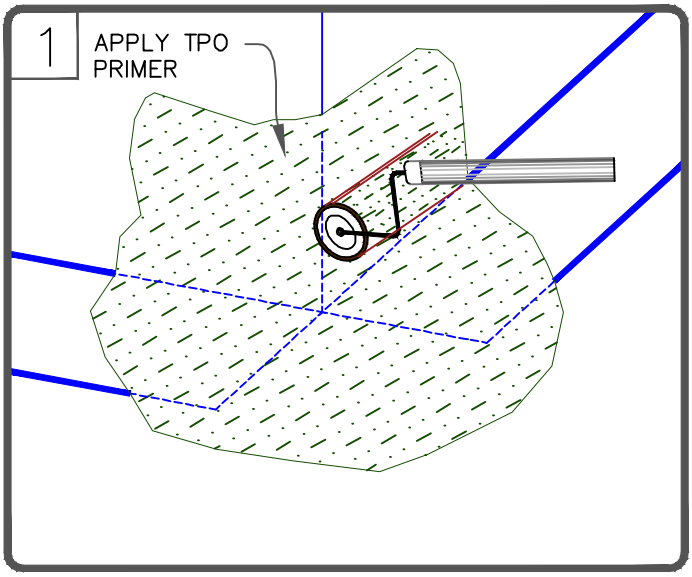
DETAIL NO. U-15CT

U (Universal Detail)

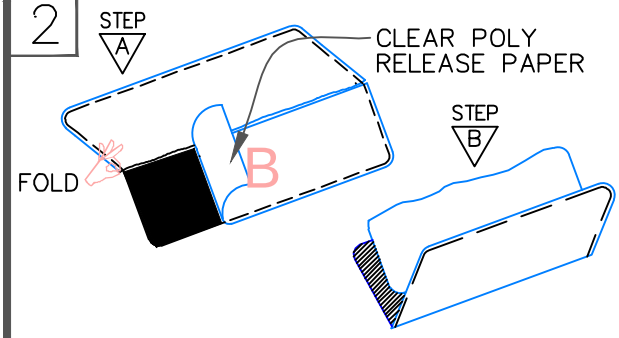
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TPO WITH EPDM FLASHING

1

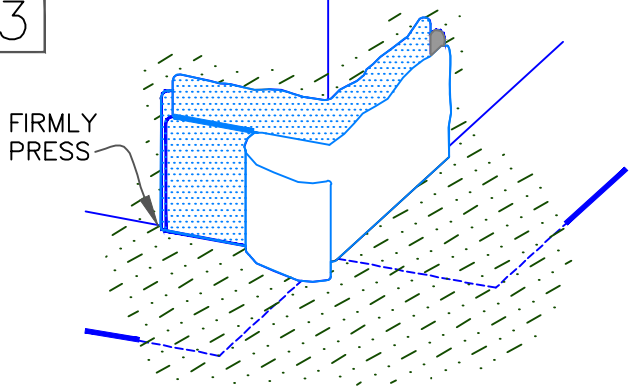


2



PRIOR TO PLACEMENT OF SURE-WHITE PRESSURE-SENSITIVE SURE-WHITE OR COOL GRAY CORNER, PEEL OFF THE POLY RELEASE FILM FROM THE FLASHING SIDE AND HEAT WITH A HEAT GUN. RE-APPLY THE POLY LOOSELY. FOLD THE FLASHING IN HALF.

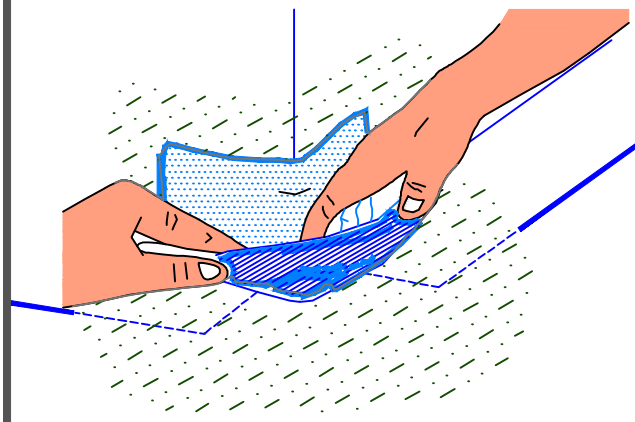
3



PLACE SURE-WHITE OR COOL GRAY INSIDE/OUTSIDE CORNER AS SHOWN AND REMOVE RELEASE PAPER.

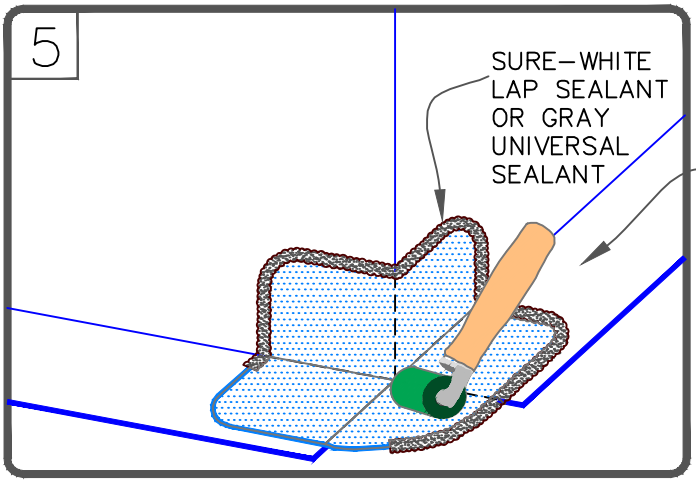
PRESS FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING AGAINST THE VERTICAL SURFACE.

4



PLACE FOLDED FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY PRESS FLASHING ONTO THE DECK FLANGE BY PRESSING THE FLASHING AGAINST THE HORIZONTAL SURFACE.

5



AFTER ADHERING, ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES.

IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE UNCURED FLASHING.

WARRANTY REQUIREMENTS	DETAIL NOT FOR USE ON 25-30 YEAR WARRANTY ROOFS.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH PRE-CUT PRESSURE-SENSITIVE EPDM FLASHING (OPTION 1)

MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO.

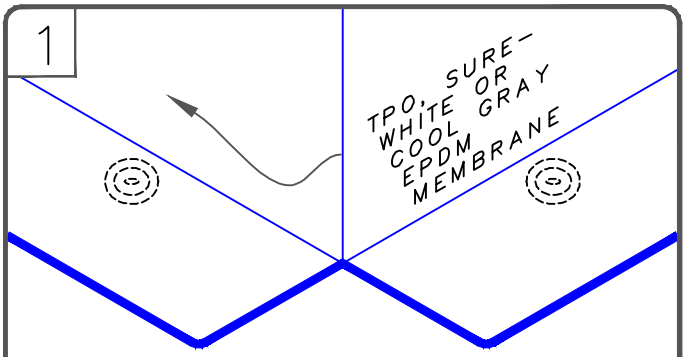
U-15ET

U (Universal Detail)

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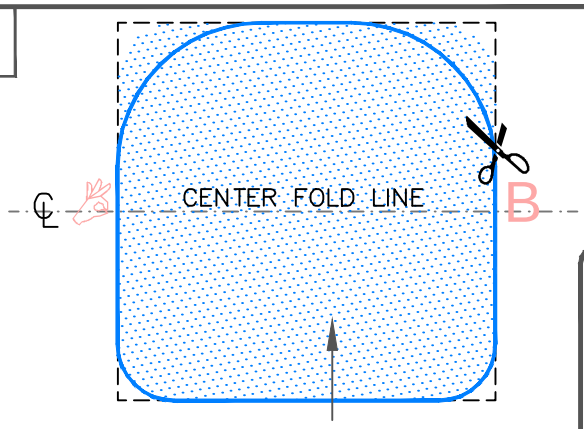
TPO WITH EPDM FLASHING

1



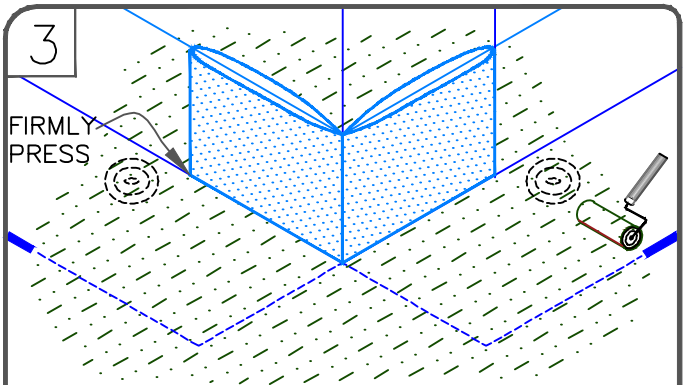
FASTEN MEMBRANE AND FLASH CURB OR WALL WITH MEMBRANE FOLLOWING STANDARD PROCEDURES USING BONDING ADHESIVE AND SURE-WHITE PRESSURE-SENSITIVE TAPE OR HOT AIR WELDING.

2



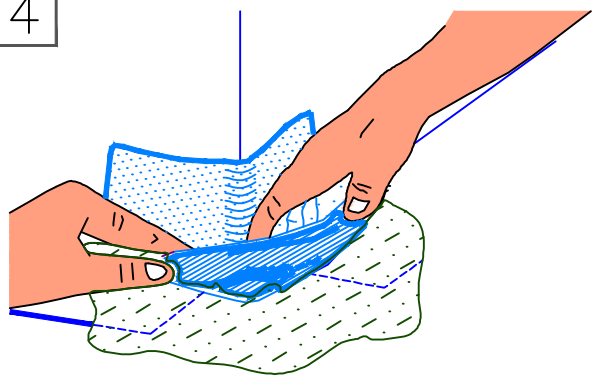
CUT A 9"x9" (23cm x 23cm) SECTION OF SURE-WHITE OR COOL GRAY PRESSURE-SENSITIVE UNCURED FLASHING AND MAKE ROUNDED CORNERS AS SHOWN.

3



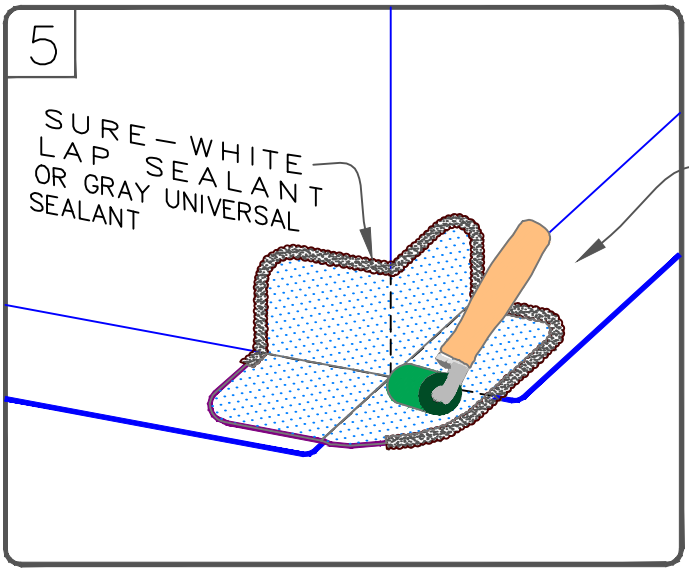
AFTER APPLYING TPO PRIMER, REMOVE AND REPLACE POLY BACKING. ON FLASHING SIDE, FOLD 9"x9" (23cm x 23cm) FLASHING IN HALF WITH ROUNDED PORTION TURNED UP. CENTER FLASHING ON CORNER AND FIRMLY PRESS AGAINST VERTICAL SURFACE.

4



ROLL AND CREASE FLASHING TIGHTLY INTO ANGLE CHANGE AND FIRMLY ROLL FLASHING ONTO THE DECK MEMBRANE.

5



AFTER ADHERING, ROLL WITH A TWO INCH WIDE ROLLER. PAY PARTICULAR ATTENTION TO THE STEP OFFS AND ANGLE CHANGES.

IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE UNCURED FLASHING.

WARRANTY REQUIREMENTS	DETAIL NOT FOR USE ON 25-30 YEAR WARRANTY ROOFS.

CARLISLE SYNTEC SYSTEMS

OUTSIDE CORNER WITH EPDM PRESSURE-SENSITIVE ELASTOFORM FLASHING (OPTION 2)

MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO.

U-15GT

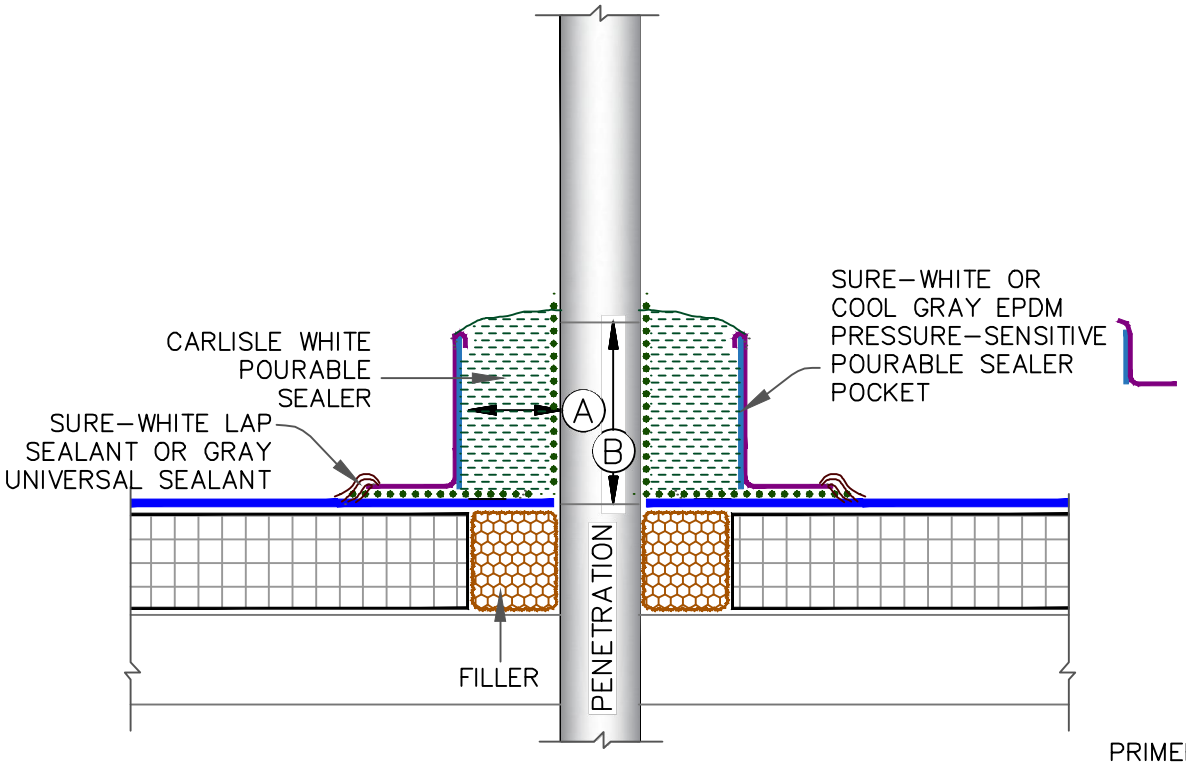
U (Universal Detail)

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CAUTION

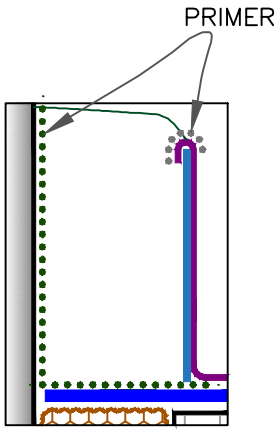
FOR 25–30 YEAR WARRANTY ROOFS, USE DETAIL 16–A WITH MANDATORY REQUIREMENT OF SHEET METAL RAIN HOOD.

TPO WITH EPDM FLASHING



NOTES:

1. THE MAXIMUM ALLOWABLE SURFACE TEMPERATURE OF THE PENETRATION SHALL NOT EXCEED 180°F (82°C).
2. ALL DEBRIS (PAINT, RUST, LEAD, OTHER FLASHINGS, ETC.) MUST BE REMOVED FROM THE PENETRATION.
3. PENETRATIONS, MEMBRANE, FLASHING AND METAL (INSIDE POCKET) MUST BE PRIMED WITH TPO PRIMER PRIOR TO APPLYING POURABLE SEALER. DO NOT PRIME THE BLUE PLASTIC SUPPORT STRIP.
4. POURABLE SEALER MUST COMPLETELY FILL POURABLE SEALER POCKET TO PREVENT PONDING OF WATER.
5. POURABLE SEALER MUST CONTACT PRIMED PRESSURE–SENSITIVE UNCURED FLASHING AND DECK MEMBRANE.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46cm) IN DIAMETER. REFER TO SPECIFICATIONS.
7. ON MECHANICALLY–FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED (SIMILAR TO U–8A) REGARDLESS OF SIZE OR DIAMETER.
8. PIPE CLUSTERS MUST HAVE MINIMUM 1" (2.5cm) CLEARANCE BETWEEN PENETRATIONS.



MANDATORY TPO PRIMER AT ALL INTERFACES OF POURABLE SEALER EXCEPT BLUE PLASTIC SUPPORT STRIP

DIMENSIONS		cm	
A	1"	2.5	MIN.
B	2"	5	MIN.

CARLISLE SYNTEC SYSTEMS

PRESSURE–SENSITIVE POURABLE SEALER POCKET

MAXIMUM WARRANTY: 20 YEARS, SEE CAUTION ON TOP OF PAGE

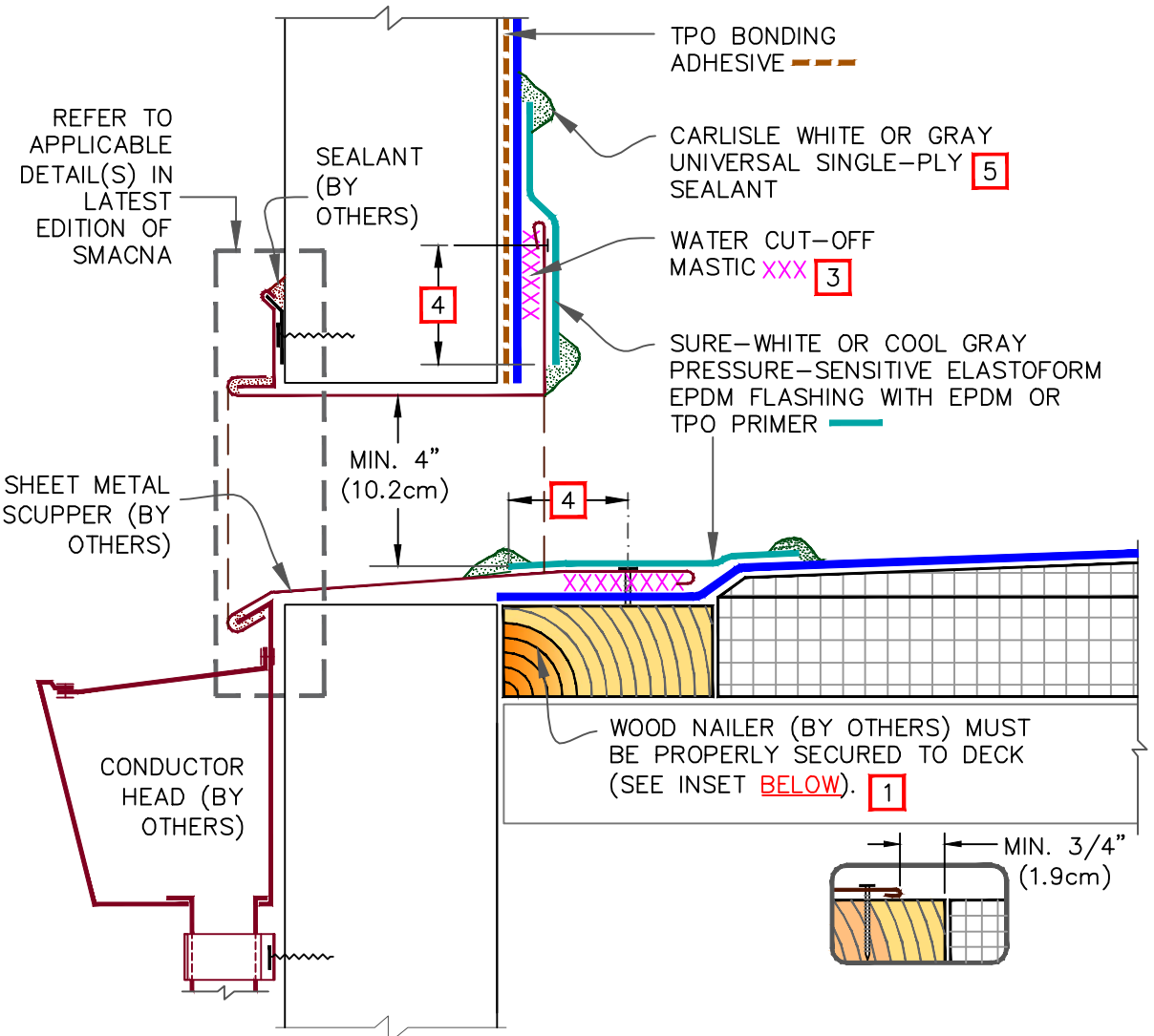
TPO

DETAIL NO. U–16BT

U (Universal Detail)

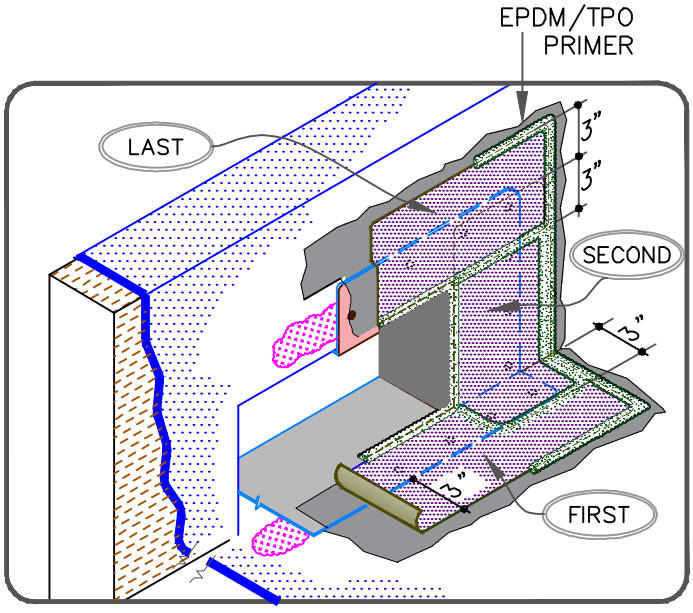
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TPO WITH EPDM FLASHING



NOTES:

1. WOOD NAILERS ARE INSTALLED AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS WATER-TIGHT.
3. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. SCUPPER FLANGES MUST BE TOTALLY COVERED BY PRESSURE-SENSITIVE UNCURED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.
5. WHITE OR GRAY UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.



CARLISLE SYNTEC SYSTEMS

SCUPPER WITH EPDM FLASHING

MAXIMUM WARRANTY: 20 YEARS

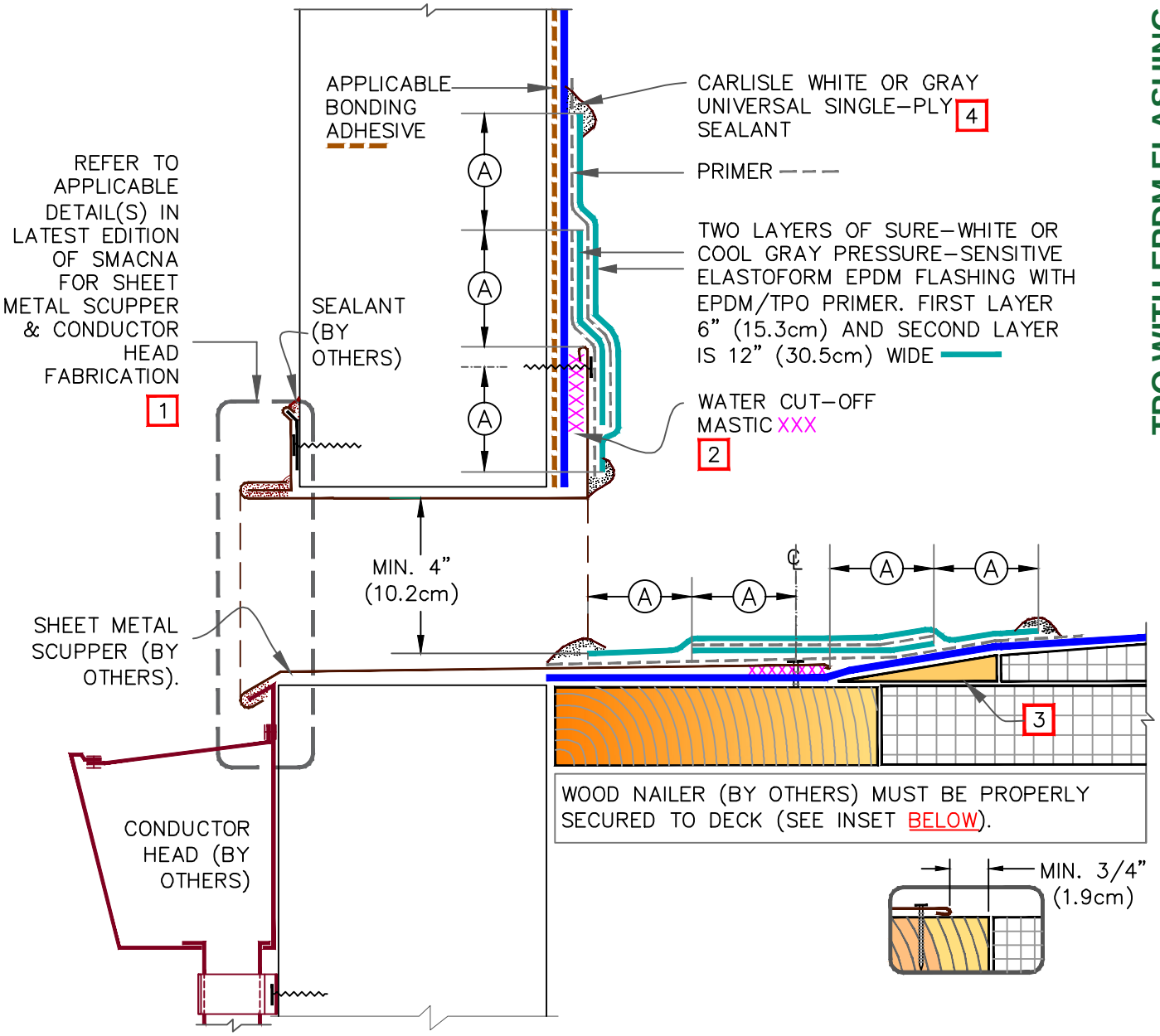
TPO

DETAIL NO. U-18BT

U (Universal Detail)

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TPO WITH EPDM FLASHING



NOTES:

1. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS AIR & WATER-TIGHT.
2. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
3. TAPERED EDGE STRIP BY HUNTER OR CANT STRIP, AS REQUIRED & SET IN ADHESIVE OR SHAVE THE EDGES OF TAPERED INSULATION.
4. WHITE OR GRAY UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.

DIMENSIONS		cm	
A	2"	5	MIN.
B	3"	7.6	MIN.

CARLISLE SYNTEC SYSTEMS

SCUPPER WITH EPDM FLASHING, PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

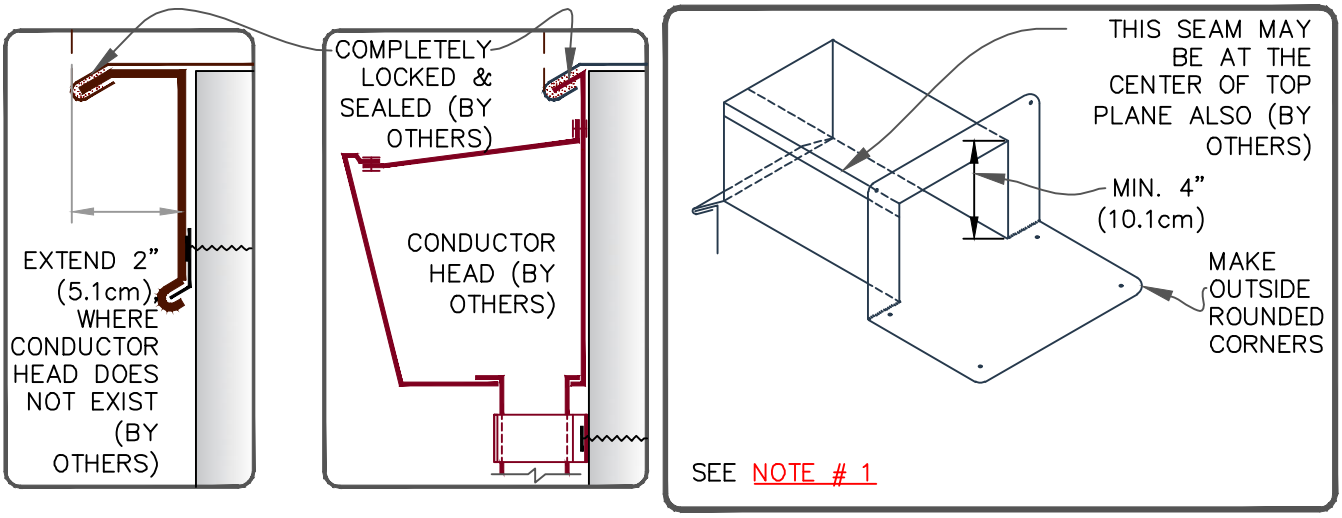
TPO

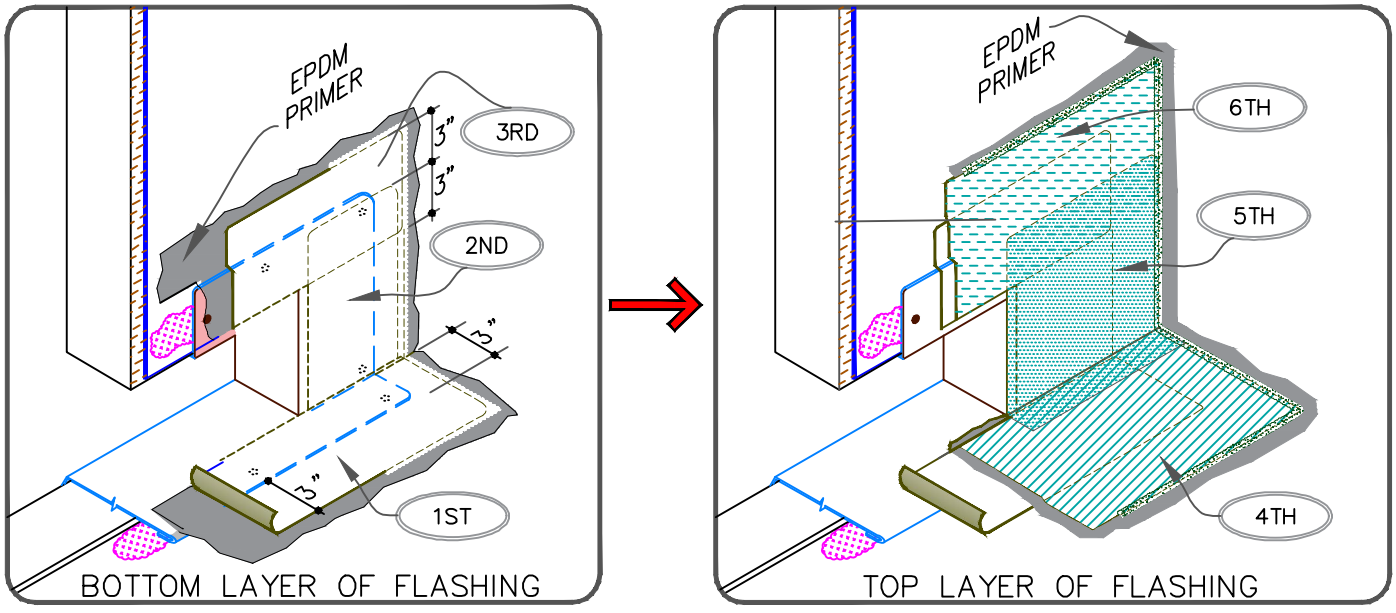
DETAIL NO. U-18CT

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TPO WITH EPDM FLASHING





CARLISLE SYNTEC SYSTEMS	SCUPPER WITH EPDM FLASHING, PAGE 2 OF 2	TPO DETAIL NO. U–18CT U (Universal Detail)

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Specification
ATTACHMENT

Sure-Weld TPO (16’ Wide) Mechanically Fastened Roofing Systems Utilizing Standard Mechanical Fasteners and Induction Welding (RhinoBond / Isoweld) Attachment Method

“Attachment III”

July 2026

This is an alternate method for securing the Carlisle’s **Sure-Weld (TPO) (16’ wide) membrane ONLY** and is intended to be used in conjunction with the Carlisle’s Sure-Weld TPO Mechanically Fastened Specification and Details.

A. **Description**

The Sure-Weld TPO (16’ wide) Mechanically Fastened Roofing System specifically enables the use of a mechanically fastened method of attachment while utilizing the larger 16’ wide, white, tan or gray in 45, 60 or 80-mil thick polyester-reinforced, Sure-Weld Thermoplastic Polyolefin (TPO) membrane field sheets. When using 16’ wide field sheets, HP-X Fasteners and RhinoBond Plates in the seam area will be utilized, in addition to utilizing induction welded plates at the halfway point between all 16’ seams (i.e. 8’). Mechanically fastened 16’ wide TPO is limited to a 30-year warranty and a wind speed up to 90mph. See charts below for additional enhancements.

NOTE: This is a mechanically fastened system. All warranty restrictions not mentioned in this attachment should follow the traditional mechanically fastened system.

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO coating. The RhinoBond or Isoweld Plates are installed with HP-X Fasteners to secure an acceptable insulation to minimum 22-gauge steel deck, minimum 15/32" thick plywood or wood plank.

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

NOTE: The Sure-Weld TPO (16’ wide) Mechanically Fastened 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.

Table I

Sure-Weld TPO (16' Wide) Mechanically Fastened Roofing System Utilizing Standard Mechanical Fasteners and Induction Welding (RhinoBond / Isoweld) Attachment Method Warranty Options

Years	Sure-Weld TPO (16' wide) Membranes ONLY		
	Warranty Wind Speed 55, 72, 80, or 90mph	Minimum Membrane Thickness (1)	Additional Puncture Coverage (4)
5,10, or 15 year	√ (2)	Sure-Weld 45-mil	Not Available
20 year	√ (2)	Sure-Weld 60-mil	Not Available
25 or 30 year	√ (2)	Sure-Weld 80-mil	Available

Notes: √= Acceptable

(1) All "T-Joints" must be overlaid with appropriate flashing material when using 60- or 80-mil TPO.
(2) Perimeter calculation is .4 x height of building. The minimum perimeter width is 8-feet up to a 20-year warranty and 16-feet for 25- or 30-year warranty.
(3) Perimeter enhancements required for wind speed coverage greater than 72mph and/or projects over 50' in height. Contact Carlisle for requirements.
(4) Carlisle's Accidental Puncture Warranty covers labor hours and material used during the repair. Maximum labor and material hours are dependent upon system design. Refer to the Warranty Availability Quick Reference Guide for coverage.

TPO (16’ Wide) Membrane Fastening Criteria (All Warranties)
Utilizing Standard Mechanical Fasteners and Induction Welding (RhinoBond / Isoweld)
Attachment Method
Table II **22 GA. Steel Deck or Structural Concrete Only**

Caution: For 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			Membrane Width (1)	Field Membrane Width (2)	Perimeter Sheet Width (2)	Seam or Row Fastening Density	
		Building Distance from Coastline							
		Greater than 7 miles	3 to 7 miles	Less than 3 miles				Membrane (Mech. Fast. Plates & Fasteners)	Field & Perimeter (Induction Welding) (3)(4)
55 MPH	Up to 60'	1	2	3	16’	8'	4'	12" O.C.	12" O.C.
	61' to 100'	2	2	3	16’	8'	4'	12" O.C.	12" O.C.
72 MPH	Up to 60'	2	2	3	16’	8'	4'	12" O.C.	12" O.C.
	61' to 100'	3	4	4	16’	8'	4'	12" O.C.	12" O.C.
80 MPH	Up to 60'	3	3	4	16’	8'	4'	12" O.C.	12" O.C.
	61' to 100'	3	4	4	16’	8'	4'	12" O.C.	12" O.C.
90 MPH	Up to 60'	3	4	4	16’	8'	4'	12" O.C.	12" O.C.
	61' to 100'	4	5	5	16’	8'	4'	12" O.C.	12" O.C.

(1) Using HP-X™ Fasteners for steel decks and HD 14-10 or CD-10 Fasteners for structural concrete decks.

(2) Using HP-X™ Fasteners and 3" diameter (RhinoBond or Isoweld) plates for steel decks and HD 14-10 or CD-10 Fasteners and 3" diameter (RhinoBond or Isoweld) plates for structural concrete decks.

(3) FM 1-120 requires 6” O.C. fastening density.

(4) When utilizing 16' Sure-Weld TPO, 4' or 6' perimeter sheets may be used in applications where only 1 perimeter sheet is used.

Table III

TPO (16' Wide) Membrane Fastening Criteria
(Up to 20 Year Warranty – Up to 60' Building Height)
Utilizing Standard Mechanical Fasteners and Induction Welding (RhinoBond / Isoweld) Attachment Method
Wood (Plywood or OSB) Decks

Wood (Plywood or OSB) Decks **Peak Gust Wind Speed Warranty**	**Deck Type**	**Projected Pull-Out Values**	**Min. Number of Perimeter Sheets**			**Membrane Width**	**Field Membrane Width**	**Perimeter Sheet Width**	**Seam or Row Fastening Density**	
			Building Distance from Coastline						**Membrane (Mech. Fast. Plates & Fasteners)**	**Field & Perimeter (Induction Welding)**
			Greater than 7 miles	**3 to 7 miles**	**Less than 3 miles**					
55 MPH	15/32" 3-Ply Plywood; 7/16" OSB	240 lbs	2	2	3	16'	8'	4'*	12" O.C.	12" O.C.
	15/32" 5-Ply Plywood; OSB	530 lbs	2	2	3	16'	8'	4'*	12" O.C.	12" O.C.
72 MPH	15/32" 3-Ply Plywood; OSB	240 lbs	2	3	3	16'	8'	4'*	12" O.C.	12" O.C.
	15/32" 5-Ply Plywood; OSB	530 lbs	2	3	3	16'	8'	4'*	12" O.C.	12" O.C.
80 MPH	*Contact Carlisle for Approval and Evaluation*									

*Maximum duration for OSB NOT to exceed 20 Years.

B. **Products/Heat Welding Equipment**

Products, including fasteners and plates, listed in "Part II" of the Carlisle TPO Mechanically Fastened Roofing System Specification can be used as part of this alternate securement method in conjunction with the RhinoBond or Isoweld Welding Plates, listed below:

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

2. **RhinoBond or Isoweld Induction Welding Tool**: An induction heating tool is used to emit the magnetic field that activates the hot melt coating on the top surface of the RhinoBond or Isoweld Welding Plate to fuse with the roofing membrane. Refer to RhinoBond or Isoweld Owner's Manual for additional information.

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

C. **Products/Mechanical Fastening**

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

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

5. **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.

6. **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.

D. **Insulation Attachment**

Prior to proceeding with insulation securement, refer to Warranty Tables, Part 1, Paragraph 1.05 of the Carlisle TPO Mechanically Fastened Roofing System Specification, for attachment method and appropriate fastening density required for the specific Carlisle Warranty.

Insulation Fastening Criteria

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

Notes: N/A = Not Applicable

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

(3) For wood planks only, fastener penetration shall not exceed 1-1/2".
(4) Most 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.

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

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

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

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

2. **Carlisle Fasteners and Fastening Plates are required for insulation securement**. Refer to Insulation Fastening Criteria Table in Part 2 – Products, Paragraph 2.05, for appropriate fastener and deck penetration. The fastener can be used with either a 2" diameter Seam Fastening Plate or 2-3/8" diameter Pirahna/Pirahna Xtra Plates OR 3" diameter Insulation Fastening plate.

3. **Any Carlisle approved insulation or cover board** shall be mechanically fastened to the roof deck at the minimum rate of **1.25 fasteners and plates per every 8 square feet** (5 fasteners in a 4 x 8 board) for minimum 1-1/2" thick insulation and coverboards. Insulation less than 1-1/2" thick requires the use of 8 fasteners and plates in a 4' x 8' board (1 per 4 square feet).

    CAUTION: Carlisle Polyisocyanurate Insulation with a thickness less than 1.5" installed over an existing roofing membrane without a tear-off must be mechanically fastened to the roof deck with a minimum of **1 fastener and plate for every 4 square feet** or less of insulation.

4. Use of DensDeck, DensDeck Prime, Dens Deck StormX Prime, DensDeck ProFast Prime, Securock Weather Defense and DEXcell should be limited to assemblies with slopes greater than 2” per foot to ensure compliance with external fire codes.

E. **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 or the induction welding attachment additional information.

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

2. Place membrane over the RhinoBond Plates.

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

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

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

6. After allowing the membrane and plates to cool to ambient temperature, remove Cooling Clamp and use a pliers by apply force to peel RhinoBond Plate from underside of membrane to determine bonding strength. The 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.

F. **Membrane Placement**

Maximum 16’ wide Sure-Weld TPO mechanically fastened to an approved insulation or substrate.

1. Position Sure-Weld membrane over the acceptable substrate. Ensure that the proper number of perimeter sheets are positioned along the perimeter of the roof as outlined in Warranty Table above.

2. Position field sheets perpendicular to the steel deck flutes.

G. **Membrane Installation**

Caution: To avoid false welds and ensure adequate membrane attachment to the plates, induction tool calibration and test welds (along with the proper positioning of the induction welder over the plate and placement of the magnet) must be performed prior to the start of work each day. All test welds must be completed using the exact components of the assembly to be installed.

1. Lay out 16’ Sure Weld TPO sheets into position. Barndoor the TPO sheet to install rows of induction welded plates exactly hallway between the 16’ sheet utilizing HPX fasteners.

2. 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".

3. Secure the mechanically fastened seam with the appropriate Carlisle Plate and fastener at the fastening density shown in Table 1-3.

4. Place Sure-Weld membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.

5. Place RhinoBond Induction Tool over the RhinoBond TPO Welding Plate, under the roofing membrane OR Place the

Isoweld Induction Tool over the Isoweld TPO Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

6. Activate induction welding tool and leave in place until heating cycle is complete.

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

8. 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.

9. Resume process ensuring membrane is attached to all induction welded plates and all seams are completed to Carlisle MF-2 Details.

H. **Perimeter Sheets**

1. 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 1-3. The roof perimeter is defined as all edges of each roof section (i.e., parapets, building expansion joints at adjoining walls, penthouse walls, etc.). When multi-level roofs meet at a common wall, the adjacent edge of the upper roof is treated as a roof perimeter if the difference in height is greater than 10'. Perimeter sheets are not required at the base of the wall at the lower level.

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

2. For Sure-Weld membranes, perimeter sheets can be formed by using individual 4’ wide sheets or by subdividing 16’ wide field sheet using induction welded plates as described below.

3. **Individual perimeter sheets** (TPO – 4’ or 6’ wide):

   a. 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.

4. Perimeter sheets using Induction Welded plates:

   a. When 16-foot TPO field sheets are positioned at the perimeter of the roof, induction welded plates must be installed to ensure there is no area greater than 6 feet. If utilizing 16-foot TPO at the perimeter of the roof, measure in 4 or 6 feet from the roof’s edge, install induction welded plates, position the TPO sheet over the plates creating the 4- or 6-foot perimeter sheet.

I. **Membrane Hot Air Welding Procedures & Additional Securement**

1. Adjoin membrane sheets by overlapping and heat welding the seam following standard Hot Air Welding Procedures as outlined in the “Part III” of the Sure-Weld TPO Mechanically Fastened Roofing System Specification.

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

J. **Associated Installation Details**

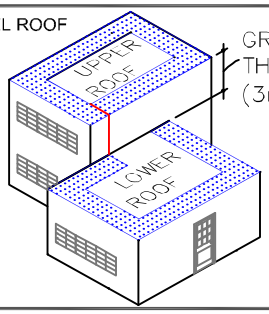
Hybrid Membrane Securement
Traditional and Induction Weld Mechanical Fasteners – Perimeter Sheet Securement.....MFIW-2A
Traditional and Induction Weld Mechanical Fasteners – Perimeter Sheet Securement.....MFIW-2B
Traditional and Induction Weld Mechanical Fasteners – Field Sheet Securement.....MFIW-2C

End of Section

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

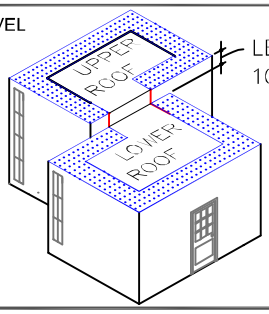
PERIMETER ZONES

SAME LEVEL ROOF



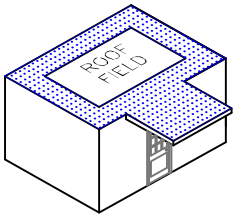
GREATER THAN 10 FT (3m)

SPLIT LEVEL ROOFS



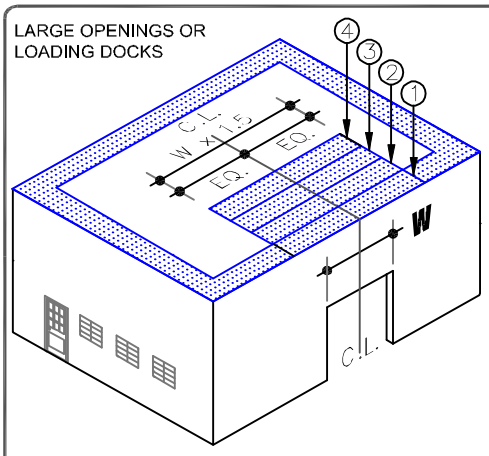
LESS THAN 10 FT (3m)

CANOPY ROOF



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

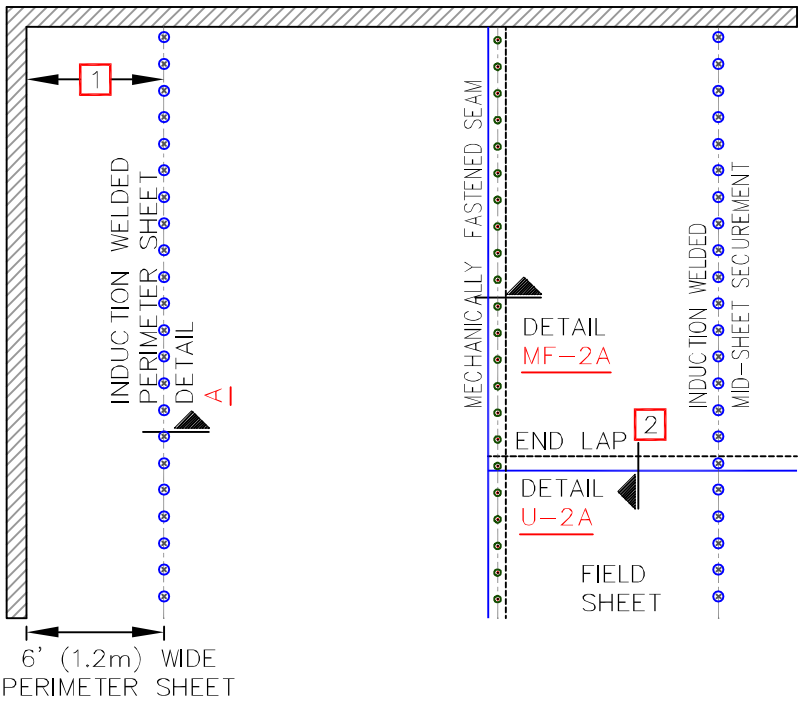
LARGE OPENINGS OR LOADING DOCKS

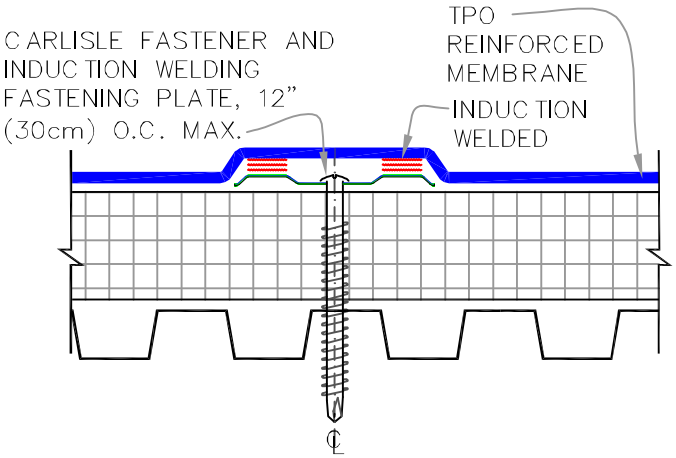


4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

CAUTION! HYBRID MECHANICALLY–FASTENED & INDUCTION WELD FASTENING SCHEME SHOWN BELOW IS ONLY INTENDED FOR USE ON 16' WIDTH TPO MEMBRANE ROLL ROOFING SYSTEMS.

PERIMETER SHEET SECUREMENT – 1 PERIMETER SHEET





Ⓐ INDUCTION WELD SECUREMENT

NOTE:

1. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH, AND MEMBRANE FASTENING SPACING.
2. END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (5cm) MINIMUM. SEE DETAIL U–2A

HYBRID INDUCTION WELD/MECHANICALLY-FASTENED ASSEMBLY - 16' WIDTH TPO ROLLS ONLY

CARLISLE SYNTEC SYSTEMS

TRADITIONAL AND INDUCTION WELD MECHANICAL FASTENERS – PERIMETER SHEET SECUREMENT

MAXIMUM WARRANTY: 20 YEARS

TPO

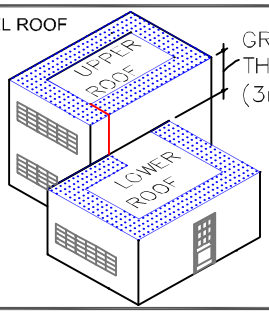
DETAIL NO. MFIW–2A

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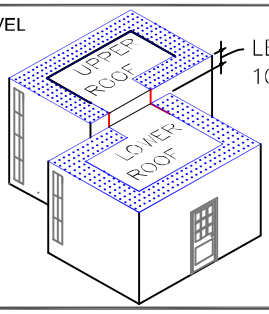
GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

PERIMETER ZONES

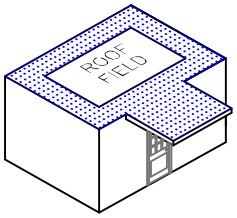
SAME LEVEL ROOF



SPLIT LEVEL ROOFS

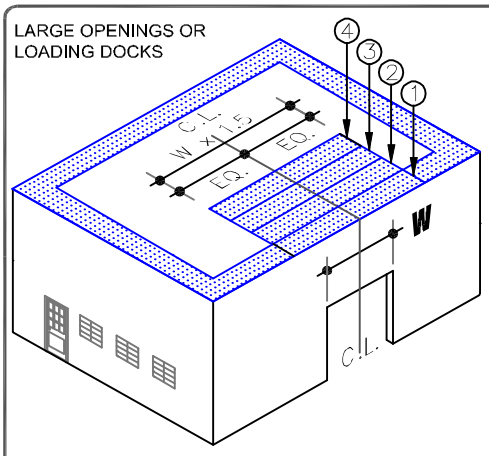


CANOPY ROOF



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

LARGE OPENINGS OR LOADING DOCKS

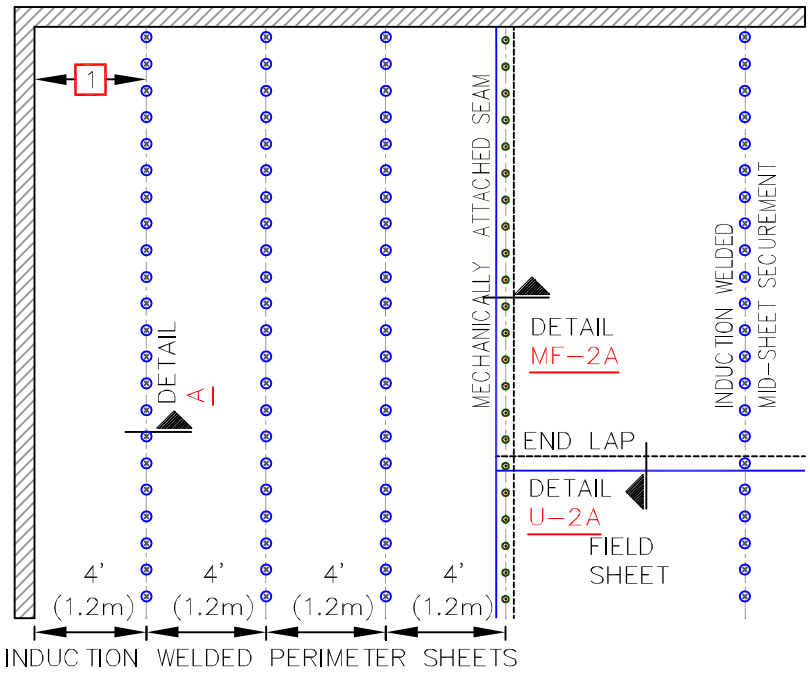


4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

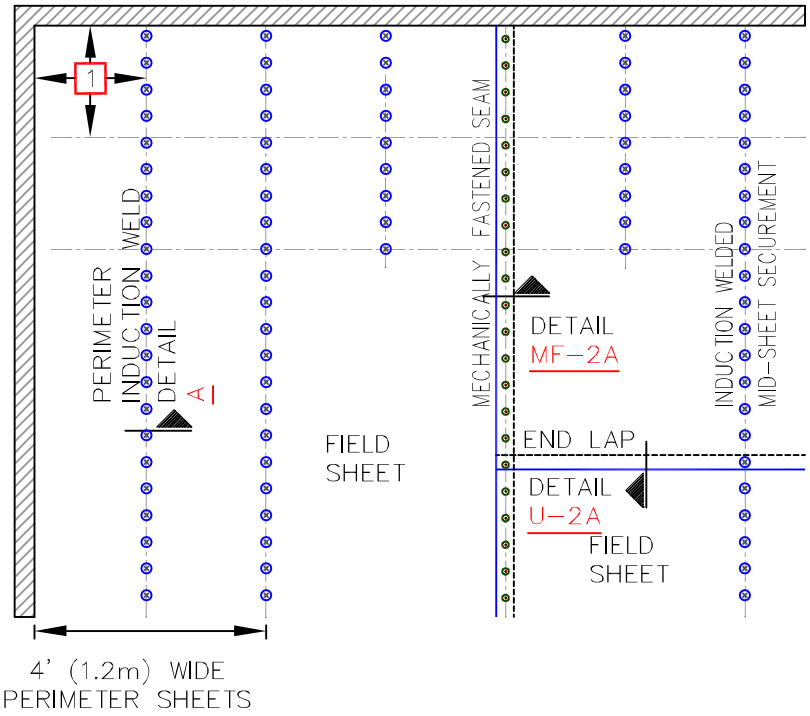
CAUTION

HYBRID MECHANICALLY–ATTACHED & INDUCTION WELD FASTENING SCHEME SHOWN BELOW IS ONLY INTENDED FOR USE ON 16' WIDTH TPO MEMBRANE ROLL ROOFING SYSTEMS.

PERIMETER SHEET SECUREMENT – 4 PERIMETER SHEETS



PERIMETER SHEET SECUREMENT – FINGER METHOD



HYBRID INDUCTION WELD/MECHANICALLY-FASTENED ASSEMBLY - 16' WIDTH TPO ROLLS ONLY

CARLISLE SYNTEC SYSTEMS

TRADITIONAL AND INDUCTION WELD MECHANICAL FASTENERS – PERIMETER SHEET SECUREMENT

MAXIMUM WARRANTY: 20 YEARS

TPO

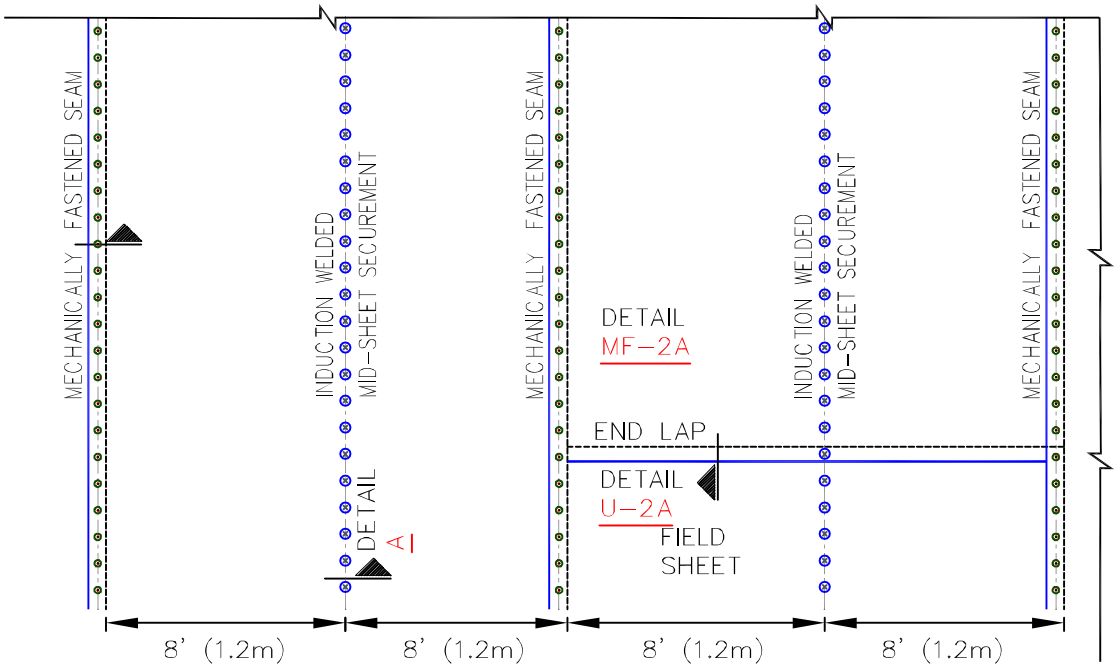
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CAUTION

HYBRID MECHANICALLY–FASTENED & INDUCTION WELD FASTENING SCHEME SHOWN BELOW IS ONLY INTENDED FOR USE ON 16' WIDTH TPO MEMBRANE ROLL ROOFING SYSTEMS.

FIELD SHEET SECUREMENT



NOTE:

1. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH, AND MEMBRANE FASTENING SPACING.

2. END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (5cm) MINIMUM. SEE DETAIL U–2A

HYBRID INDUCTION WELD/MECHANICALLY-FASTENED ASSEMBLY - 16' WIDTH TPO ROLLS ONLY

CARLISLE SYNTEC SYSTEMS

TRADITIONAL AND INDUCTION WELD MECHANICAL FASTENERS – FIELD SHEET SECUREMENT

MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO. MFIW–2C

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Sure-Weld® TPO
Roofing Systems

Sure-Weld®
Mechanically Fastened and Adhered Roofing Systems

Installation Details

TABLE OF CONTENTS
July 2026

Mechanically Fastened — **Detail**

Membrane Securement MF-2
Membrane Securement with RUSS MF-2.1
Mechanically Fastened Seam (Page 1 of 2) MF-2A
Mechanically Fastened Seam (Page 2 of 2) MF-2A
Ridge Membrane Attachment MF-22

Metal Edges and Gravel Stops

Drip Edge Fascia with TPO Flashing U-1A
SecurWeld Coated Drip Edge Fascia U-1B
Metal Bar Edge Termination U-1C
Carlisle SecurEdge Snap-on Canted Fascia U-1D
Carlisle SecurEdge EX Snap-on Fascia & SecurEdge Snap-on Fascia U-1F

Membrane Splices

Membrane Splice U-2A
Self-Adhering TPO Membrane Splice U-2B

Expansion Joints

Deck-to-Deck Roof Expansion Joint - 3/4” to Up to 3” **(30 Year Warranty)** U-3A
Deck-to-Deck Roof Expansion Joint - Greater than 3” **(30 Year Warranty)** U-3A.1
Deck-to-Deck Curbed Roof Expansion Joint - 3/4” to Up to 3” **(30 Year Warranty)** U-3B
Deck-to-Deck Curbed Roof Expansion Joint - Greater than 3” **(30 Year Warranty)** U-3B.1
Deck-to-Wall Expansion Joint - 3/4” to Up to 2” **(30 Year Warranty)** U-3C
Deck-to-Wall Expansion Joint - Greater than 2” **(30 Year Warranty)** U-3C.1

Curb Flashing

Curb Flashing with TPO Membrane U-5A
Curb Flashing with TPO Coated Metal U-5B
Curb Flashing with CFA TPO Curb Wrap Corners U-5C
Self-Flashing Curb with CFA TPO Curb Wrap Corners U-5D

Drains

Roof Drain: Sump Slope Less than 3 inches to One Horizontal Foot U-6A
Roof Drain: Sump Slope Greater than 3 inches to One Horizontal Foot (Option 1) U-6B
Roof Drain: Sump Slope Greater than 3 inches to One Horizontal Foot (Option 2) Page 1 of 2 ..... U-6C
Roof Drain: Sump Slope Greater than 3 inches to One Horizontal Foot) (Option 2) Page 2 of 2 ..... U-6C
Add-On Drain U-6D

Pipe Flashing

Pre-molded Flashing U-8A
Field Fabricated Pipe Flashing U-8B
CFA Certified Pre-Fabricated Square Tube Wrap U-8C
Field Fabricated Square Tube Flashing U-8D
CFA Certified Pre-Fabricated Split Pipe Seal U-8E
CFA Certified Hot Pipe Flashing U-8F

Flexible Penetration U-8G

Terminations
Membrane Terminations, Page 1 of 3 ..... U-9
Membrane Terminations, Page 2 of 3 ..... U-9
Membrane Terminations, Page 3 of 3 ..... U-9

Parapet Flashing
Parapet Base Flashing Fastened Into Deck or Wall U-12A
Parapet Flashing with Pressure-Sensitive RUSS, Page 1 of 2 ..... U-12B
Parapet Flashing with Pressure-Sensitive RUSS, Page 2 of 2 ..... U-12B.1
TPO Coated Metal Wall Flashing U-12C
Parapet Flashing / No Adhesion – Any Height Option U-12F
TPO SAT Parapet Flashing with TPO RUSS U-12G
TPO SAT Parapet Flashing with Reinforced TPO SAT Membrane U-12H

Tie-Ins
TPO Tie-In To Built-Up Roofing Over Steel Roof Deck U-13A
TPO Tie-In To Built-Up Roofing Over Concrete Roof Deck U-13B
TPO Tie-In To Existing Single-Ply Roof with Curb U-13C
TPO Tie-In to Existing EPDM/TPO Membrane on Steel Deck U-13D
EPDM/TPO Tie-In on Concrete Deck U-13E
TPO Tie-In to Shingled or Metal Panel Roof U-13F

Inside / Outside Corners
Pre-Molded Inside Corner Flashing U-15A
Field Fabricated Inside Corner Flashing U-15B
Inside Corner with TPO Coated Metal Wall Flashing U-15C
Pre-Molded Outside Corner Flashing U-15D
Field Fabricated Outside Corner Flashing U-15E
Outside Corner with TPO Coated Metal Wall Flashing U-15F
TPO Universal Corners – Combination Inside & Outside Corner U-15G

Sealant Pocket
Molded Sealant Pocket U-16A
Field Fabricated TPO Coated Metal Pocket U-16C

Through-Wall Scupper
Prefabricated Scupper with Coated Metal U-18A
Scupper with EPDM Flashing, Page 1 of 2 ..... U-18CT
Scupper with EPDM Flashing, Page 2 of 2 ..... U-18CT

Lightning Rods
Lightning Rod at Parapet (Vertical Attachment) U-20A
Lightning Rod at Deck Level U-20B

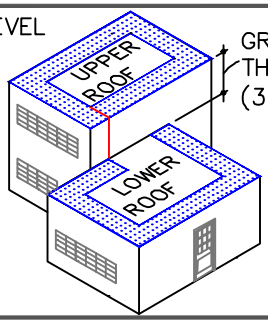
Sleeper
Sleeper U-24

Accessories
Sure-Weld TPO Rib: Typical Profile U-25A
Sure-Weld TPO Rib: Various Applications U-25B
Sure-Weld TPO Rib: Example of Dome with Ribs Aligned Over Membrane Seams U-25C

GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

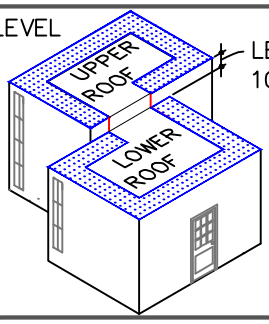
PERIMETER ZONES

SAME LEVEL ROOF



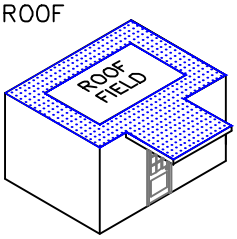
GREATER THAN 10 FT (3m)

SPLIT LEVEL ROOFS



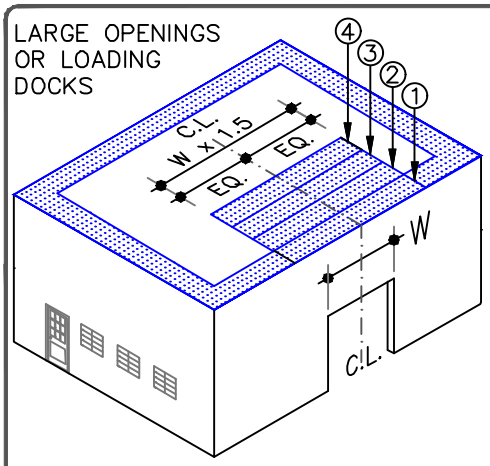
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CANOPY ROOF

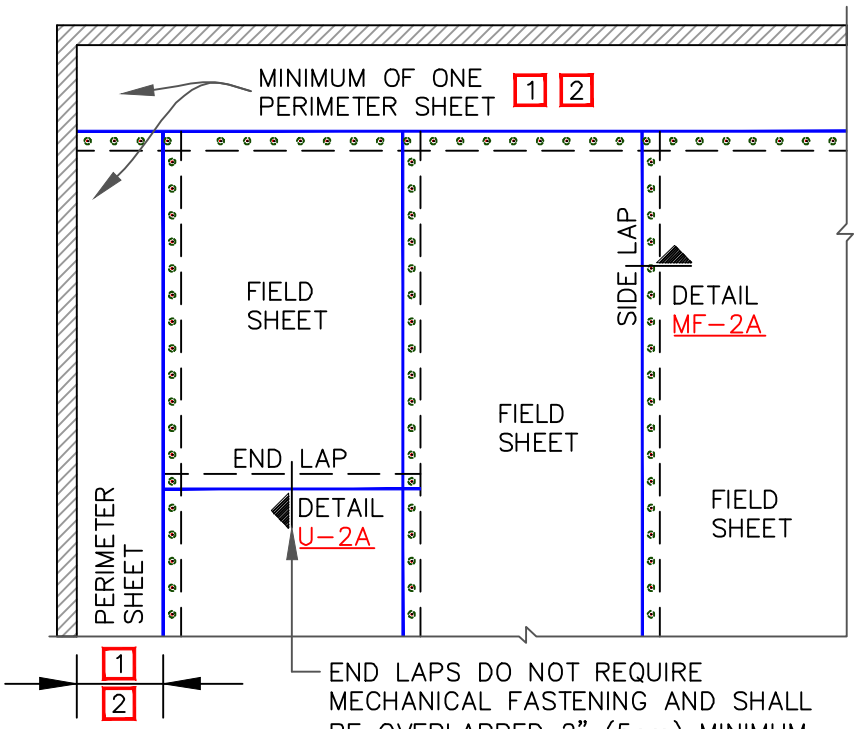


INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG (PROJECTION ROOF) AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS



NOTES:

1. PERIMETER SHEETS:

   1.1. WHEN USING 10' (3m) OR 12' (3.7m) WIDE FIELD SHEETS, 6' (1.8m) WIDE PERIMETER SHEETS ARE UTILIZED.

   1.2. WHEN USING 8' (2.4m) WIDE FIELD SHEETS, 4' (1.2m) WIDE PERIMETER SHEETS ARE UTILIZED.

2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.

CARLISLE SYNTEC SYSTEMS

MEMBRANE SECUREMENT

MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO.

MF-2

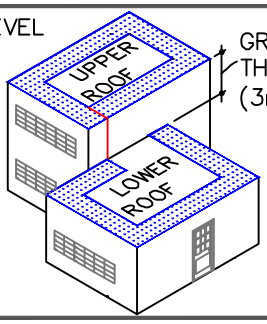
MF (Mechanically Fastened) Detail

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GUIDELINES FOR ROOF PERIMETER ZONES FOR MECHANICALLY ATTACHED ROOF SYSTEM

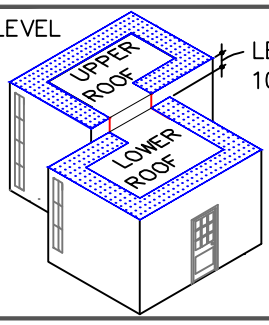
PERIMETER ZONES

SAME LEVEL ROOF



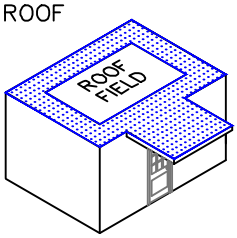
GREATER THAN 10 FT (3m)

SPLIT LEVEL ROOFS



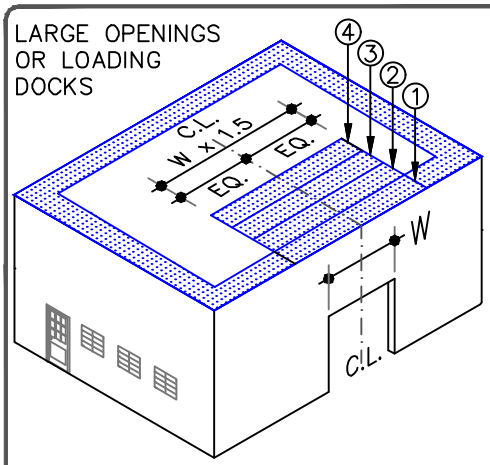
LESS THAN 10 FT (3m)

CANOPY ROOF



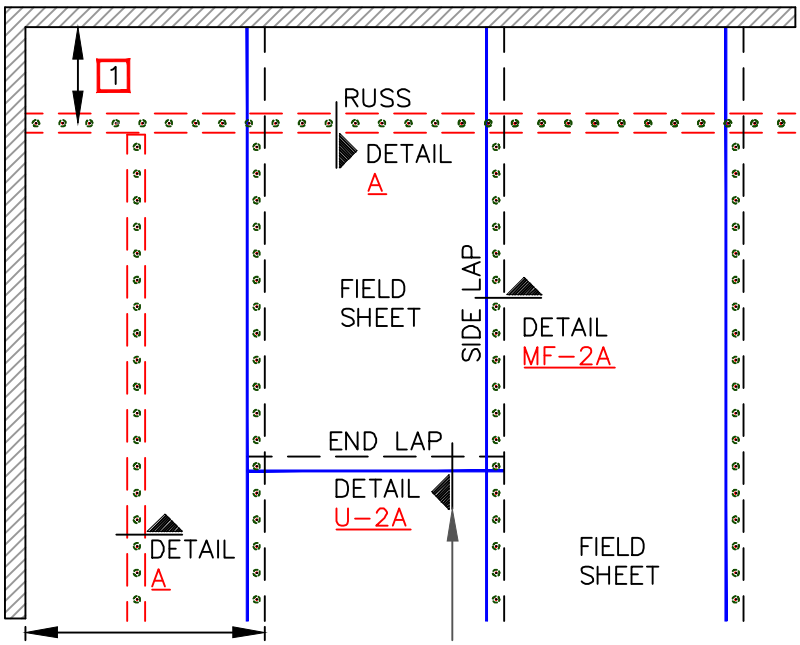
INSTALL PERIMETER SHEETS OVER THE ENTIRE OVERHANG (PROJECTION ROOF) AREA, EXTENDING ONTO THE MAIN ROOF DECK WHEN AT THE SAME LEVEL AS SHOWN.

LARGE OPENINGS OR LOADING DOCKS



4 PERIMETER SHEETS CENTERED OVER LARGE OPENINGS

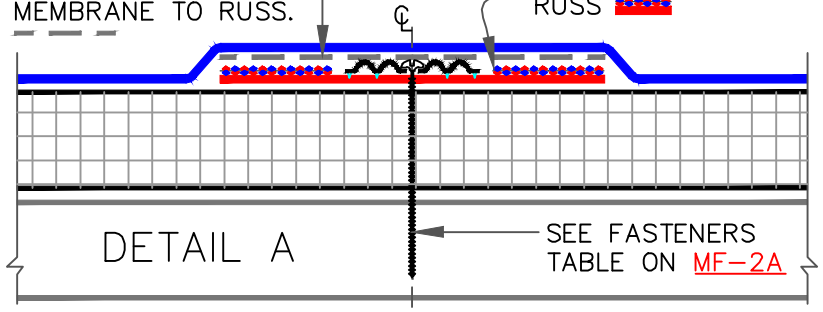
RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)



END LAPS DO NOT REQUIRE MECHANICAL FASTENING AND SHALL BE OVERLAPPED 2" (5cm) MINIMUM. SEE DETAIL U-2A

TPO PRIMER MUST BE APPLIED TO THE BACK SIDE OF MEMBRANE SURFACE PRIOR TO ADHERING MEMBRANE TO RUSS.

10" (25cm) WIDE TPO PRESSURE-SENSITIVE RUSS



NOTES:

1. RUSS SHALL BE POSITIONED 5' (1.5m) TO 6' (1.8m) FROM THE PERIMETER EDGE WHEN USING 10' (3m) OR 12' (3.7m) WIDE FIELD SHEETS. WHEN USING 8' (2.4m) WIDE FIELD SHEETS, RUSS SHALL BE POSITIONED 4' (1.2m) FROM THE PERIMETER EDGE.

2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.

CARLISLE SYNTEC SYSTEMS

MEMBRANE SECUREMENT WITH RUSS

MAXIMUM WARRANTY: 30 YEARS

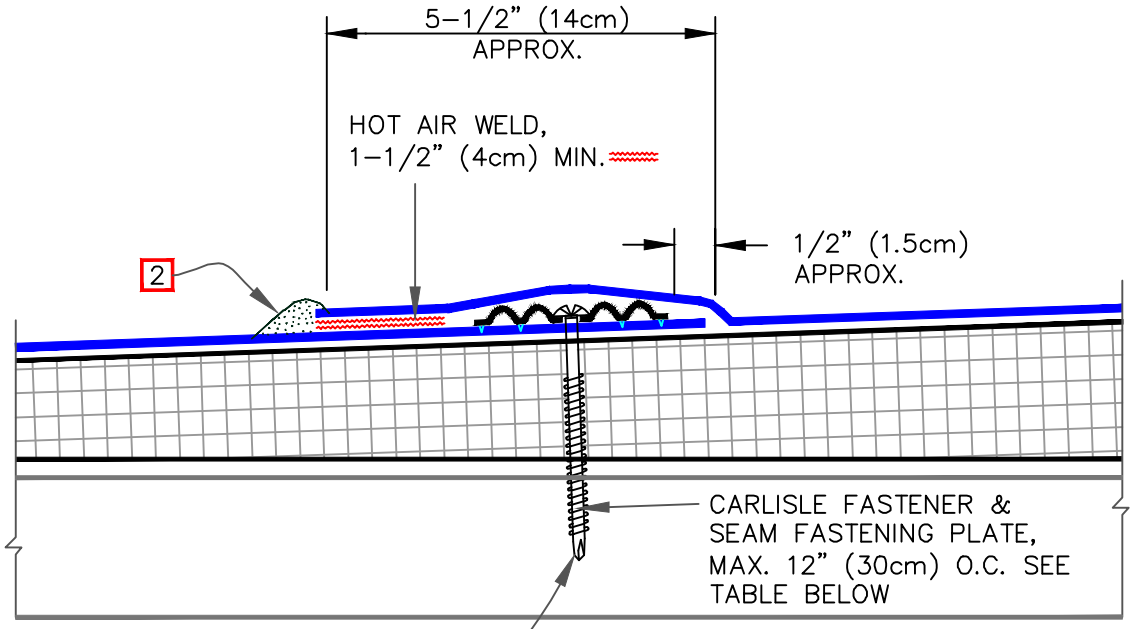
TPO

DETAIL NO.

MF-2.1

MF (Mechanically Fastened) Detail

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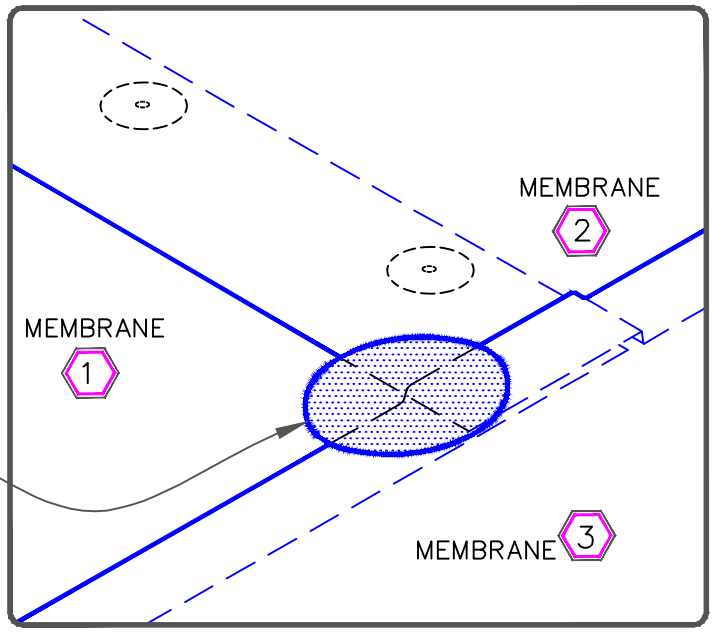
FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

NOTES:

1. POSITION SEAM FASTENING PLATES BEYOND NON–REINFORCED ENCAPSULATED EDGE.
2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

WHEN USING 60 OR 80-MIL (1.52/2.03mm) THICK MEMBRANE
APPLY A 4–1/2" (11.8cm) DIAMETER "T–JOINT" COVER AT FIELD SPLICE INTERSECTIONS, CENTRALLY ALIGNED.



CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM,
PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

TPO

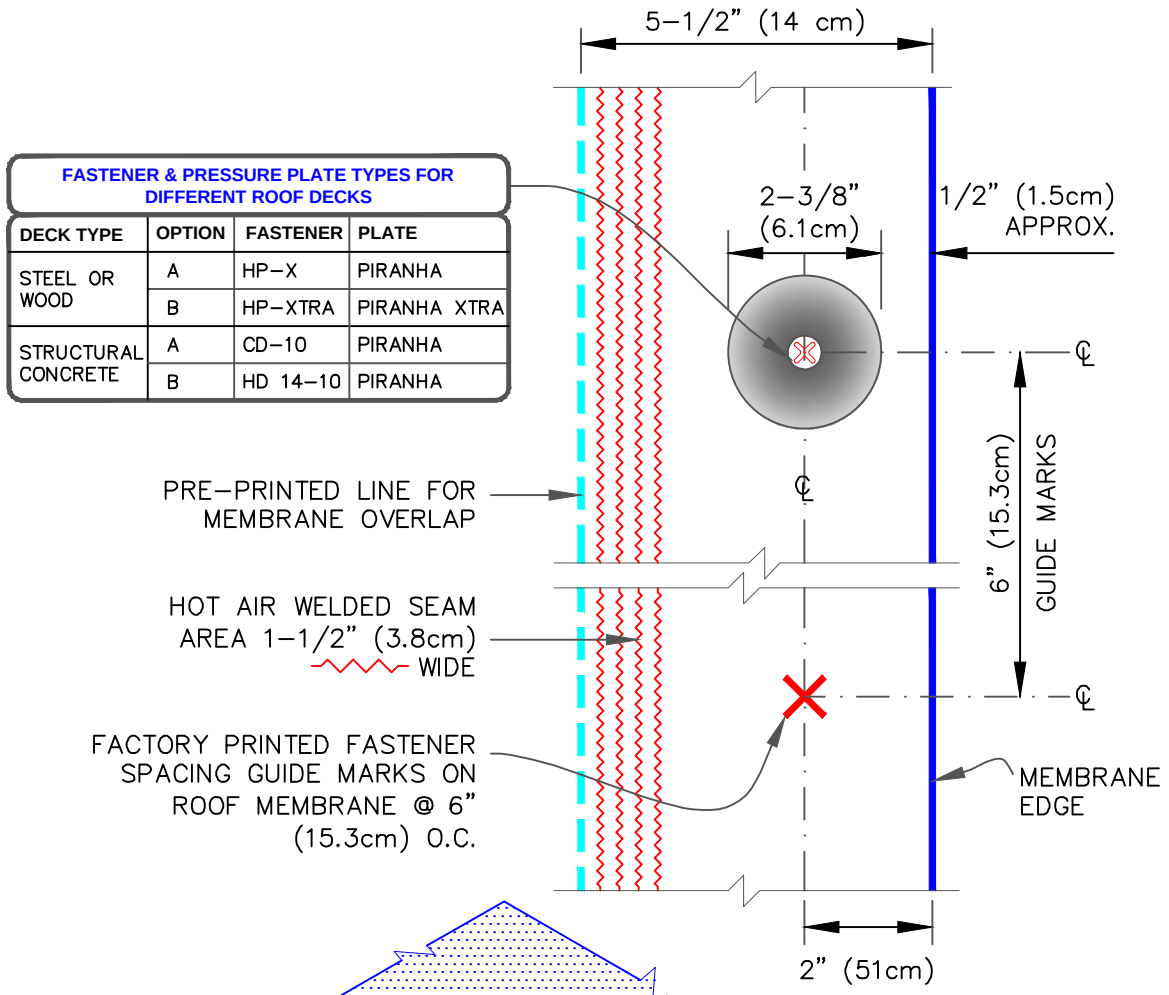
DETAIL NO.
MF–2A

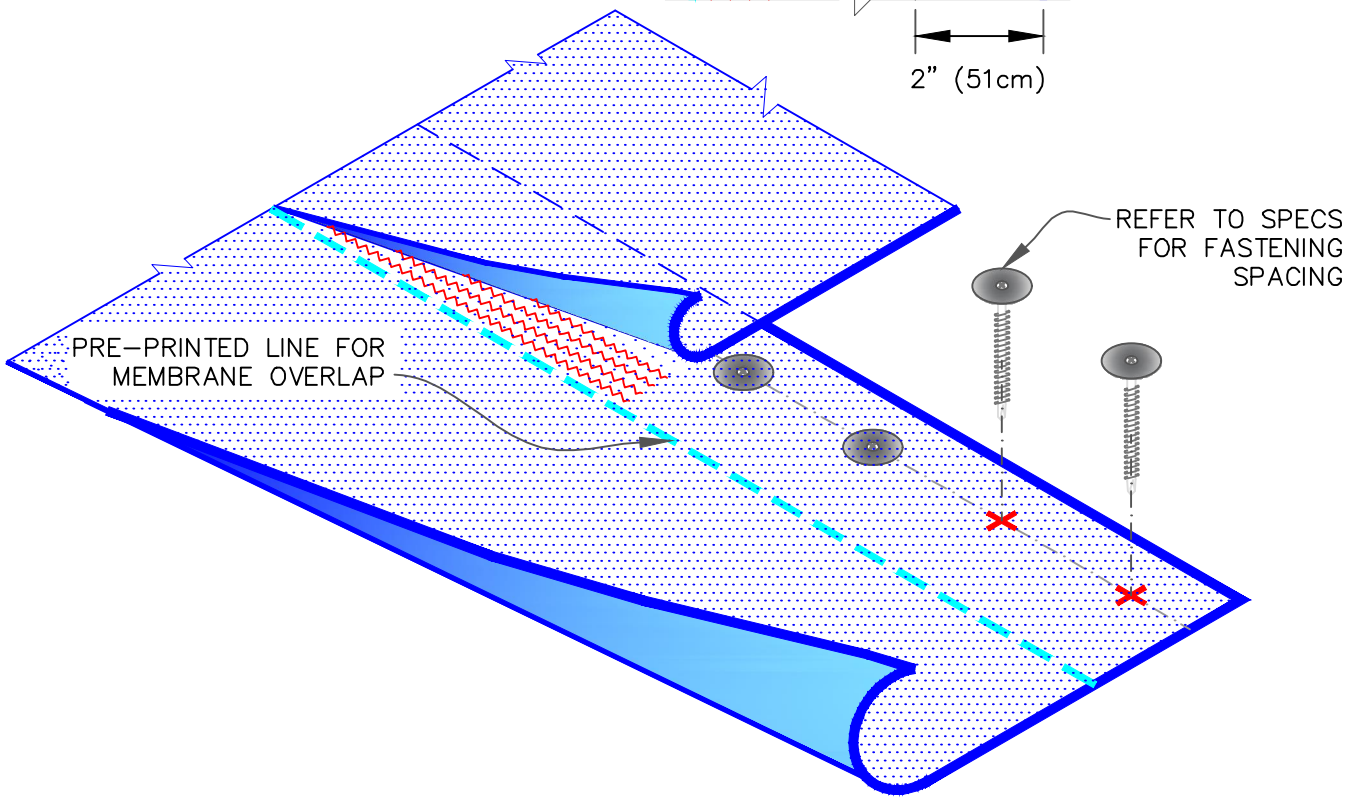
MF (Mechanically Fastened) Detail

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FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA





CARLISLE SYNTEC SYSTEMS

MECHANICALLY FASTENED SEAM, PAGE 2 OF 2

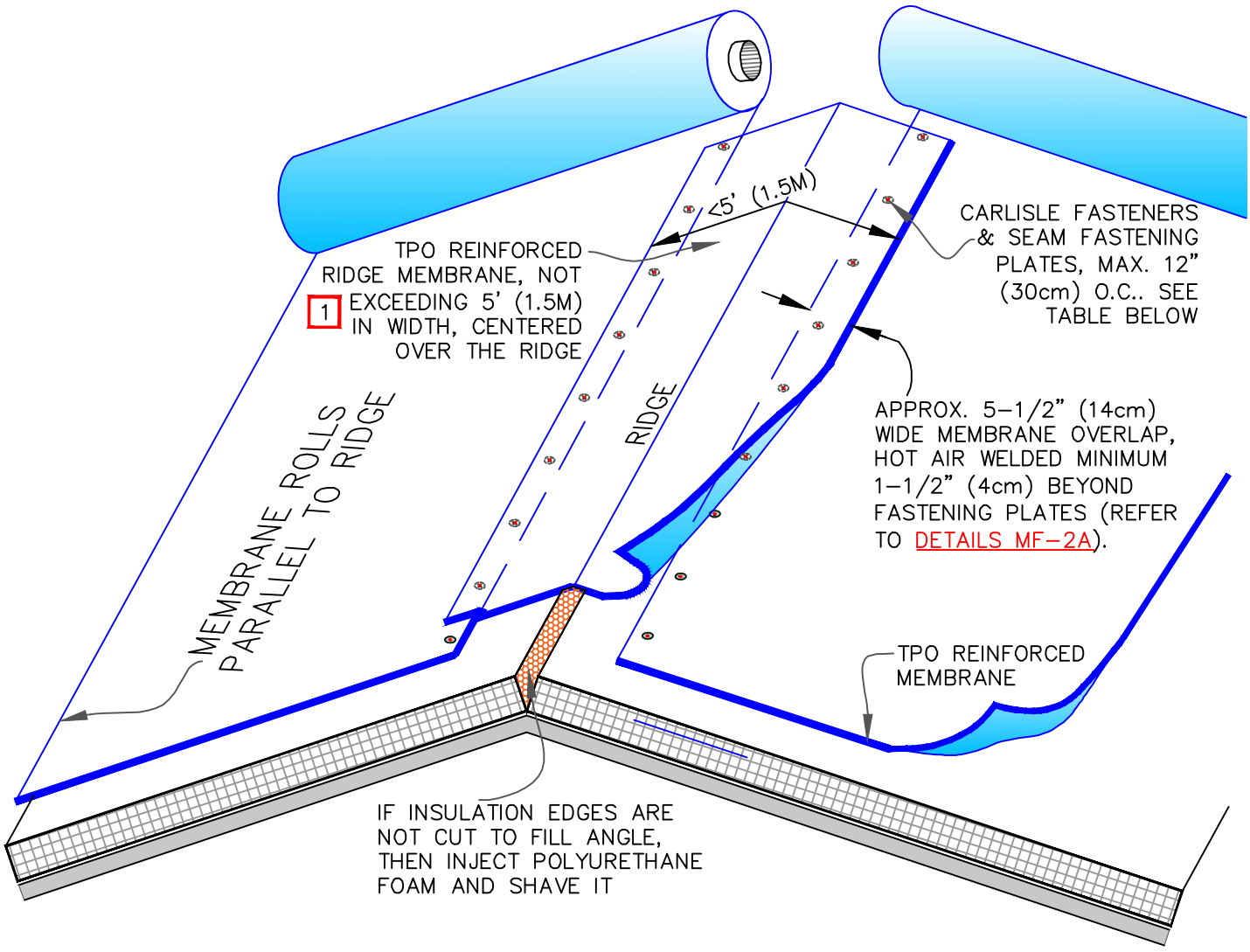
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. MF–2A

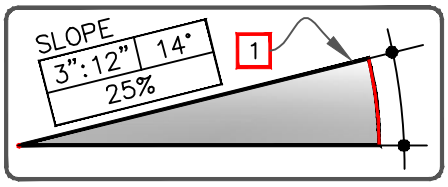
MF (Mechanically Fastened) Detail

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NOTES

1. RIDGE MEMBRANE ATTACHMENT IS ONLY REQUIRED WHEN ROOF SLOPE EXCEEDS 3" TO 12" (7.5cm TO 30.5cm) HORIZONTAL.
2. REFER TO CARLISLE SPECIFICATIONS FOR REQUIRED NUMBER OF PERIMETER SHEETS, SHEET WIDTH AND MEMBRANE FASTENING SPACING.
3. AS AN OPTION TO USING PERIMETER SHEETS, 10" (25cm) WIDE PRESSURE–SENSITIVE RUSS MAY BE USED BENEATH THE TPO FIELD SHEETS ONLY FOR PERIMETER SECUREMENT. SEE DETAIL MF–2.1, DETAIL A.
4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

CARLISLE SYNTEC SYSTEMS

RIDGE MEMBRANE ATTACHMENT

MAXIMUM WARRANTY: 30 YEARS

TPO

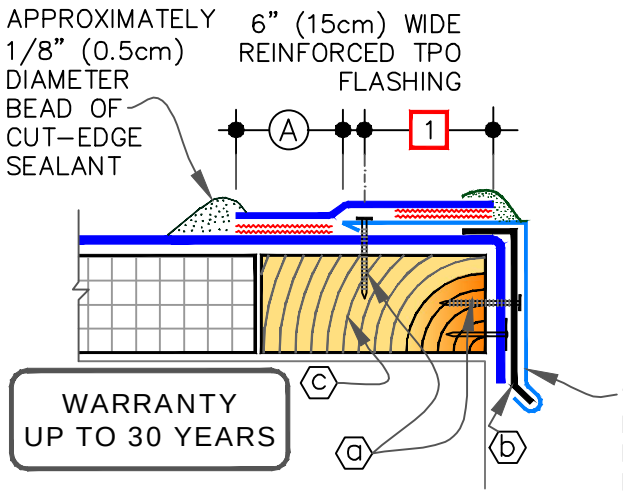
DETAIL NO. MF–22

MF (Mechanically Fastened) Detail

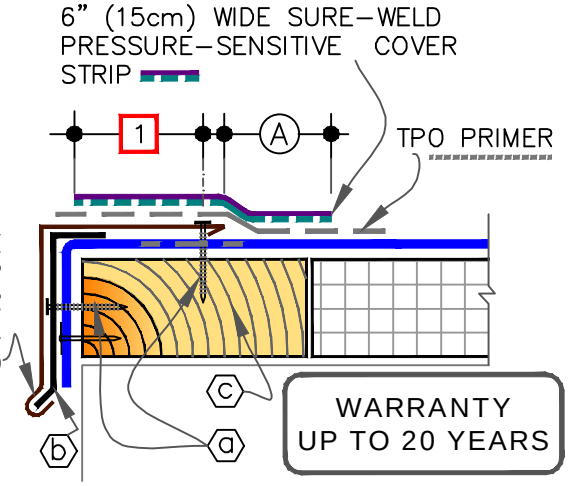
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CAUTIONS

- DETAIL B IS NOT RECOMMENDED FOR ROOFS THAT ARE LIKELY TO EXPERIENCE SIGNIFICANT SNOW AND ICE UP-SLOPE FROM THE GUTTER /EDGE. REFER TO DETAILS U-1B OR U-1C.
- FOR 30-YEAR WARRANTY PROJECTS, SEE ALSO DETAILS U-1B, U-1C, U-1D OR U-1F



A SECURWELD DRIP EDGE FASCIA

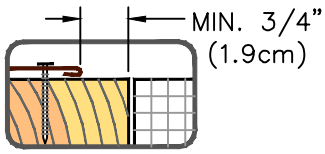


B SecurSeal DRIP EDGE FASCIA

ⓐ M1-1/2" (3.8cm) RING SHANK NAILS 6" (15cm) O.C. MAX.

ⓑ MINIMUM 22-GAUGE CONTINUOUS CLEAT.

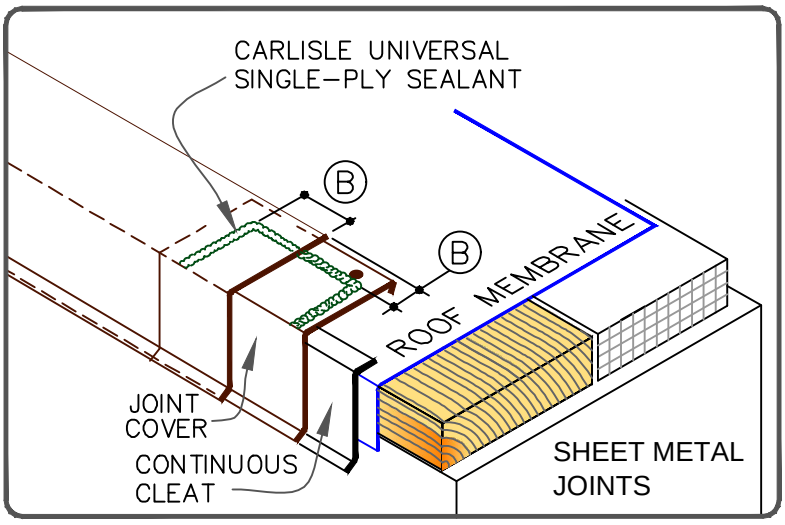
ⓒ WOOD NAILER (BY OTHERS)



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

NOTES:

1. METAL FASCIA DECK FLANGE MUST BE TOTALLY COVERED BY TPO PRESSURE-SENSITIVE COVER STRIP WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEADS.
2. TO REMOVE FINISHING OILS, SCRUB METAL FLANGE WITH WEATHERED MEMBRANE CLEANER; ALLOW TO DRY PRIOR TO APPLYING TPO PRIMER.
3. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.
4. TO ENSURE TPO PRESSURE-SENSITIVE COVER STRIP CONFORMS TO STEP-OFFS, HEAT COVER STRIP AT SPLICE INTERSECTIONS PRIOR TO ROLLING.



CARLISLE SYNTEC SYSTEMS

DRIP EDGE FASCIA WITH TPO FLASHING

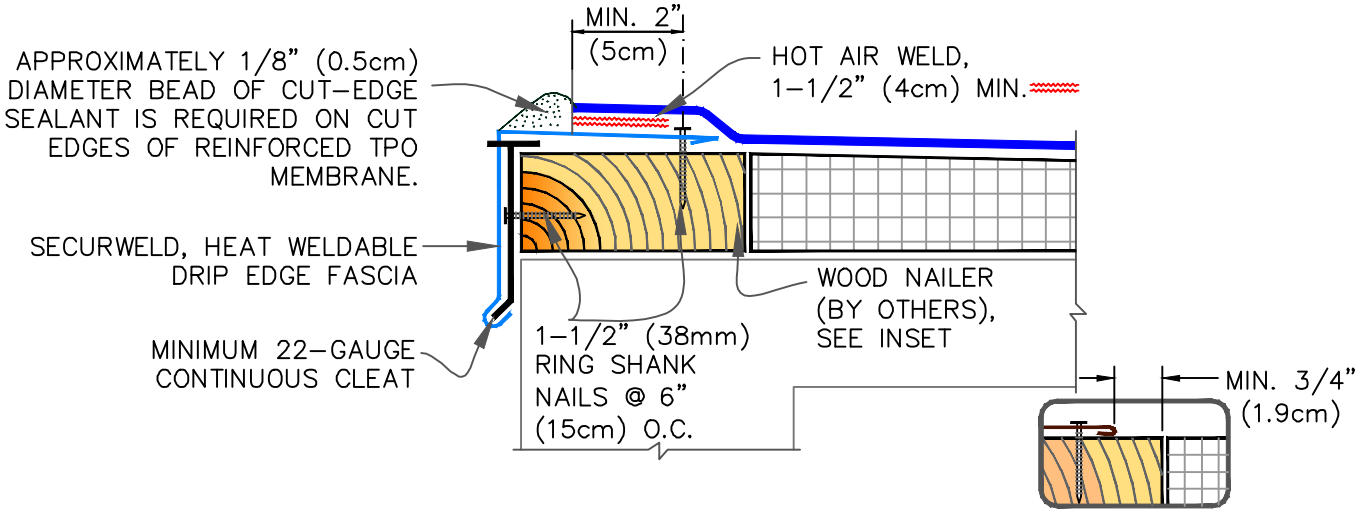
MAXIMUM WARRANTY: SEE EACH DETAIL (SEE CAUTION ON TOP OF PAGE)

TPO

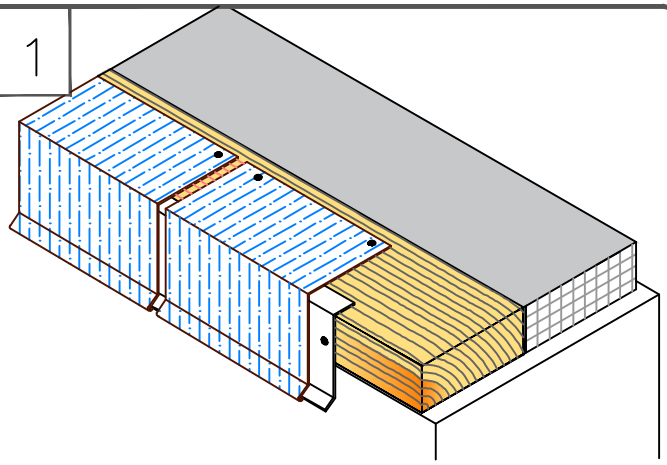
DETAIL NO. U-1A

U (UNIVERSAL DETAILS)

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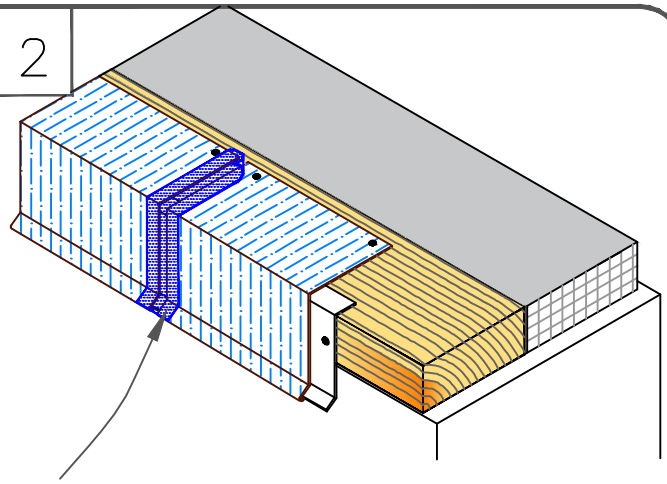


1



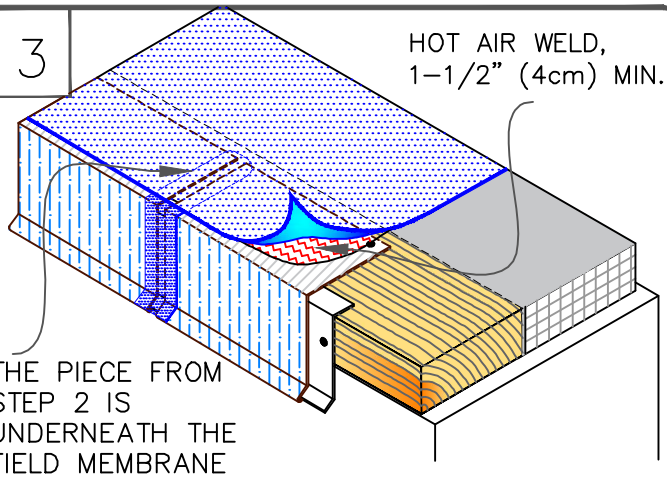
INSTALL CONTINUOUS CLEAT AND COATED METAL WITH 1/8"-1/4" (0.5-1cm) JOINTS BETWEEN ADJOINING SECTIONS.

2



HEAT WELD 3" (7.5cm) WIDE PIECE OF NON-REINFORCED TPO MEMBRANE OVER JOINT

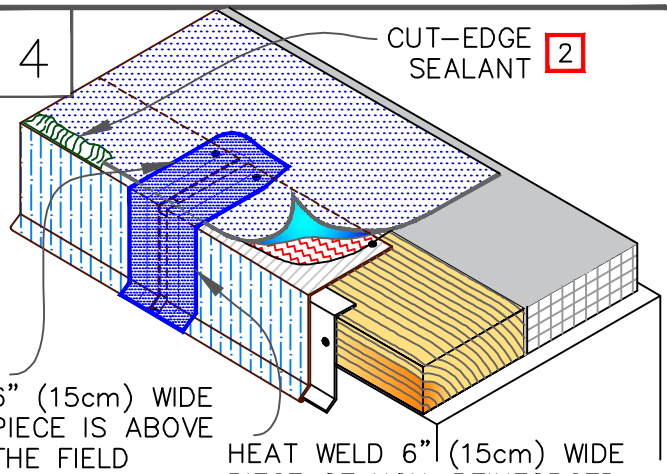
3



THE PIECE FROM STEP 2 IS UNDERNEATH THE FIELD MEMBRANE

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

4



6" (15cm) WIDE PIECE IS ABOVE THE FIELD MEMBRANE ON ROOF

HEAT WELD 6" (15cm) WIDE PIECE OF NON-REINFORCED MEMBRANE OVER JOINT, CENTERED ABOVE STEP 2 PIECE

CARLISLE SYNTEC SYSTEMS

SecurWELD COATED DRIP EDGE FASCIA

MAXIMUM WARRANTY: 30 YEARS

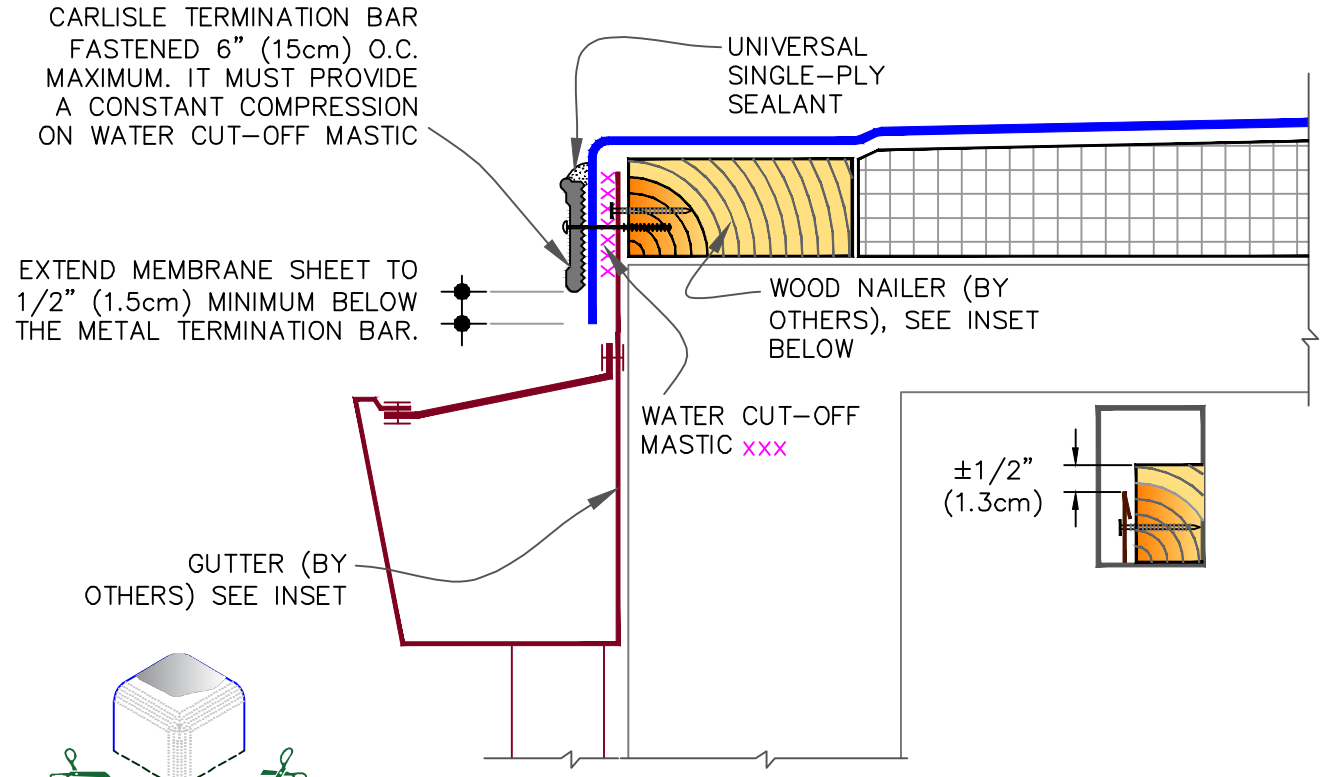
TPO

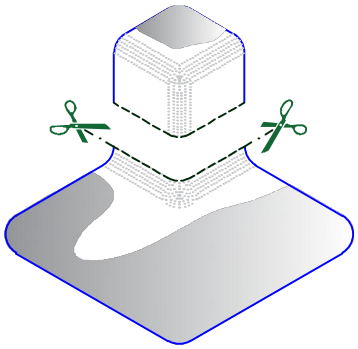
DETAIL NO.

U-1B

U (Universal Detail)

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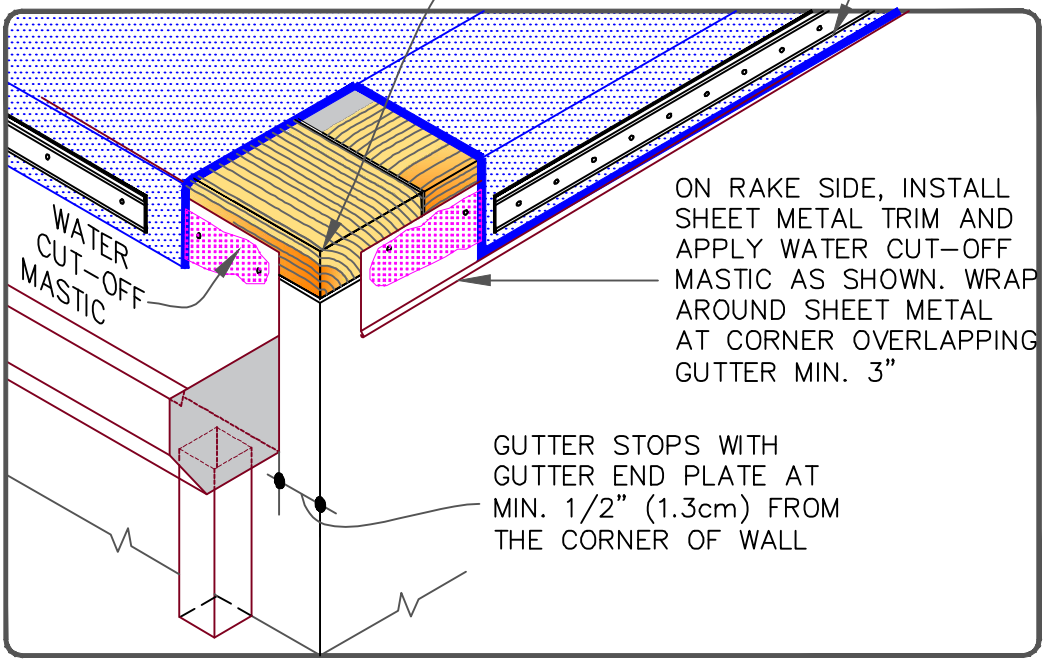


60-MIL (1.52mm) THICK TPO, UNIVERSAL CORNER CAN BE USED FOR AT TOP CORNER. CUT AS SHOWN IN DETAIL U-15G

DESIGNER MAY USE CARLISLE SECUREDGE TERMINATION BAR WITH FASCIA COVER ALSO



COLORED COVER



CARLISLE SYNTEC SYSTEMS

METAL BAR EDGE TERMINATION

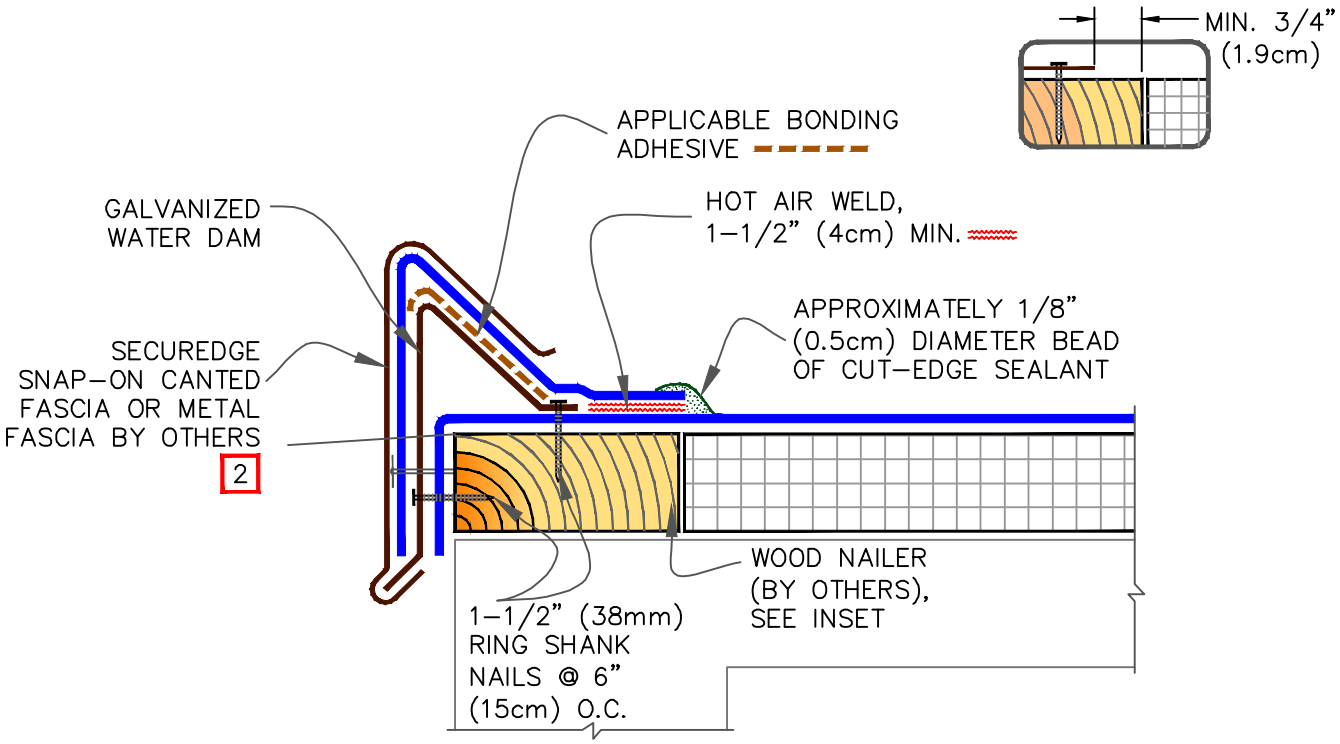
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-1C

U (Universal Detail)

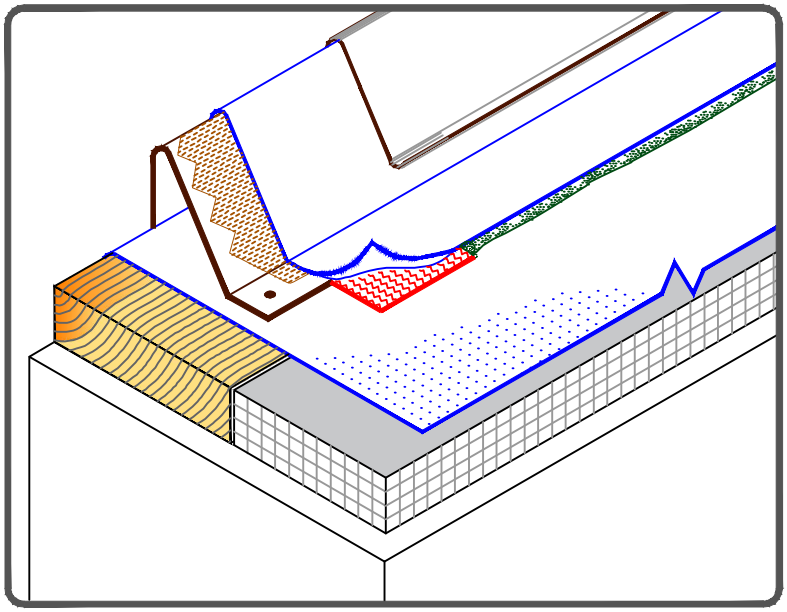
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NOTES:

1. REFER TO SecurEdge SNAP–ON CANTED FASCIA INSTRUCTION MANUAL FOR STEP–BY–STEP INSTALLATION PROCEDURES.

2. WHEN METAL FASCIA BY OTHERS IS USED, FASTENER TYPE AND FASTENING FREQUENCY SHALL BE RECOMMENDED BY METAL EDGE MANUFACTURER.



CARLISLE SYNTEC SYSTEMS

CARLISLE SecurEdge SNAP–ON CANTED FASCIA

MAXIMUM WARRANTY: 30 YEARS

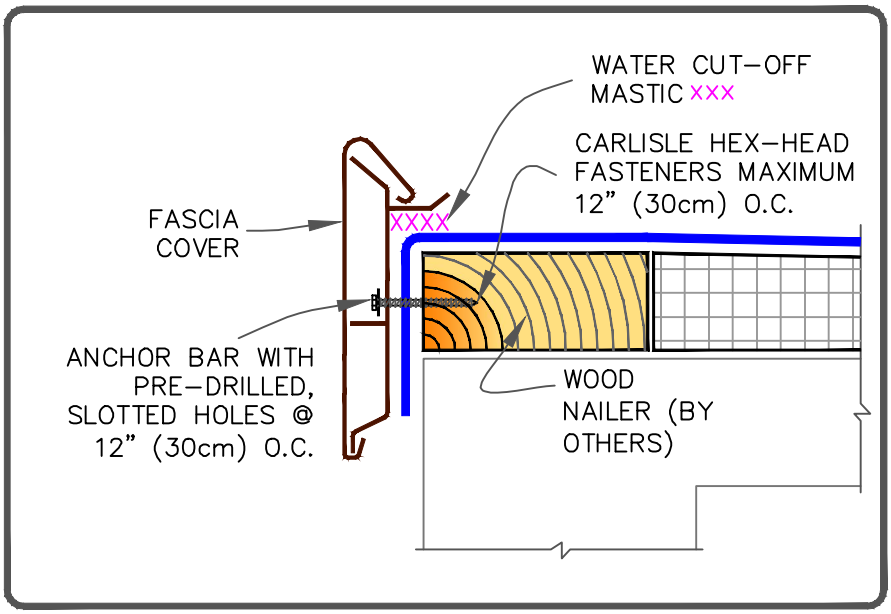
TPO

DETAIL NO.

U–1D

U (Universal Detail)

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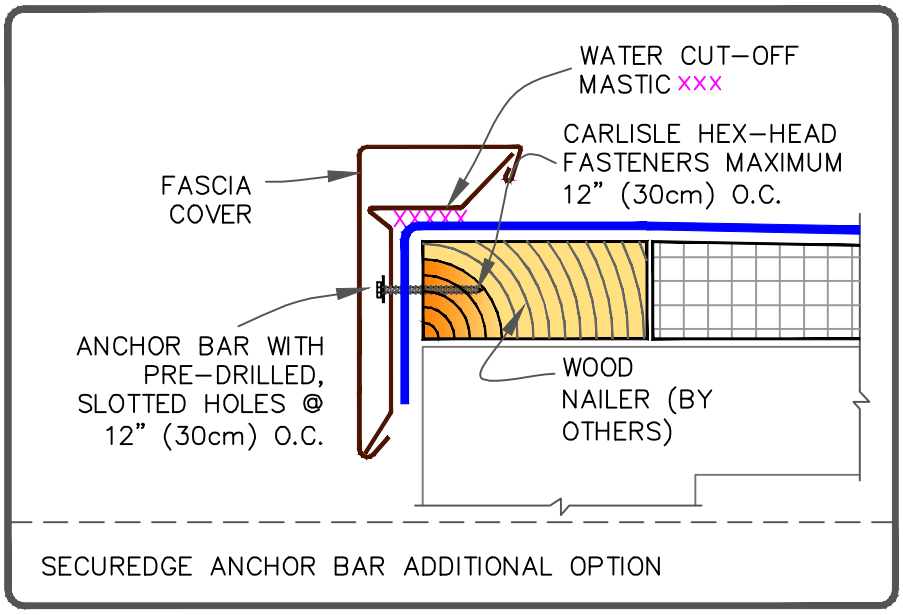
SecurEdge EX SNAP-ON FASCIA

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.

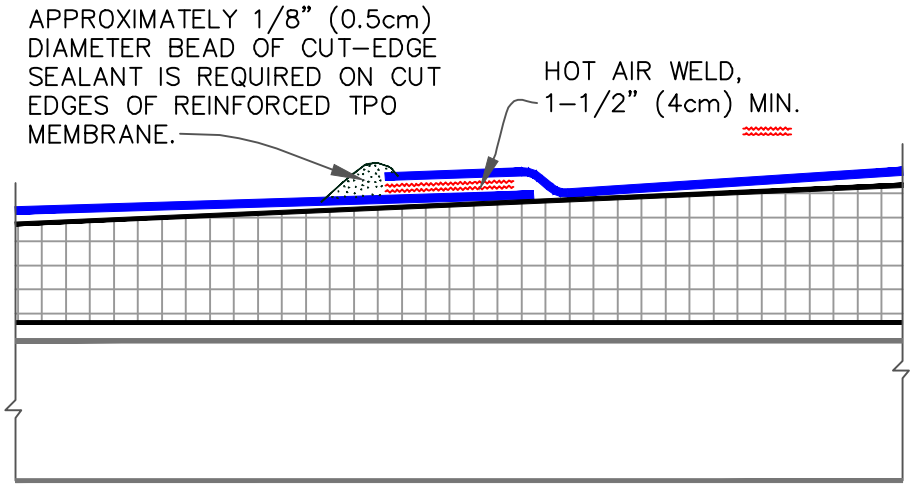
3. ENSURE ROOF SLOPES AWAY FROM SECUREDGE .



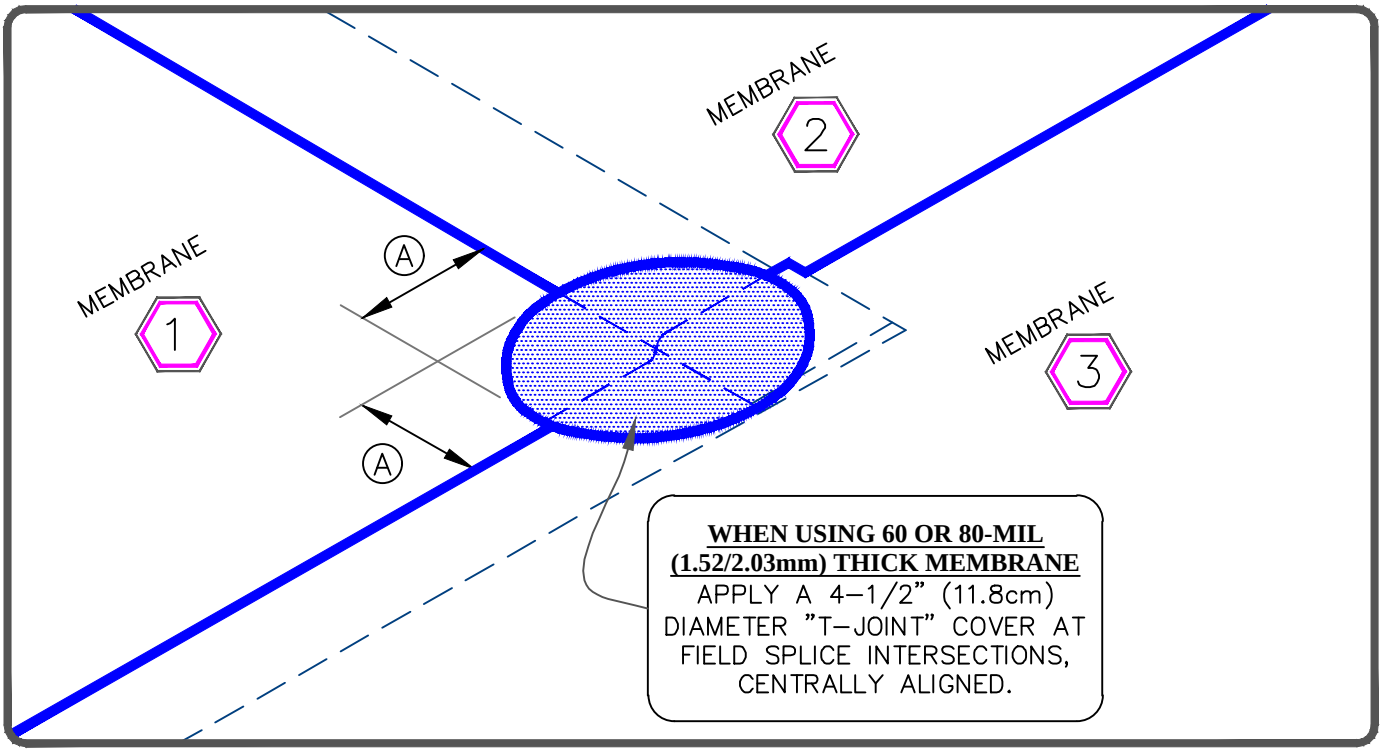
SecurEdge SNAP-ON FASCIA

CARLISLE SYNTEC SYSTEMS	CARLISLE SecurEdge EX SNAP-ON FASCIA & SecurEdge SNAP-ON FASCIA	TPO	DETAIL NO. U-1F
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

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DIMENSIONS		cm	
Ⓐ	2-1/4"	6	MIN.



NOTE:

1. WHEN USING 60-MIL (1.52mm) THICK TPO MEMBRANE, THEN MAXIMUM WARRANTY IS 20 YEARS.

CARLISLE SYNTEC SYSTEMS

MEMBRANE SPLICE

MAXIMUM WARRANTY: 30 YEARS (SEE NOTE 1)

TPO

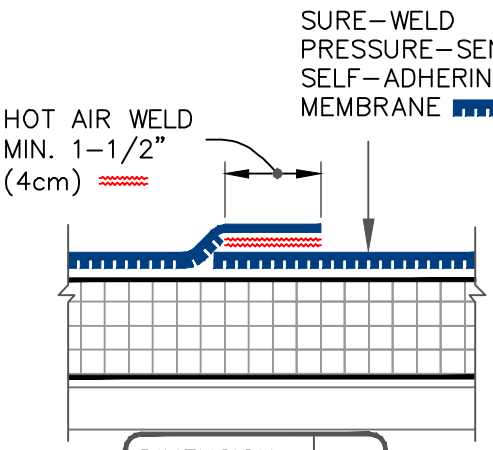
DETAIL NO. U-2A

U (Universal Detail)

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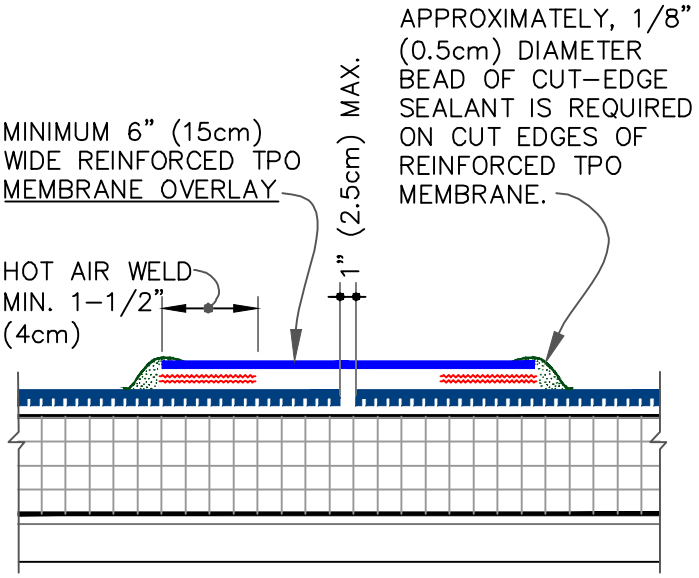
SELF-ADHERING TPO

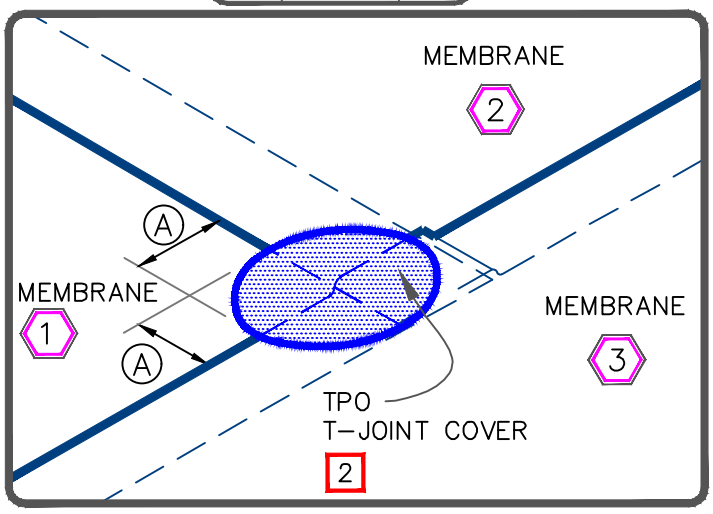
SIDE LAP SPLICE

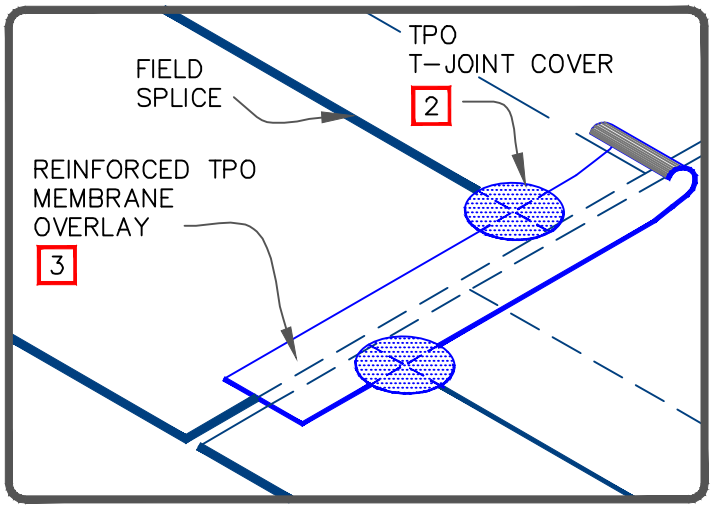


DIMENSION	cm
Ⓐ 2–1/4"	6

END LAP SPLICE







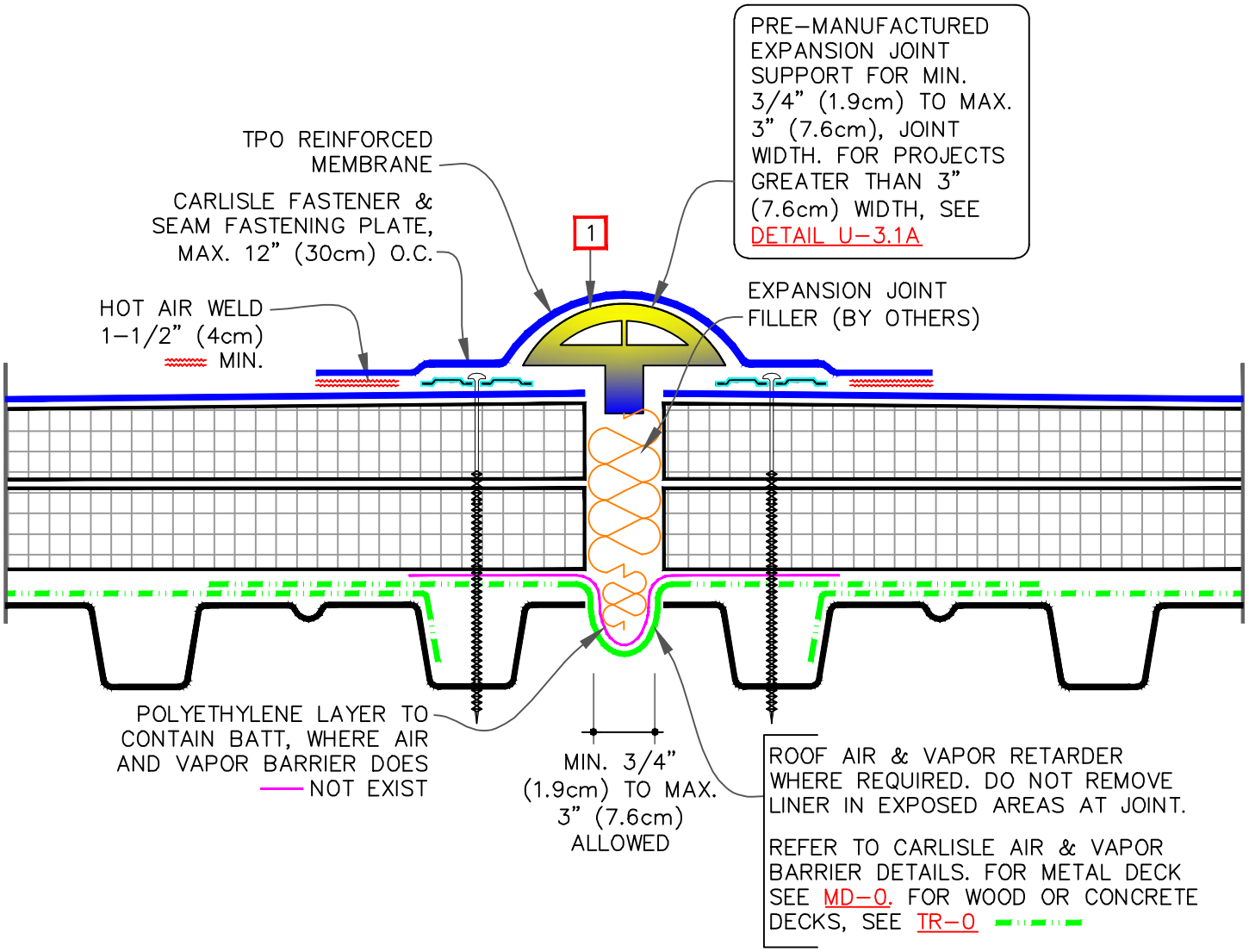
NOTES:

1. WHEN USING 60–MIL (1.52mm) THICK TPO, MAXIMUM WARRANTY IS 20 YEARS.
2. WHEN USING SAT TPO MEMBRANE, 60/80–MIL (1.52/2.03mm) THICK, APPLY A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS. .
3. WHEN USING 60/80 MIL (1.52/2.03mm) THICK TPO REINFORCED MEMBRANE OVERLAY, INTERSECTIONS BETWEEN SPLICES MUST BE OVERLAID WITH A 4–1/2" (11cm) DIAMETER TPO "T–JOINT" COVER.

SAT TPO

CARLISLE SYNTEC SYSTEMS	SELF–ADHERING TPO MEMBRANE SPLICE MAXIMUM WARRANTY: 30 YEARS (SEE NOTE 1)	TPO DETAIL NO. U–2B U (Universal Detail)

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NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. WHEN THE EXPANSION JOINT INTERSECTS WITH A COATED METAL DRIP EDGE, THEN COATED METAL SHOULD BE GAPPED AND THE U–1B DETAIL BE FOLLOWED. DRIP EDGE BY OTHERS SHOULD ALSO BE GAPPED.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

CARLISLE SYNTEC SYSTEMS

DECK–TO–DECK ROOF EXPANSION JOINTS 3/4" TO UP TO 3"

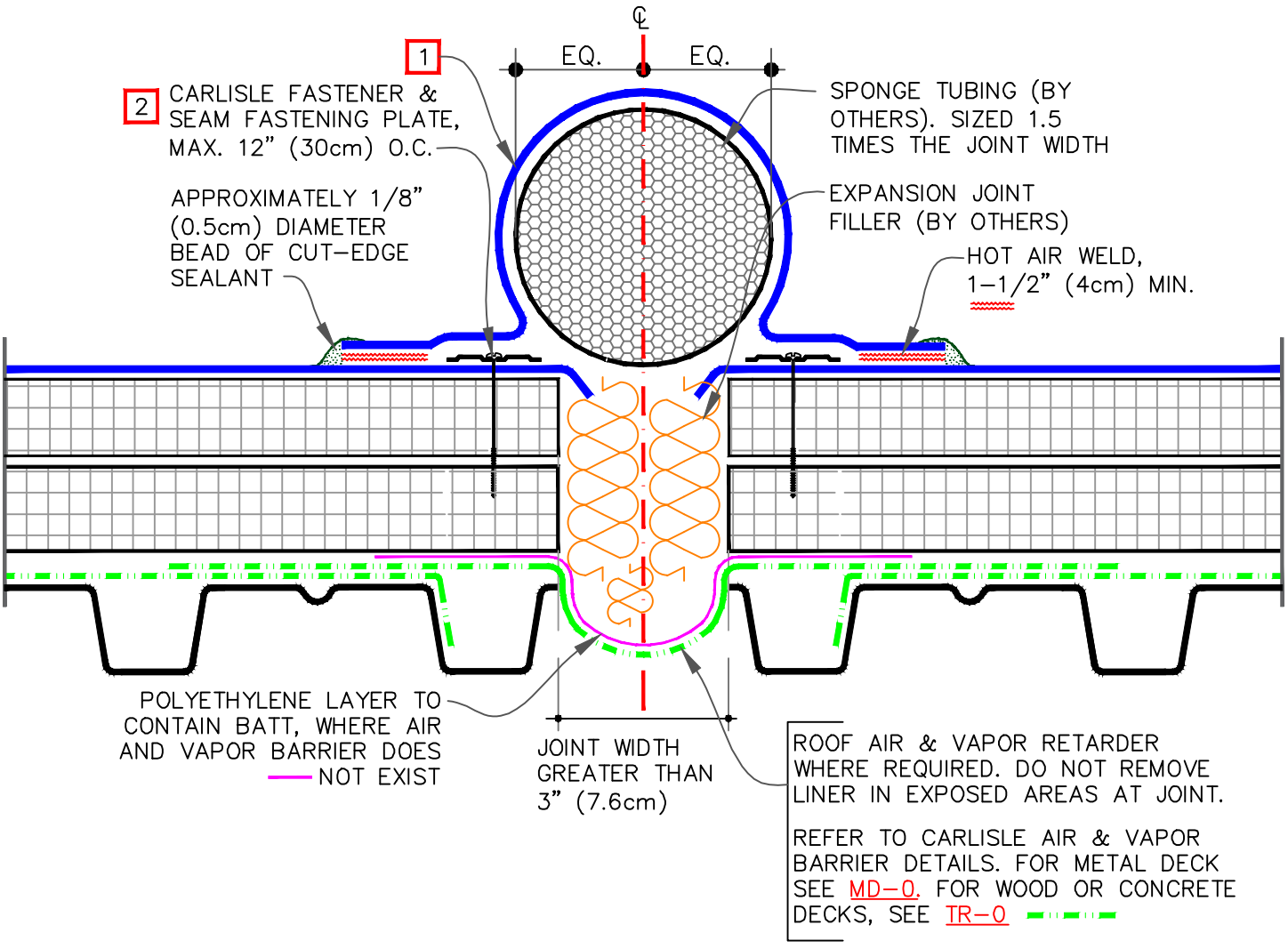
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–3A

U (Universal Detail)

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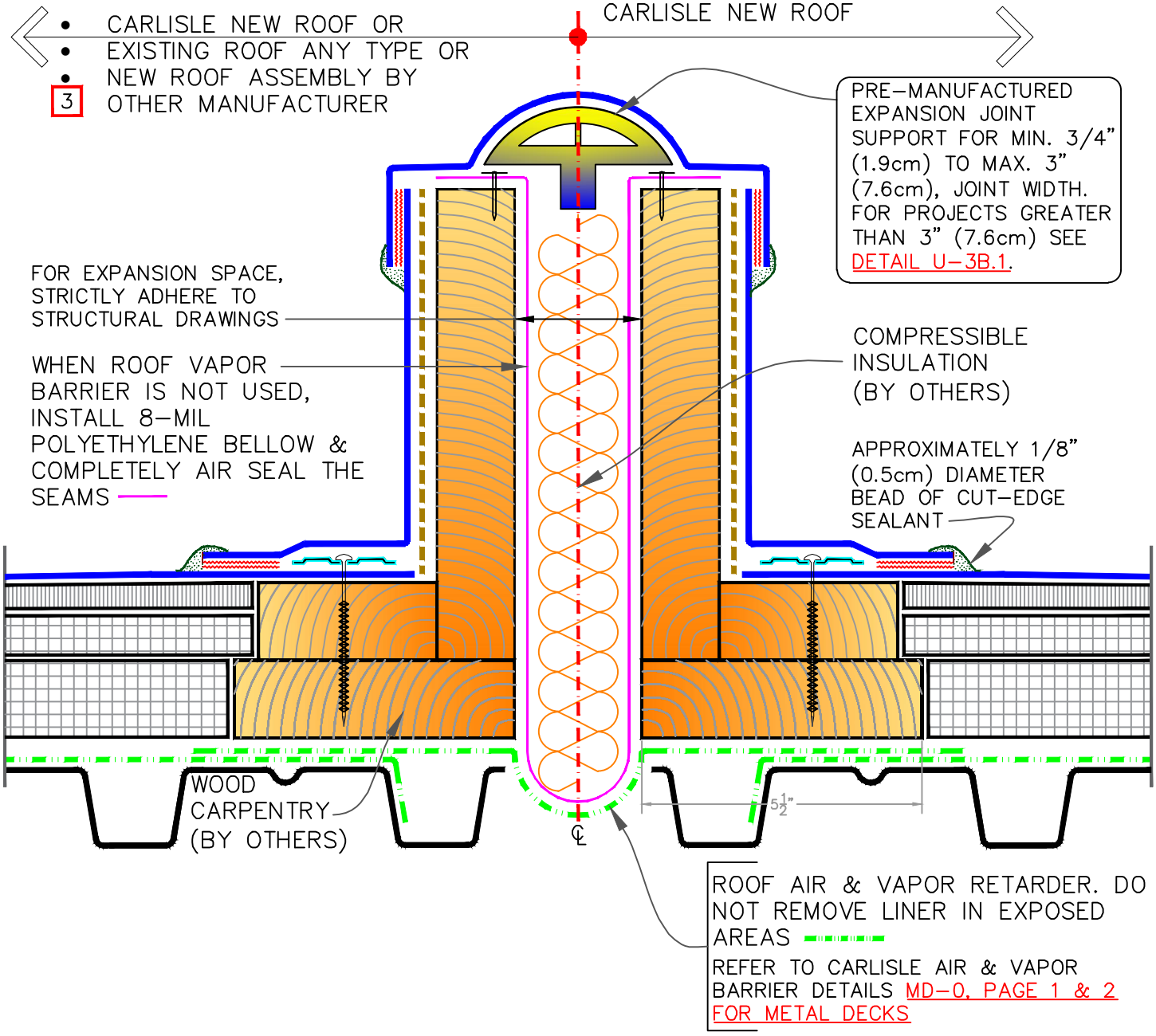


NOTES:

1. MEMBRANE SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. HP FASTENERS AND POLYMER SEAM PLATES ARE REQUIRED ON MECHANICALLY FASTENED SYSTEMS OVER STEEL DECKS.

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK ROOF EXPANSION JOINTS GREATER THAN 3"	TPO	DETAIL NO. U-3A.1
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

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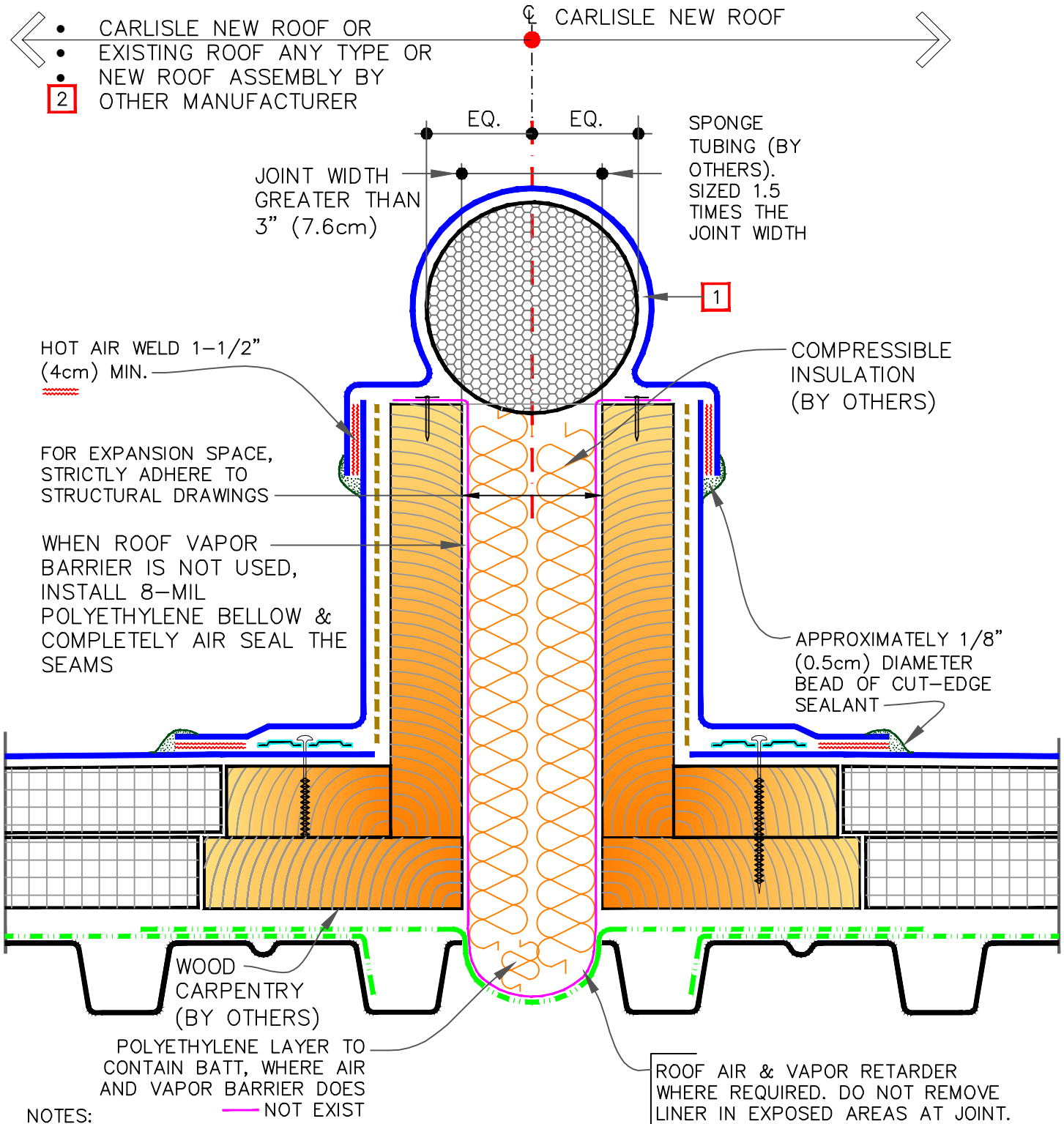


NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.
2. ENSURE SEAMS ARE PROPERLY MADE OUTSIDE THE EXPANSION JOINT, SEALED AND TAPED AND THEN VAPOR RETARDER IS LAID IN PLACE.
3. IN CASE THE ROOF TYPE IS DIFFERENT, DESIGNER TO PROVIDE ROOF TYPE AND ITS CONDITION TO CARLISLE TO DEVELOP TIE-IN DETAIL ON THIS SIDE ACCORDINGLY.

CARLISLE SYNTEC SYSTEMS	DECK-TO-DECK CURBED ROOF EXPANSION JOINTS 3/4" TO UP TO 3"	TPO	DETAIL NO. U-3B
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

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NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT.
2. IN CASE THE ROOF TYPE IS DIFFERENT, DESIGNER TO PROVIDE ROOF TYPE AND ITS CONDITION TO CARLISLE TO DEVELOP A TIE–IN DETAIL ON THIS SIDE ACCORDINGLY.

CARLISLE SYNTEC SYSTEMS

DECK–TO–DECK CURBED ROOF EXPANSION JOINT GREATER THAN 3"

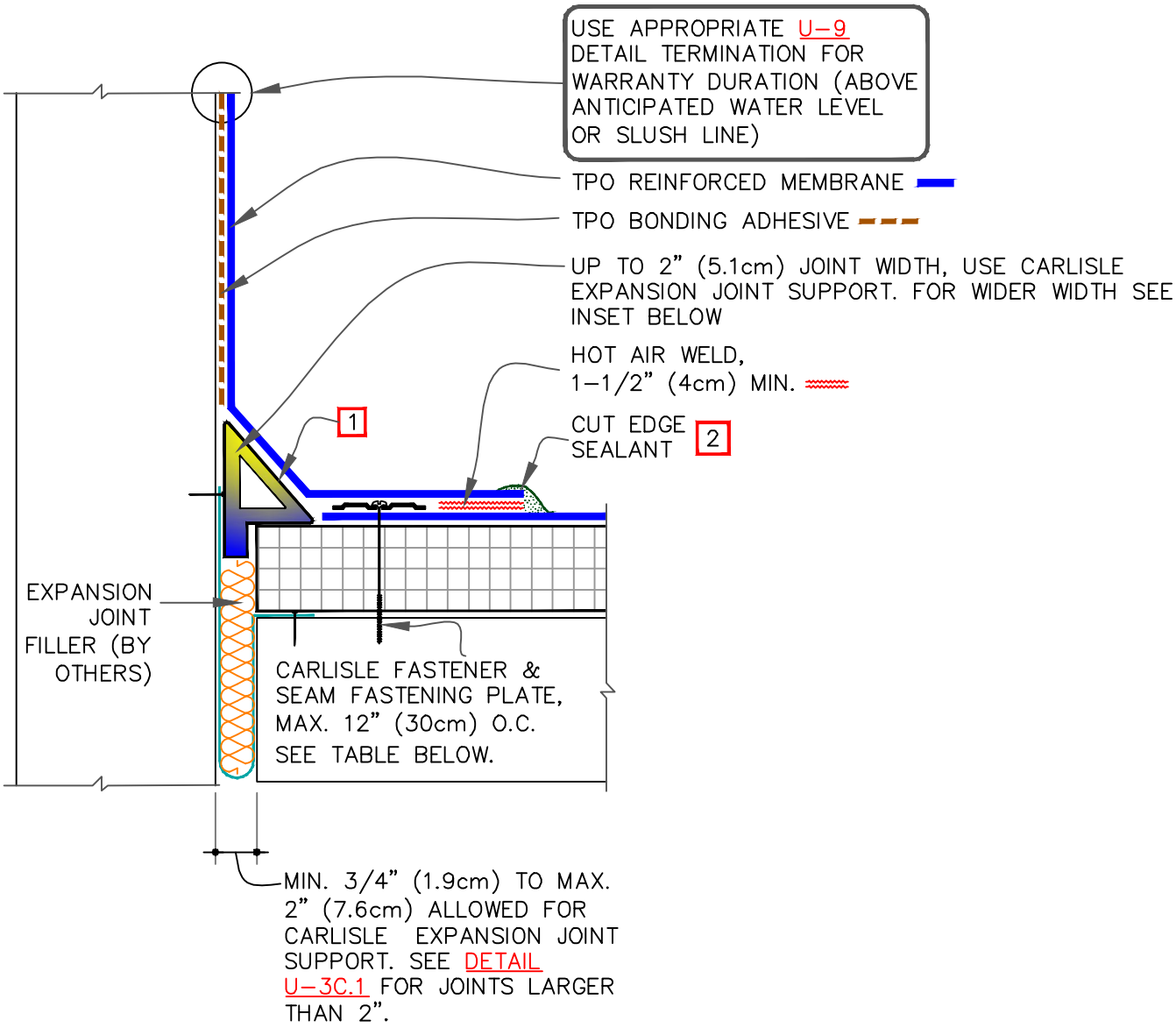
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–3B.1

U (Universal Detail)

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NOTES:

1. MEMBRANE FLASHING SHALL NOT BE ADHERED OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE. PLATES.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA

CARLISLE SYNTEC SYSTEMS

DECK–TO–WALL EXPANSION JOINTS 3/4" TO UP TO 2"

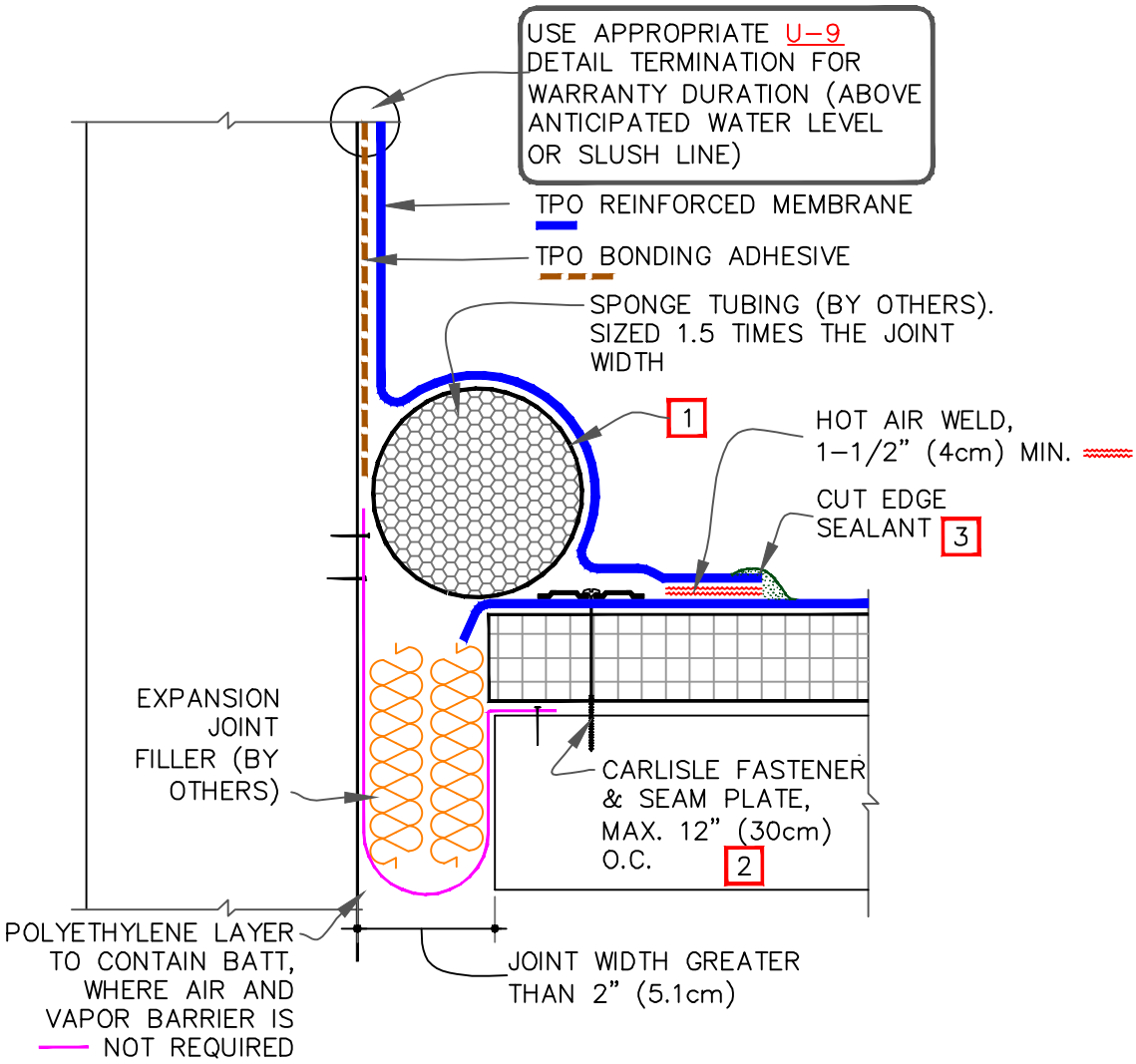
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–3C

U (Universal Detail)

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NOTES:

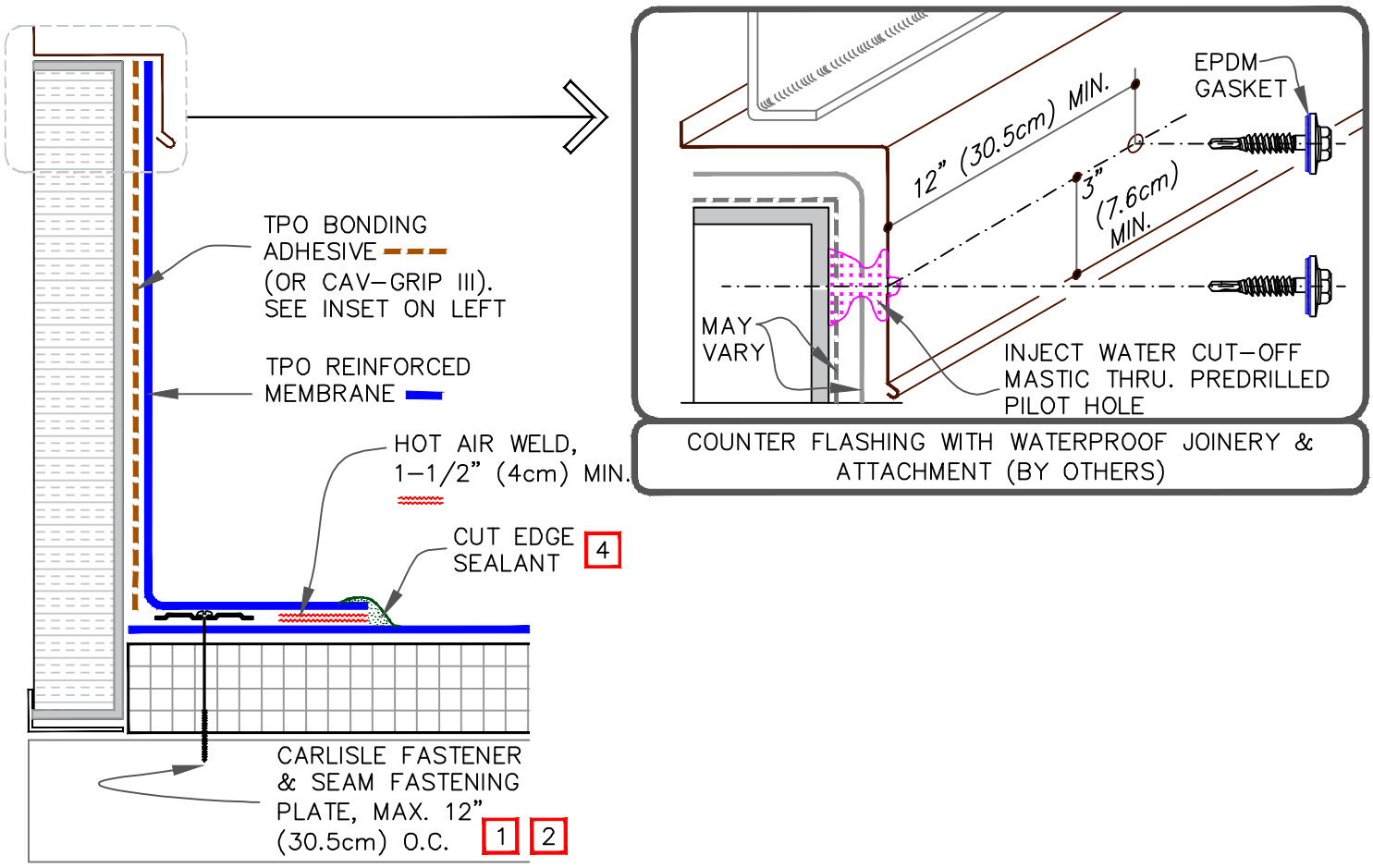
1. ROOF MEMBRANE SHALL BE LOOSE-LAID OVER THE EXPANSION JOINT SUPPORT OR SPONGE TUBING.

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

3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE. PLATES.

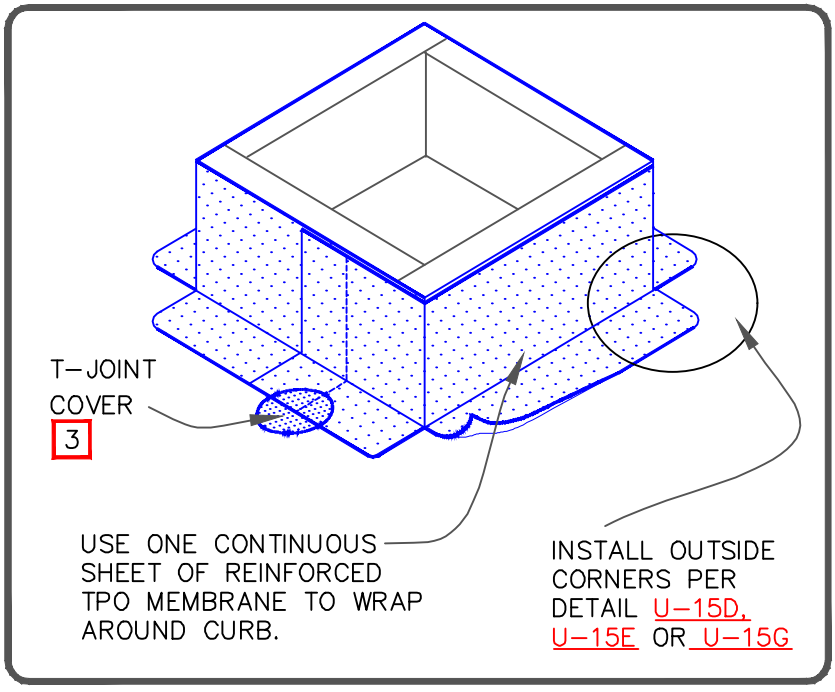
CARLISLE SYNTEC SYSTEMS	DECK-TO-WALL EXPANSION JOINTS GREATER THAN 2"	TPO	DETAIL NO. U-3C.1
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

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NOTES:

1. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
2. MECHANICAL SECUREMENT MAY BE INSTALLED INTO THE VERTICAL SUBSTRATE.
3. WHEN USING 80 MIL (2.03mm) THICK CURB FLASHING, THE INTERSECTIONS BETWEEN SPLICES MUST OVERLAID WITH A TPO "T-JOINT" COVER.
4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH TPO MEMBRANE

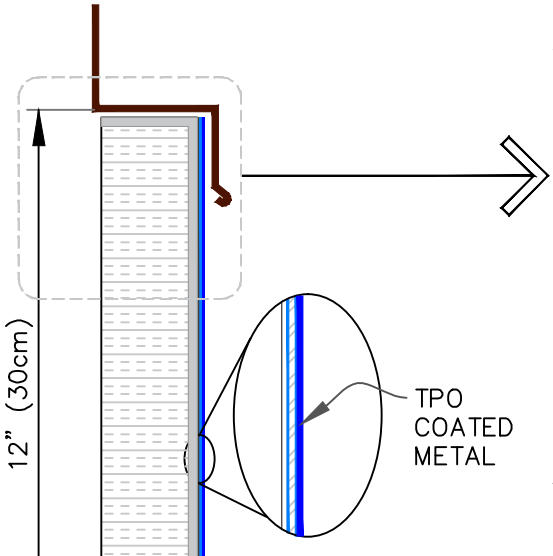
MAXIMUM WARRANTY: 30 YEARS

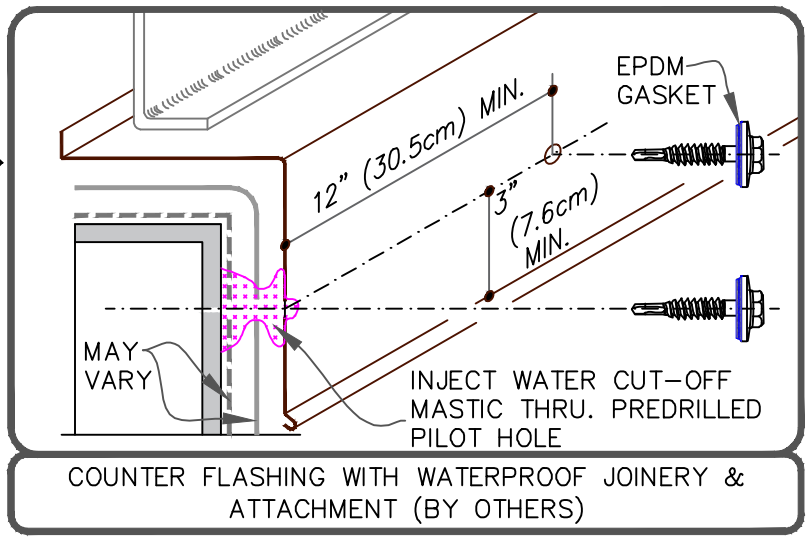
TPO

DETAIL NO. U-5A

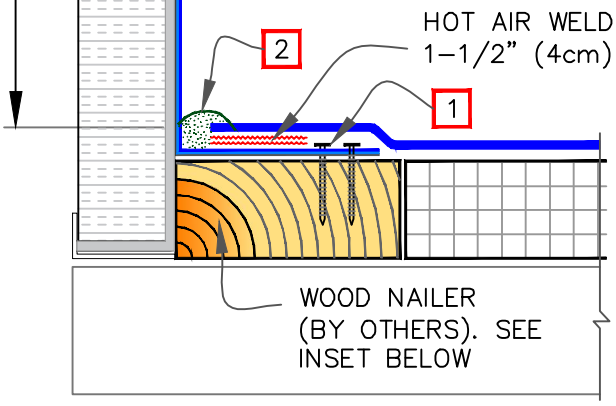
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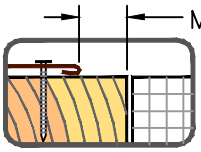
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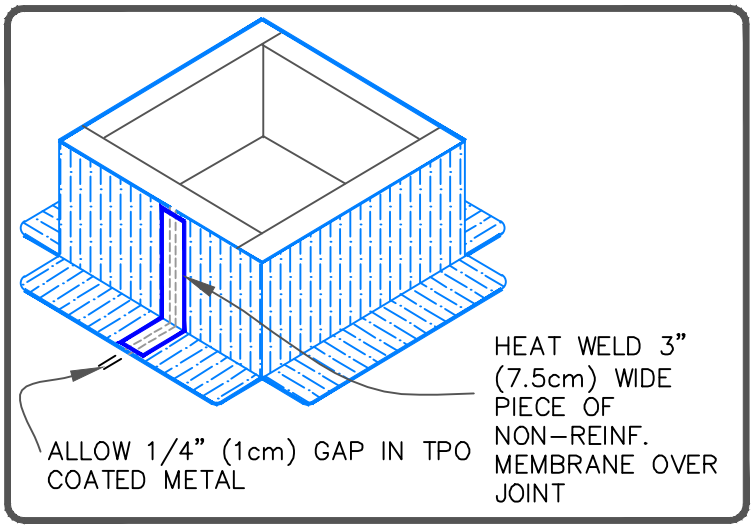


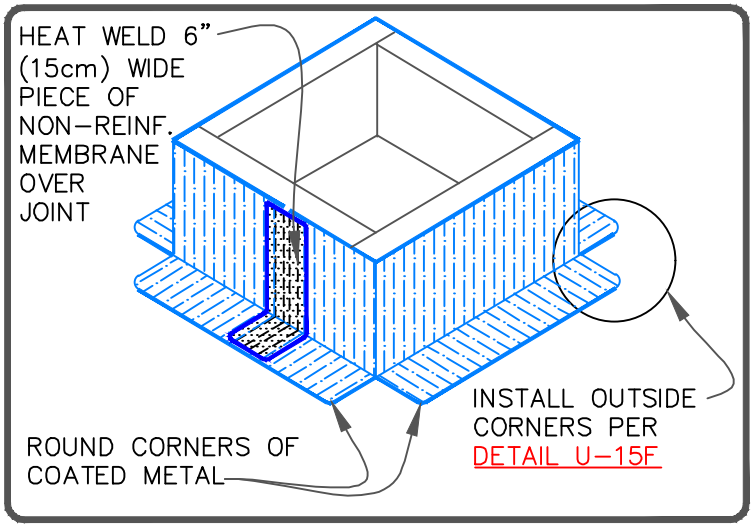


COUNTER FLASHING WITH WATERPROOF JOINERY & ATTACHMENT (BY OTHERS)









NOTES:

1. FASTEN COATED METAL USING 1-1/2" (38mm) MIN. RING SHANK NAILS AT 6" (15cm) STAGGERED APPROX. 1/2" (1.5cm).
2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH TPO COATED METAL

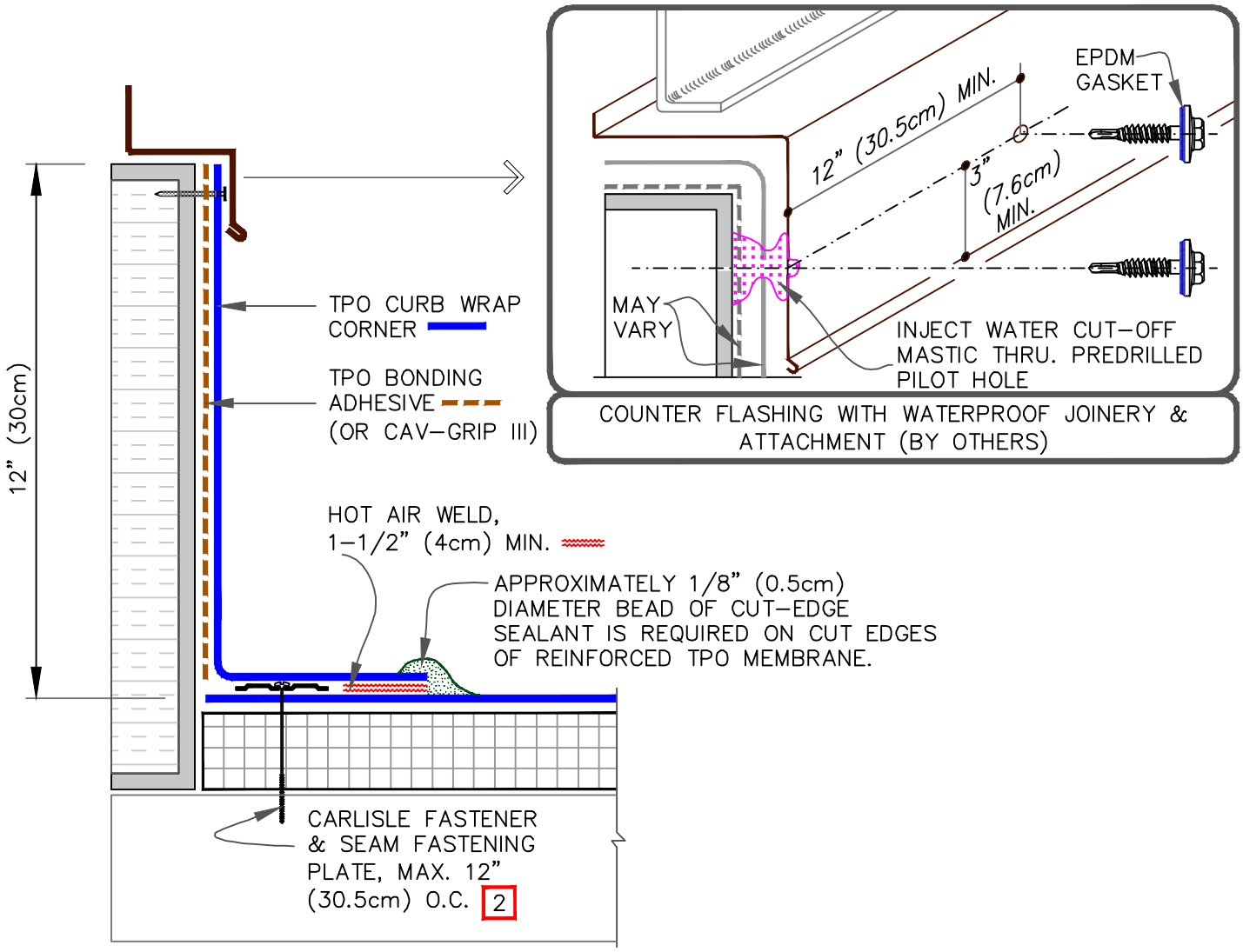
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-5B

U (Universal Detail)

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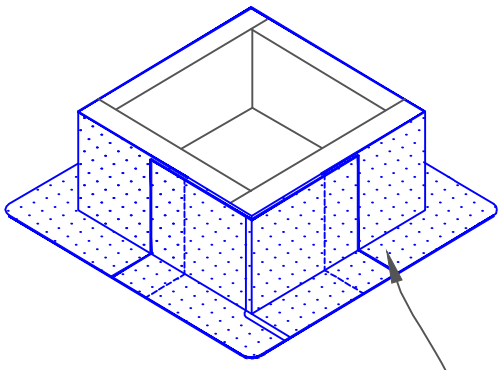


NOTES:

1. FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (91cmX 91cm). FOR LARGER CURBS USE THE TPO CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF SURE-WELD TPO MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).



USE ONE TPO CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

CFA (CERTIFIED FABRICATED ACCESSORIES)

CARLISLE SYNTEC SYSTEMS

CURB FLASHING WITH CFA TPO CURB WRAP CORNERS

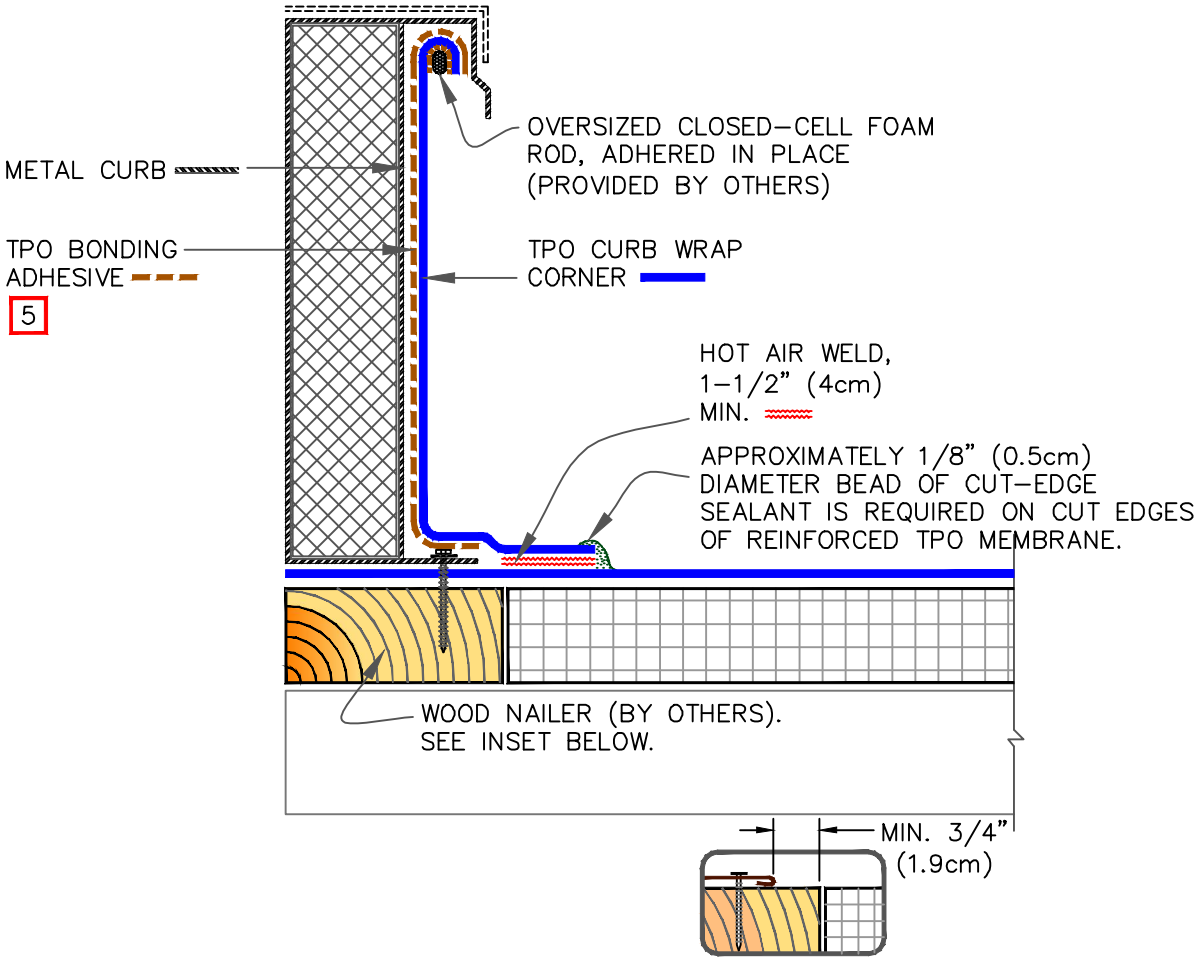
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-5C

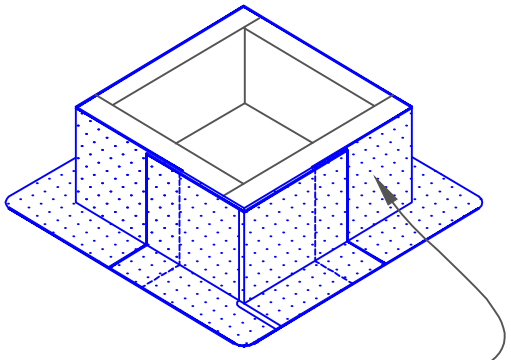
U (Universal Detail)

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NOTES:

1. FOUR (4) CURB WRAP CORNERS WILL COMPLETELY FLASH A MAXIMUM CURB SIZE OF 3'X3' (90cmX 90cm). FOR LARGER CURBS USE THE TPO CURB WRAP CORNERS IN CONJUNCTION WITH ADDITIONAL SECTIONS OF SURE-WELD TPO.
2. IF CURB WRAP CORNER IS NOT USED, THEN USE DETAIL U-15G FOR OUTSIDE CORNERS.
3. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.
4. CUSTOM SIZES ARE AVAILABLE FOR CURB FLASHING HEIGHTS GREATER THAN 12" (30cm).
5. CAV GRIP III ADHESIVE MAY ALSO BE USED ON VERTICAL PORTION.

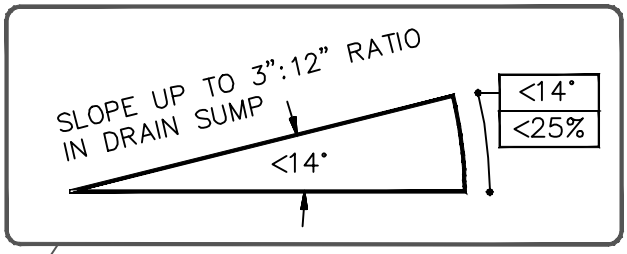


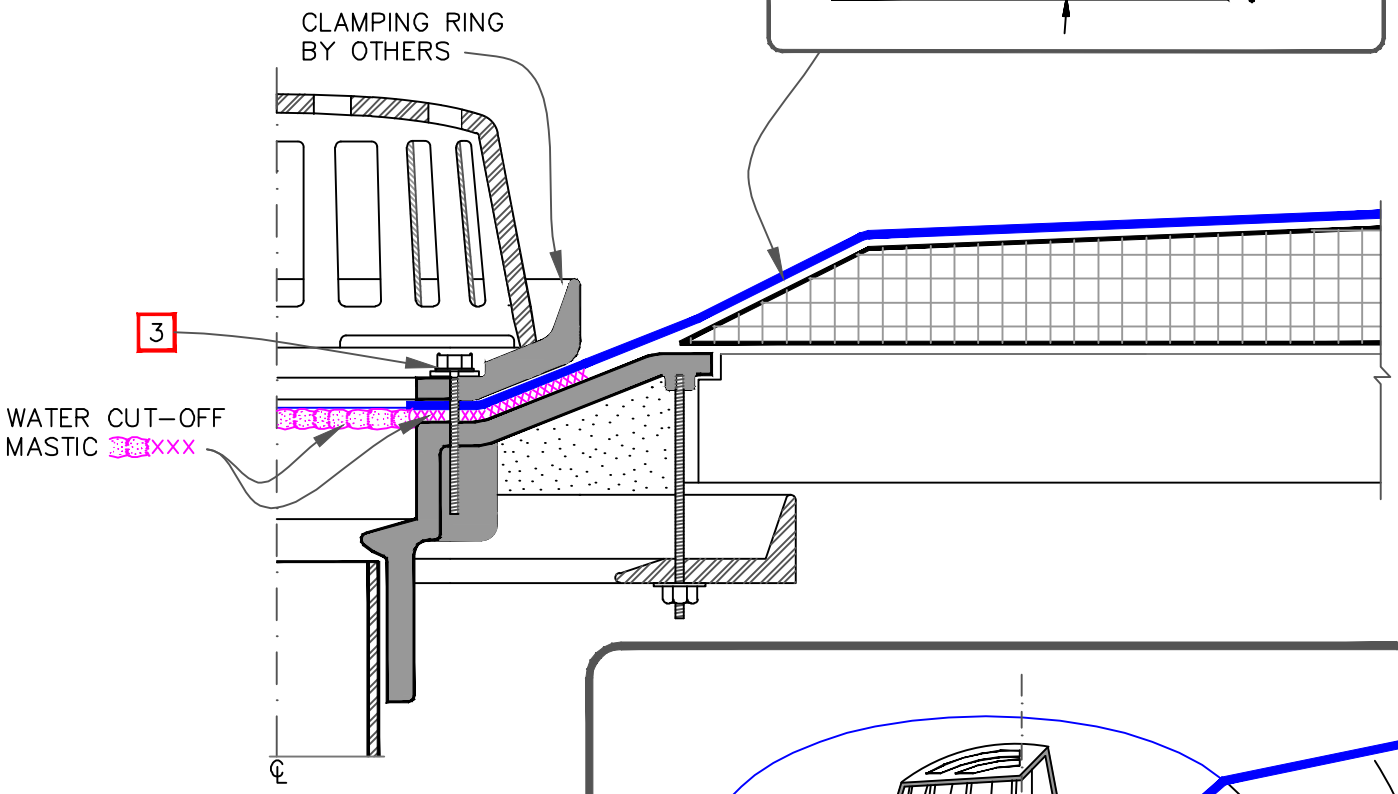
USE ONE TPO CURB WRAP CORNER AT EACH CORNER OF THE CURB. HOT AIR WELD ALL SEAMS IN ACCORDANCE WITH STANDARD SPLICING METHODS. 1

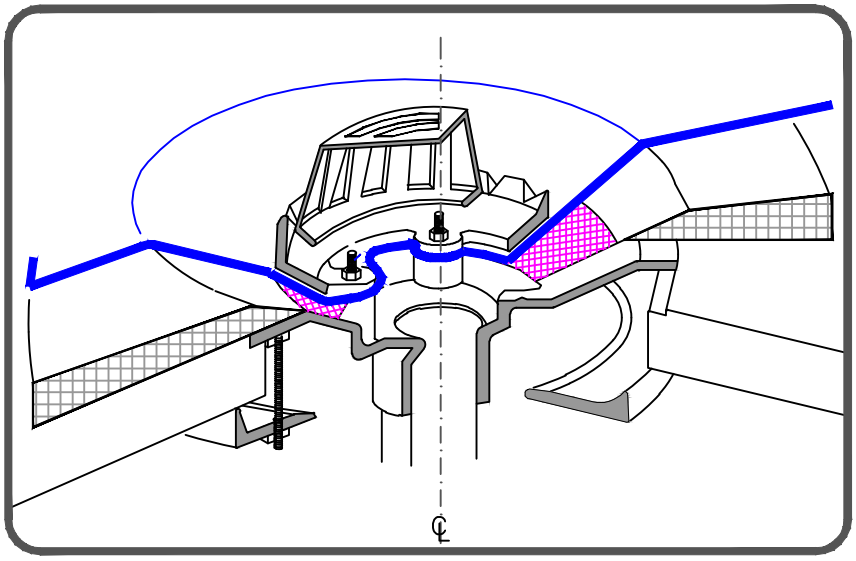
CFA (CERTIFIED FABRICATED ACCESSORIES)

CARLISLE SYNTEC SYSTEMS	SELF-FLASHING CURB WITH CFA TPO CURB WRAP CORNERS MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U-5D U (Universal Detail)

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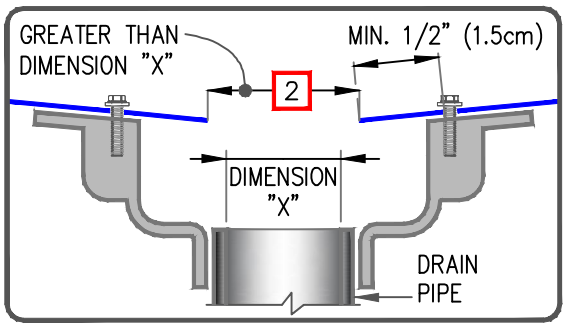






NOTES:

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" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT-OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.



CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE LESS THAN 3" TO ONE HORIZONTAL FOOT

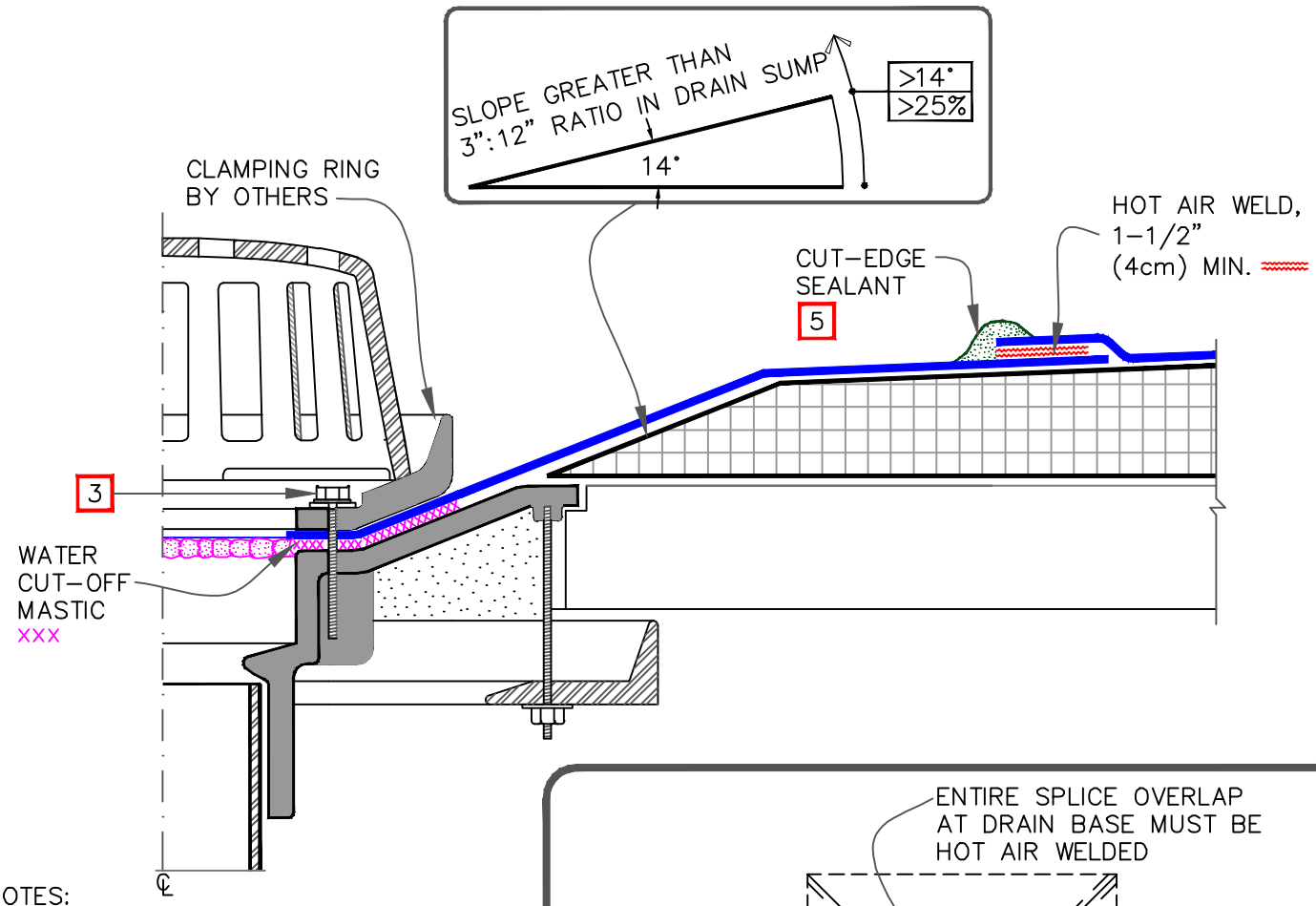
MAXIMUM WARRANTY: 30 YEARS

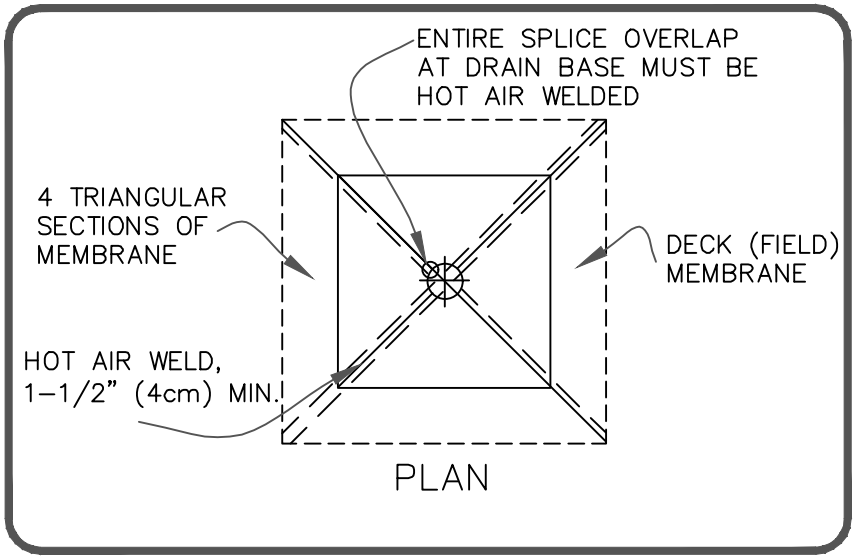
TPO

DETAIL NO. U-6A

U (Universal Detail)

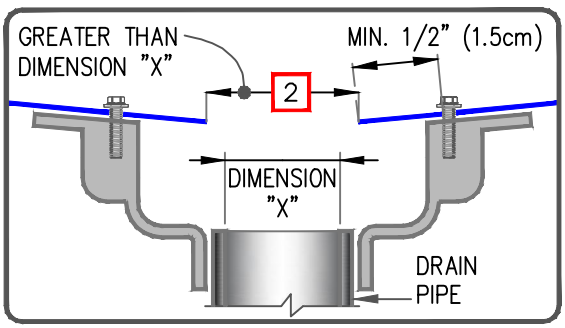
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NOTES:

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" (1.5cm) FROM THE ATTACHMENT POINTS OF THE DRAIN CLAMPING RING.
3. ALL BOLTS OR CLAMPS MUST BE IN PLACE TO PROVIDE CONSTANT COMPRESSION ON WATER CUT–OFF MASTIC.
4. REMOVE EXISTING LEAD, FLASHING MATERIAL & ENSURE THE DRAIN RING IS COMPLETELY CLEAN DOWN TO BARE METAL.
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 1)

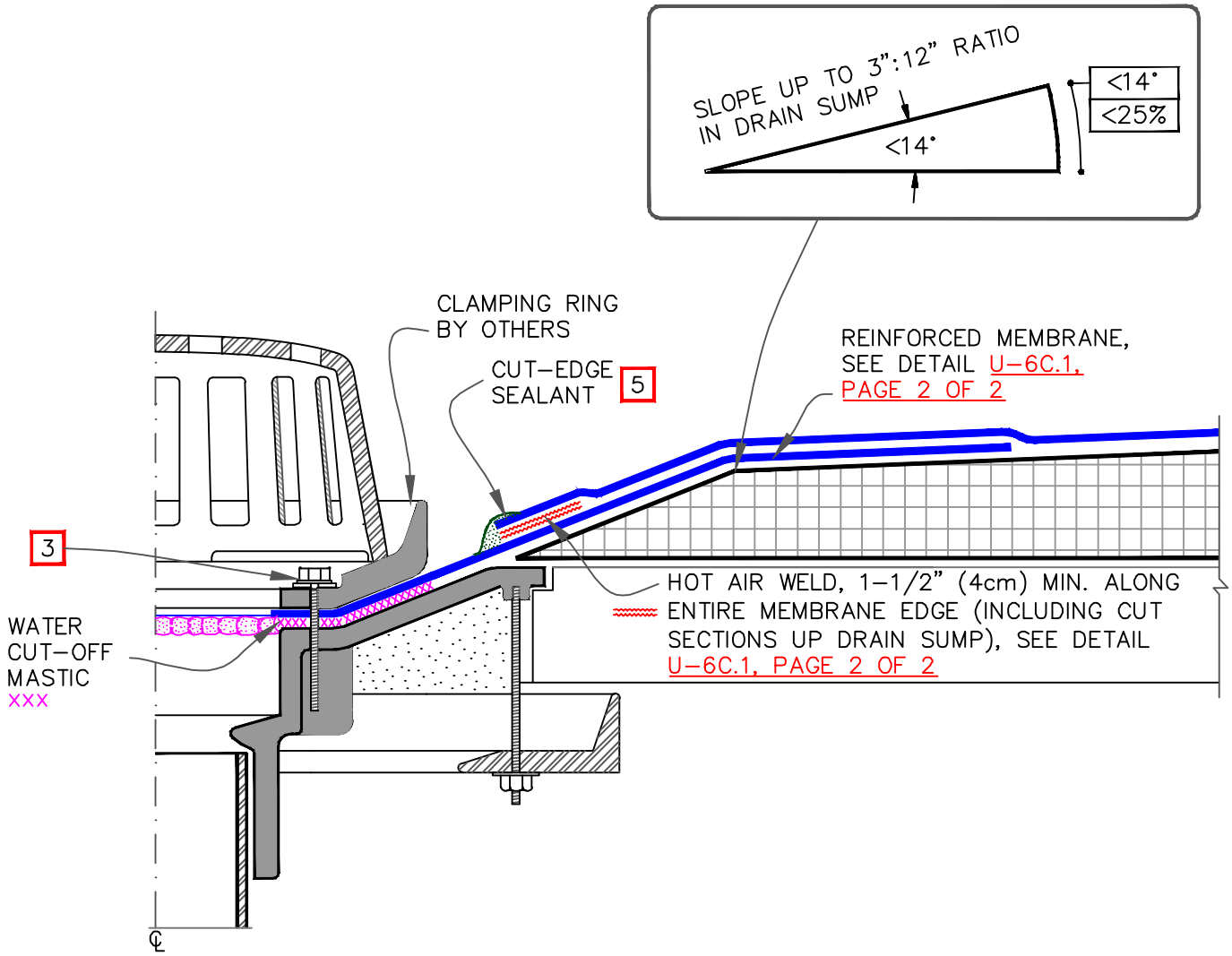
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–6B

U (Universal Detail)

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NOTES:

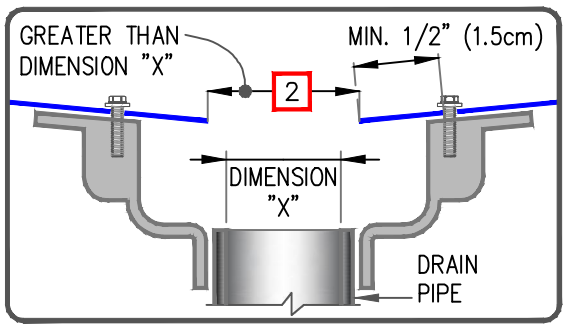
1. ROOF DRAIN SIZE AND NUMBER OF DRAINS SHALL BE IN ACCORDANCE WITH THE LOCAL CODES.

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

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

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

5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO ONE HORIZONTAL FOOT (OPTION 2), PAGE 1 OF 2

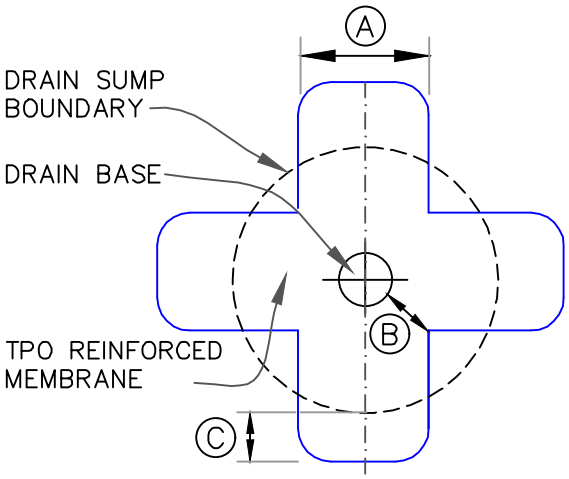
MAXIMUM WARRANTY: 30 YEARS

TPO

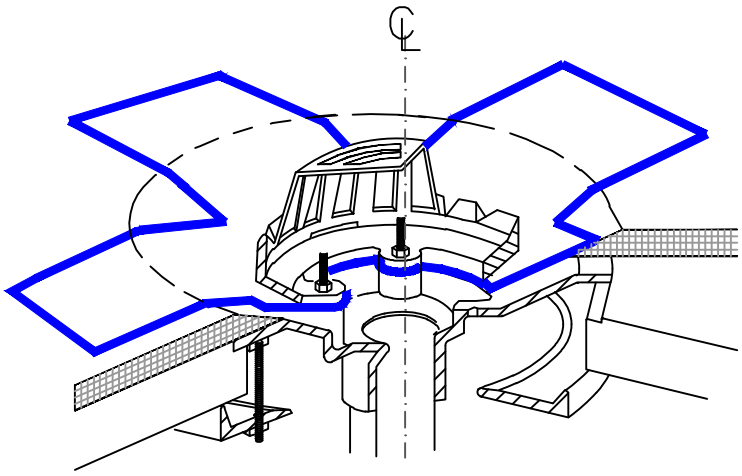
DETAIL NO. U–6C

U (Universal Detail)

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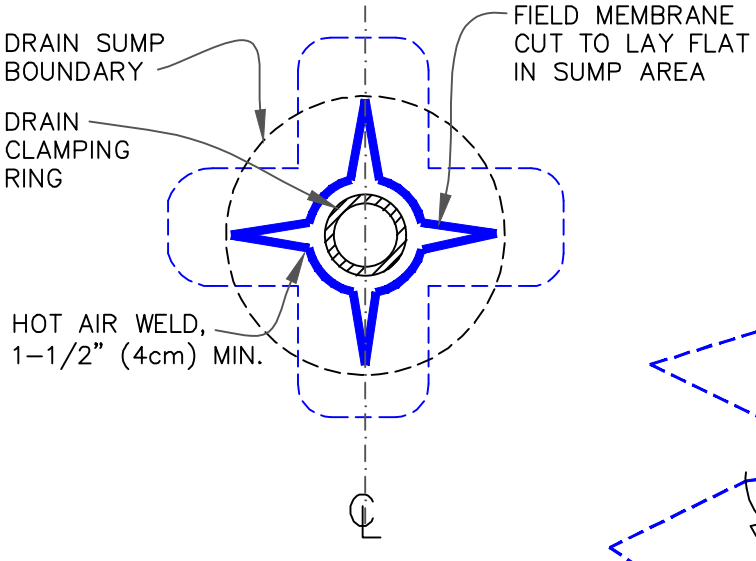


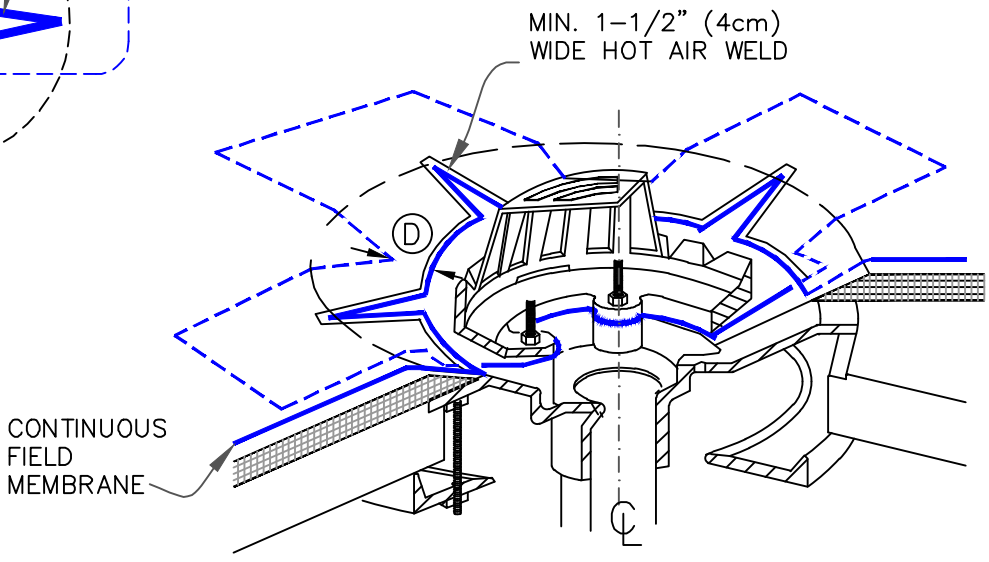
CUT SECTION OF TPO REINFORCED MEMBRANE AS SHOWN AND POSITION INTO DRAIN SUMP. EXTEND MEMBRANE OUT OF DRAIN SUMP APPROXIMATELY 6" (15cm) (ROUND CORNERS).



EXTEND TPO MEMBRANE ONTO MEMBRANE SECTION POSITIONED AT DRAIN SUMP AND CUT AS SHOWN TO LAY FLAT IN SUMP. HOT AIR WELD A MINIMUM OF 1–1/2" (4cm) COMPLETELY SURROUNDING AREA.

DIMENSIONS		cm	
A	12"	30	MIN.
B	6"	15	MIN.
C	6"	15	APPROX.
D	3"	7.5	MIN.





CARLISLE SYNTEC SYSTEMS

ROOF DRAIN: SUMP SLOPE GREATER THAN 3" TO 1" HORIZONTAL FOOT (OPTION 2), PAGE 2 OF 2

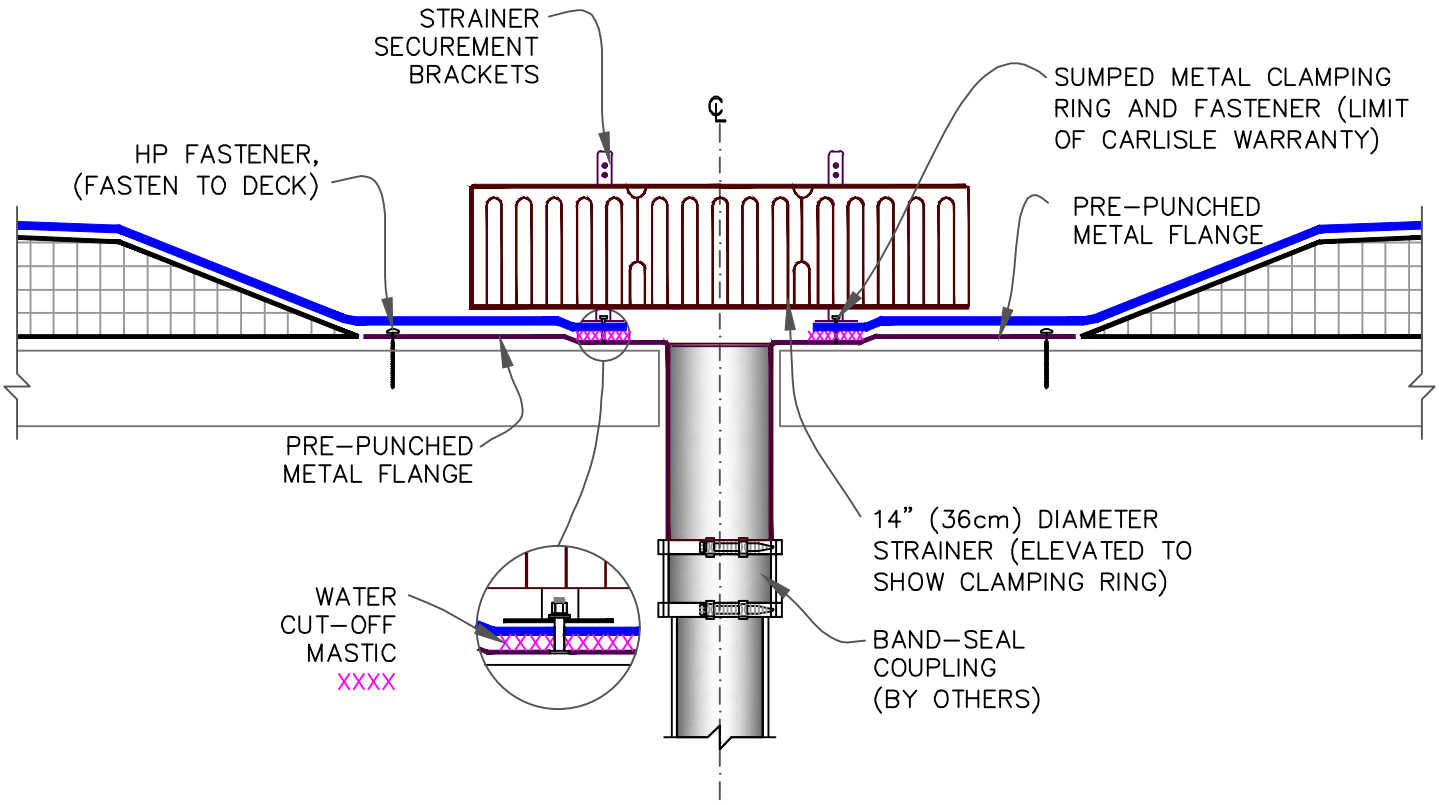
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–6C

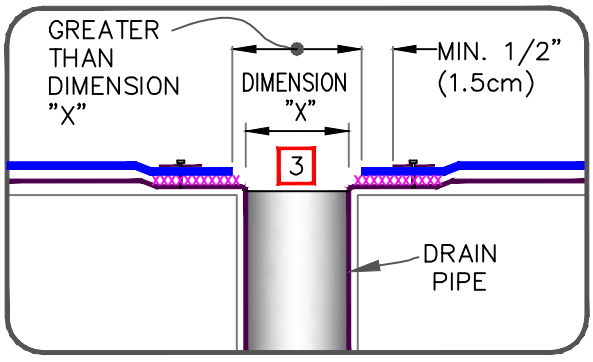
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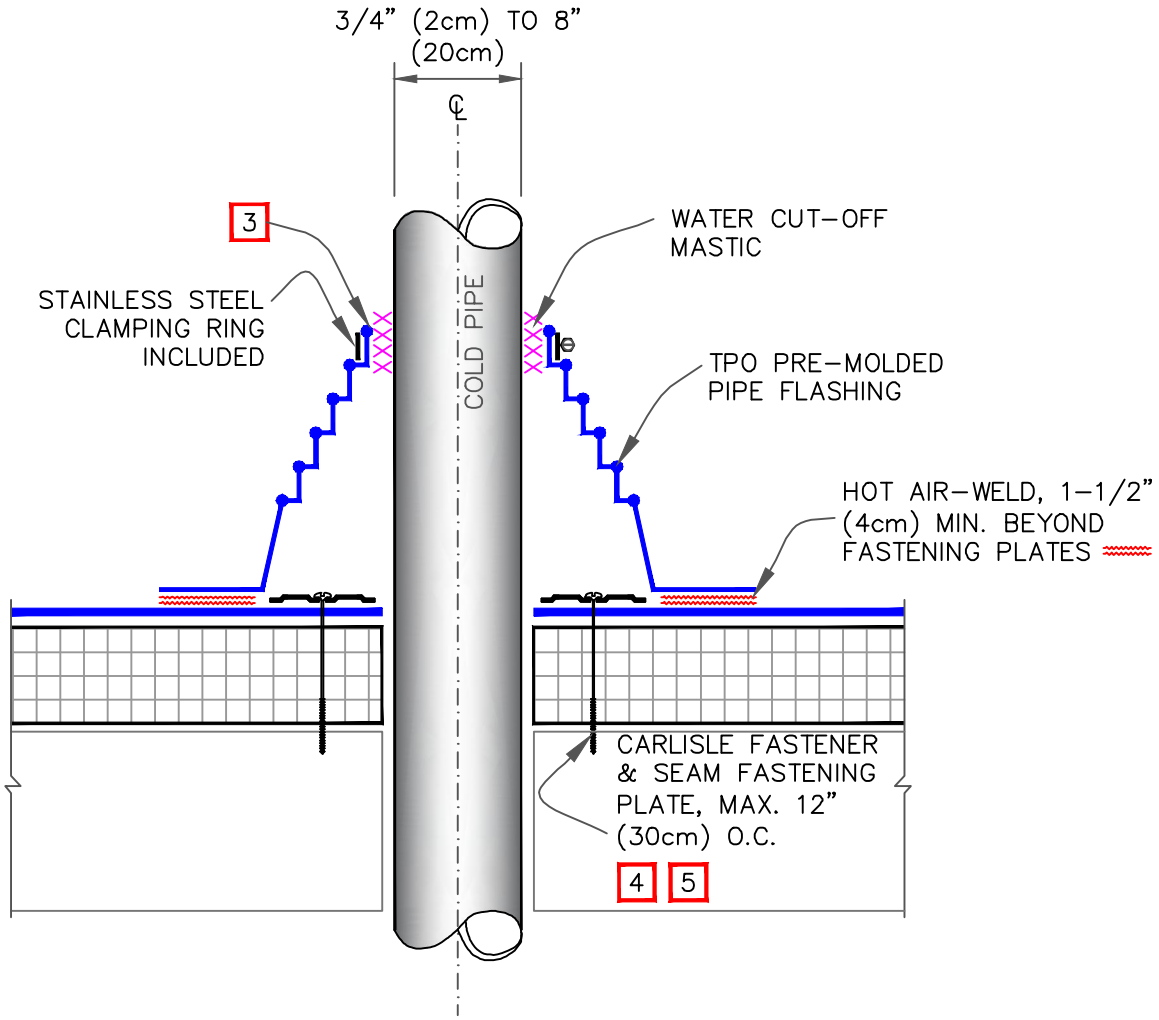
NOTES:

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



CARLISLE SYNTEC SYSTEMS	ADD-ON DRAIN MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U-6D U (Universal Detail)

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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 160°F (71°C).
3. PRE-MOLDED PIPE FLASHING MUST HAVE INTACT RIB AT THE TOP EDGE REGARDLESS OF PIPE DIAMETER.
4. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH TPO REINFORCED MEMBRANE / TPO CUT-EDGE SEALANT. REFER TO DETAIL U8B.
5. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

PRE-MOLDED PIPE FLASHING

MAXIMUM WARRANTY: 30 YEARS

TPO

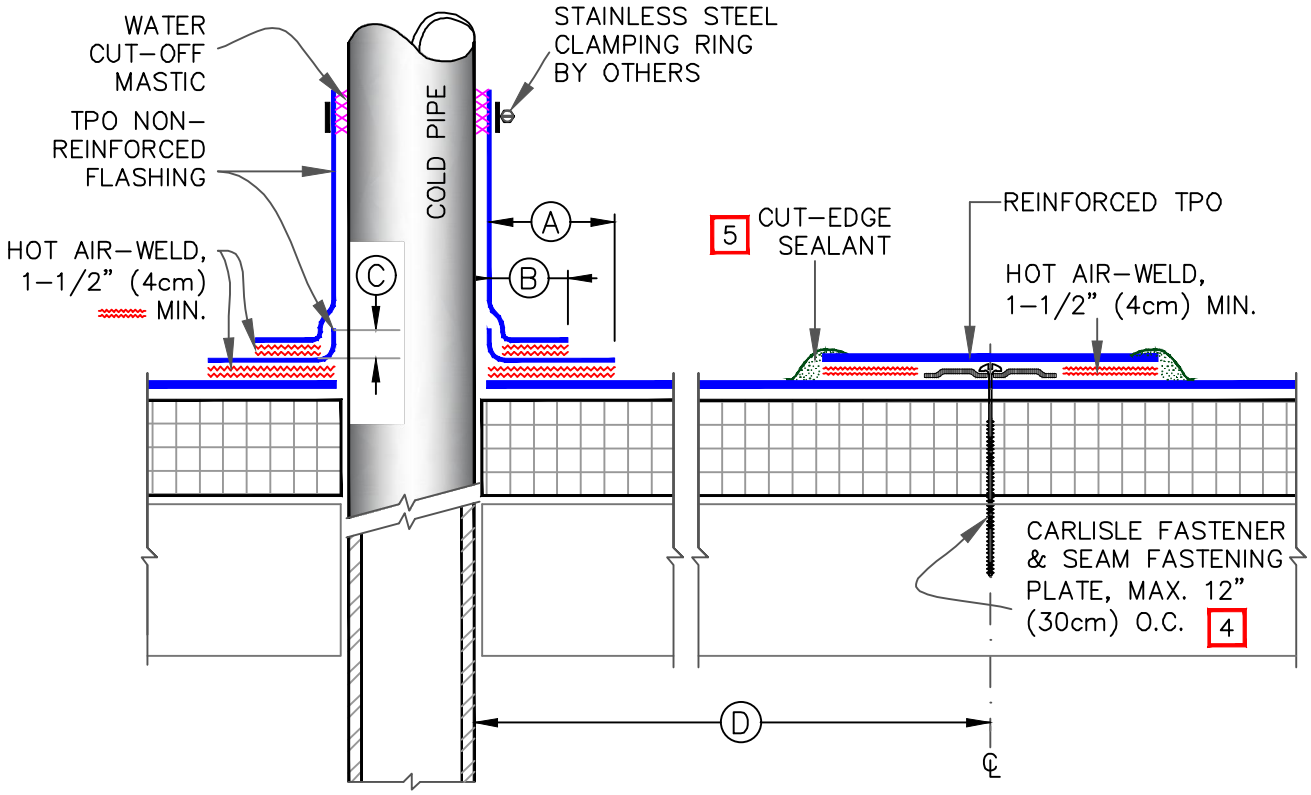
DETAIL NO. U-8A

U (Universal Detail)

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CAUTION

DETAIL NOT FOR USE ON 25 OR 30-YEAR WARRANTY PROJECT. PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE PIPE FLASHINGS SHALL CONFORM WITH TPO UNIVERSAL DETAILS U-8A, U-8C OR U-8D.



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING FIELD FABRICATED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).
3. TPO NON-REINFORCED FLASHING WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2" (4cm) VERTICAL HOT AIR WELD. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR PIPES WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (15cm) IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
4. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

DIMENSIONS		cm	
A	1-1/2"	4	TO
	2"	5	
B	1"	2.5	MIN.
C	1/2"	1.5	MIN.
D	12"	30	APPROX.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

FIELD-FABRICATED PIPE FLASHING

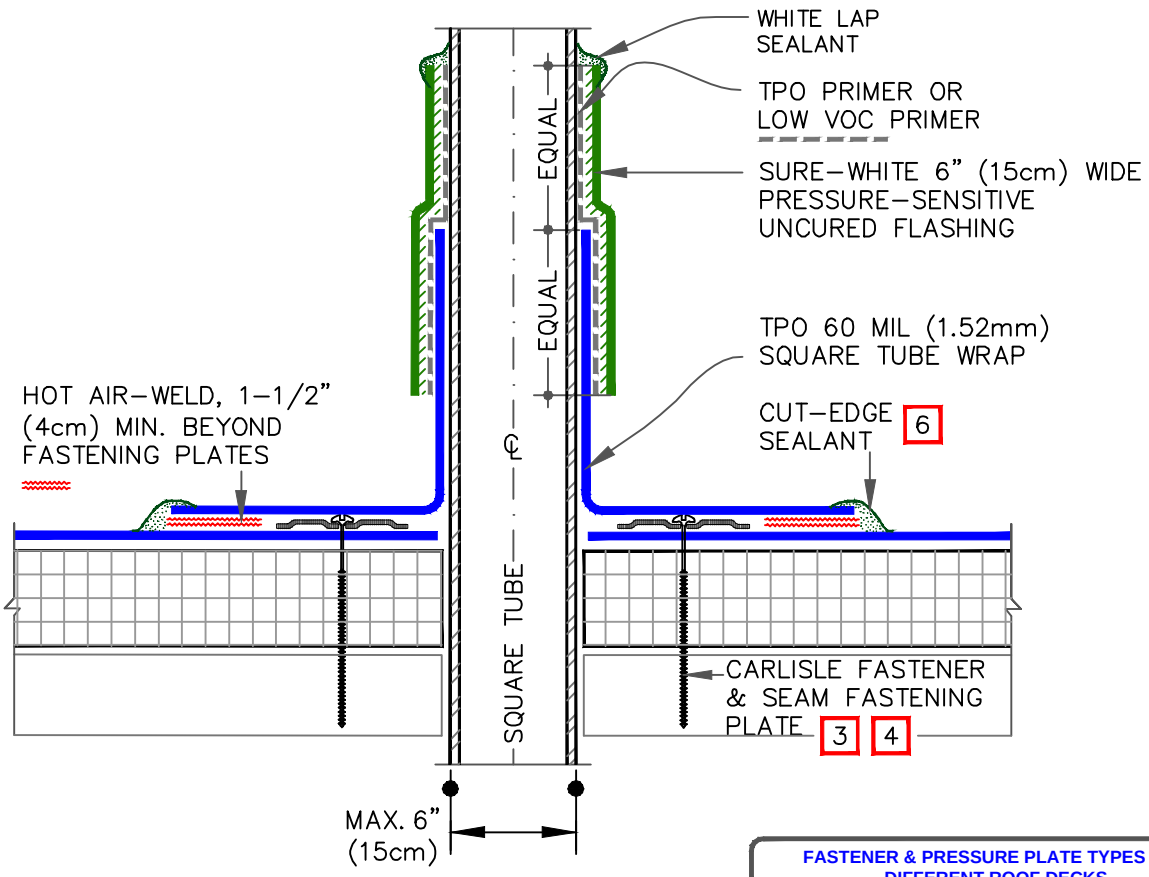
MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO. U-8B

U (Universal Detail)

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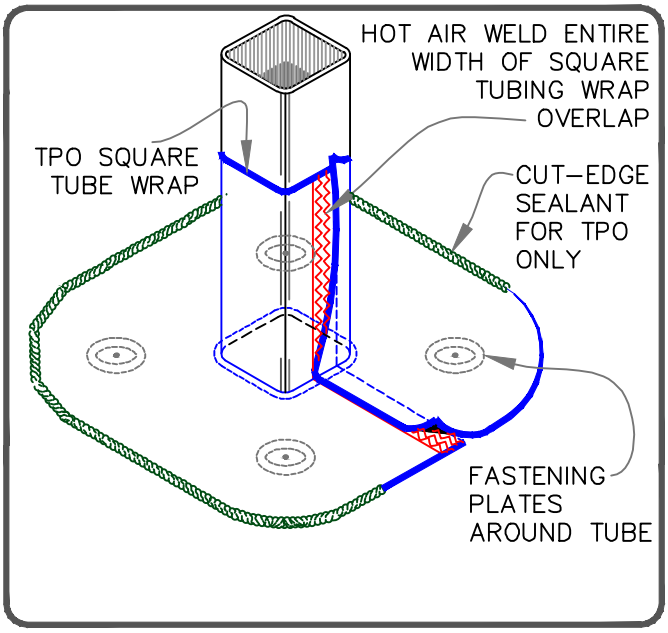


FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE-FABRICATED SQUARE TUBE WRAP.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).
3. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR TUBE SIDE DIMENSIONS UP TO 6" (15cm).
4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEM. SEE TABLE FOR MF SYSTEM.
5. T-JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY, FOR ADDITIONAL COLORS IT IS REQUIRED TO COVER T-JOINTS.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.



CARLISLE SYNTEC SYSTEMS

CFA CERTIFIED PRE-FABRICATED SQUARE TUBE WRAP

MAXIMUM WARRANTY: 30 YEARS

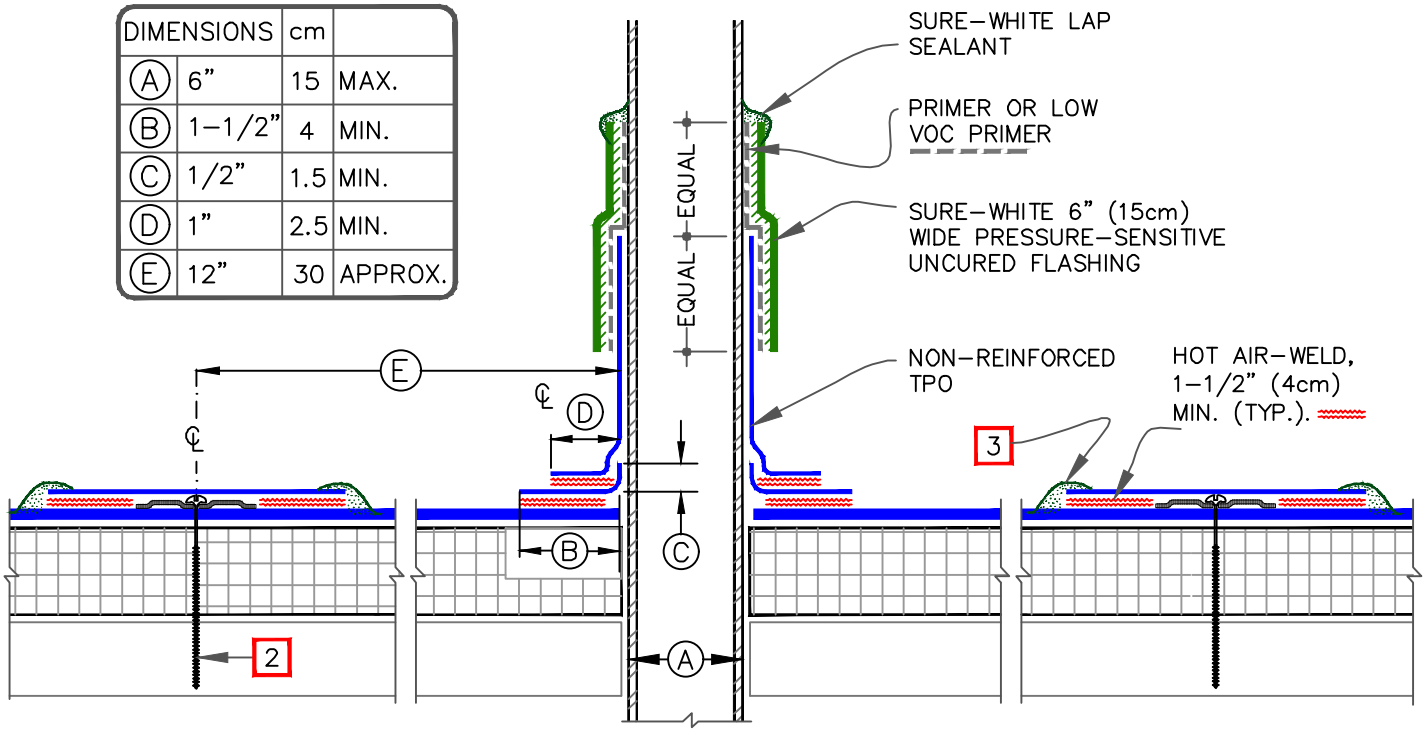
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DETAIL NO. U-8C

U (Universal Detail)

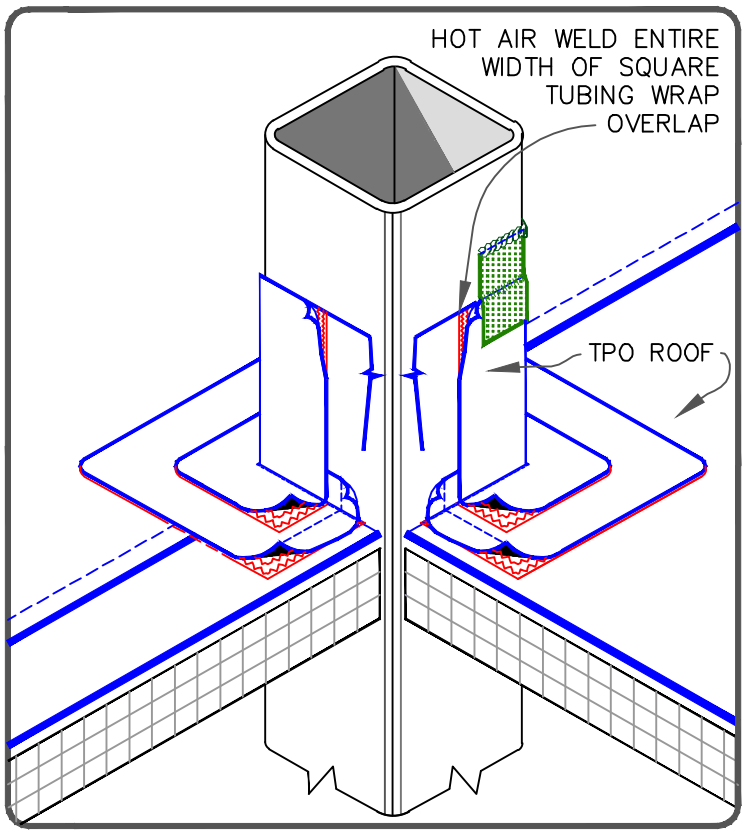
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DIMENSIONS		cm	
(A)	6"	15	MAX.
(B)	1–1/2"	4	MIN.
(C)	1/2"	1.5	MIN.
(D)	1"	2.5	MIN.
(E)	12"	30	APPROX.



FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PRE–FABRICATED SQUARE TUBE WRAP.
2. CARLISLE FASTENERS & SEAM FASTENING PLATES FOR MECHANICALLY FASTENED SYSTEM (NOT REQUIRED ON ADHERED SYSTEM). SEE TABLE ABOVE.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

FIELD–FABRICATED SQUARE TUBE FLASHING

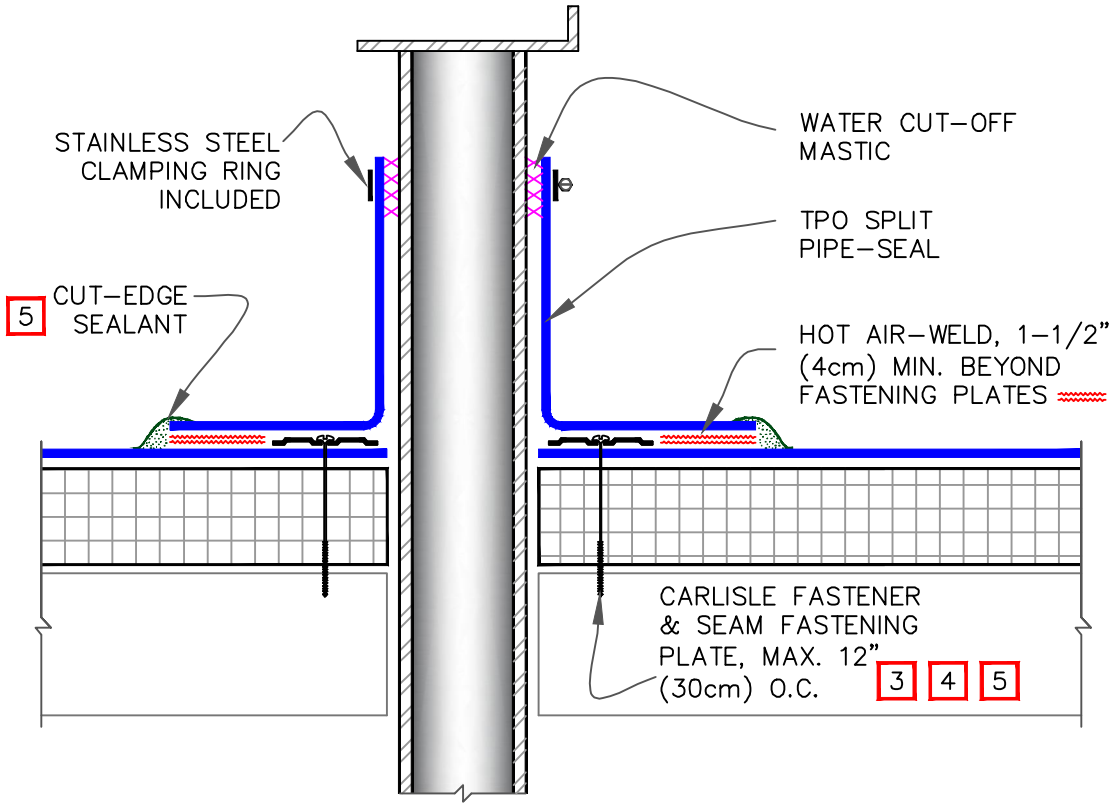
MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO. U–8D

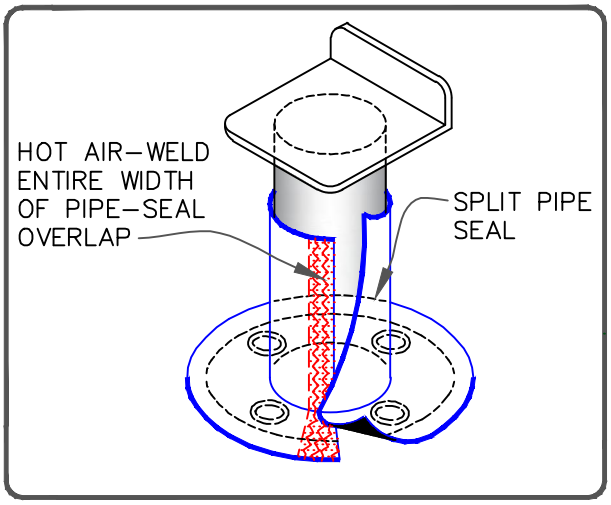
U (Universal Detail)

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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 160°F (71°C).
3. INSTALL A MINIMUM OF 4 FASTENERS AND PLATES AROUND THE PIPE, EQUALLY SPACED. IF FASTENERS AND PLATES CANNOT BE INSTALLED AS SHOWN, THEY MAY ALSO BE POSITIONED OUTSIDE THE PIPE MAXIMUM 12" (30cm) O.C. AND FLASHED WITH TPO REINFORCED MEMBRANE/CUT–EDGE SEALANT. REFER TO DETAIL U–8B.
4. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (46cm).
5. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE ONLY.
6. T–JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY PREFABRICATED ACCESSORIES. FOR ALL ADDITIONAL COLORS IT IS REQUIRED TO COVER T–JOINTS.



CARLISLE SYNTEC SYSTEMS

CFA CERTIFIED PRE–FABRICATED SPLIT PIPE SEAL

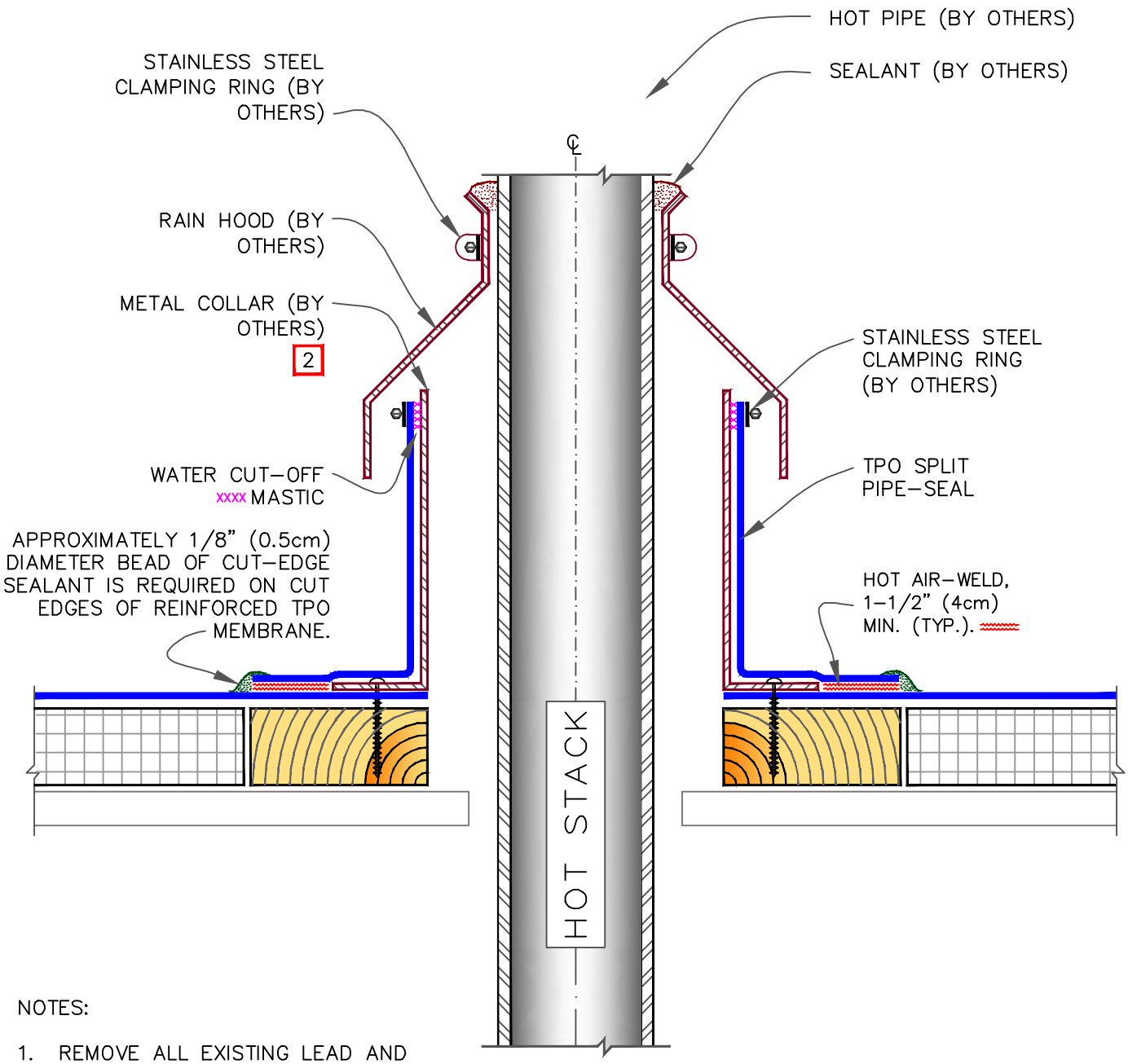
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–8E

U (Universal Detail)

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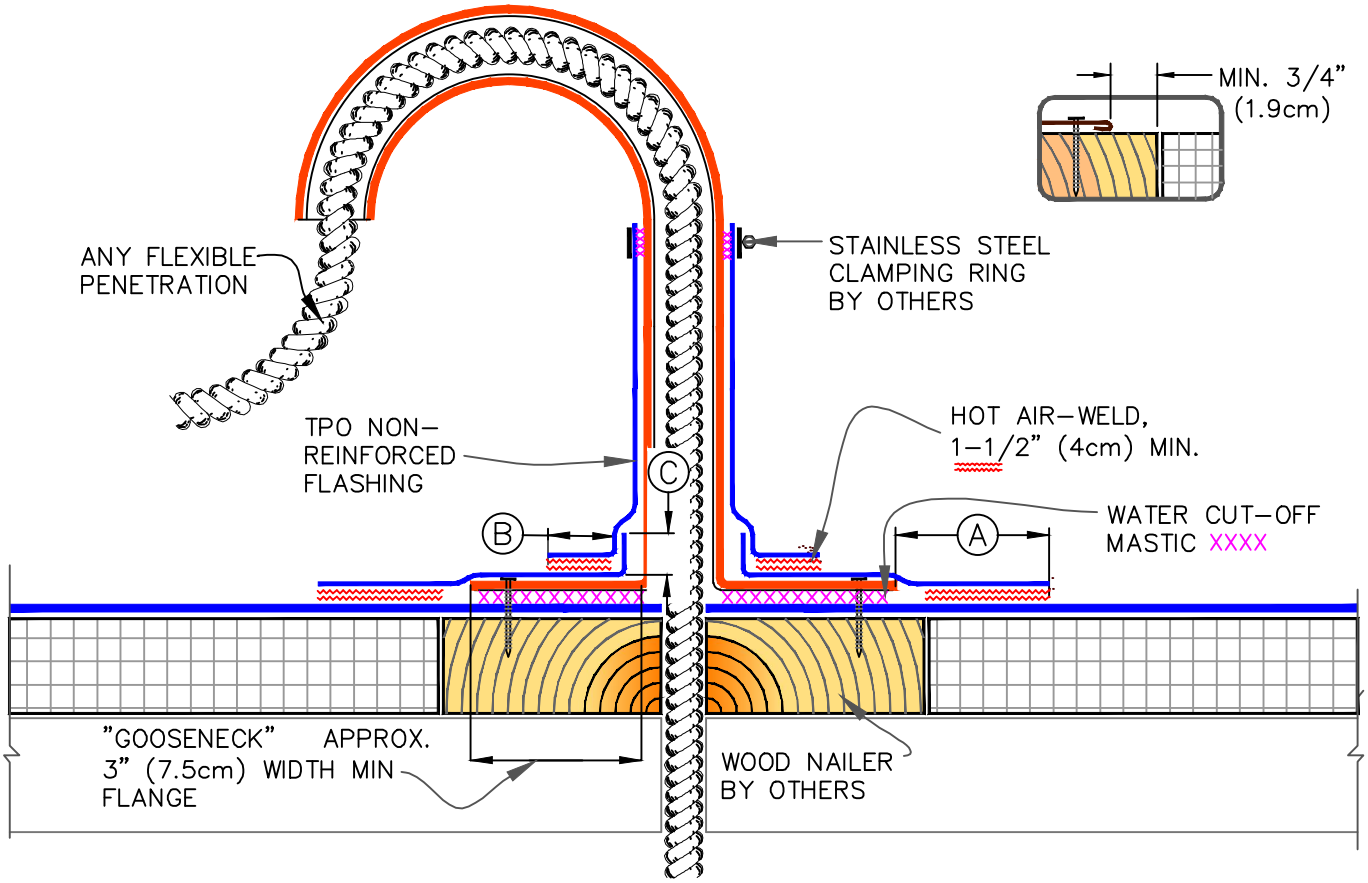
NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING PIPE FLASHING.
2. TEMPERATURE OF THE METAL COLLAR MUST NOT EXCEED 160°F (71°C).
3. T–JOINT COVERS ARE NOT REQUIRED ON WHITE, TAN OR GRAY, FOR ADDITIONAL COLORS IT IS REQUIRED TO COVER T–JOINTS.

CFA (CERTIFIED FABRICATED ACCESSORIES)

CARLISLE SYNTEC SYSTEMS	CFA CERTIFIED HOT PIPE FLASHING	DETAIL NO. U–8F
	MAXIMUM WARRANTY: 30 YEARS	U (Universal Detail)

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NOTES:

1. REMOVE ALL EXISTING LEAD AND FLASHING MATERIAL BEFORE INSTALLING FIELD FABRICATED PIPE FLASHING.
2. TEMPERATURE OF THE PIPE PENETRATION MUST NOT EXCEED 160°F (71°C).
3. TPO NON-REINFORCED FLASHING WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2" (4cm) VERTICAL HOT AIR WELD. INSTALL A MINIMUM OF 4 SEAM FASTENING PLATES FOR PIPES WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL SEAM FASTENING PLATES WILL BE REQUIRED FOR PIPES GREATER THAN 6" (15cm) IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
4. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18" (50cm).

DIMENSIONS		cm	
A	1-1/2"	4	TO
	2"	5	
B	1"	2.5	MIN.
C	1/2"	1.5	MIN.

CARLISLE SYNTEC SYSTEMS

FLEXIBLE PENETRATION

MAXIMUM WARRANTY: 20 YEARS

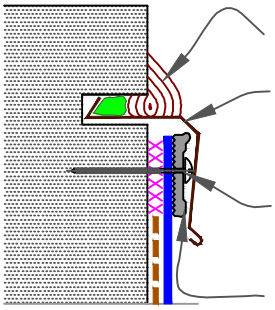
TPO

DETAIL NO. U-8G

U (Universal Detail)

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9A MECHANICAL TERMINATION WITH COUNTER FLASHING



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

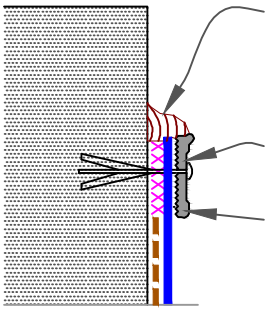
METAL COUNTER–FLASHING WITH LEAD WEDGES, AS REQUIRED (BY OTHERS).

THREADED FASTENERS OR CARLISLE HP TERM BAR NAIL–IN. 6"(15cm) O.C. FASTENING RECOMMENDED.

CARLISLE TERMINATION BAR

WARRANTY UP TO 30 YEARS | SEE INSET A

9B MECHANICAL TERMINATION



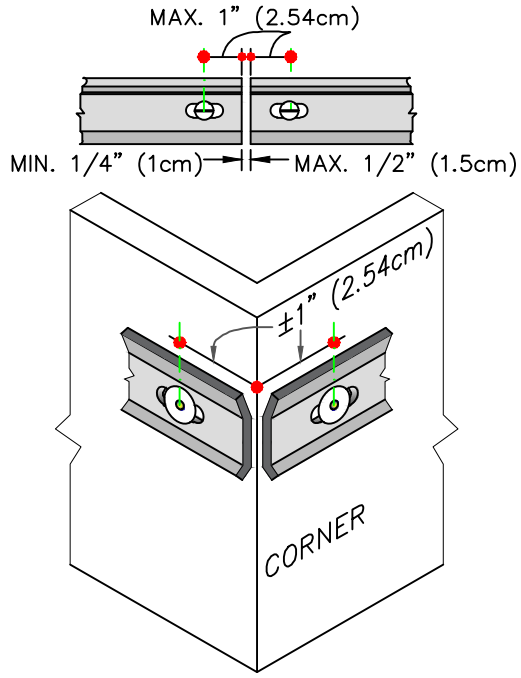
CARLISLE UNIVERSAL SINGLE–PLY SEALANT OR SEALANT (BY OTHERS)

CARLISLE HP TERM BAR NAIL–IN. 6"(15cm) O.C. FASTENING RECOMMENDED.

CARLISLE TERMINATION BAR

WARRANTY UP TO 20 YEARS | SEE INSET A

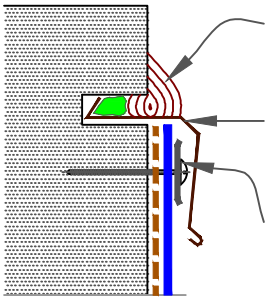
INSET A



NOTES:

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

9C COUNTER FLASHING TERMINATION



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

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

FASTEN MEMBRANE @ 12" (30cm) O.C. MAX. USE GALVANIZED WASHERS, MIN. 1", (2.54cm) DIAMETER

NOTE:

1. WHEN MECHANICAL FASTENERS ARE USED TO PENETRATE THE METAL COUNTER–FLASHING, USE EPDM WASHERS, APPLY WATER CUT–OFF MASTIC UNDER THE COUNTER–FLASHING OR CAULK THE FASTENER HEADS.

WARRANTY UP TO 10 YEARS

APPLICABLE BONDING ADHESIVE

xxx WATER CUT–OFF MASTIC– MUST BE HELD UNDER CONSTANT COMPRESSION.

CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 1 OF 3)

WARRANTY AS NOTES FOR EACH DETAIL

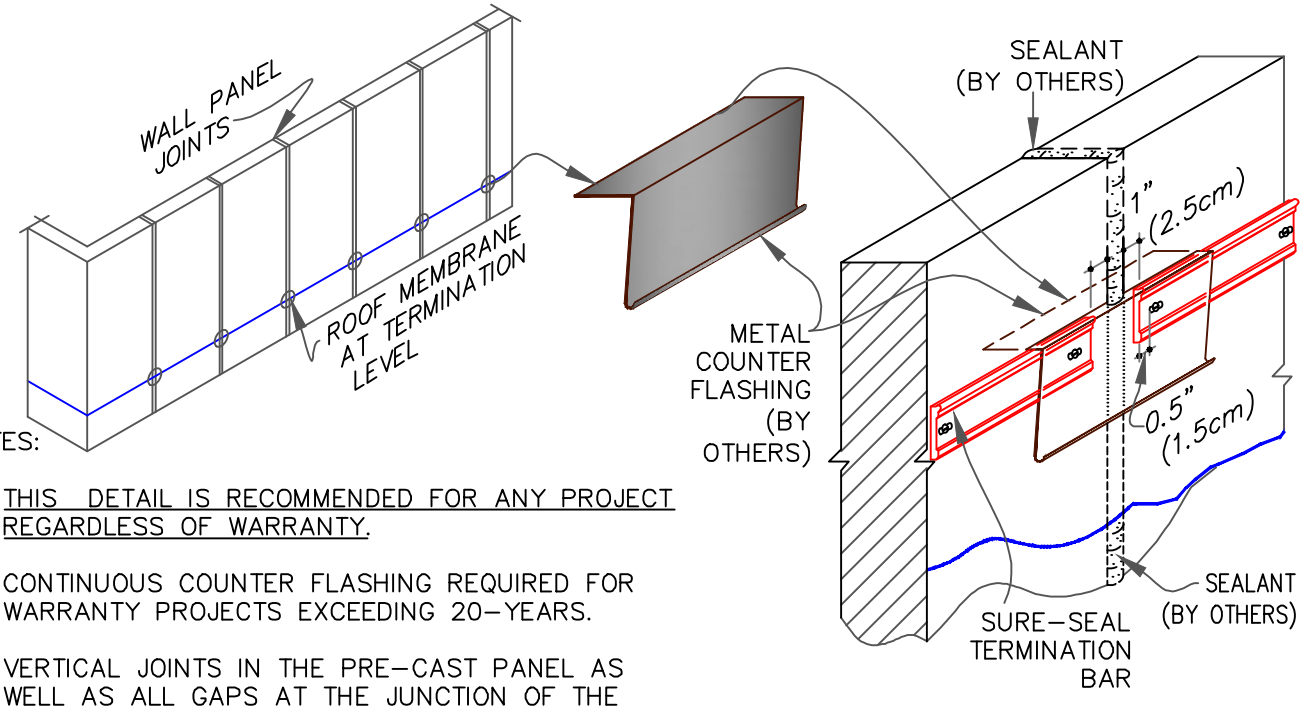
TPO

DETAIL NO. U–9

U (Universal Detail)

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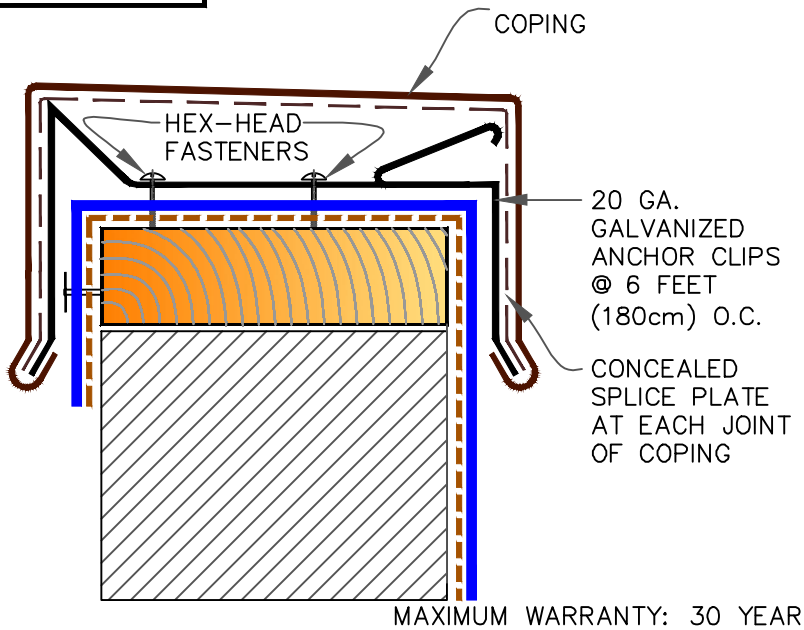
9D MECHANICAL TERMINATION AT VERTICAL JOINTS



NOTES:

1. THIS DETAIL IS RECOMMENDED FOR ANY PROJECT REGARDLESS OF WARRANTY.
2. CONTINUOUS COUNTER FLASHING REQUIRED FOR WARRANTY PROJECTS EXCEEDING 20-YEARS.
3. VERTICAL JOINTS IN THE PRE-CAST PANEL AS WELL AS ALL GAPS AT THE JUNCTION OF THE TILT-UP PANEL AND ROOF DECK MUST BE FULLY SEALED TO PREVENT AIR INFILTRATION.
4. APPLY ON HARD SMOOTH SURFACE ONLY.

9E SecurEdge & SecurEdge 300 COPINGS



NOTES:

1. MEMBRANE MUST BE EXTENDED AT CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE. REFER TO 3D DETAIL ON DETAIL U-9F.
2. REFER TO SecurEdge COPING INSTALLATION INSTRUCTION MANUAL FOR STEP-BY-STEP INSTRUCTION PROCEDURES.

MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

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

CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 2 OF 3)

WARRANTY AS NOTES FOR EACH DETAIL

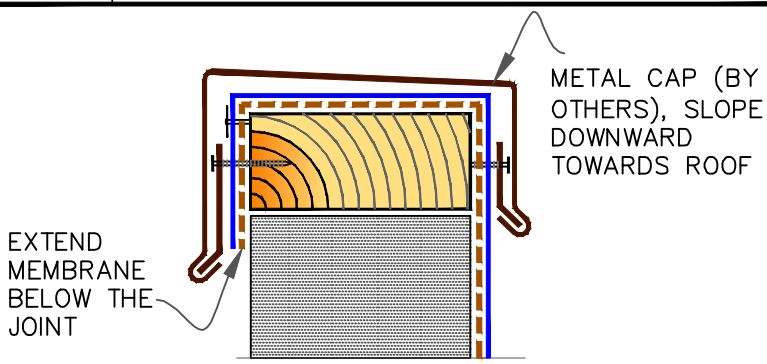
TPO

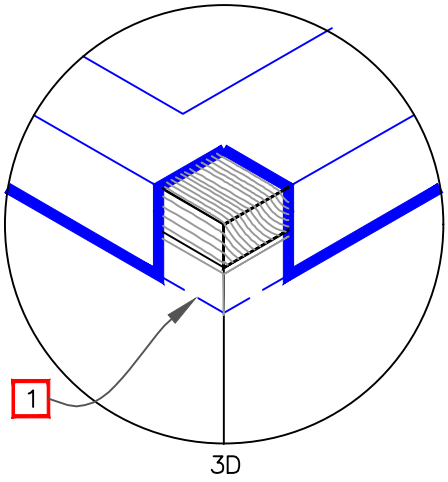
DETAIL NO. U-9

U (Universal Detail)

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9F SHEET METAL COPING (BY OTHERS)

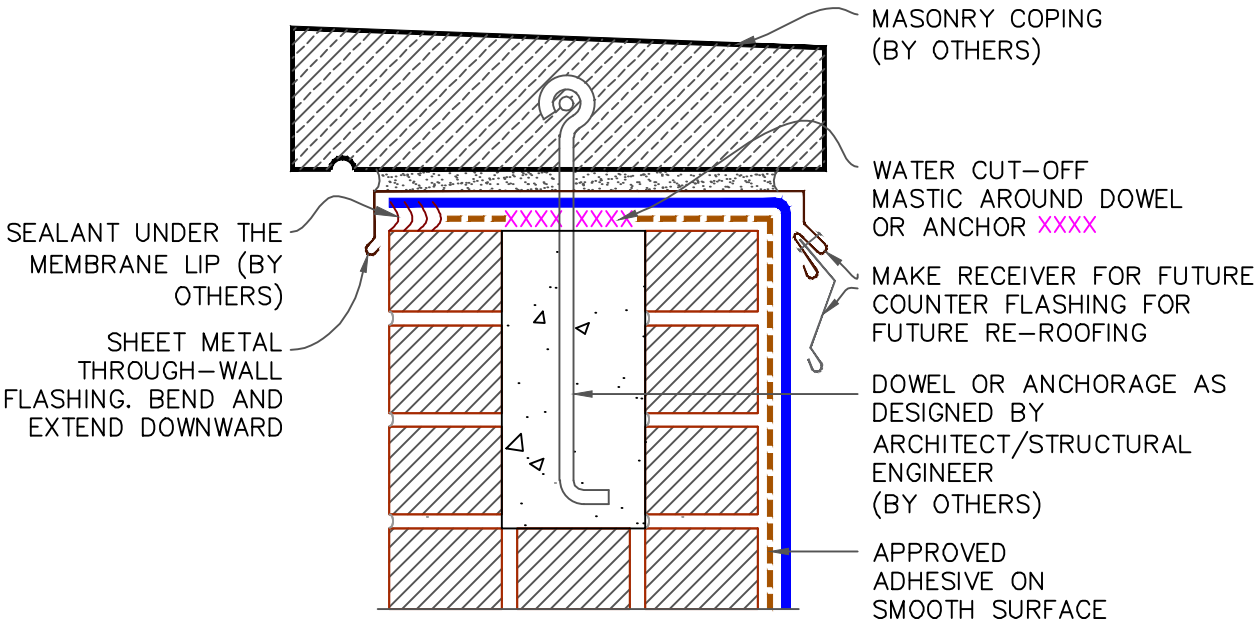




NOTES:

1. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE TOP WALL SURFACE.
2. WARRANTY AS PROVIDED (BY OTHERS).

9G MASONRY COPINGS (BY OTHERS)



MAXIMUM WARRANTY: 30 YEARS

APPLICABLE BONDING ADHESIVE

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

CARLISLE SYNTEC SYSTEMS

MEMBRANE TERMINATIONS (PAGE 3 OF 3)

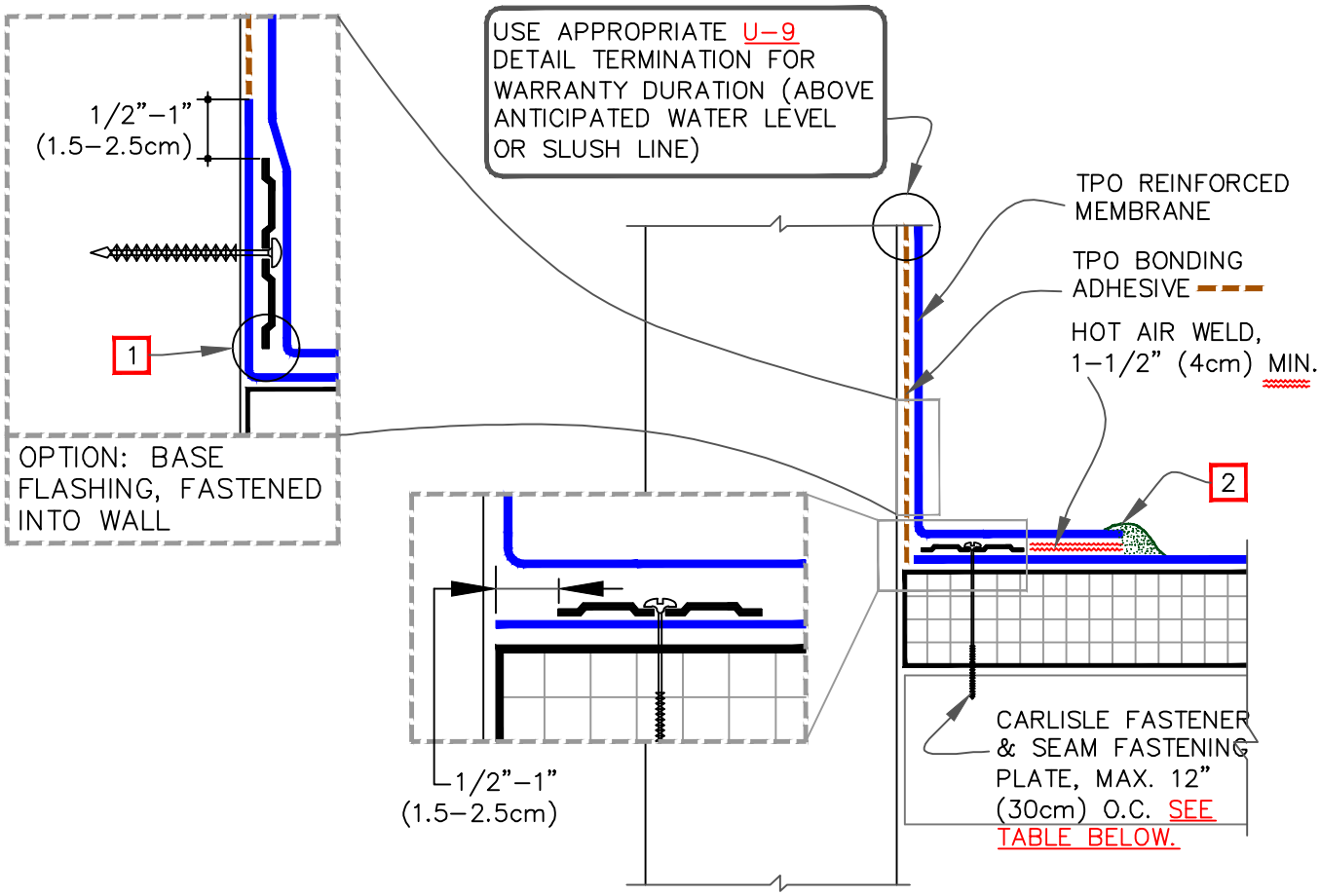
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-9

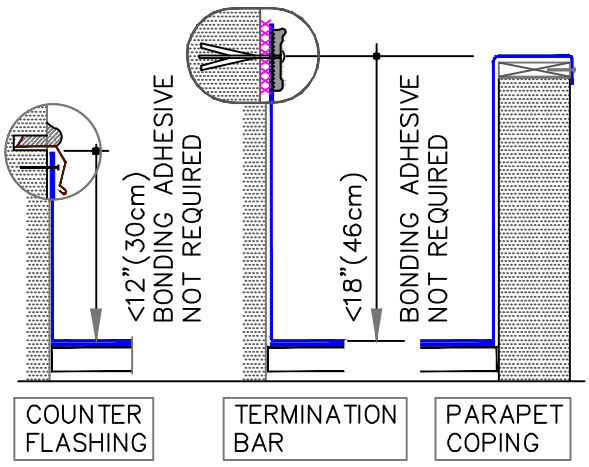
U (Universal Detail)

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FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP–X	PIRANHA
	B	HP–XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD–10	PIRANHA
	B	HD 14–10	PIRANHA



NOTES:

1. CARE MUST BE TAKEN TO PRESS THE MEMBRANE TIGHTLY INTO THE ANGLE CHANGE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE MEMBRANE IN THE PROPER POSITION.

2. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

PARAPET BASE FLASHING: FASTENED INTO DECK OR WALL

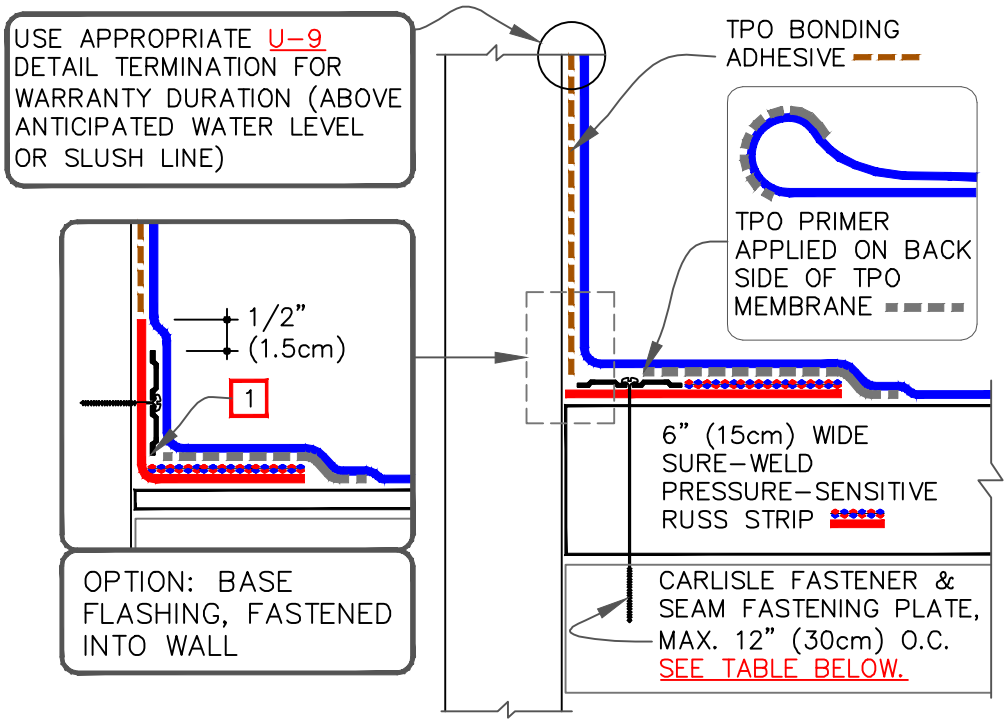
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–12A

U (Universal Detail)

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FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

NOTE:

1. IN A CASE WHERE FASTENERS MUST BE FASTENED INTO THE VERTICAL SURFACE, CARE MUST BE TAKEN TO PRESS THE PRESSURE-SENSITIVE RUSS, AS WELL AS THE MEMBRANE, TIGHTLY INTO THE ANGLE CHANGE TO MAXIMIZE CONTACT BETWEEN THE TAPE AND MEMBRANE. MEMBRANE MUST BE ADHERED TO THE FULL WIDTH OF THE TAPE. PLACING THE PLATES TIGHT INTO THE ANGLE CHANGE WILL HELP HOLD THE PRESSURE-SENSITIVE RUSS IN THE PROPER POSITION.

RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING WITH PRESSURE SENSITIVE RUSS, PAGE 1 OF 2

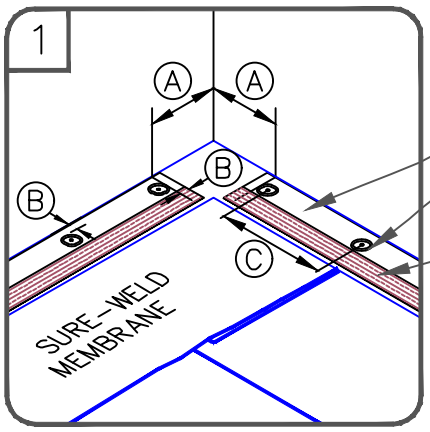
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-12B

U (Universal Detail)

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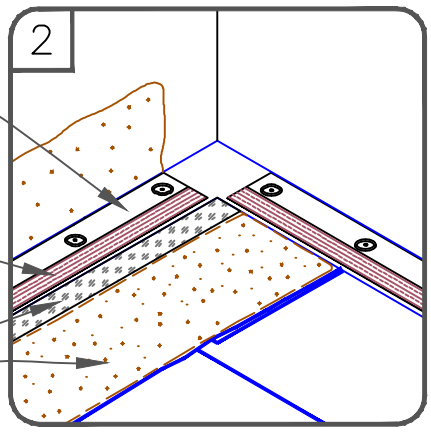
6" (15cm) WIDE PS RUSS

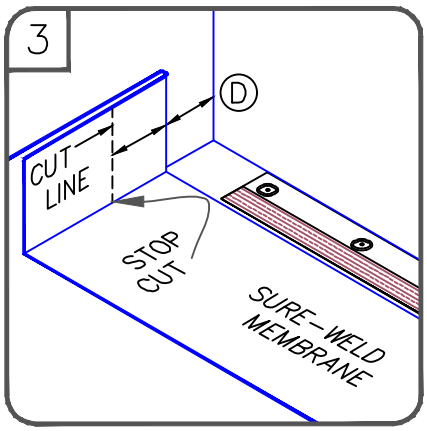
CARLISLE FASTENER & SEAM FASTENING PLATE, MAX. 12" (30cm) O.C.

PRE-APPLIED PS TAPE

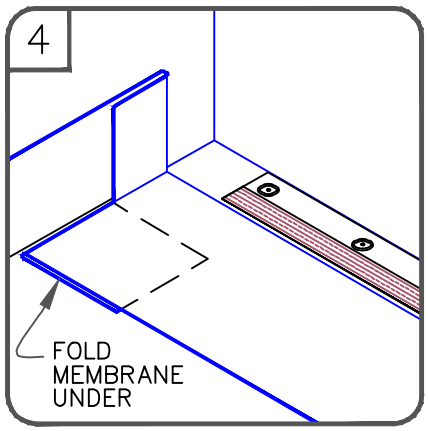
TPO PRIMER

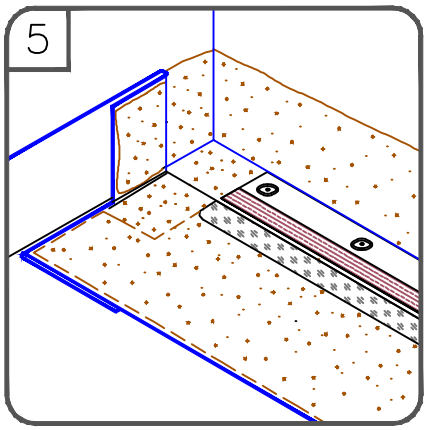
SURE-WELD BONDING ADHESIVE





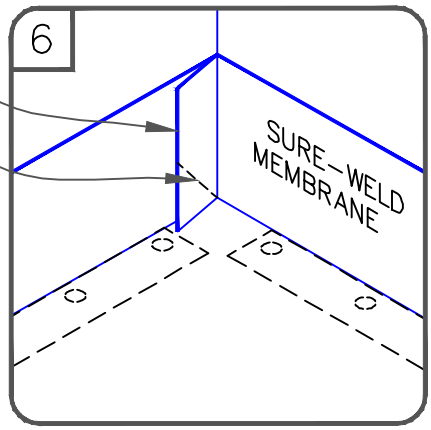
DIMENSIONS		cm	
A	6"	15	TO
	9"	23	
B	1/8"	0.5	MIN.
	1"	2.5	MAX.
C	12"	30	MIN.
D	6"	15	MIN.
E	1-1/2"	4	MIN.





HOT AIR WELD FLAP IN STEP 7

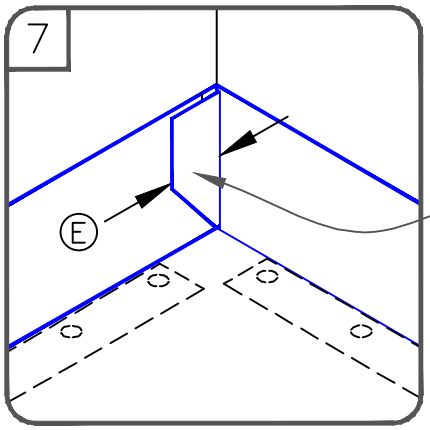
CUT AT 45°



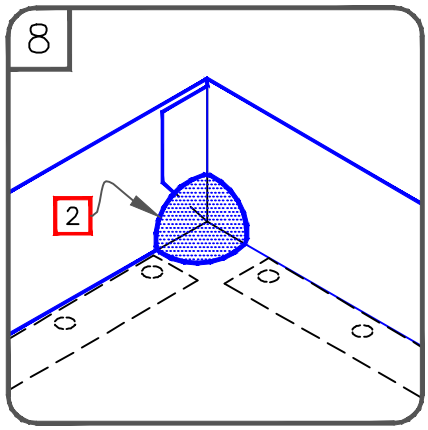
NOTES:

1. THE CUT SECTION OF VERTICAL MEMBRANE WILL BE FOLDED UNDER THE FIELD MEMBRANE AS SHOWN IN STEP 4.

2. APPLY INSIDE CORNER IN ACCORDANCE WITH CARLISLE DETAILS U-15A OR U-15B.



HOT AIR WELD



CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING WITH PRESSURE SENSITIVE RUSS, PAGE 2 OF 2

MAXIMUM WARRANTY: 30 YEARS

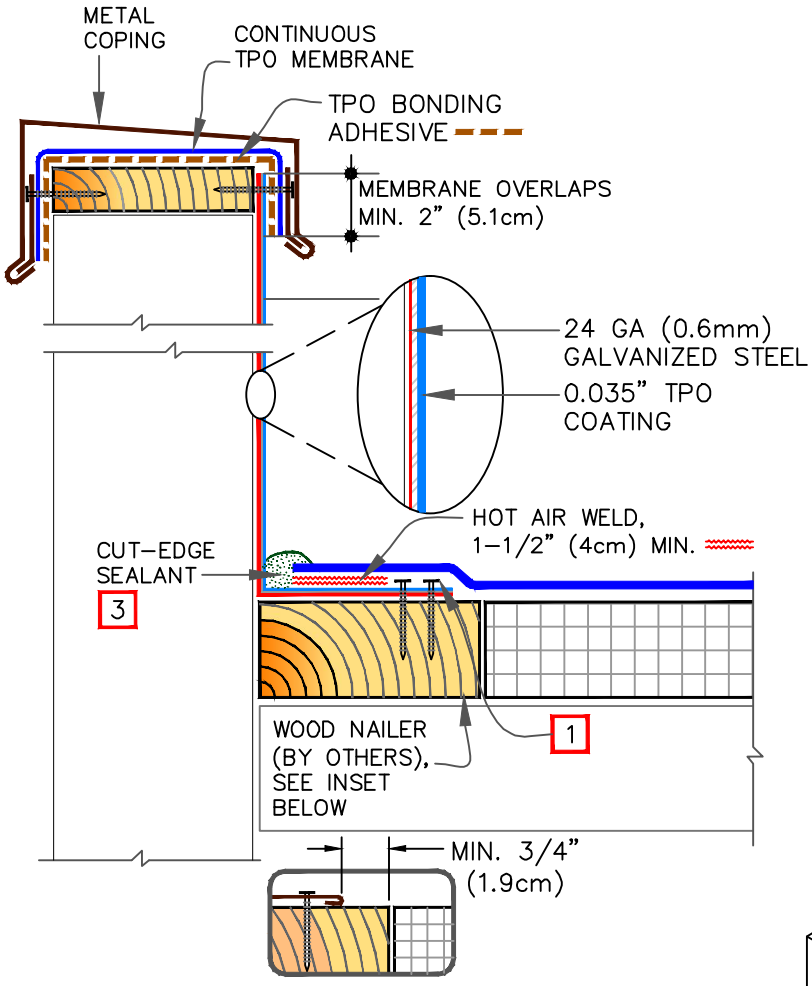
TPO

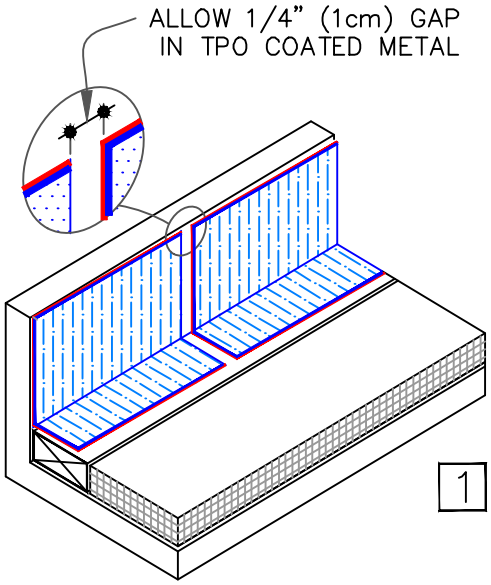
DETAIL NO.

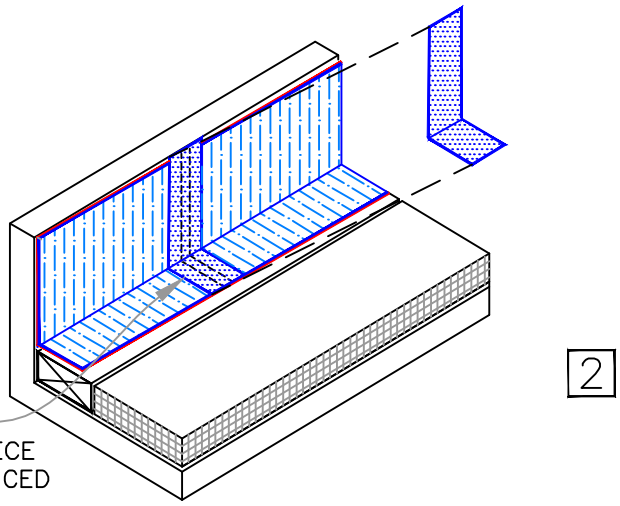
U-12B.1

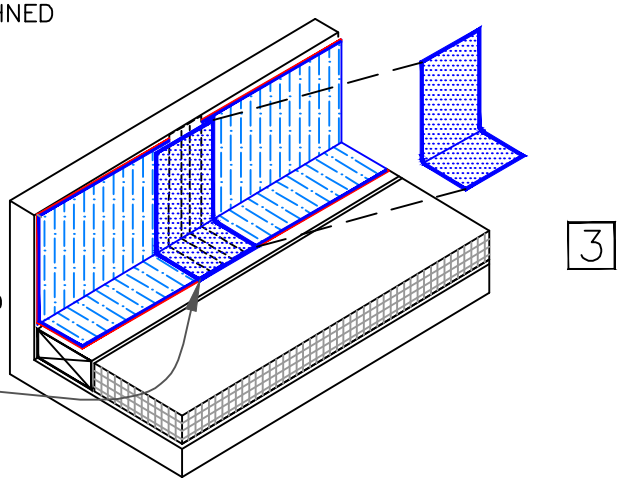
U (Universal Detail)

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NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. SEE U-15C FOR ADDITIONAL INFORMATION.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

TPO COATED METAL WALL FLASHING

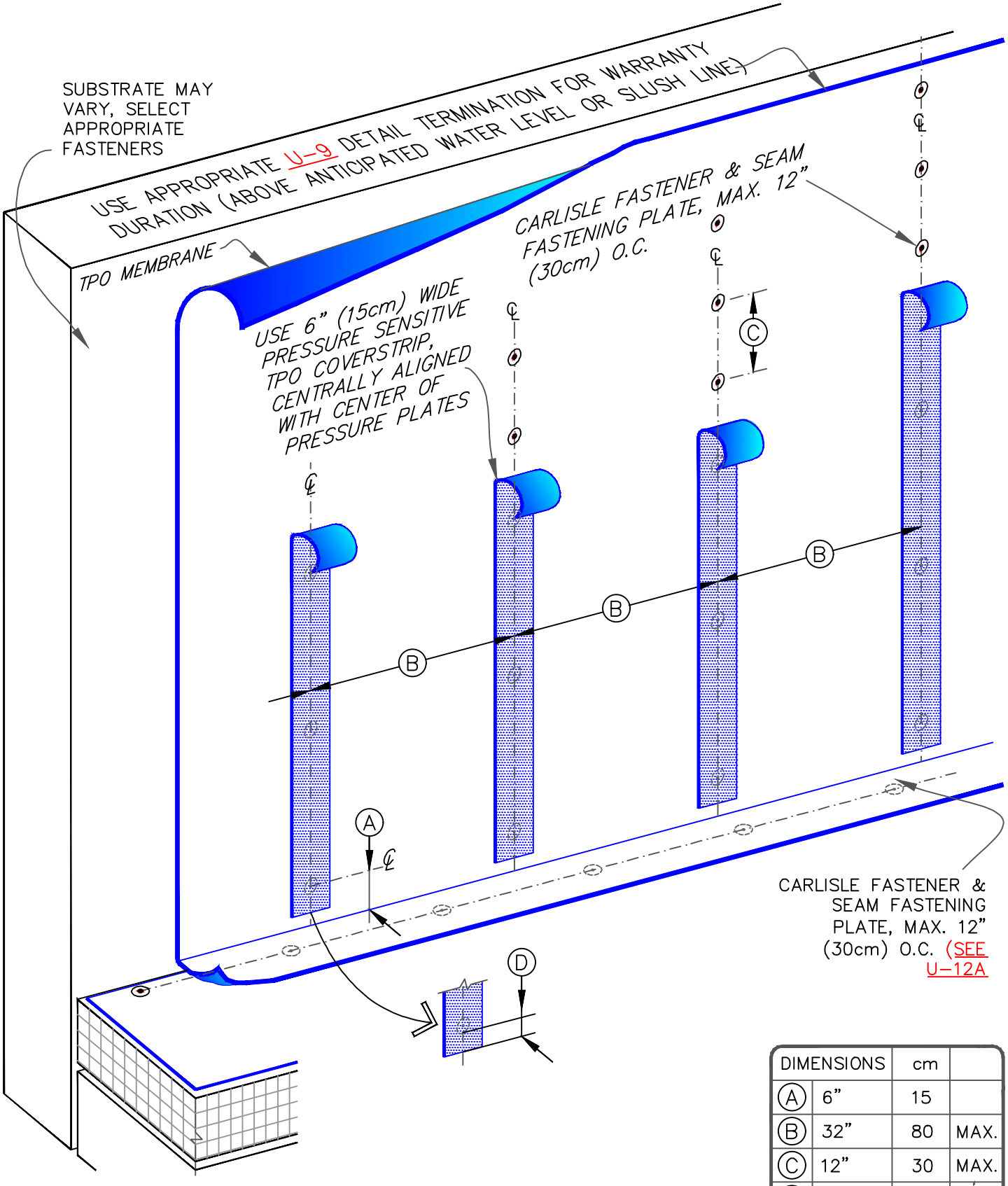
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-12C

U (Universal Detail)

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DIMENSIONS		cm	
A	6"	15	
B	32"	80	MAX.
C	12"	30	MAX.
D	3"	7.6	MIN.

CARLISLE SYNTEC SYSTEMS

PARAPET FLASHING / NO ADHESION – ANY HEIGHT OPTION

MAXIMUM WARRANTY: 30 YEARS

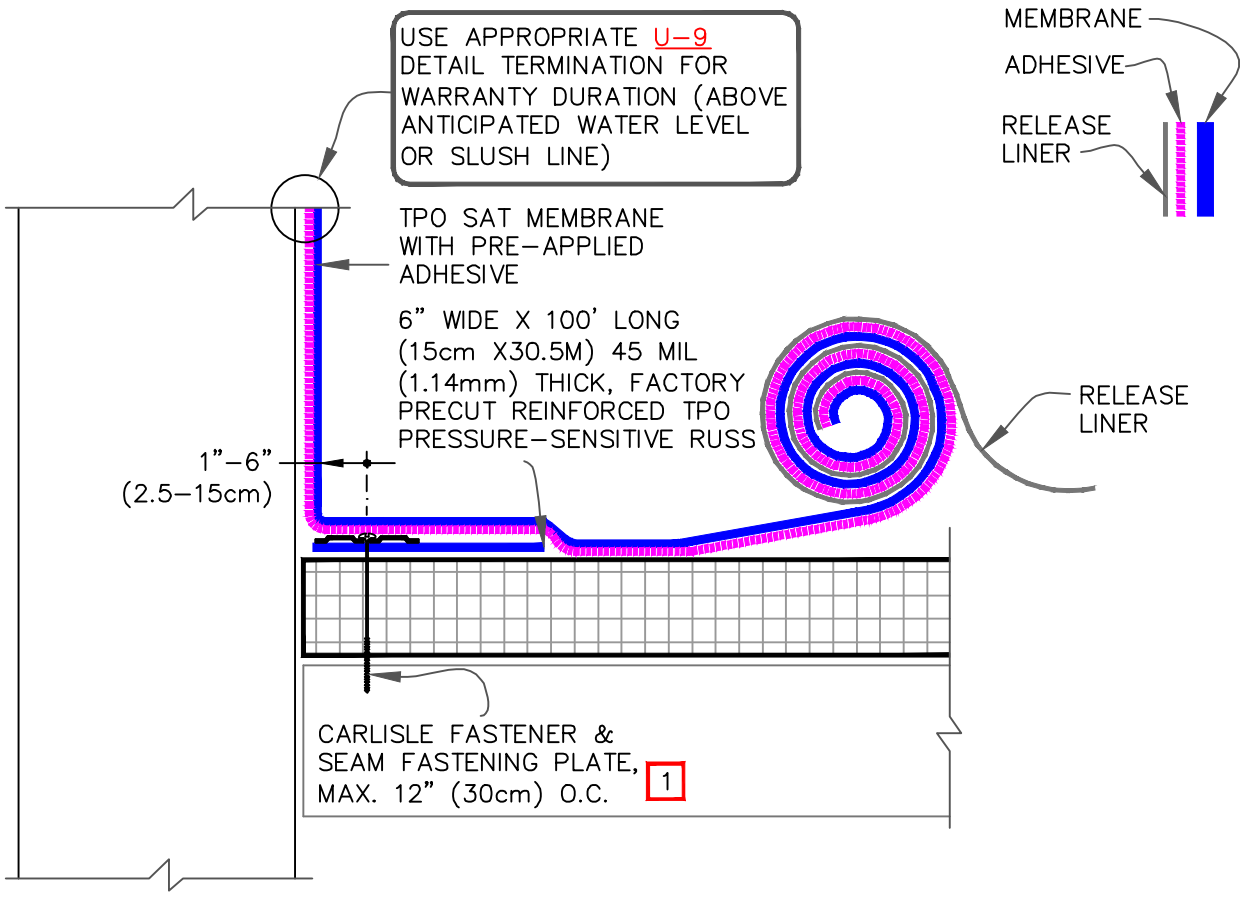
TPO

DETAIL NO. U–12F

U (Universal Detail)

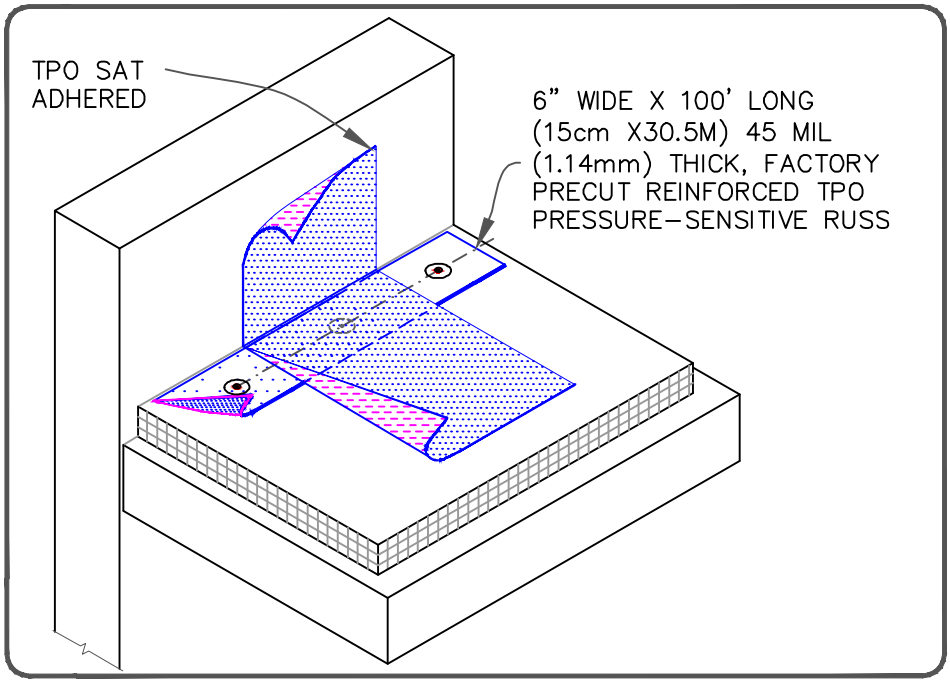
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TPO WITH SAT (SELF ADHERING TECHNOLOGY)



NOTE:

1. WIND SPEED GREATER THAN 90 MPH (145 KILOMETERS /HOURS)(40.3 METER PER SECOND) OR PROJECTS WITH 25 OR 30-YEAR WARRANTIES REQUIRE FASTENING @ 6"(15.2cm) O.C.



RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS

TPO SAT PARAPET FLASHING WITH TPO RUSS

MAXIMUM WARRANTY: 30 YEARS

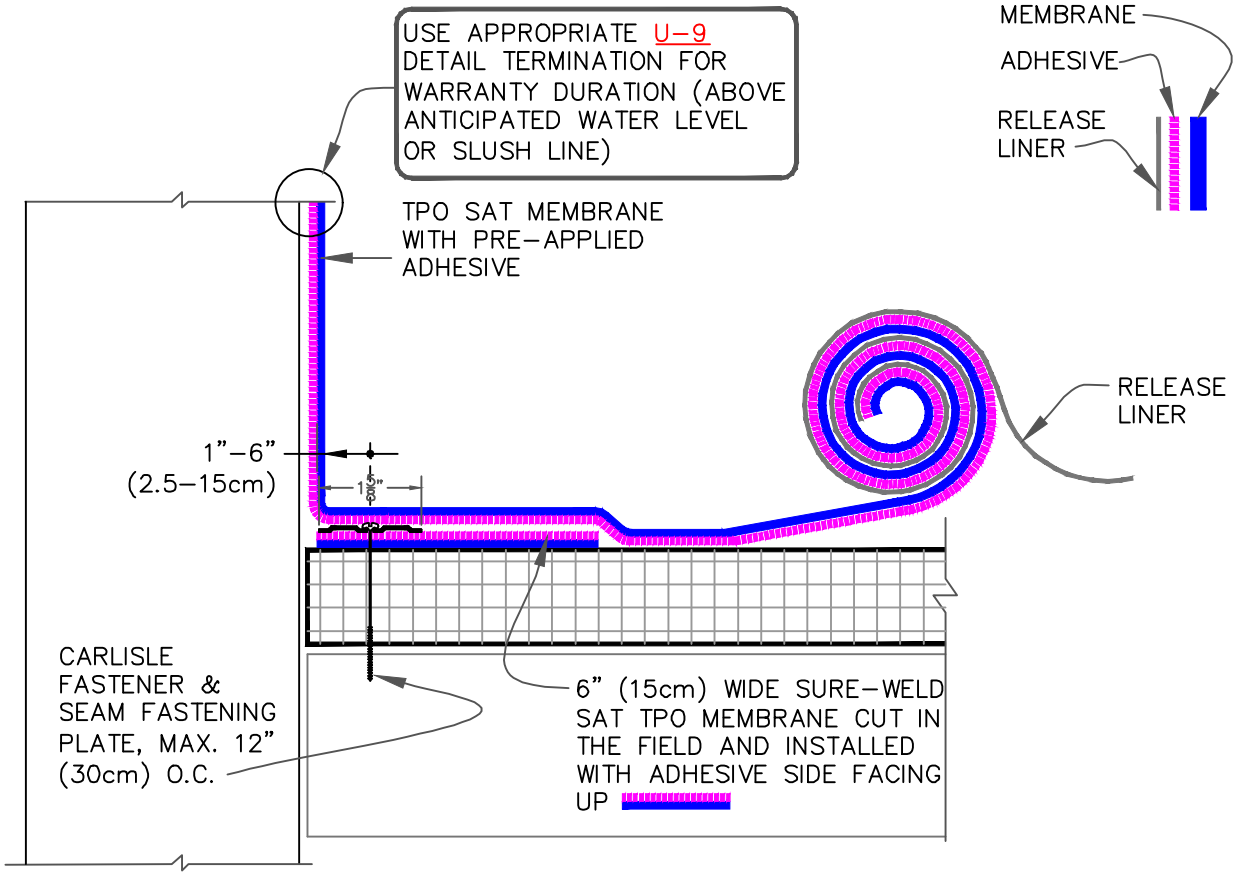
TPO

DETAIL NO. U-12G

U (Universal Detail)

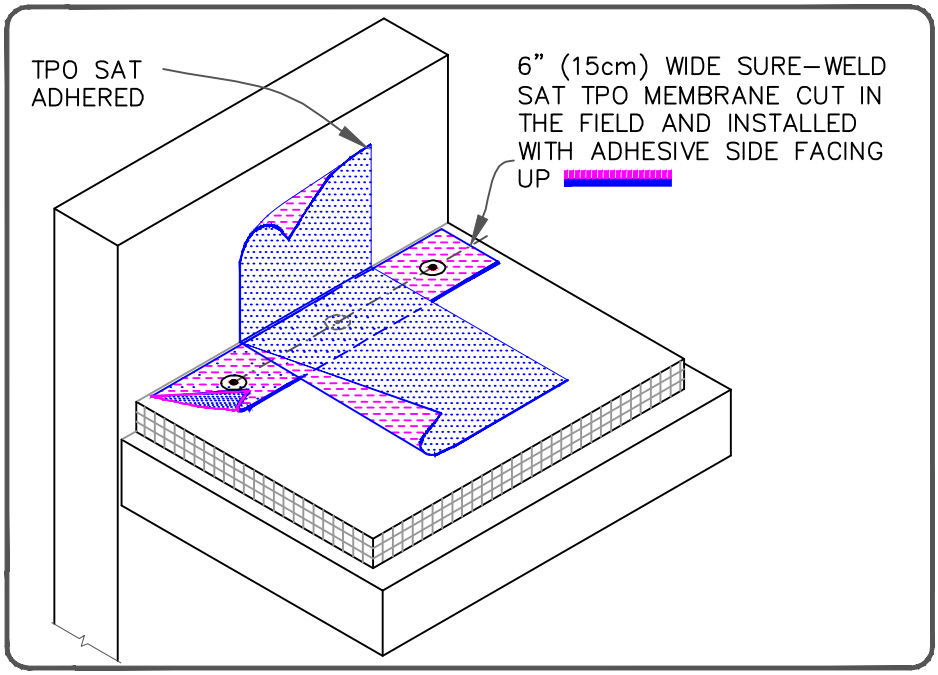
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TPO WITH SAT (SELF ADHERING TECHNOLOGY)



NOTE:

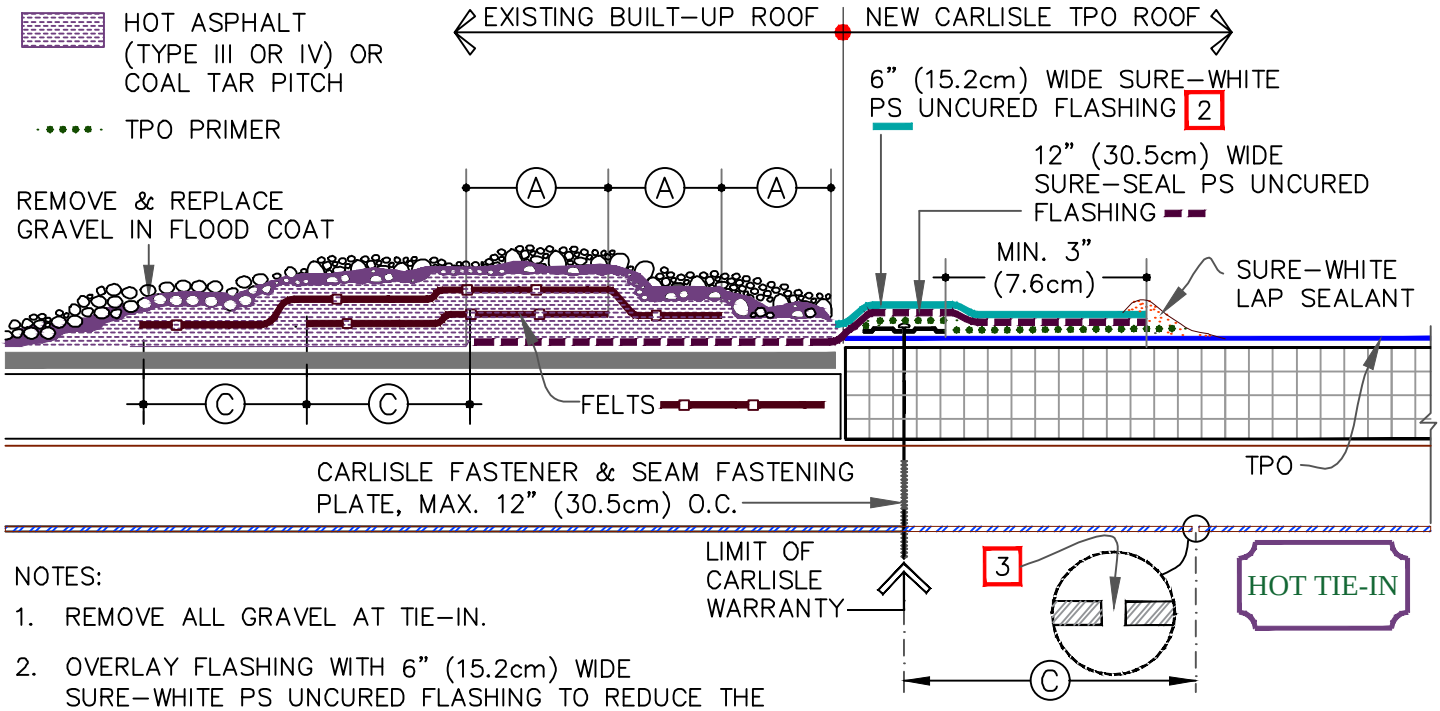
1. WIND SPEED GREATER THAN 90 MPH (145 KILOMETERS /HOURS)(40.3 METER PER SECOND) OR PROJECTS WITH 25 OR 30-YEAR WARRANTIES REQUIRE FASTENING @ 6"(15.2cm) O.C.



RUSS (REINFORCED UNIVERSAL SECUREMENT STRIP)

CARLISLE SYNTEC SYSTEMS	TPO SAT PARAPET FLASHING WITH SELF-ADHERING REINFORCED TPO MEMBRANE MAXIMUM WARRANTY: 30 YEARS	DETAIL NO. U-12H U (Universal Detail)

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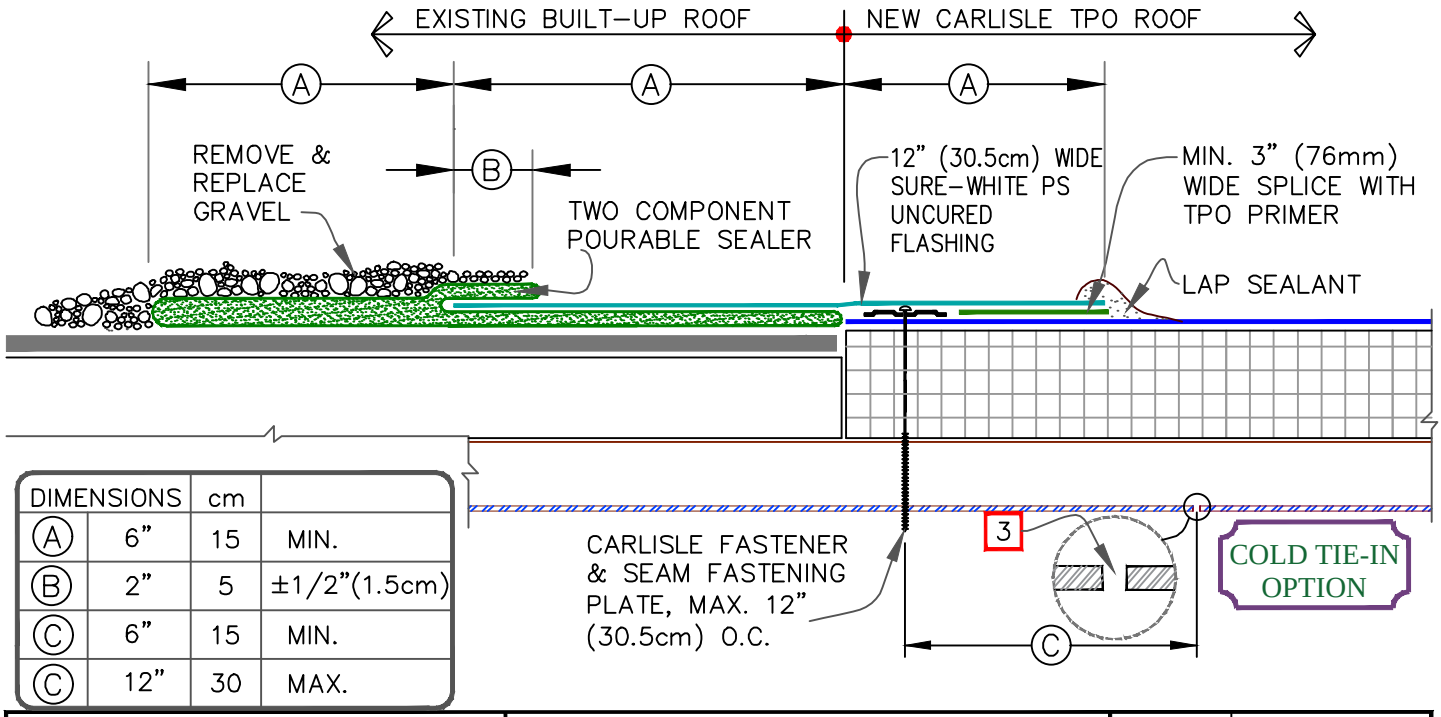


NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. OVERLAY FLASHING WITH 6" (15.2cm) WIDE SURE-WHITE PS UNCURED FLASHING TO REDUCE THE HEAT GAIN ON TPO MEMBRANE.
3. IF FLUTES ARE PERPENDICULAR TO THE TIE-IN DRILL A 3/8" (1cm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (15cm) MINIMUM TO 12" (30cm) MAXIMUM FROM THE SEAM FASTENING PLATE. HOLES MAY NOT BE REQUIRED IF DECK SLOPES DOWN TOWARDS EXISTING ROOF.
4. IF WATER PONDS OR FLOWS OVER TIE-IN FROM BUR SURFACE, USE DETAIL U-13B

FASTENER AND PLATE TYPES (STEEL DECK)

OPTIONS	FASTENER	PLATE
A	HP-X	PIRANHA
B	HP-XTRA	PIRANHA XTRA



DIMENSIONS		cm	
A	6"	15	MIN.
B	2"	5	±1/2"(1.5cm)
C	6"	15	MIN.
C	12"	30	MAX.

CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO BUILT-UP ROOFING OVER STEEL ROOF DECK

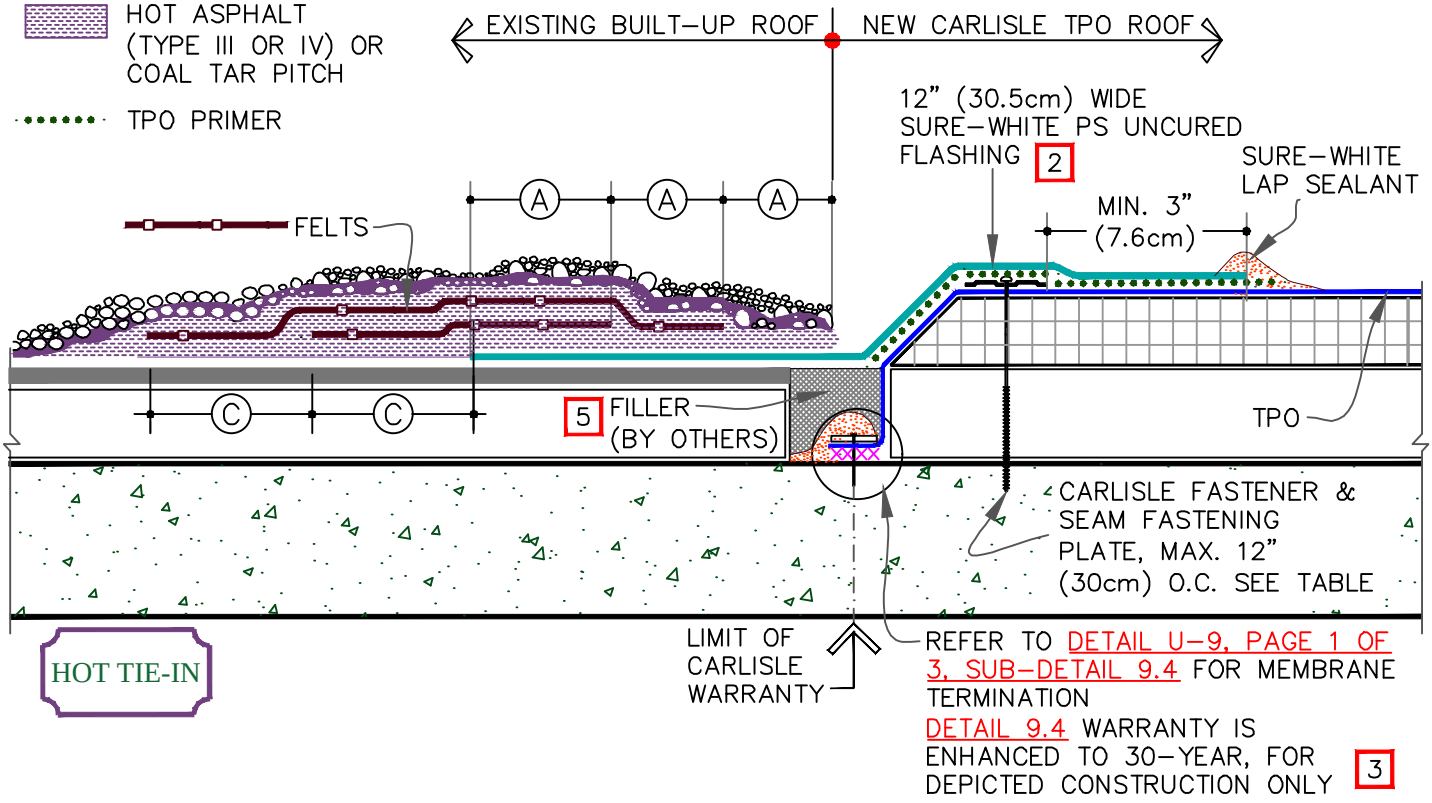
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-13A

U (Universal Detail)

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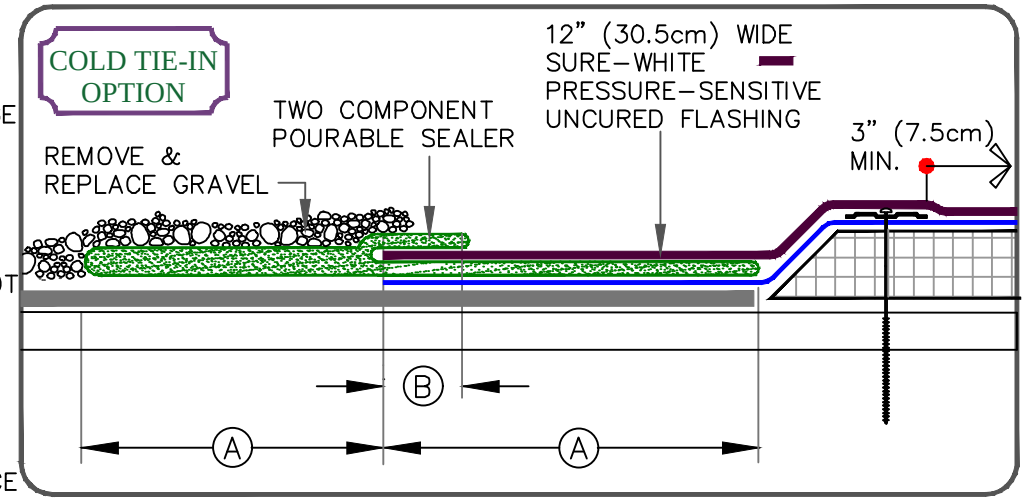
NOTES:

1. REMOVE ALL GRAVEL AT TIE-IN.
2. SPLICE TWO PIECES OF SURE-WHITE PRESSURE-SENSITIVE UNCURED FLASHING TOGETHER TO ACHIEVE DESIRED WIDTH.
3. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION.
4. CARLISLE IS NOT RESPONSIBLE FOR DAMAGE TO THE BUILT-UP ROOF OR STRUCTURAL DECK RESULTING FROM PONDED WATER; THIS DETAIL APPLIES TO RE-ROOFING WHEN A TEAR-OFF IS NOT SPECIFIED AND WAS DESIGNED TO PREVENT MIGRATION OF WATER WITHIN THE NEW ROOFING SYSTEM.
5. ACHIEVE SMOOTH SURFACE ON TOP.

FASTENER AND PLATE TYPE (STRUCTURAL CONCRETE DECK)

OPTION	FASTENER	PLATE
A	CD-10	PIRANHA
B	HD 14-10	PIRANHA

DIMENSIONS	cm	
(A) 6"	15	MIN.
(B) 2"	5	±1/2"(1.5cm)
(C) 6"	15	MIN.
(C) 12"	30	MAX.



CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO BUILT-UP ROOFING OVER CONCRETE ROOF DECK

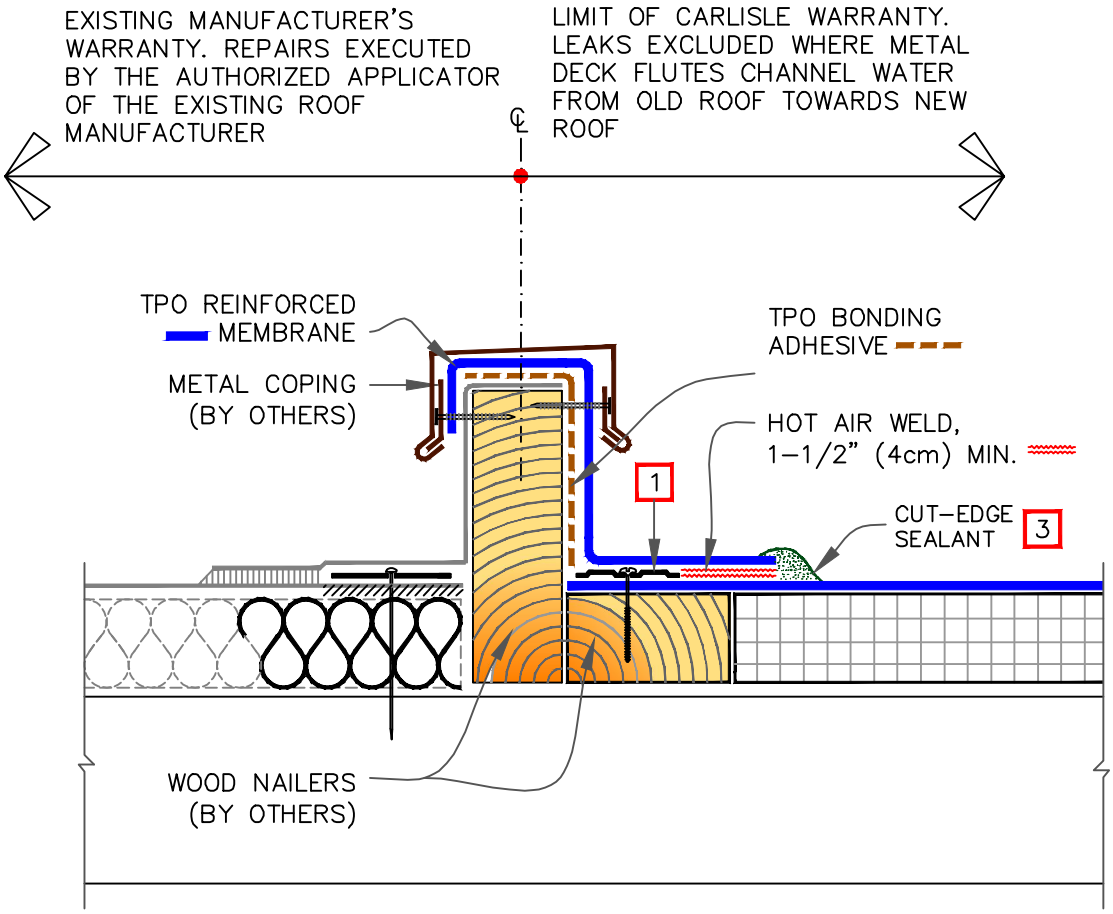
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-13B

U (Universal Detail)

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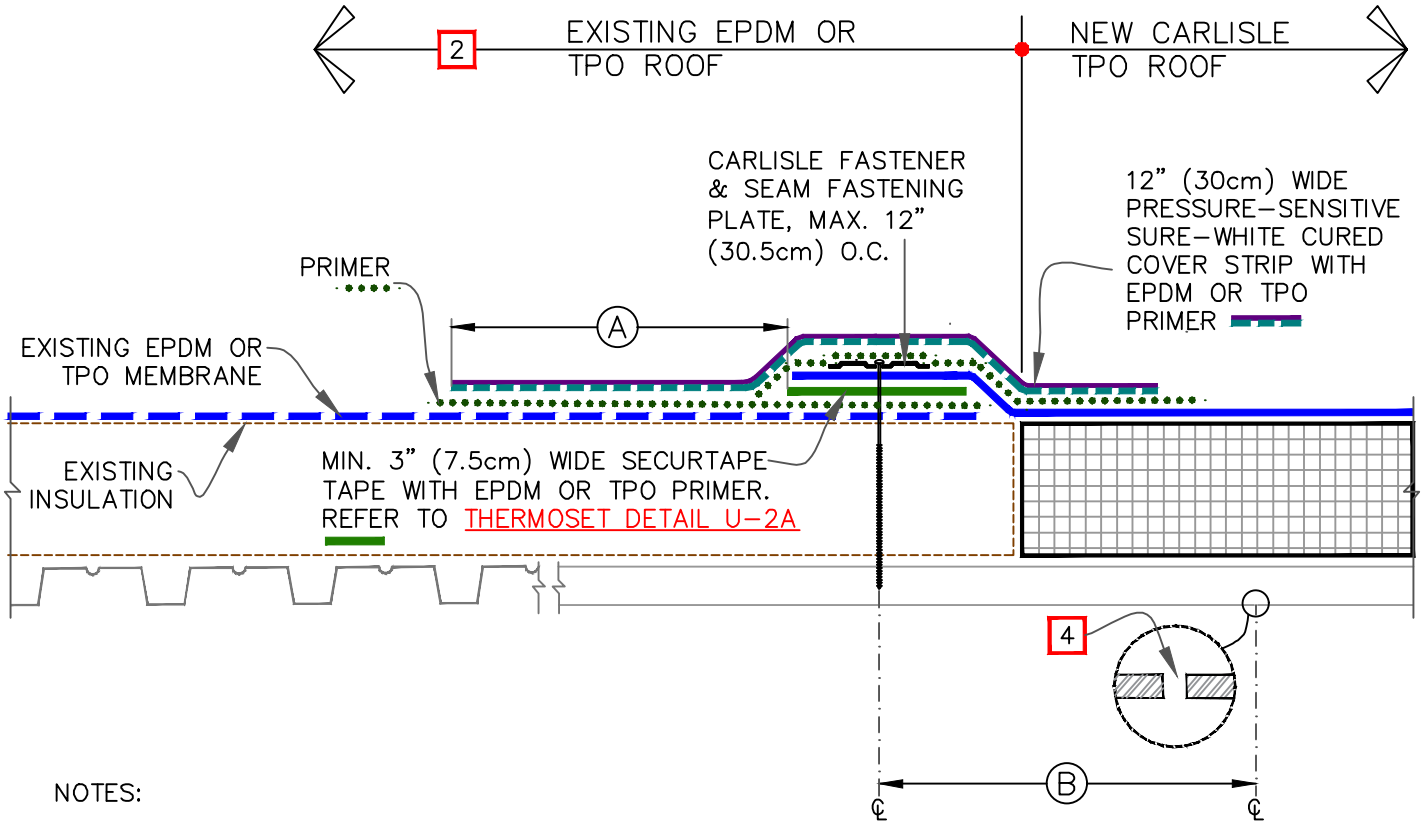
NOTES:

1. POSITION MEMBRANE FASTENING PLATES 1/2" (1.5cm) TO 1" (2.5cm) FROM EDGE OF DECK MEMBRANE.
2. ENSURE THE LOCATION OF CURB WILL NOT IMPEDE THE FLOW OF WATER AT EXISTING ADJACENT ROOF.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS	TPO TIE–IN TO EXISTING SINGLE PLY ROOF WITH CURB MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U–13C U (Universal Detail)

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EPDM / TPO PRIMER



NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM OR TPO BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.

2. CONTACT MANUFACTURER OF EXISTING WARRANTED MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN.

3. FOR EXISTING BALLASTED SYSTEMS BY OTHERS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.

4. IF FLUTES ARE PERPENDICULAR (AS DEPICTED), DRILL A 3/8" (1cm) DIAMETER WEEP HOLE INTO THE BOTTOM FLUTES OF THE STEEL DECK ALONG THE PERIMETER OF THE TIE-IN 6" (15cm) MINIMUM TO 12" (30cm) MAXIMUM FROM THE SEAM FASTENING PLATE. HOLES MAY NOT BE REQUIRED IF DECK SLOPES DOWN TOWARDS EXISTING ROOF.

DIMENSIONS	cm	
Ⓐ 6"	15	
Ⓑ 6"	15	MIN.
Ⓑ 12"	30	MAX.

FASTENER & PRESSURE PLATE TYPES FOR DIFFERENT ROOF DECKS

DECK TYPE	OPTION	FASTENER	PLATE
STEEL OR WOOD	A	HP-X	PIRANHA
	B	HP-XTRA	PIRANHA XTRA

CARLISLE SYNTEC SYSTEMS

TPO TIE-IN TO EXISTING EPDM / TPO MEMBRANE ON STEEL DECK

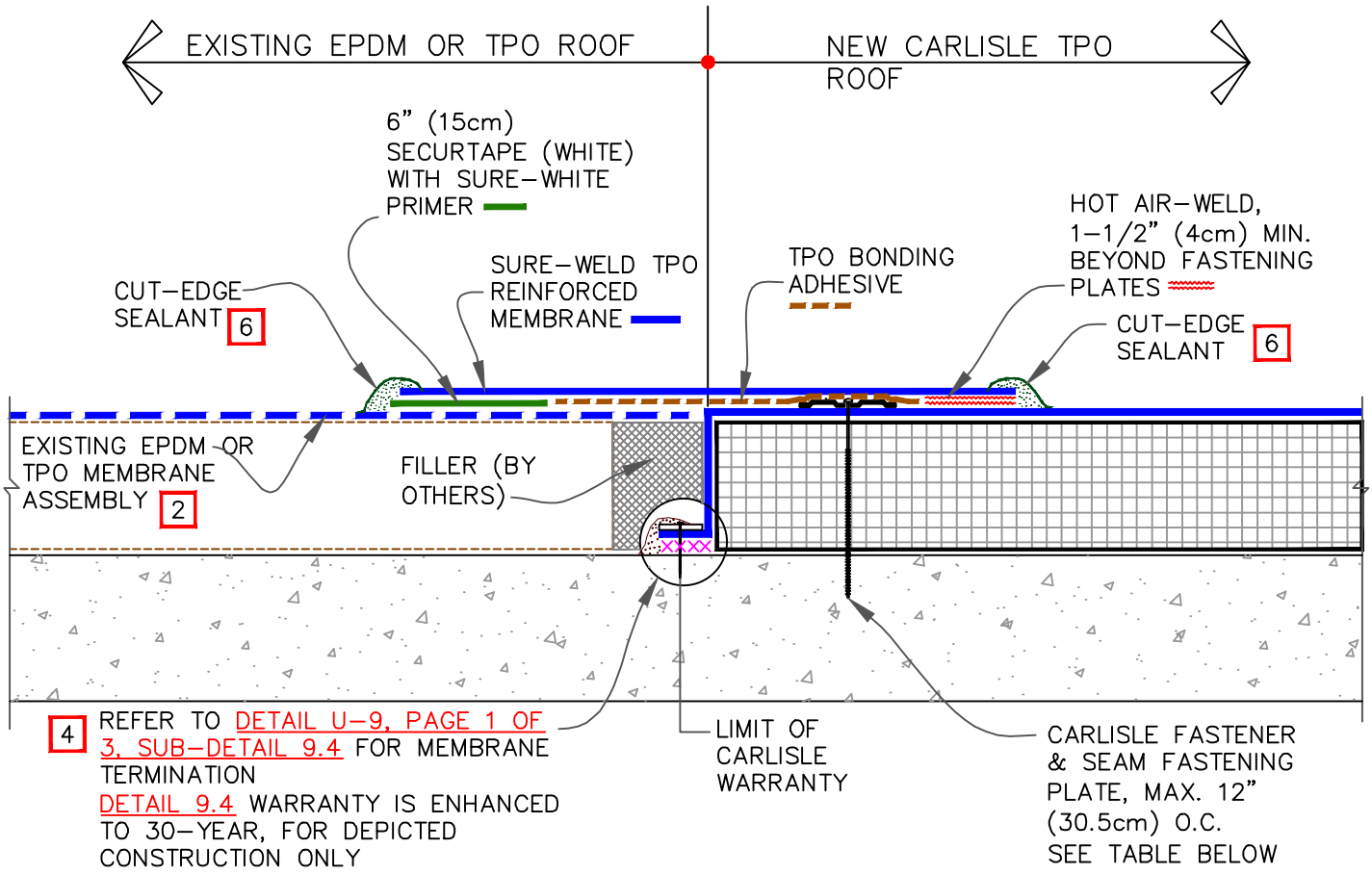
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-13D

U (Universal Detail)

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NOTES:

1. PRIOR TO SPLICING, CLEAN EXISTING EPDM OR TPO MEMBRANE BY SCRUBBING THE SPLICE AREA WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.
2. CONTACT MANUFACTURER OF EXISTING WARRANTED MEMBRANE ROOFING SYSTEM TO VERIFY ACCEPTANCE OF TIE-IN.
3. ON EXISTING BALLASTED SYSTEMS, CONSULT RESPECTIVE MANUFACTURER FOR ACCEPTABLE GRAVEL CONTAINMENT TO PREVENT GRAVEL MIGRATION.
4. WATER CUT-OFF MASTIC MUST BE HELD UNDER CONSTANT COMPRESSION.
5. WHEN RE-ROOFING OVER PRE-CAST CONCRETE, APPLY LIBERAL BEAD OF WATER CUT-OFF MASTIC IN THE JOINTS TO PREVENT MOISTURE MIGRATION.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

FASTENER TYPES ON MECHANICALLY FASTENED ROOF ASSEMBLY

DECK TYPE	OPTION	FASTENER	PLATE
STRUCTURAL CONCRETE	A	CD-10	PIRANHA
	B	HD 14-10	PIRANHA

CARLISLE SYNTEC SYSTEMS

EPDM/TPO TIE-IN ON CONCRETE DECK

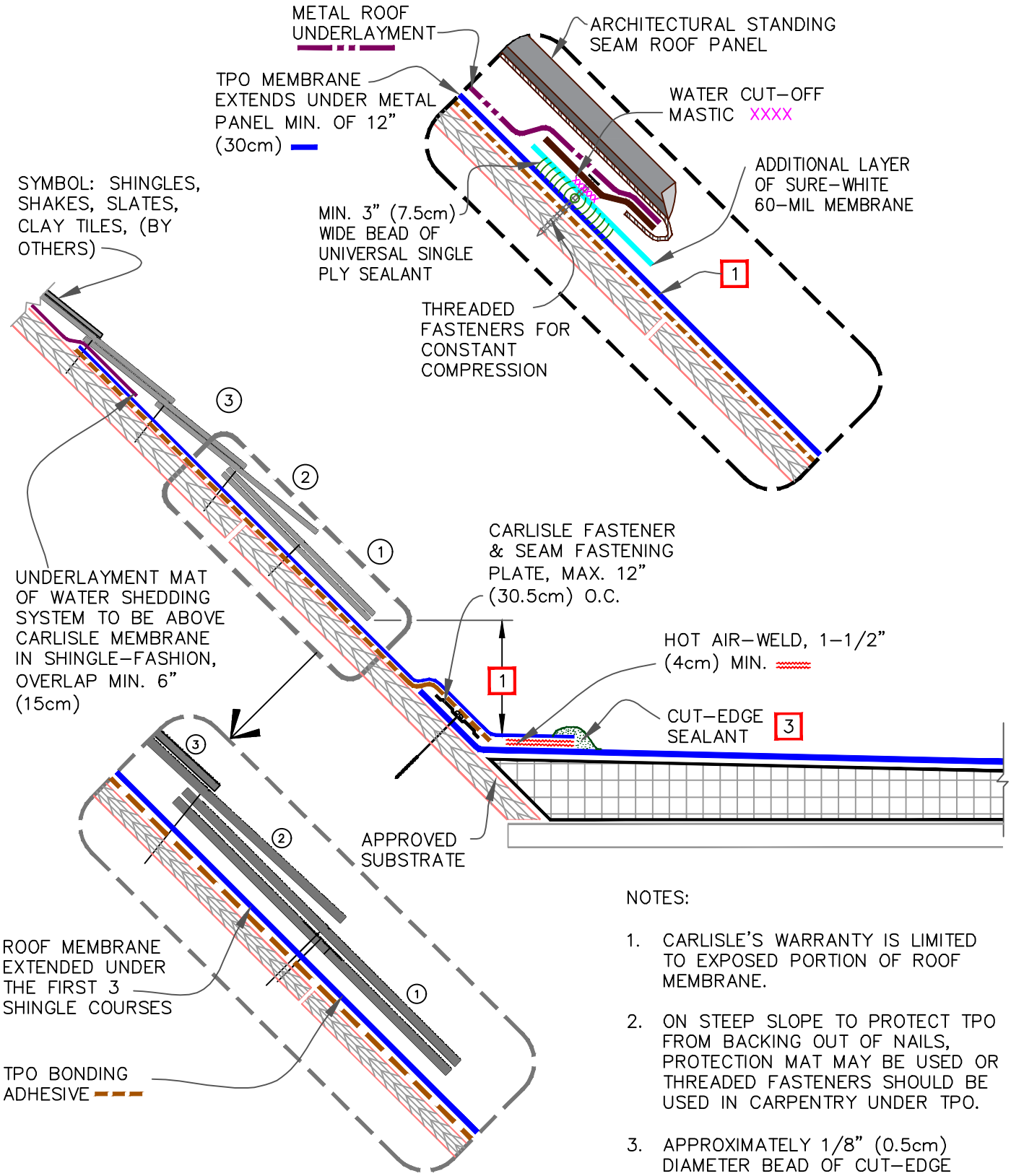
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-13E

U (Universal Detail)

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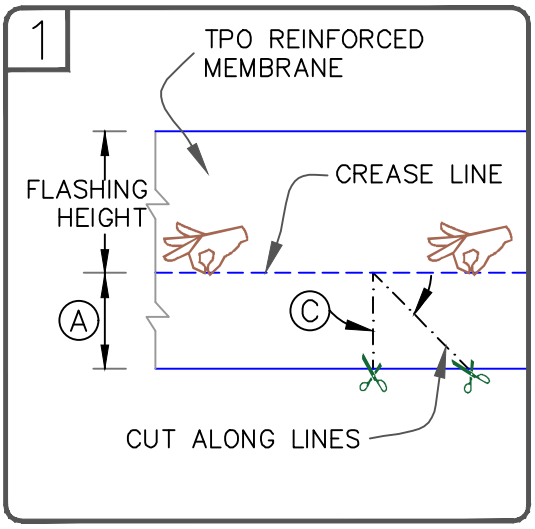


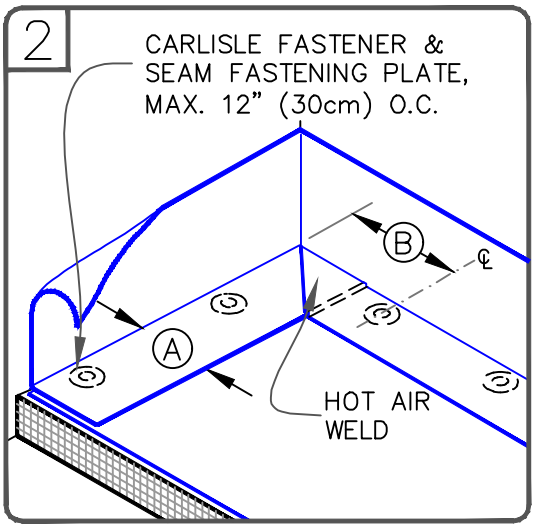
NOTES:

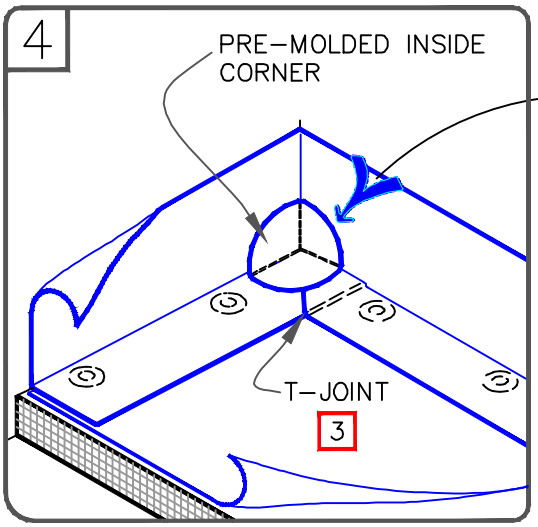
1. CARLISLE'S WARRANTY IS LIMITED TO EXPOSED PORTION OF ROOF MEMBRANE.
2. ON STEEP SLOPE TO PROTECT TPO FROM BACKING OUT OF NAILS, PROTECTION MAT MAY BE USED OR THREADED FASTENERS SHOULD BE USED IN CARPENTRY UNDER TPO.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

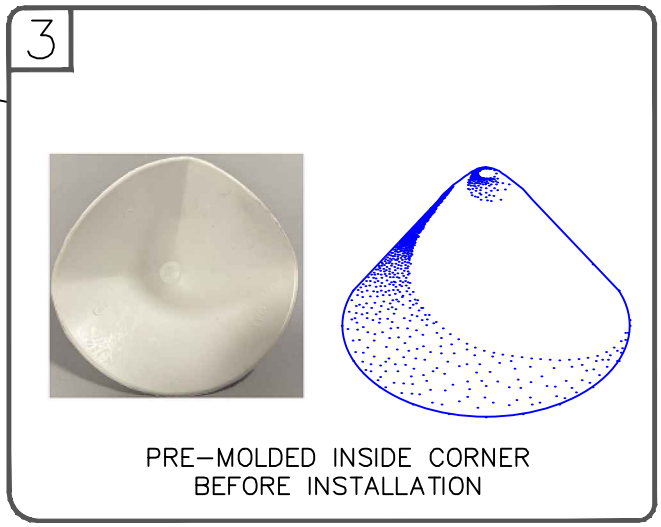
CARLISLE SYNTEC SYSTEMS	TPO TIE-IN TO SHINGLED OR METAL PANEL ROOF MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U-13F U (Universal Detail)

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NOTES:

1. POSITION FASTENING PLATES 6" TO 9" (15 TO 23cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

3. WHEN USING 60-MIL TPO OR 80-MIL, APPLY A 4-1/2" (11.5cm) DIAMETER "T-JOINT" COVER AT ALL FIELD SPLICE INTERSECTIONS.

4. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"-9"	15-23	
C	45-DEGREES APPROX.		

CARLISLE SYNTEC SYSTEMS

PRE-MOLDED INSIDE CORNER FLASHING

MAXIMUM WARRANTY: 30 YEARS

TPO

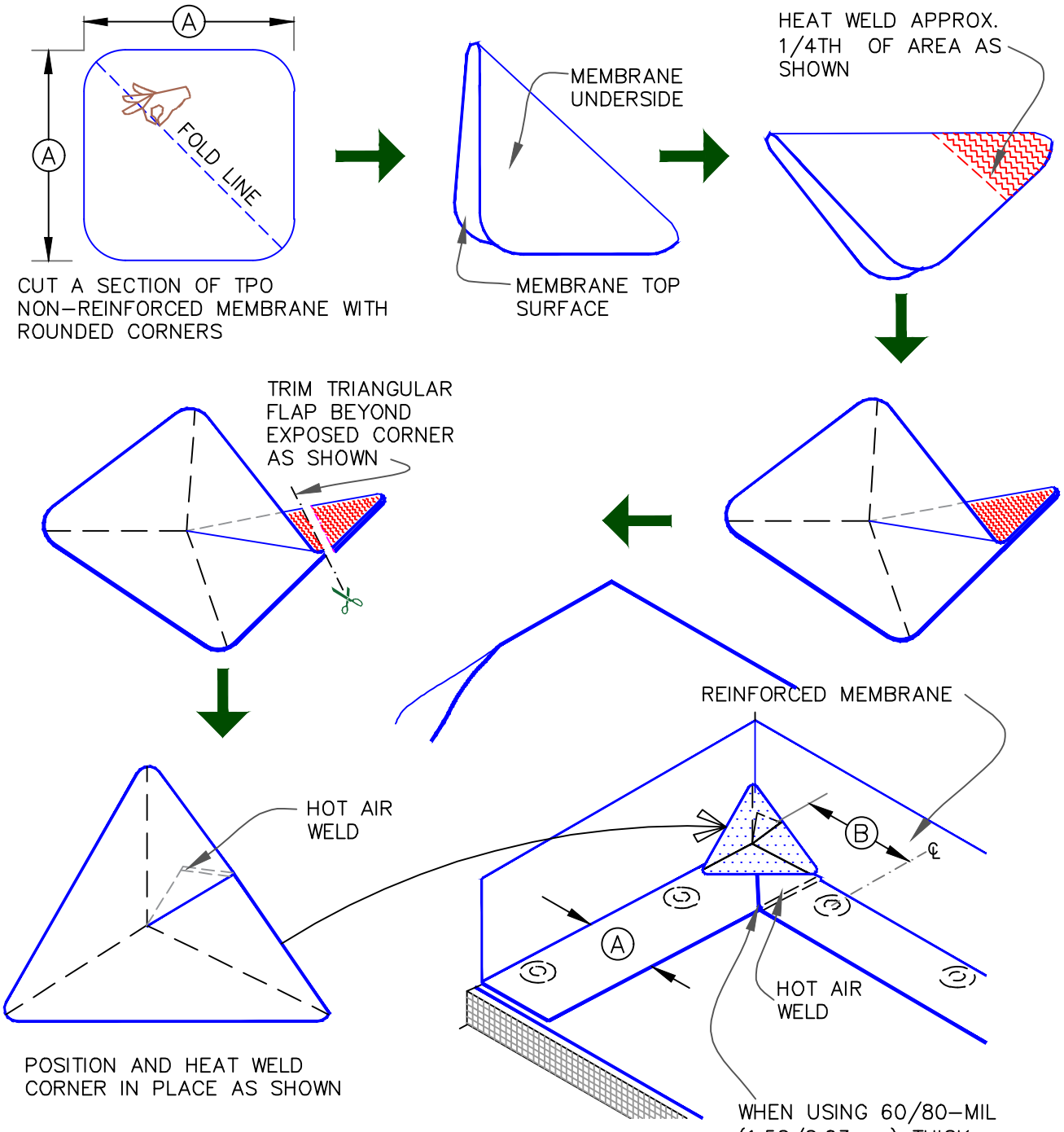
DETAIL NO. U-15A

U (Universal Detail)

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CAUTION

FOR 30–YEAR WARRANTY PROJECTS, PRE–FABRICATED/PRE–MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH TPO UNIVERSAL DETAIL U–15A OR U–15G.



DIMENSIONS		cm	
A	6"	15	APPROX.
B	6"–9"	15–23	

CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED INSIDE CORNER FLASHING

MAXIMUM WARRANTY: 20 YEARS. SEE CAUTION ON TOP OF PAGE

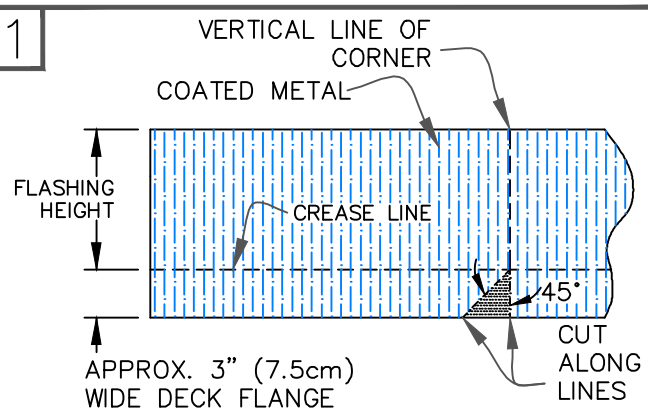
TPO

DETAIL NO. U–15B

U (Universal Detail)

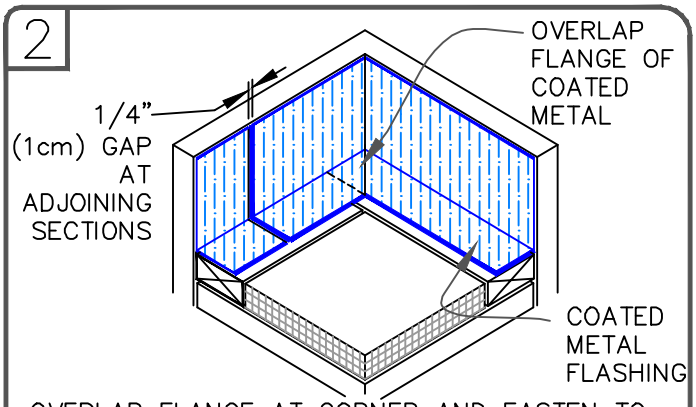
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1



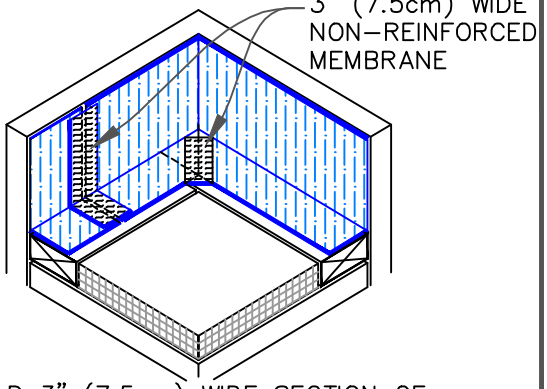
CREASE COATED METAL FLASHING ALONG DASHED LINES AFTER CUTTING AND REMOVING SHADED TRIANGLE.

2



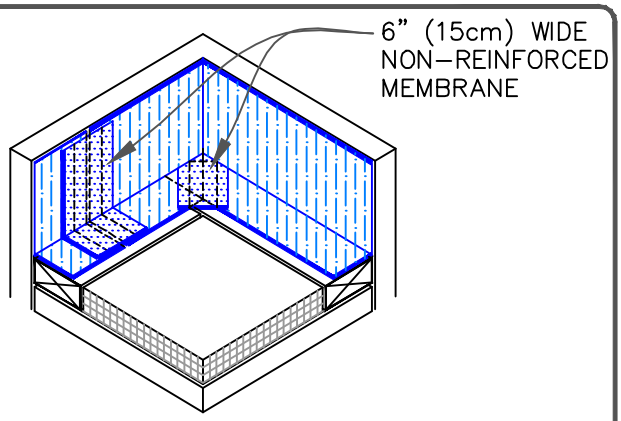
OVERLAP FLANGE AT CORNER AND FASTEN TO WOOD NAILERS USING 1–1/2" (4cm) RING SHANK NAILS SPACED 6" (15cm) O.C., STAGGERED 1/2" (1.5cm).

3



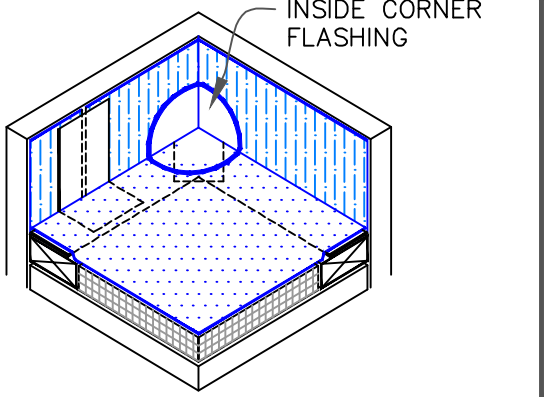
HEAT WELD 3" (7.5cm) WIDE SECTION OF NON–REINFORCED MEMBRANE OVER VERTICAL JOINT IN COATED METAL AND OVER CUT EDGE AT CORNER AS SHOWN.

4



HEAT WELD 6" (15cm) WIDE PIECE OF REINFORCED MEMBRANE OVER 3" WIDE NON–REINFORCED MEMBRANE.

5



INSTALL FIELD MEMBRANE AND HEAT WELD TO FLANGE OF COATED METAL. ALSO INSTALL INSIDE CORNER FLASHING PER DETAILS: U–15A OR U–15B OR U–15G

NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1–1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. COORDINATE THIS DETAIL WITH U–12C FOR ADDITIONAL INFORMATION.
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS

INSIDE CORNER WITH TPO COATED METAL WALL FLASHING

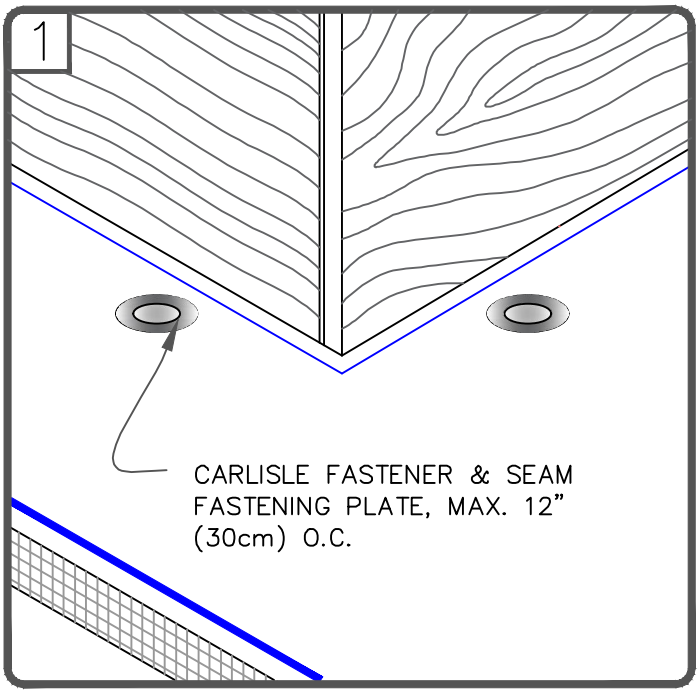
MAXIMUM WARRANTY: 30 YEARS

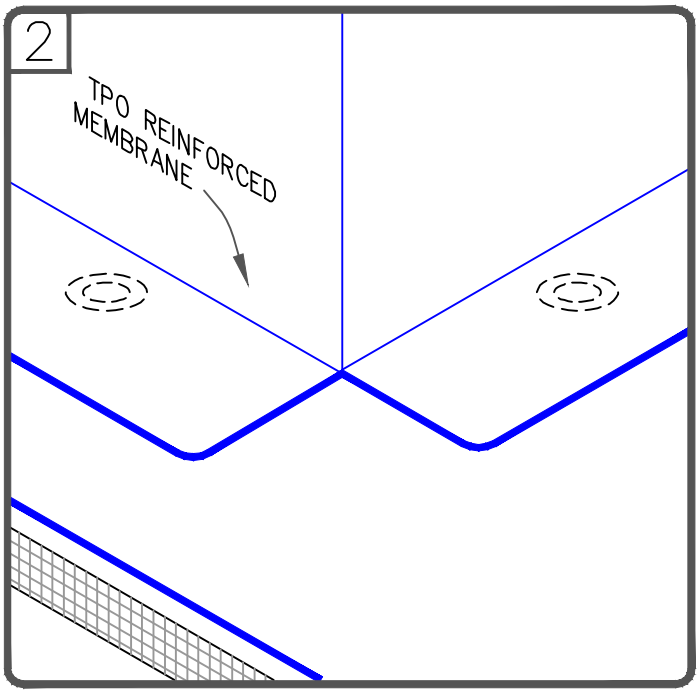
TPO

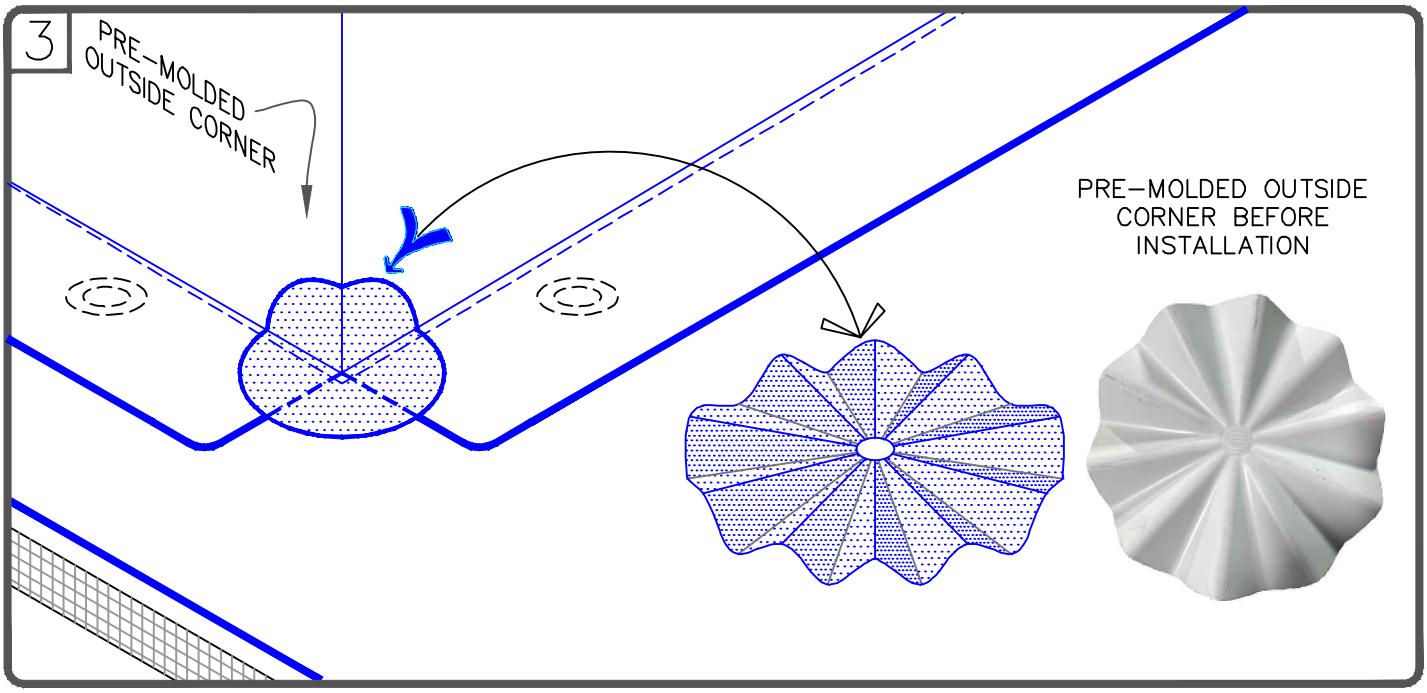
DETAIL NO. U–15C

U (Universal Detail)

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NOTES:

1. POSITION FASTENING PLATES 6" (15cm) FROM THE CORNER AND 1/2" TO 1" (1.5 TO 2.5cm) FROM EDGE OF MEMBRANE.

2. REFER TO CARLISLE SPECIFICATIONS FOR ACCEPTABLE CARLISLE FASTENERS AND PLATES.

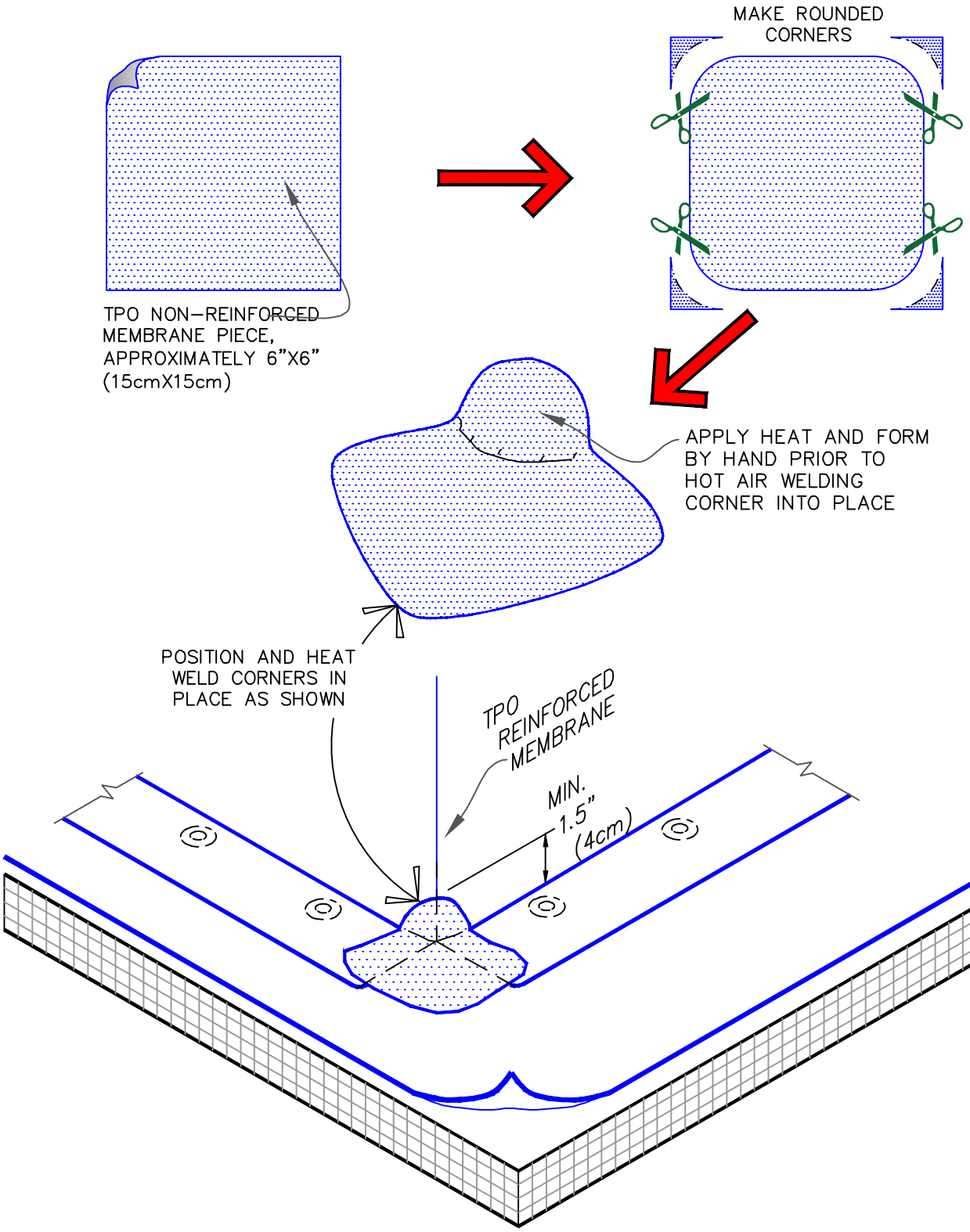
3. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

CARLISLE SYNTEC SYSTEMS	PRE-MOLDED OUTSIDE CORNER FLASHING	TPO	DETAIL NO. U-15D
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

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CAUTION

FOR 30-YEAR WARRANTY PROJECTS, PRE-FABRICATED/PRE-MOLDED ACCESSORIES MUST BE UTILIZED. ACCEPTABLE FLASHING SHALL CONFORM WITH TPO UNIVERSAL DETAIL U-15D OR U-15G.



CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED OUTSIDE CORNER FLASHING

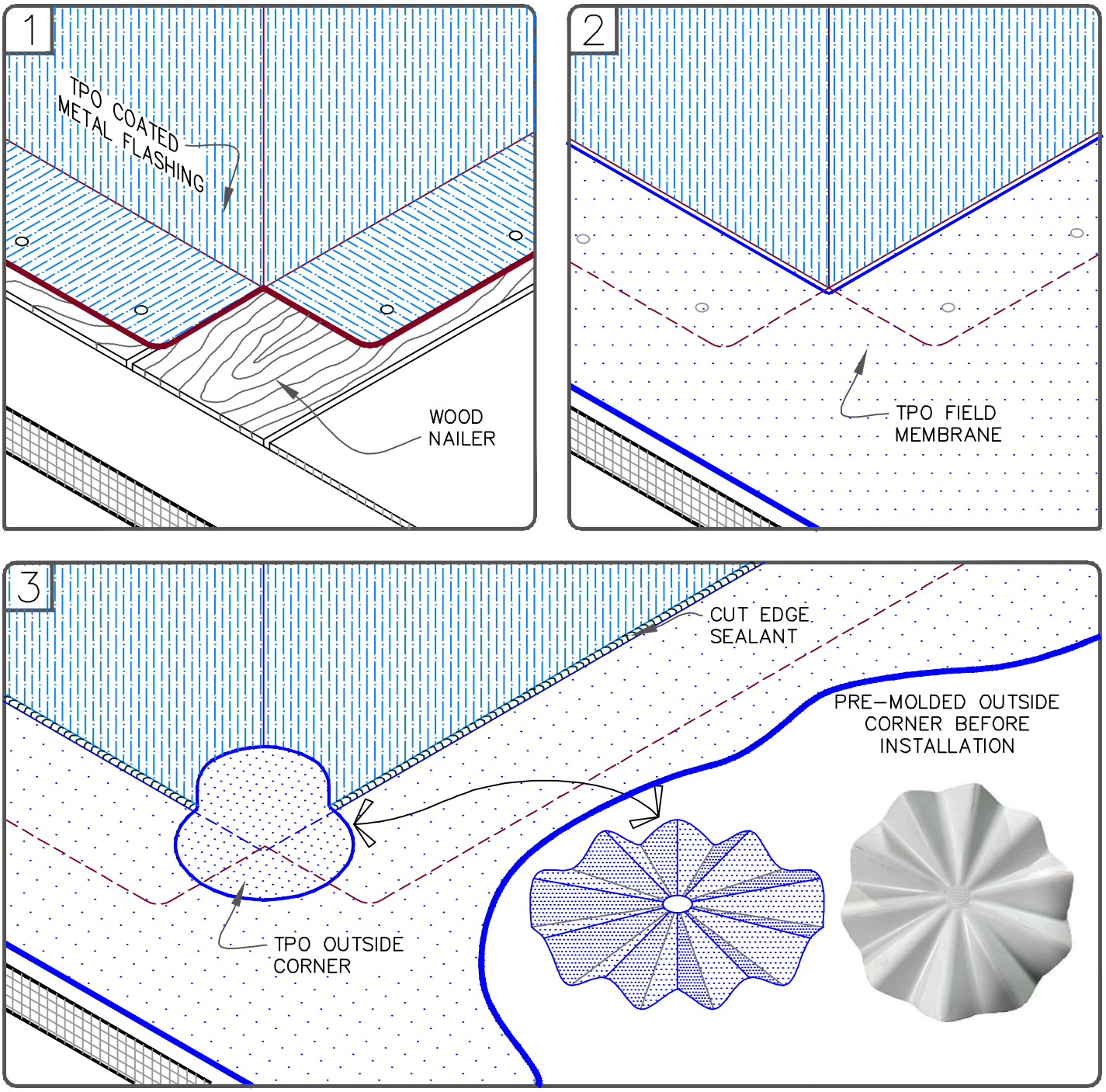
MAXIMUM WARRANTY: 20 YEARS. SEE CAUTION ON TOP OF PAGE

TPO

DETAIL NO. U-15E

U (Universal Detail)

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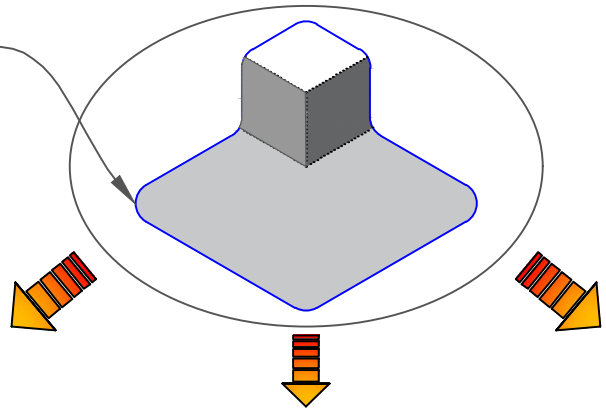
NOTES:

1. FASTEN COATED METAL FLASHING TO WOOD NAILERS USING 1-1/2" (4cm) MIN. RING SHANK NAILS SPACED 6" (15cm) ON CENTER AND STAGGERED APPROX. 1/2" (1.5cm).
2. REFER TO TPO DETAIL U-5B FOR FLASHING VERTICAL JOINTS IN COATED METAL.

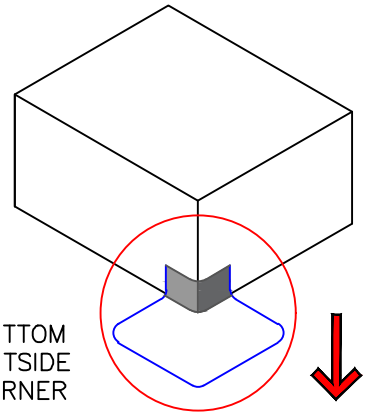
CARLISLE SYNTEC SYSTEMS	OUTSIDE CORNER WITH TPO COATED METAL WALL FLASHING	TPO	DETAIL NO. U-15F
	MAXIMUM WARRANTY: 30 YEARS		U (Universal Detail)

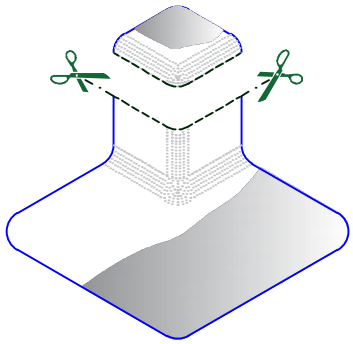
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60–MIL (1.52mm) THICK TPO, UNIVERSAL CORNERS CAN BE USED FOR 3 DIFFERENT CORNER CONDITIONS AS SHOWN BELOW

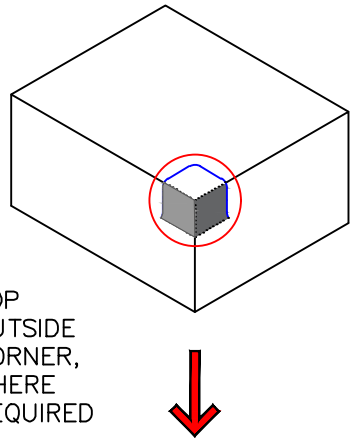


OPTION A

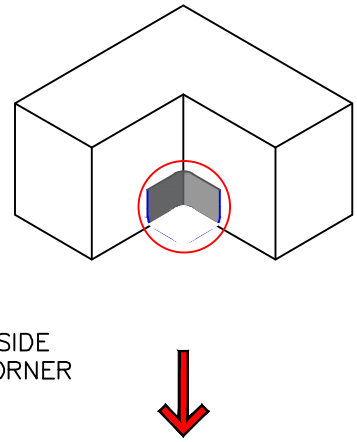


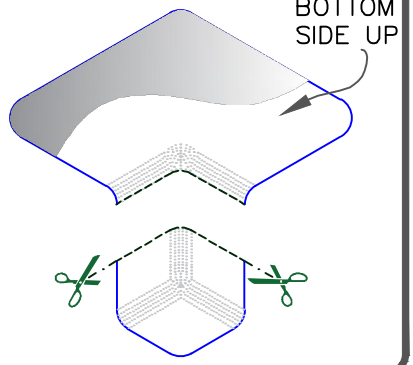


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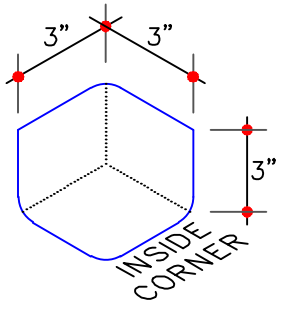
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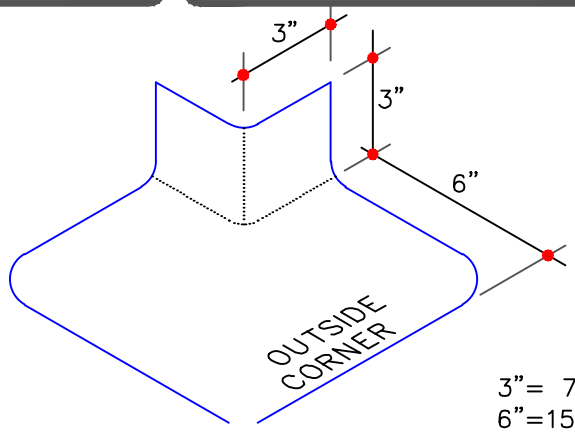




NOTES:

1. ROOF SYSTEMS MUST NOT HAVE FIELD FABRICATED OR BUILT–IN CANT STRIP.
2. REFER TO TECHNICAL DATA BULLETINS FOR COLOR AVAILABILITY.





TYPICAL DIMENSIONS

3”= 7.5cm
6”=15cm

CARLISLE SYNTEC SYSTEMS

TPO UNIVERSAL CORNERS–COMBINATION INSIDE & OUTSIDE CORNERS

MAXIMUM WARRANTY: 30 YEARS

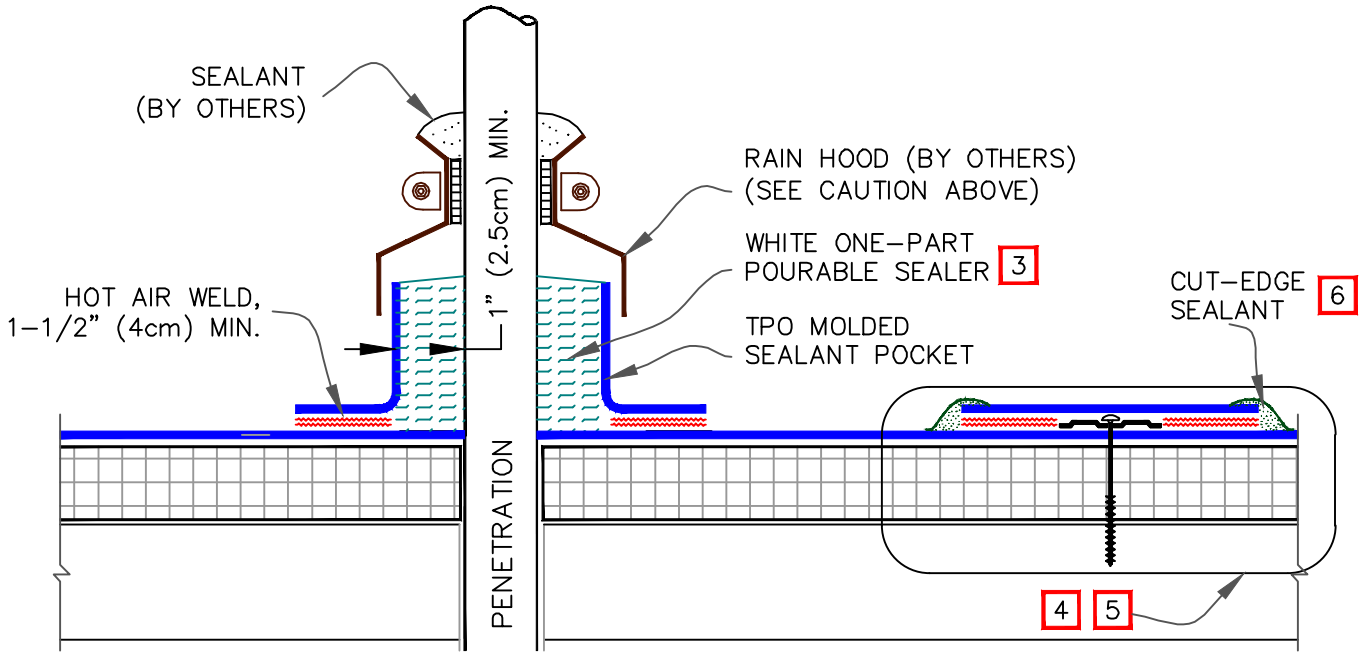
TPO

DETAIL NO. U–15G

U (Universal Detail)

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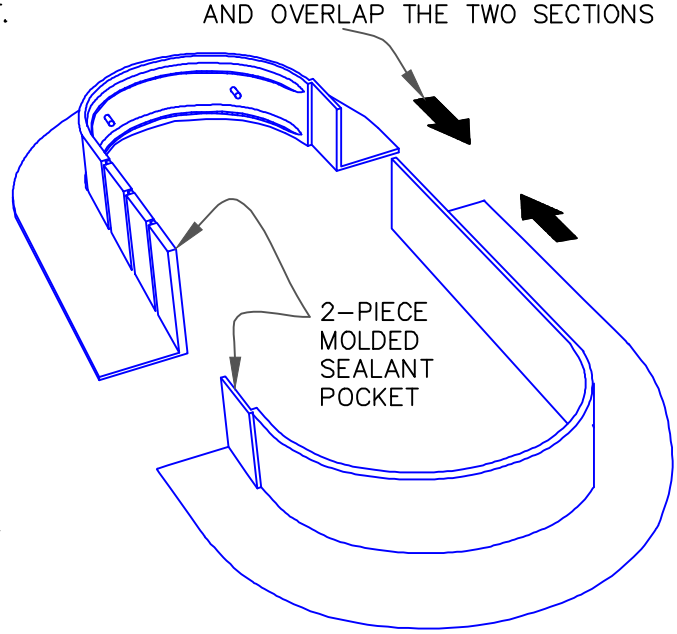
MOLDED SEALANT POCKETS MUST BE USED WITH RAIN HOODS FOR PROJECTS WITH 25 AND 30–YEAR WARRANTIES.



NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 160° F (71° C).
2. WHEN USING TPO MOLDED SEALANT POCKET, TPO PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT.
3. FILL POCKET COMPLETELY WITH WHITE ONE–PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY–FASTENED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (15cm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (30cm) ON CENTER MAXIMUM.
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER FASTENERS AND PLATES.
6. APPROXIMATELY 1/8" (0.5cm) DIAMETER BEAD OF CUT–EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED TPO MEMBRANE.

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



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

CARLISLE SYNTEC SYSTEMS

MOLDED SEALANT POCKET

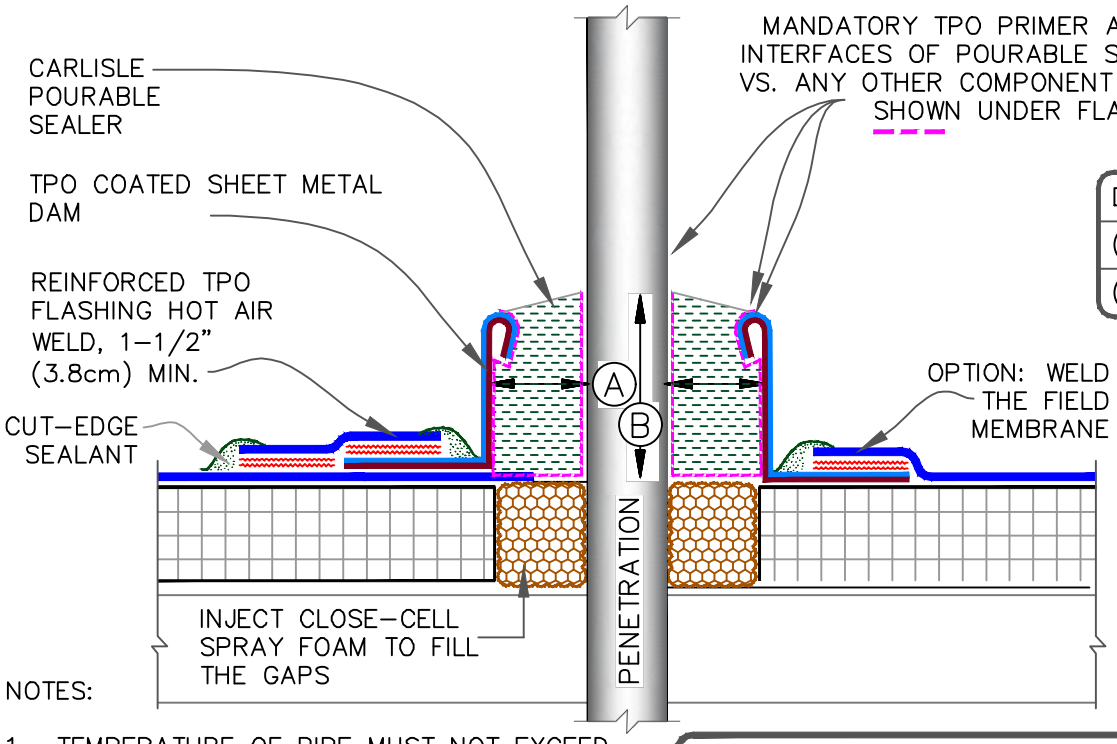
MAXIMUM WARRANTY: 20–YEAR. SEE CAUTION AT THE TOP OF PAGE.

TPO

DETAIL NO. U–16A

U (Universal Detail)

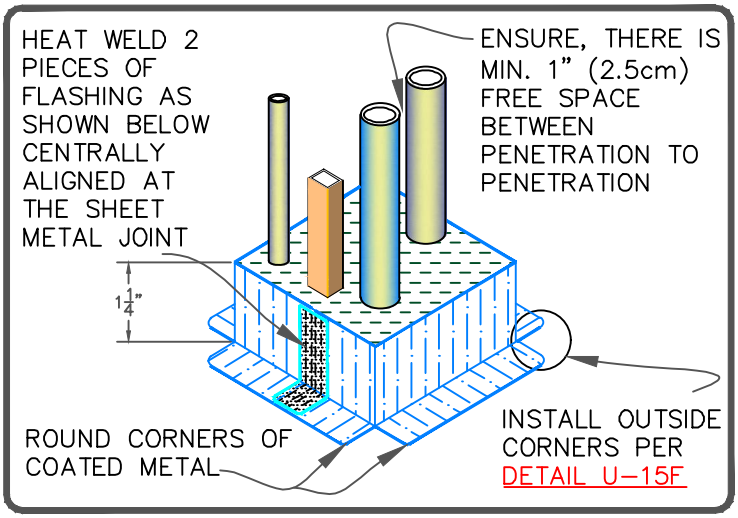
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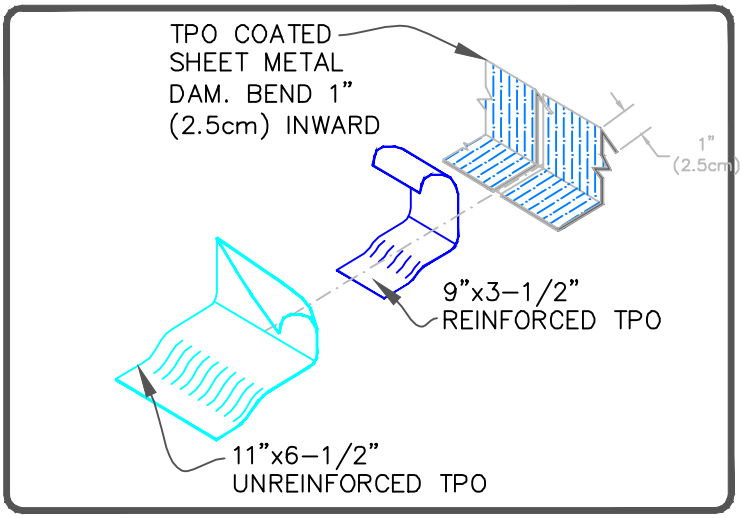


DIMENSIONS	cm	
(A) 1"	2.5	MIN.
(B) 2.5"	5	MIN.

NOTES:

1. TEMPERATURE OF PIPE MUST NOT EXCEED 160° F (71° C).
2. TPO PRIMER MUST BE APPLIED TO ALL INSIDE SURFACES AND PENETRATIONS PRIOR TO FILLING WITH SEALANT..
3. FILL POCKET COMPLETELY WITH WHITE ONE–PART POURABLE SEALER UNTIL RIM IS COVERED WITH SEALANT; ENSURE ALL VOIDS ARE FILLED.
4. ON MECHANICALLY–ATTACHED SYSTEMS, INSTALL A MINIMUM OF 4 FASTENING PLATES AROUND SEALANT POCKETS WITH A DIAMETER UP TO 6" (152mm). ADDITIONAL FASTENING PLATES WILL BE REQUIRED FOR SEALANT POCKETS GREATER THAN 6" IN DIAMETER AND SHALL BE SPACED 12" (305mm) ON CENTER MAXIMUM. FASTENERS/PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS SEALANT POCKET DIAMETER EXCEEDS 18" (305mm).
5. REFER TO CARLISLE SPECIFICATIONS FOR PROPER TYPES OF FASTENERS AND PLATES.
6. SECUREMENT IS REQUIRED FOR POURABLE SEALER POCKETS WHICH ARE GREATER THAN 18" (46 CM) IN DIAMETER. REFER TO SPECIFICATIONS.
7. WHEN ANY ONE SIDE OF THE FIELD FABRICATED POURABLE SEALER POCKET EXCEEDS 12" (30 CM). USE WOOD BLOCKING TO ANCHOR SHEET METAL.





CARLISLE SYNTEC SYSTEMS

FIELD FABRICATED TPO COATED METAL POCKET

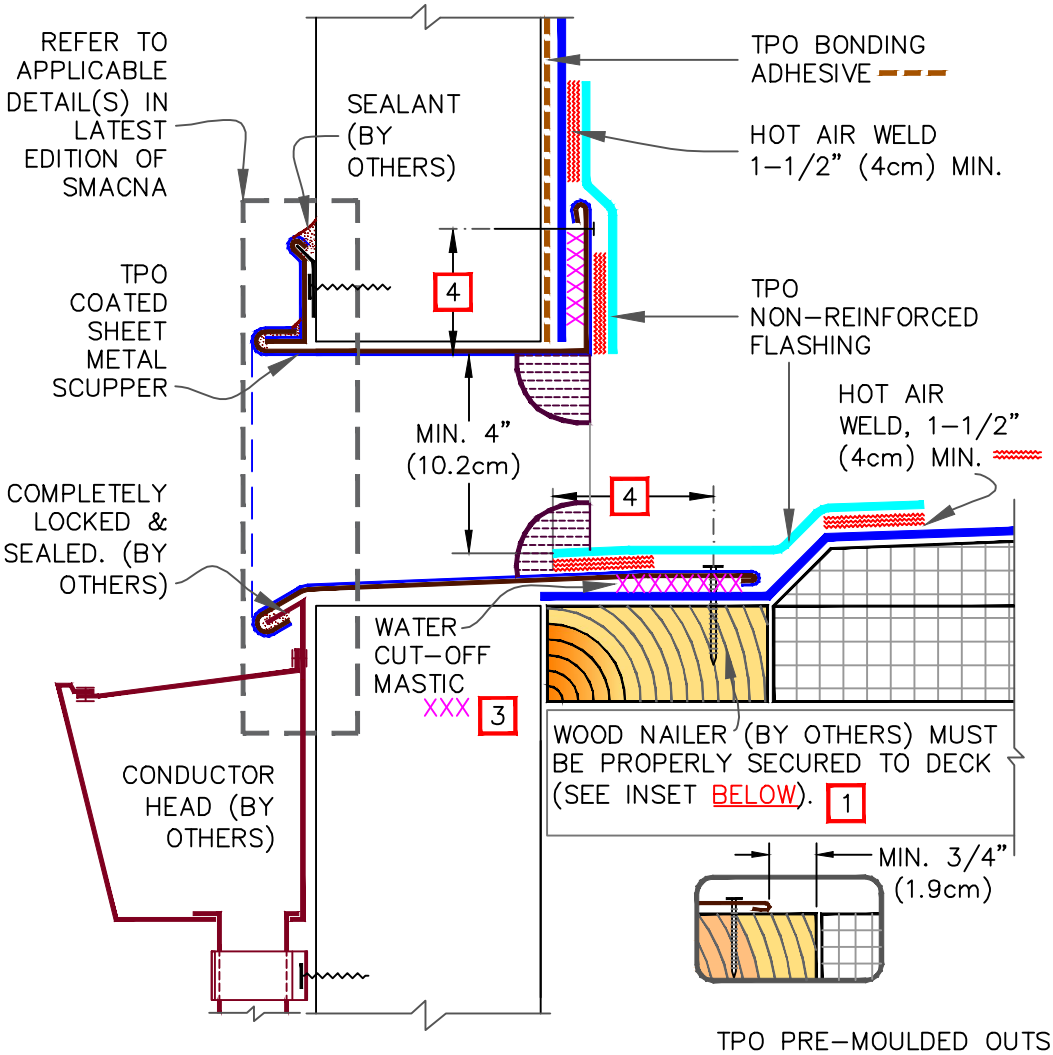
MAXIMUM WARRANTY: 20 YEARS

TPO

DETAIL NO. U–16C

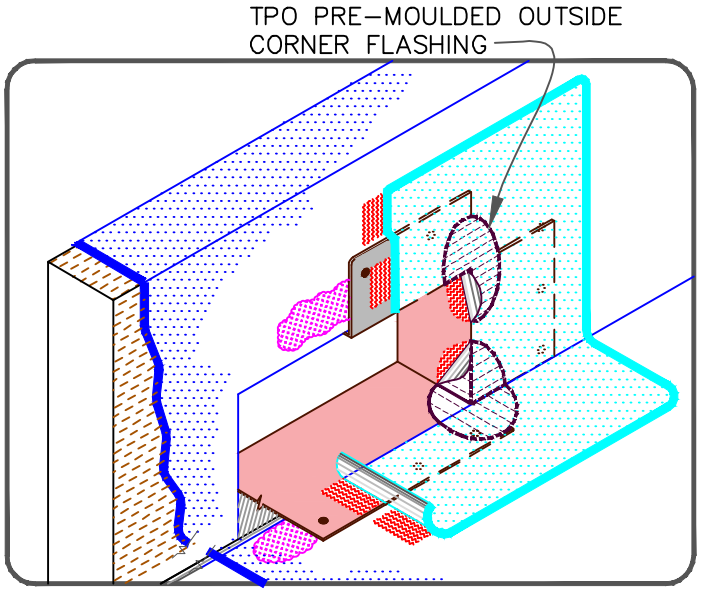
TPO UNIVERSAL

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NOTES:

1. WOOD NAILERS ARE INSTALLED AT SCUPPERS TO SECURE METAL SLEEVE AND MUST EXTEND PAST THE WIDTH OF METAL SLEEVE FLANGE.
2. METAL SCUPPER BOX MUST HAVE FOLDED FLANGE CORNERS FULLY COVERED BY OUTSIDE CORNER FLASHING.
3. WATER CUT–OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
4. SCUPPER FLANGES MUST BE TOTALLY COVERED BY NON–REINFORCED FLASHING WITH MINIMUM 2" (5cm) COVERAGE PAST NAIL HEAD.



CARLISLE SYNTEC SYSTEMS

PREFABRICATED SCUPPER WITH TPO COATED METAL

MAXIMUM WARRANTY: 30 YEARS

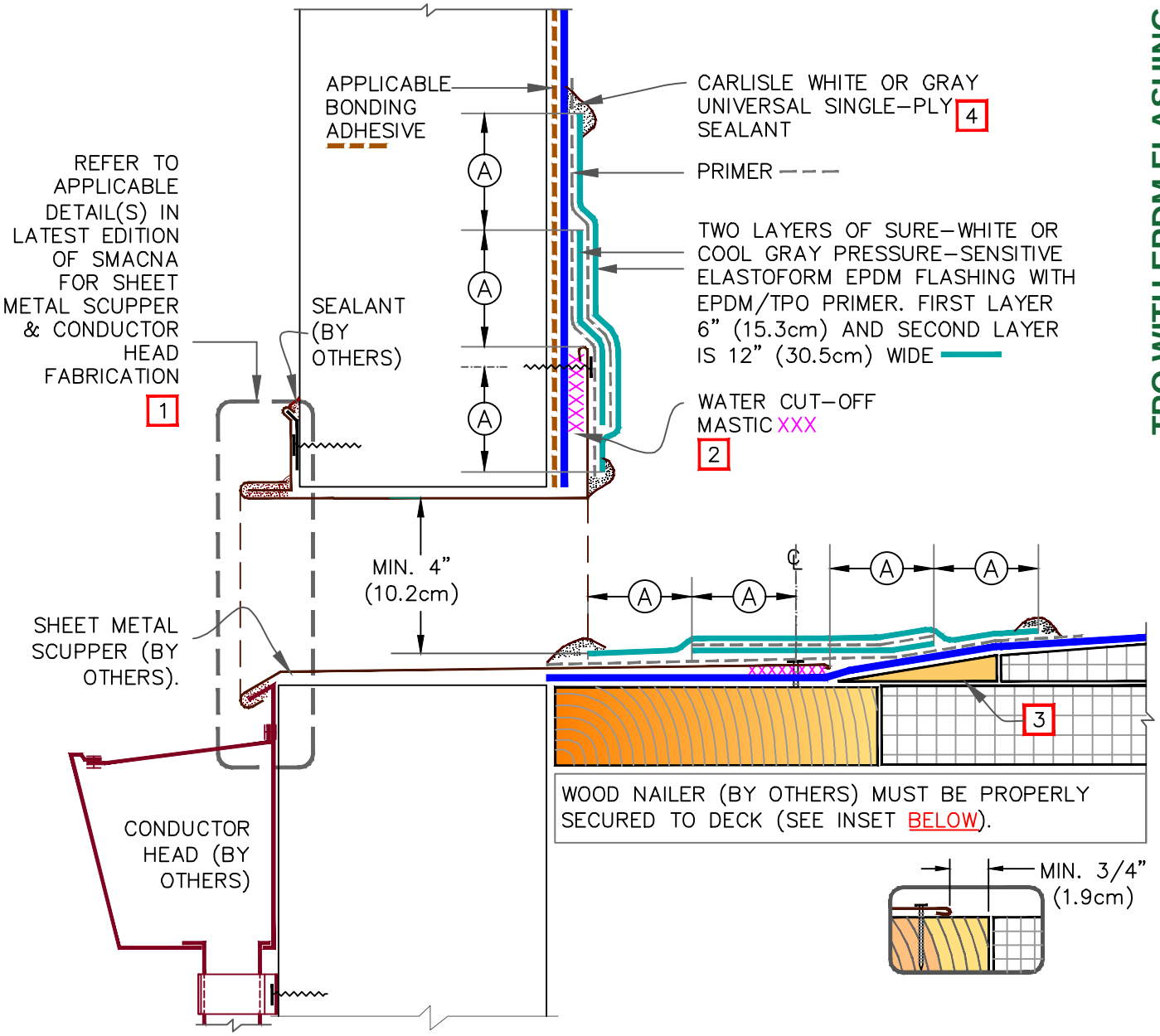
TPO

DETAIL NO. U–18A

U (Universal Detail)

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TPO WITH EPDM FLASHING



NOTES:

1. METAL SCUPPER BOX MUST HAVE CONTINUOUS FLANGES WITH ROUNDED CORNERS, SOLDER ALL SCUPPER SEAMS AIR & WATER-TIGHT.
2. WATER CUT-OFF MASTIC UNDER SCUPPER FLANGES MUST BE UNDER CONSTANT COMPRESSION.
3. TAPERED EDGE STRIP BY HUNTER OR CANT STRIP, AS REQUIRED & SET IN ADHESIVE OR SHAVE THE EDGES OF TAPERED INSULATION.
4. WHITE OR GRAY UNIVERSAL SINGLE-PLY SEALANT IS REQUIRED AT FLASHING EDGES ON SCUPPER EDGE. TPO PRIMER MUST BE USED TO PREPARE SURFACES PRIOR TO THE APPLICATION OF SEALANT.

DIMENSIONS		cm	
A	2"	5	MIN.
B	3"	7.6	MIN.

CARLISLE SYNTEC SYSTEMS

SCUPPER WITH EPDM FLASHING, PAGE 1 OF 2

MAXIMUM WARRANTY: 30 YEARS

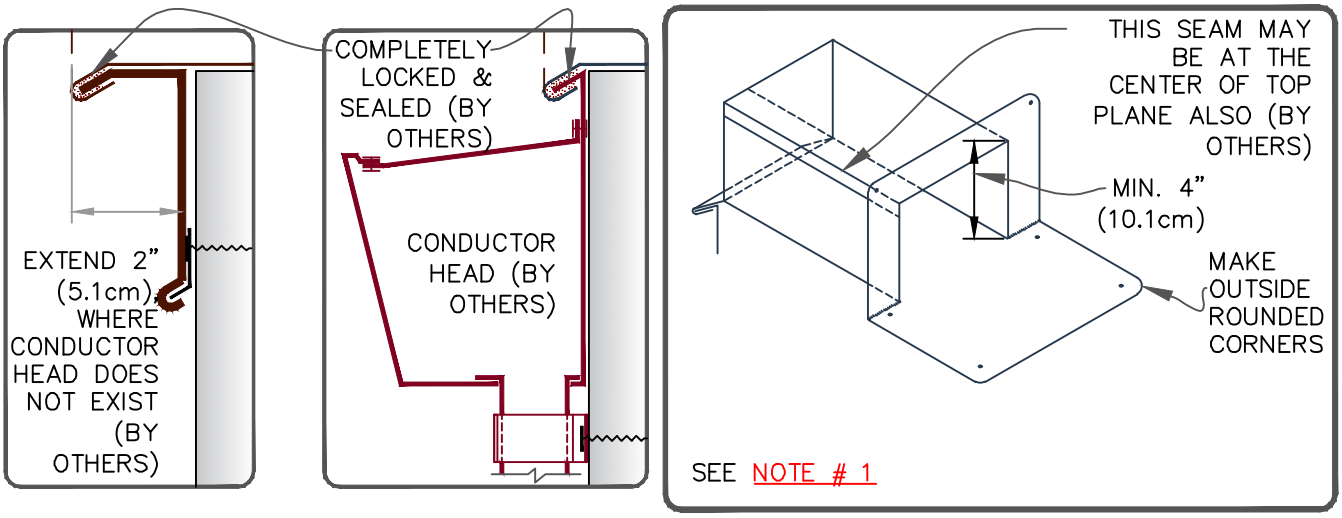
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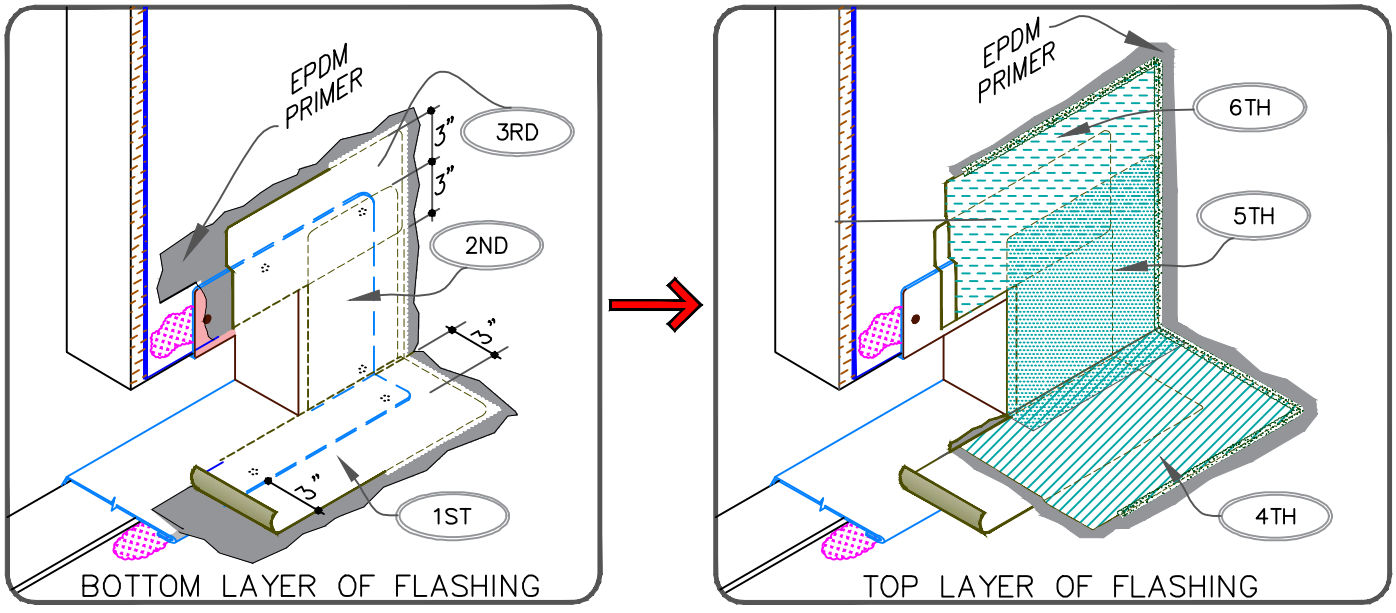
DETAIL NO. U-18CT

U (Universal Detail)

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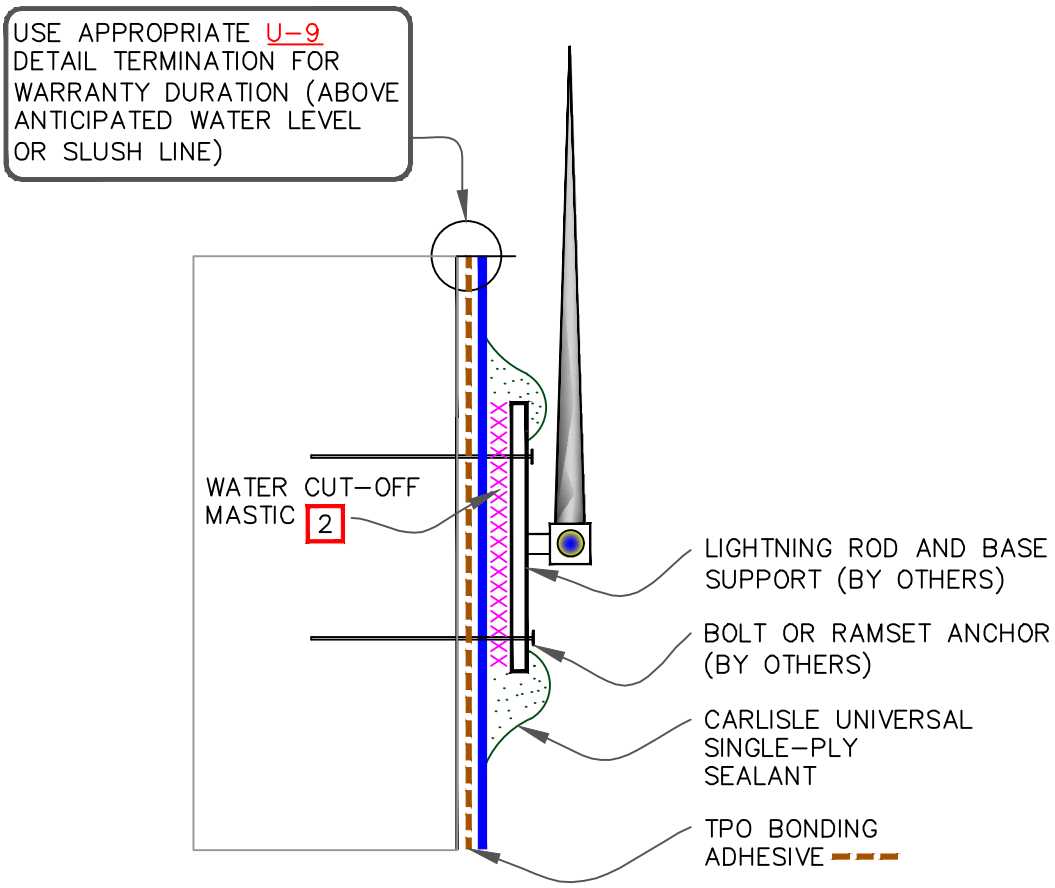
TPO WITH EPDM FLASHING





CARLISLE SYNTEC SYSTEMS	SCUPPER WITH EPDM FLASHING, PAGE 2 OF 2	TPO DETAIL NO. U–18CT U (Universal Detail)

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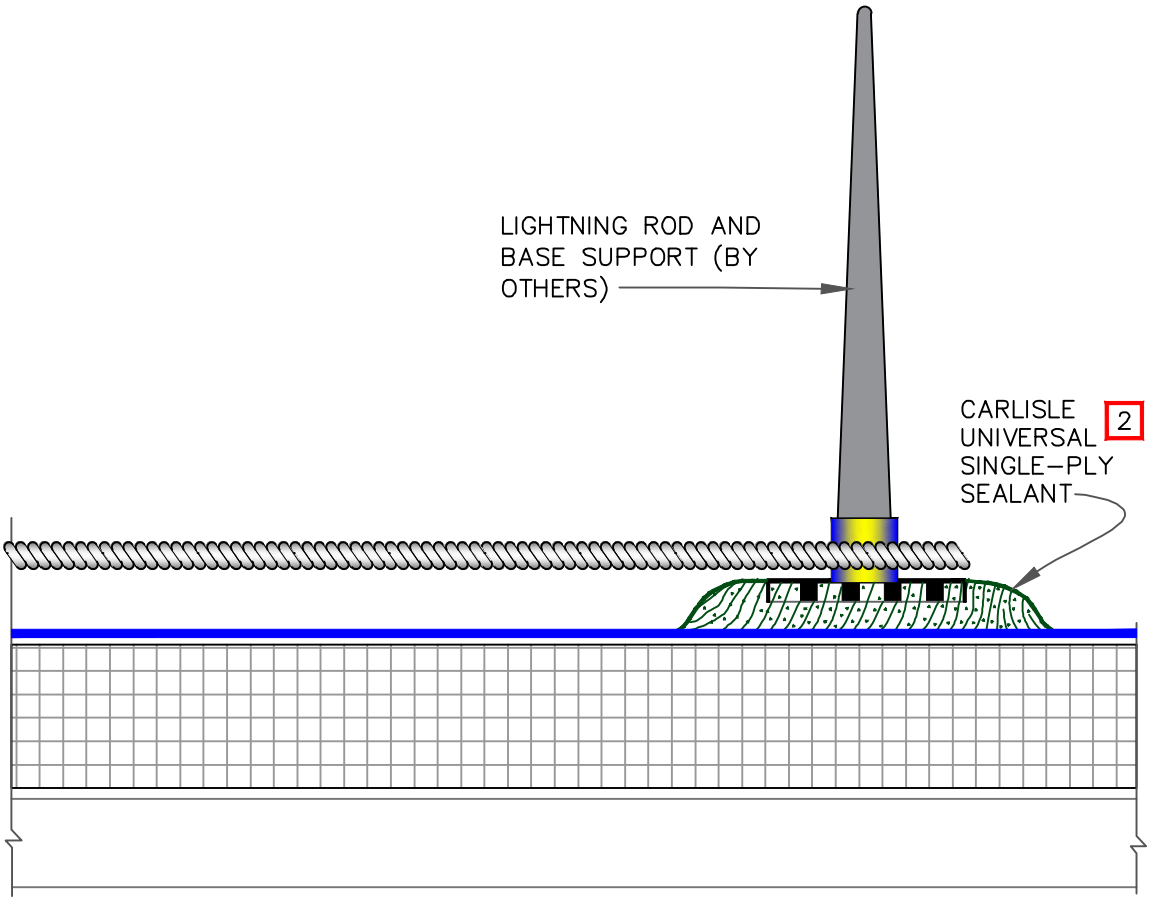


NOTES:

1. DETAIL MAY BE USED FOR ANY FASTENER PENETRATION (E.G., ACCESS LADDER, ANCHOR SUPPORT TO PARAPET).
2. WATER CUT–OFF MASTIC MUST BE UNDER CONSTANT COMPRESSION.
3. DETAIL UNACCEPTABLE FOR HORIZONTAL APPLICATION ON ROOF DECK.
4. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT PARAPET (VERTICAL ATTACHMENT) MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U–20A U (Universal Detail)

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NOTES:

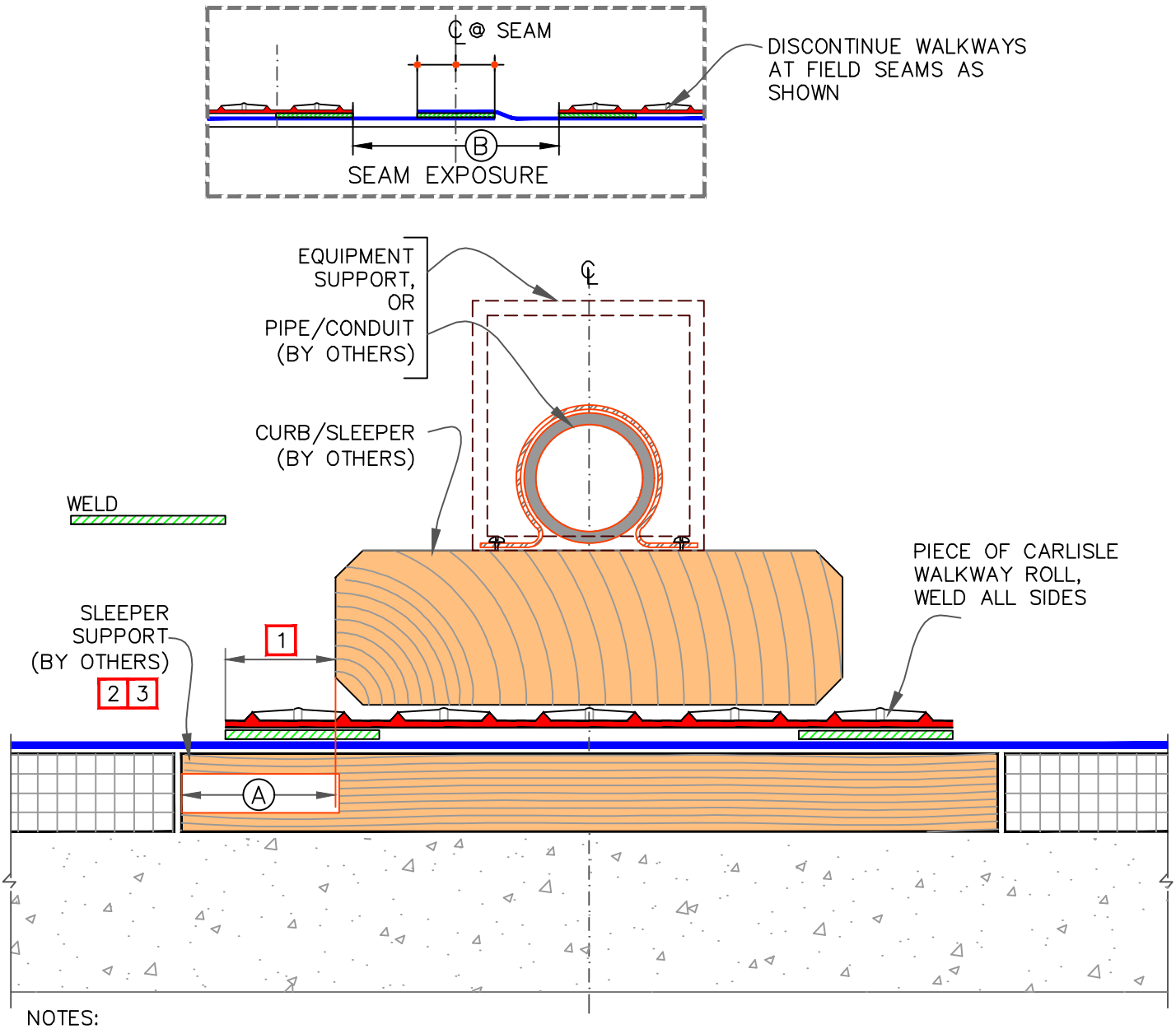
1. CLEAN EXPOSED MEMBRANE SURFACE WITH WEATHERED MEMBRANE CLEANER AND ALLOW TO DRY.

2. APPLY TPO PRIMER TO THE MEMBRANE SURFACE PRIOR TO THE APPLICATION OF UNIVERSAL SINGLE–PLY SEALANT.

3. COMPLY WITH ZONING ORDNANCE AND LOCAL CODES FOR MOUNTING A LIGHTNING SYSTEM.

CARLISLE SYNTEC SYSTEMS	LIGHTNING ROD AT DECK LEVEL MAXIMUM WARRANTY: 30 YEARS	TPO DETAIL NO. U–20B U (Universal Detail)

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NOTES:

1. SLEEPER MUST BE LARGE ENOUGH TO SUPPORT WEIGHT OF EQUIPMENT WITHOUT INDENTING INSULATION. EXTEND SLEEPER OUT AS REQUIRED BY STRUCTURAL ENGINEER TO DISTRIBUTE SUBJECT LOAD OR AT LEAST EXTEND OUT MIN. 3" (7.5cm).
2. ENSURE SCREW/ANCHOR HEADS IN TOP SURFACE OF WOOD BLOCKING ARE RECESSED TO PROTECT MEMBRANE.
3. SLEEPER SUPPORT NOT REQUIRED UNDER CONDUIT OR PIPE SUPPORTS.
4. CONSULT STRUCTURAL ENGINEER AND/OR SPECIFIER TO AVOID WATER PONDING DUE TO DECK DEFLECTION.
5. RAISE CONDUITS AND PIPES ABOVE THE REGIONAL SNOW LINE WHEN SLOPE OF THE ROOF CAN LEAD TO SLIDING SNOW.

DIMENSIONS		cm	
Ⓐ	3"	7.5	MIN. ALL SIDES
Ⓑ	8"	20	

CARLISLE SYNTEC SYSTEMS

SLEEPER

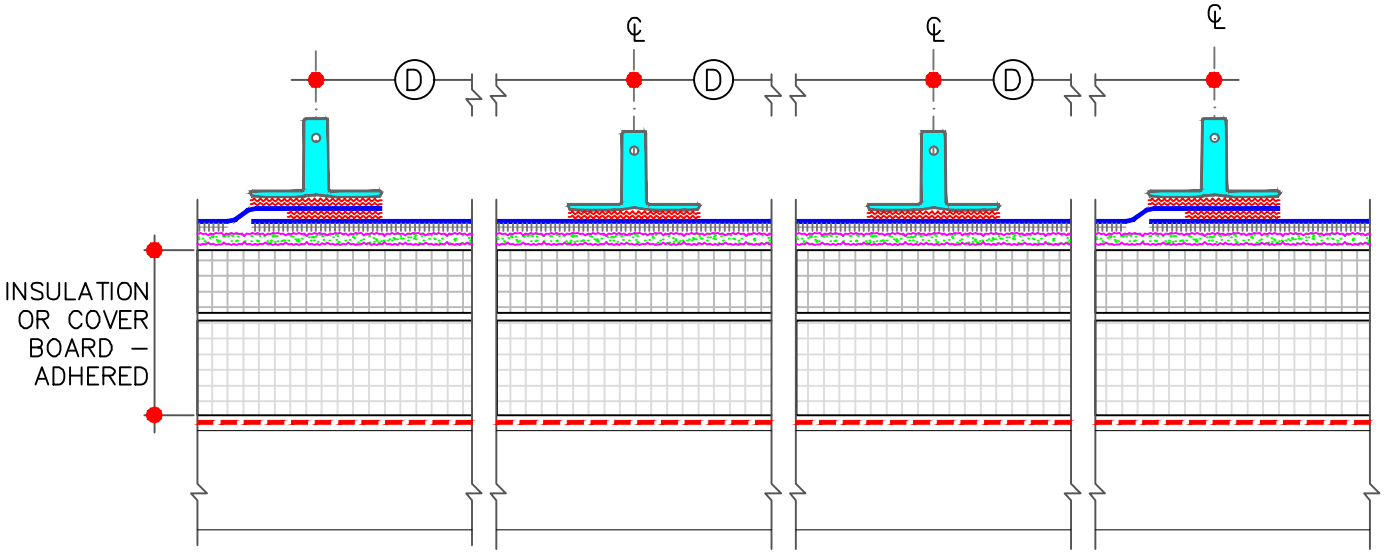
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U–24

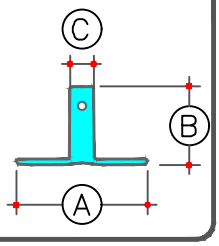
U (Universal Detail)

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SECTION AA: CONTOUR RIB PROFILE

CONTOUR RIB		
DIMENSIONS		cm
A	1–3/4"	4.5
B	1–1/4"	3
C	1/2"	1
D	VARIES	



TPO REINFORCED MEMBRANE

APPROVED ADHESIVE

HOT AIR WELD (REFER TO SPECS)

AIR/VAPOR BARRIER (WHERE REQUIRED)

CARLISLE SYNTEC SYSTEMS

SURE–WELD TPO RIB: TYPICAL PROFILE

MAXIMUM WARRANTY: 30 YEARS

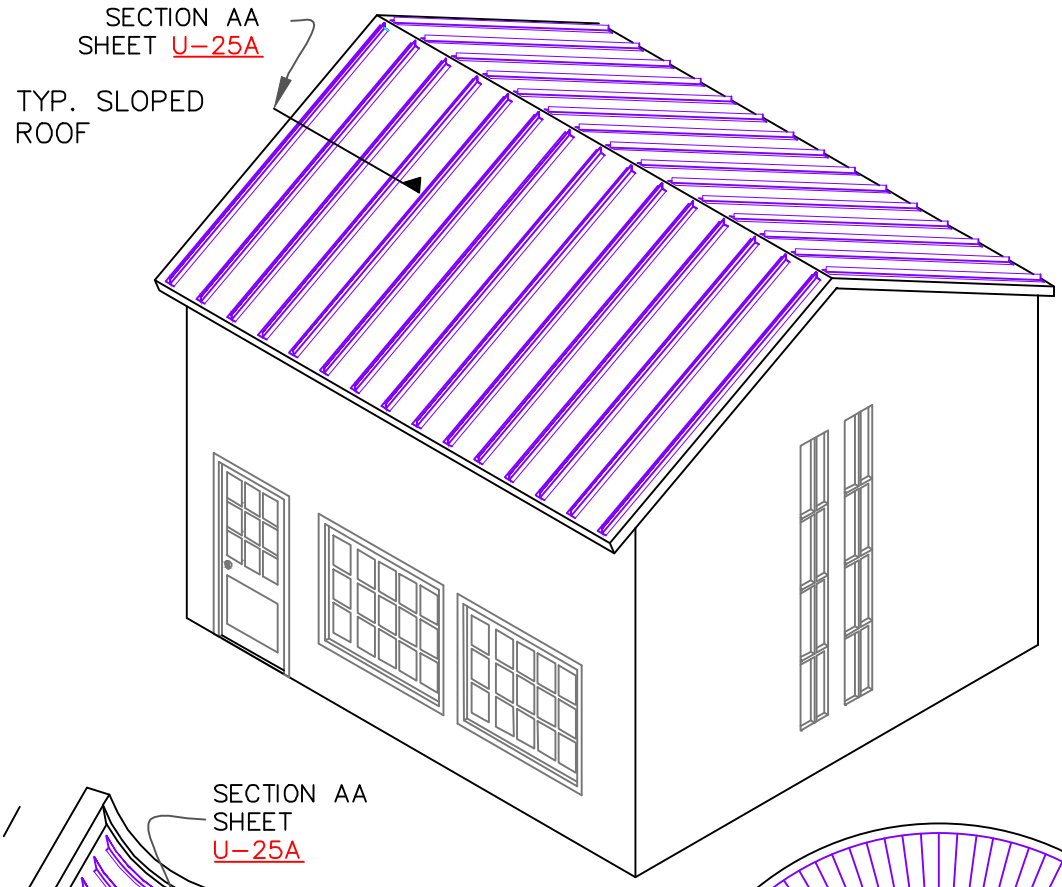
TPO

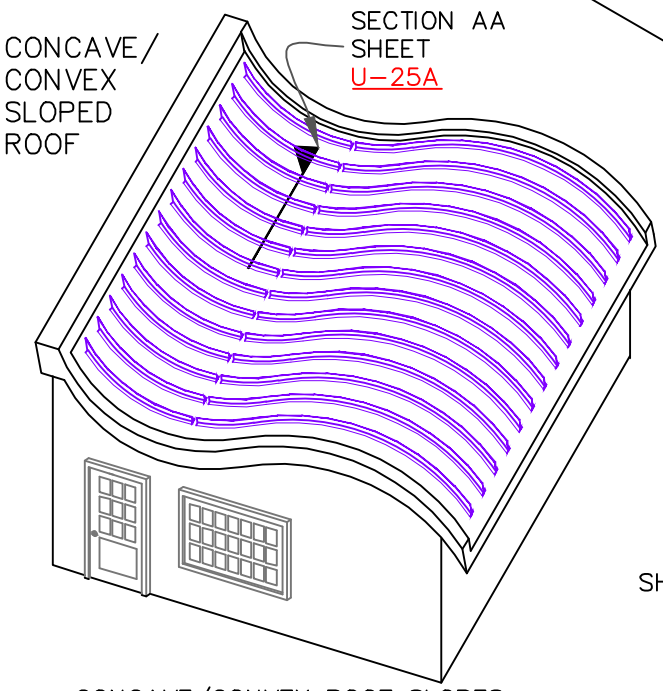
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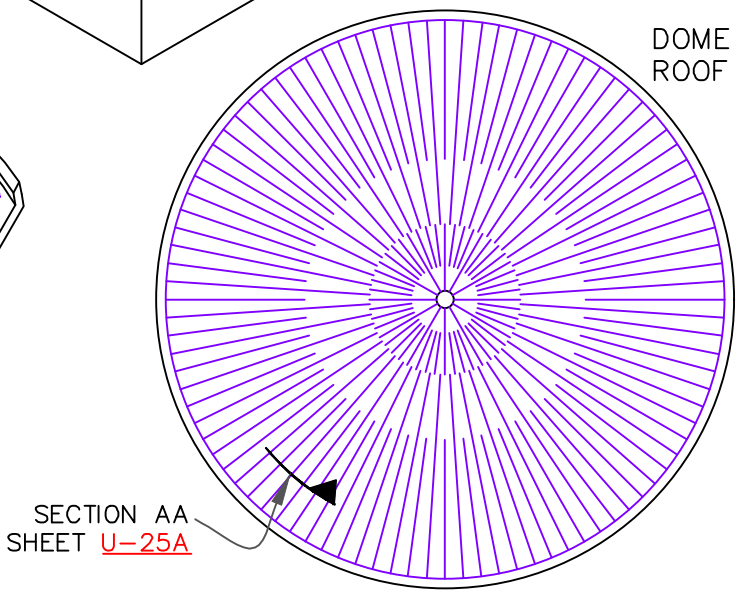
U–25A

U (Universal Detail)

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CONCAVE/CONVEX ROOF SLOPES

AT COMPLEX GEOMETRIC SHAPES, WITH MULTI-DIRECTIONAL SLOPES, THE SHEET METAL ROOF IS NOT ONLY DIFFICULT TO INSTALL, BUT THE WATER-SHEDDING ABILITY OF METAL ROOF IS SERIOUSLY HAMPERED WITHIN THE CONCAVE (NEGATIVE) SLOPES. THE WATERPROOFED ROOF MEMBRANE WITH THE CONTOUR RIB IS A PRACTICAL SOLUTION.

TYPICAL PLAN OF DOME ROOF

WHERE CONCENTRATION OF STANDING SEAMS NEAR CENTER IN METAL SYSTEM IS EXTREMELY HARD TO FABRICATE & INSTALL, THE CONTOUR RIB INSTALLATION IS EXTREMELY SIMPLE & EASY TO INSTALL.

CARLISLE SYNTEC SYSTEMS

SURE-WELD TPO RIB:
VARIOUS APPLICATIONS

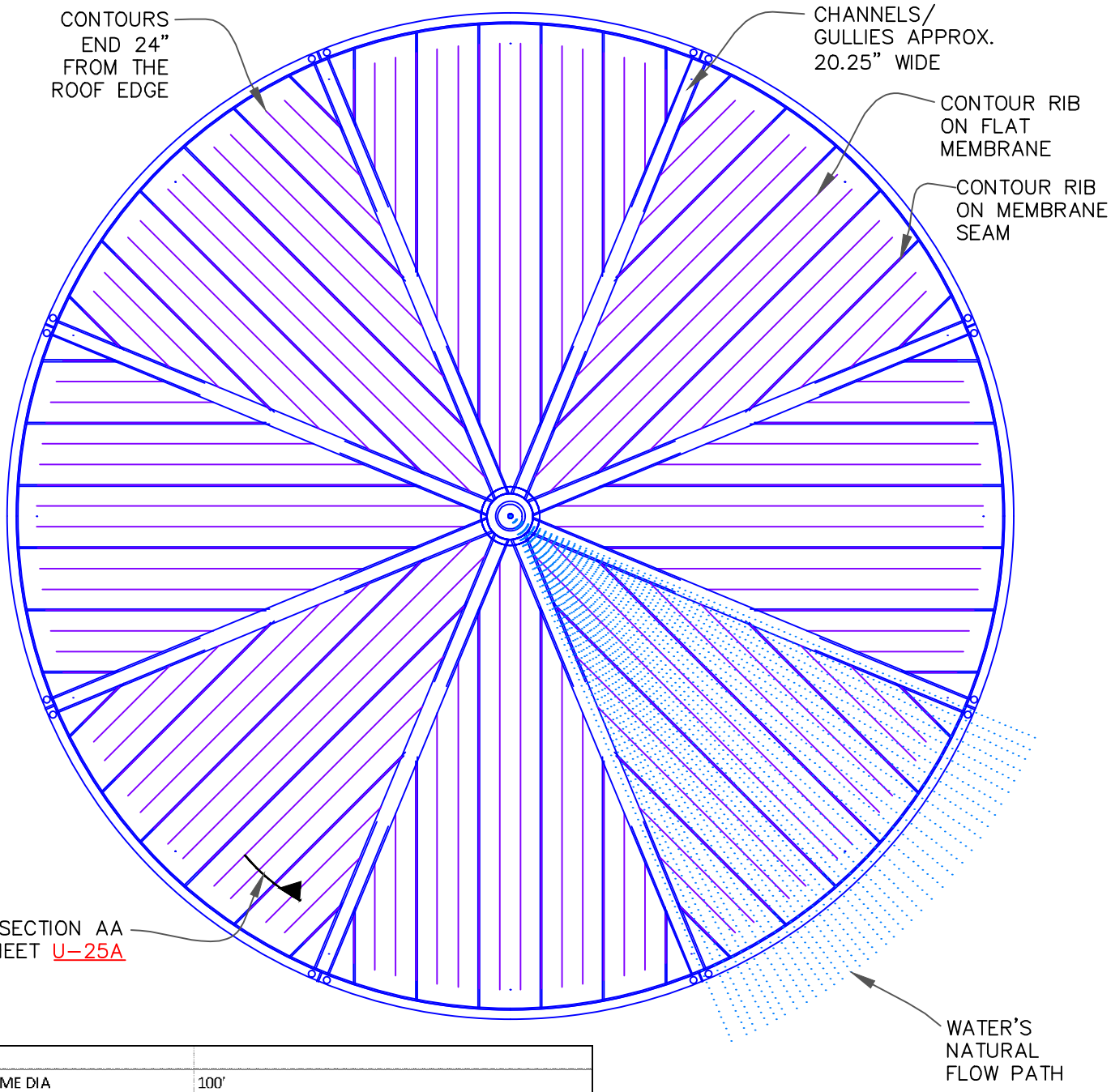
MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO.
U-25B

U (Universal Detail)

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DOME	
TYP. DOME DIA	100'
DOME AREA	8,550 S.F.
MEMBRANE	
ROLL WIDTH	81"
MEMBRANE SEAM WIDTH	2"
WELDED PORTION	1.5"
CHANNELS/GULLIES	PERFECTLY CUT 1/4TH WIDTH OF 81" ROLL (20.25")
APEX POINT	PERFECTLY CUT CIRCULAR SHAPE AS DESIGNED, APPRX. 37" DIA SHOWN
CONTOUR RIBS	
CONTOUR RIBS O.C.	26.333"
TOTAL LENGTH OF CONTOUR RIBS ON ENTIRE 100 DIA DOME	3256 LINEAR FEET (ADD % FOR DOME CURVE)

TYPICAL EXAMPLE OF 100' DIAMETER DOME ROOF PLAN SHOWS 81" WIDE ROLLS SHOWING CONTOUR RIBS @ 26.33" O.C.

NOTE: APEX MAY BE DESIGNED WITH SELF-CLEANSING ZINC STRIPS TO CUT DOWN STAINING AROUND LIGHTNING ROD ARRESTOR

CARLISLE SYNTEC SYSTEMS

SURE-WELD TPO RIB: EXAMPLE OF DOME WITH RIBS ALIGNED OVER MEMBRANE SEAMS

MAXIMUM WARRANTY: 30 YEARS

TPO

DETAIL NO. U-25C

U (Universal Detail)

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