

# Sure-Weld® TPO Roofing Systems

## G U I D E - S P E C

### **Sure-Weld® TPO MECHANICALLY FASTENED ROOFING SYSTEM Induction Welding (RhinoBond / Isoweld) Attachment Method**

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This **GUIDE-SPEC** is a brief outline of Carlisle's Sure-Weld Mechanically Fastened Roofing System requirements using the Induction Welding Attachment Method and is intended for use as a submittal with a bid package. Specifiers and the Carlisle Authorized Roofing Applicator must comply with the applicable sections of Carlisle's Technical Manual prior to design or bid.

#### **PART I GENERAL**

##### **1.01 DESCRIPTION**

The **Sure-Weld Mechanically-Fastened Roofing System** incorporates 12', 10' or 8' wide, white, gray or tan 45, 60 or 80-mil thick scrim-reinforced Sure-Weld Thermoplastic Polyolefin (TPO) membrane. Insulation is mechanically fastened to an acceptable roof deck using approved fasteners and RhinoBond or Isoweld plates. Sure-Weld 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. 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 hot air weld. Refer to the Thermoplastic Specification for the required fastener spacing.

##### **1.02 QUALITY ASSURANCE**

- A. This roofing system must be installed by a Carlisle Authorized Roofing Applicator in compliance with shop drawings as approved by Carlisle.
- B. Upon request, an inspection shall be conducted by a Field Service Representative of Carlisle to ascertain that the membrane roofing system has been installed according to Carlisle's published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.
- C. For specific code approvals achieved with this system, refer to Carlisle's Sure-Weld Code Approval Guide, DORA (Directory of Roof Assemblies), FM Approvals or UL Fire Resistance Directory for Roofing Materials and System.

##### **1.03 SUBMITTALS**

- A. To ensure compliance with Carlisle's warranty requirements, the following projects should be forwarded to Carlisle for review prior to installation, preferably prior to bid.
  1. Air pressurized buildings, canopies, and buildings with large openings, cold storage buildings or freezer facilities, adhered roofing system projects over 100' in height or projects where the membrane is expected to come in direct contact with petroleum-based products, waste products (i.e., grease, oil, animal fats, etc.) and other chemicals.
- B. Shop drawings must be submitted to Carlisle by the Carlisle Authorized Roofing Applicator along with a completely executed Notice of Award (Page 1 of Carlisle's Request For Warranty form) for approval. Approved shop drawings are required for inspection of the roof and on projects where on-site technical assistance is requested.



**1.04 GENERAL DESIGN CONSIDERATIONS**

- A. 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.
- B. 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-01-21 “Construction Generated Moisture” included in the Carlisle Technical Manual.]
- C. On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

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

- D. Vapor Retarders
  - 1. Carlisle does not require a vapor retarder for the protection of the membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:
    - a. Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier.
    - b. In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid **interior toward** a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder. Attention should be given to buildings located in moderate climates, where large temperature differences between daytime and nighttime temperatures may be experienced, resulting in condensation and moisture accumulation if a vapor retarder is not used. Such conditions along with others should be assessed by the designer or design team.

**1.05 WARRANTY**

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

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

Notes: √= Acceptable

- (1) All “T-Joints” must be overlaid with appropriate flashing material when using 60-mil membrane.
- (2) Perimeter enhancements required for wind speed coverage greater than 72mph. Contact Carlisle for requirements.
- (3) 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.

**1.06 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Store Sure-Weld membrane in the original undisturbed plastic wrap.
- C. Job site storage temperatures in excess of 90°F may affect shelf life of curable materials (i.e., adhesives and sealants).
- D. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60°F before use.

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

## 1.07 JOB CONDITIONS

- A. Refer to Carlisle Technical Manual for applicable project specific Job Conditions.

## PART II PRODUCTS

### 2.01 GENERAL

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

### 2.02 MEMBRANE

Sure-Weld white, gray or tan 45, 60, 80-mil thick reinforced Thermoplastic Polyolefin (TPO) membrane is used for this system. Field membrane sheets are 12', 10' or 8' wide by 100' long based on project conditions. Perimeter sheets are 6' wide (used with 12' or 10' field sheets), or 4' wide (used with 8' field sheets).

### 2.03 RELATED MATERIALS

Sure-Weld Non-Reinforced or Reinforced Flashing, Bonding Adhesive, Cut Edge Sealant, Water Cut-Off Mastic, Weathered Membrane Cleaner, Molded Pocket Sealant, Heat Weldable Walkway Pads, Pre-Molded Inside/Outside Corners, Pipe Flashings, Curb Wraps, LIQUISEAL Liquid Flashing and Sealant Pockets.

## PART III EXECUTION

### 3.01 GENERAL

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

### 3.02 ROOF DECK CRITERIA

- A. Proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.
- B. Defects in the roof deck 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.
- C. Refer to Carlisle Technical Manual for acceptable decks and the applicable Sure-Seal Fasteners (when mechanical attachment of insulation is specified).

### 3.03 SUBSTRATE PREPARATION

- A. On retrofit-recover projects, cut and remove wet insulation, as identified by specifier, and fill all voids with new insulation so it is relatively flush with existing surface.
- B. For all projects, substrate must be even without noticeable high spots or depressions, and must be free of accumulated water, ice or snow.
- C. Clear the substrate of debris and foreign material. Fresh bitumen based roof cement must be removed or concealed.

### 3.04 INSTALLATION

Refer to the applicable Safety Data Sheets and Product Data Sheets for applicable cautions and warnings.

#### A. Insulation Attachment

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' 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.

**B. Membrane Placement, Attachment and Hot Air Welding**

1. Place Sure-Weld membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.
2. 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.
3. Activate induction welding tool and leave in place until heating cycle is complete.
4. Immediately place the magnet on the membrane over the plate and leave in place for at least 60 seconds.
5. Resume process ensuring membrane is attached to all plates.
6. Overlap adjacent membrane a minimum of 2" at end roll sections (width of the membrane).
7. Hot air weld the membrane sheets a minimum of 1-1/2" with an Automatic Hot Air Welding Machine.
8. Membrane that has been exposed to the elements for approximately 7 days must be prepared with Weathered Membrane Cleaner. Wipe the surface where Weathered Membrane Cleaner has been applied with a clean, dry HP Splice Wipe or other white rag to remove cleaner residue prior to hot air welding.

**C. Additional Membrane Securement**

The membrane must be secured at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any angle change which exceeds 2" in one horizontal foot and at all other penetrations in accordance with Carlisle's Details published with Carlisle's Specifications.

**D. Membrane Flashing**

1. Flash all walls and curbs with Sure-Weld reinforced membrane. Non-Reinforced membrane shall be limited to inside and outside corners, field fabricated pipe seals, scuppers and Sealant Pockets where the use of pre-molded accessories are not practical.
2. On vertical surfaces, such as walls, curbs and pipes, Bonding Adhesive is not required when the flashing height is 12" or less and the membrane is terminated under a metal counterflashing (nailed). When a coping or termination bar is used for vertical terminations, Bonding Adhesive may be eliminated for flashing heights 18" or less.
3. Terminate the flashing in accordance with an appropriate Carlisle Details above anticipated slush line.
4. When using the Pressure-Sensitive Cover Strip to overlay metal edging flanges or fasteners/plates, Carlisle Weathered Membrane Cleaner is used to clean surfaces as needed. Apply Carlisle HP-250 Primer prior to applying Pressure-Sensitive Cover Strip.

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Carlisle SynTec  
P. O. Box 7000, Carlisle, PA 17013-0295  
Phone: 800-479-6832  
<http://www.carlisle-syntec.com>

**Physical properties of Sure-Weld Membrane can be referenced in Part II, "Products" of the Thermoplastic Specification.**

**Attach copies of the applicable Carlisle Details that pertain to the individual project to complete a bid package submittal.**