

PART I – GENERAL**DESCRIPTION**

The Carlisle Sure-Weld Mechanically-Fastened Roofing System incorporates a 10' or 8' wide (white) .045" thick, scrim-reinforced, Sure-Weld Thermoplastic Polyolefin (TPO) membrane. Insulation is mechanically fastened to an acceptable roof deck. Sure-Weld perimeter sheets (5' or 4' wide respectively) are installed along the building edges and field membrane sheets are mechanically fastened to the roof deck with the appropriate Manufacturer 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 "Design Criteria" section for the required number of perimeter membrane sheets and the required fastener spacing. **This is a Required Vendor.**

Hereafter, in this Section, the word Manufacturer shall be used to imply "Carlisle".

SUBSTITUTIONS

No substitutions.

QUALITY ASSURANCE

- This roofing system must be installed by a Manufacturer Authorized Roofing Applicator in compliance with shop drawings as approved by Manufacturer. There must be no deviations made without PRIOR WRITTEN APPROVAL of Manufacturer.
- Upon completion of the installation, an inspection will be conducted by a Technical Representative of Manufacturer to ascertain the roofing system has been installed according to Manufacturer's specifications and details.
- This roofing system meets Underwriters Laboratories (UL) and Factory Mutual (FM) requirements (minimum required FM design is FM Class1A-90). For specific code approvals achieved with this system, refer to Manufacturer's Code Approval Guide, Factory Mutual Approval Guide or Underwriters Laboratories Fire Resistance and Roofing Materials and Systems Directories.

SUBMITTALS

- A. The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.

Submit the following items for review by the Professional of Record in accordance with Section 01300, Submittals.

- B. To ensure compliance with Manufacturer's warranty requirements, the following projects should be forwarded to Manufacturer for review prior to installation, preferably prior to bid.
1. Projects where building height exceeds 50 feet.
 2. Projects with fasteners specified to exceed 12 inches in length.

3. 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).
 4. Projects where membrane is expected to come in direct contact with petroleum based products or other chemicals.
- C. Along with the project submittals (shop drawings and Request for Warranty), the roofing contractor must include pullout tests when the HP-X Fastener is used through a lightweight insulating concrete substrate into a steel deck lighter than 22 gauge or into plywood decks less than 5/8 inch thick. Pullout tests are also required when the Sure-Seal HP Lightweight Deck Fastener is used with cementitious wood fiber or gypsum decks or the HP Woodie Fastener is used with oriented strand board (OSB) decks.
- D. For all projects (prior to project inspection by Manufacturer) a final shop drawing must be approved by Manufacturer.

PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 90°F may affect shelf life of curable materials (i.e., uncured flashing, adhesives, sealants, primers, SecurTape, Pourable Sealer and Pressure-Sensitive Flashings).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60°F before use. Do not store adhesive containers with opened lids due to loss of solvent, which will occur from flash off.
- D. Insulation and underlayment must be stored so it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

JOB CONDITIONS

- A. This roofing system must not be applied on portions of a project where the slope exceeds 18 inches in one horizontal foot.
- B. On retrofit-recover projects, existing roofing material must be investigated and wet material must be removed. Existing sprayed-in-place urethane roofs and Phenolic insulation must be removed.

- C. The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated by the specifier. Consult the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.
- D. If this roofing system is installed during windy conditions or on projects, which are not encapsulated, precautionary measures must be taken to utilize temporary ballast during installation.
- E. Coordination between trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane.

WARRANTY

- A. Roofing – 5 years by manufacture (15 year available if Landlord wants to purchase – not included in original pricing). A 15 year Golden Seal Total System Warranty which utilize all components manufactured or marketed by Manufacturer., with a wind speed coverage up to 72 mph is available for a charge. Extended wind uplift coverage (greater than 55 mph) is available only upon review by Manufacturer and at Manufacturer's sole discretion.

Note: Due to the various wind uplift conditions, these projects must be reviewed by Manufacturer prior to bid, preferably in the design phase, to determine system enhancements that may be applicable.

PART II – PRODUCTS

GENERAL

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

MEMBRANE

Sure-Weld white, .045" thick reinforced Thermoplastic Polyolefin (TPO membrane) is used for this system. Field membrane sheets are 10' or 8' by 100' long based on project conditions. Perimeter sheets are 5' wide (used with 10' field sheets) or 4' wide (used with 8' field sheets).

ROOF INSULATION

- A. Roof insulation shall be polyisocyanurate roof insulation with a minimum "R" value of 30 (5.0" thick minimum) in accordance with LTTR procedures. Polyisocyanurate shall have a typical compressive strength of 20 psi. Polyisocyanurate roof insulation shall meet Federal Specification HH-1-1972/2-Class I, UL Class A rating and Factory Mutual (FM) Class 1 approval.
 - Provide in all locations.
 - Apply in two (2) layers with staggered joints.

- Provide 1" rigid insulation at all preformed curbs without factory installed insulation.
- B. All insulation shall be mechanically fastened to the roof deck with a minimum six (6) fasteners per 48 inches per a 96 inch board. Additional fasteners shall be located as required to eliminate high spots in boards.
- C. Insulation joints shall be 1/4" or less in width. Repair all joints wider than 1/4" with insulation. Stagger all joints.
- D. Broken corners shall be cut out and replaced with sections of insulation large enough to be supported on two or more deck flutes.
- E. All roof insulation shall be installed in accordance with the recommendations of Factory Mutual (FM) and the roof insulation manufacturer.
- F. Tapered roof insulation and necessary fill boards forming all crickets between each scupper (where applicable), crickets on the high side of roof scuttle, crickets formed on high side of smoke/heat release vents, HVAC units and all other roof penetrations with curbs, as shown on roof plan shall be polyisocyanurate roof insulation meeting Federal Specifications HH-1-1972/2 Class 1 and Factory Mutual (FM) Class 1 approval. Taper insulation to provide 1/4" per foot minimum slope at areas noted as crickets on roof plan.
- G. Insulation must be accepted in writing by roof membrane manufacturer.

RELATED MATERIALS

Sure-Weld Non-Reinforced or Reinforced Flashing, Bonding Adhesive, Cut Edge Sealant, Water Cut-Off Mastic, CCW-102C Sealant, Brite-Ply™ Spicing Cement, Sure-Weld Membrane Cleaner, Heat Weldable Walkway Pads, Pre-Molded Inside/Outside Corners, Pipe Flashings and Sealant Pockets.

PART III – EXECUTION

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 and terminations.
- B. Follow criteria outlined in the "Design Criteria" Section of Manufacturer's technical manual to prepare the roof deck or the substrate prior to the application of the new roofing system.

ROOF DECK CRITERIA

- A. 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 Manufacturer Authorized Roofing Applicator shall not proceed unless the defects are corrected.
- C. Acceptable decks and the applicable Manufacturer Fasteners:
 - 1. Steel, 22 gauge or heavier - Manufacturer HP-X Fasteners/Piranha Plates are required for membrane securement with a minimum pullout of 500 pounds per fastener.
 - 2. Lightweight Insulating Concrete over Steel - Manufacturer HP-X Fasteners/Piranha Plates are required with a minimum pullout of 360 pounds per fastener (into the steel deck below the lightweight concrete).
 - 3. Structural Concrete, rated 3,000 psi or greater - Manufacturer HP Concrete Spikes or HD 14-10 Fasteners (with Piranha Plates) are required with a minimum pullout of 800 pounds per fastener.
 - 4. Wood Plank or minimum 15/32 inch thick Plywood - Manufacturer HP-X Fasteners/Piranha Plates are required with a minimum pullout of 360 pounds per fastener. If the minimum pullout value cannot be achieved, the HP Woodie Fastener may be used providing a minimum pullout value of 360 pounds can be achieved.
 - 5. Oriented Strand Board (OSB), minimum 7/16 inch thick - Manufacturer HP Woodie Fasteners are required with a minimum pullout of 360 pounds per fastener. On minimum 5/8 inch thick OSB decks, HP-X Fasteners/Piranha Plates may be used with a minimum pullout of 360 pounds.
 - 6. Cementitious Wood Fiber and Gypsum - Manufacturer HP Lightweight Deck Fasteners are required with a minimum pullout of 300 pounds.

SUBSTRATE PREPARATION

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

INSTALLATION

Refer to the applicable Material Safety Data Sheets and Technical Data Bulletins for cautions and warnings. Remove excess dust and dirt from the membrane by wiping with a clean rag. If necessary, scrub the sheets with warm soapy water and rinse with clean water.

A. Insulation Attachment

- 1. Insulation shall be mechanically fastened to the roof deck as follows:
 - a. For HP Recovery Board or minimum 1-1/2" thick Polyisocyanurate, a minimum of 5 fasteners and plates per 4' x 8' board are required.
 - b. For Polyisocyanurate less than 1-1/2" thick or Foamular® or DOW Extruded Polystyrene, any thickness, a minimum of 6 fasteners and plates per 4' x 8' board are required.

Note: Extruded polystyrene insulation is for use directly under white Sure-Weld membrane only.
 - c. Insulation boards 4' x 4', regardless of thickness, must be fastened at the minimum rate of 1 fastener and plate every 4 square feet.
- 2. Manufacturer's Piranha Plates, Seam Fastening Plates (2" diameter) or Insulation Fastening Plates (3" diameter) must be used with appropriate fastener for insulation attachment.

B. Membrane Placement and Attachment and Hot Air Welding

- 1. A minimum of one perimeter sheet shall be installed at edges of each roof level and either 10' or 8' wide membrane shall be installed in the field of the roof.
- 2. Membrane sheets shall be mechanically fastened with the appropriate Fastener/Fastening Plate spaced 6" to 12" on center, depending on project criteria, within the membrane splice. Refer to the "Design Criteria" section for required number of perimeter membrane sheets and fastener spacing.
- 3. Overlap adjacent membrane sheets approximately 5--1/2" at those locations where Fastening Plates are located (along length of membrane) and a minimum of 2" at end roll sections (width of the membrane).
- 4. Hot air weld the membrane sheets a minimum of 1-1/2" with an Automatic Hot Air Welding Machine.
- 5. Membrane that has been exposed to the elements for approximately 7 days must be prepared with Sure-Weld Membrane Cleaner. Wipe the surface where Sure-Weld 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

- 1. 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 Manufacturer's Published Details.

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 premolded accessories are not practical. Terminate the flashing in a manner approved by Manufacturer.
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.

E. Other Related Work

1. Walkways are required at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.), regardless of traffic frequency. Walkways are also required if regular maintenance (once a month or more) is necessary to service rooftop equipment. Walkways are considered a maintenance item and are excluded from the Manufacturer's Warranty.
 - a) Sure-Weld Heat Weldable Walkway Rolls are required when walkway pads are specified and are heat welded to the Sure-Weld membrane.
 - b) Smooth concrete pavers, when used, shall be loose laid over a slip sheet of reinforced membrane or 2 layers of HP Protective Mat.
 - c) Sure-Seal Interlocking™ Rubber Pavers can be placed directly over the membrane. Installation Instructions Sheets are available from Manufacturer.

Note: Pavers are not recommended when the roof slope is greater than 2 inches per one horizontal foot (16 cm/m).

END OF SECTION