



Sure-Seal®/Sure-White™ EPDM and Sure-Weld TPO FleeceBACK™ Adhered Roofing System using Aqua Base 120 Bonding Adhesive

May 2006

PART I GENERAL

1.01 DESCRIPTION

This FleeceBACK Adhered Roofing System incorporates Sure-Seal (black) or Sure-White (white-on-black) non-reinforced EPDM or Sure-Weld (white, gray or tan) reinforced TPO membrane laminated to non-woven polyester fleece-backing. The membrane is fully adhered to an acceptable insulation or substrate with Carlisle Aqua Base 120 Bonding Adhesive (water based).

Adjoining sheets of EPDM FleeceBACK membrane are spliced together using 3" or 6" wide factory-applied SecurTAPE™ in conjunction with Primer. Sheets of Sure-Weld FleeceBACK membrane are joined together with a minimum 1-1/2" wide hot air weld.

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. There must be no deviations made from Carlisle's specifications or the approved shop drawings without the **PRIOR WRITTEN APPROVAL** of Carlisle.
- B. Upon completion of the installation, an inspection will be conducted by a Field Service Representative of Carlisle to ascertain that the roofing system has been installed according to Carlisle's specifications and details.
- C. This roofing system meets Underwriters Laboratories (UL) and Factory Mutual (FM) requirements. For specific code approvals achieved with this system, contact Carlisle.

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 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. Projects where the FleeceBACK Membrane is expected to come in direct contact with petroleum based products or other chemicals.

- 4. Projects over 100' in height.

- B. When mechanical attachment of insulation is proposed over fibrous cement, gypsum, steel lighter than 22 gauge or OSB decks less than 5/8" thick, withdrawal tests must be conducted with the appropriate Carlisle Fastener. If the pullout values do not meet the requirements outlined in this Specification, the values must be submitted to Carlisle to determine any additional enhancements.

As an option to eliminate the need for mechanical fasteners, Carlisle FAST™ Adhesive, OlyBond 500 BA or VersiGrip Insulation Adhesive may be used to attach insulation. Type III or IV hot asphalt may also be used for insulation attachment.

- C. For all projects, prior to project inspection by Carlisle, a final shop drawing must be approved by Carlisle.

1.04 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. Job site storage temperatures in excess of 90°F may affect shelf life of curable materials (i.e., Aqua Base 120 Bonding Adhesive, splicing cement, sealants, cleaners, primers, SecurTAPE, Pourable Sealer, Pressure-Sensitive Flashing and uncured flashing).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60°F before use. Do not store containers with opened lids due to loss of solvent which will occur from flash off.

CAUTION: Do not allow Aqua Base 120 Bonding Adhesive to freeze. Do not store below 40°F.

- D. FleeceBACK Membrane should be stored in its original plastic wrap and be covered to protect from moisture. Any moisture absorbed by the fleece-backing must be removed by using a wet-vac system, prior to membrane adhesion.
- E. 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.

1.05 JOB CONDITIONS

- A. Do not apply Aqua Base 120 Bonding Adhesive when ambient temperatures are below 40°F. Do not apply if ambient temperature will drop below 32°F before adhesive dries.
- B. Open containers of Aqua Base 120 Bonding Adhesive should be used within 48 hours since adhesive will form a thick surface skin that will not re-dissolve. Adhesive can be used providing the skinned layer is removed.
- C. There is no maximum slope restriction for the application of this roofing system. On Sure-White EPDM FleeceBACK Roofing Systems, a slope greater than 1/8" per horizontal foot is recommended to serve long-term aesthetics.

On Sure-Weld TPO FleeceBACK Roofing Systems, when the slope exceeds 5" per horizontal foot, use of an automatic heat welding machine may be more difficult. A hand held heat welder should be specified.

- D. On retrofit-recover projects, existing roofing material must be investigated and wet material must be removed.
- E. Existing Phenolic Insulation must be removed.
- F. 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.

If a vapor retarder is specified and insulation is to be secured with Carlisle FAST Adhesive, OlyBond Spot Shot or 500 BA or Versigrip Insulation Adhesive, Carlisle recommends the use of our Carlisle 725 Air and Vapor Barrier. If a vapor retarder manufactured by others is to be utilized, Carlisle must be contacted regarding a suitable material.
- G. Coordination between various trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane.

1.06 WARRANTY

All warranties are available for commercial projects only.

- A. **A 5 or 10 year Membrane System Warranty** is available for a charge.
- B. **A 10 or 15 year Golden™ Seal Total Roofing System Warranty** is available for a charge on projects which utilize all components manufactured or marketed by Carlisle.
- C. Projects will receive peak gust warranty wind speed coverage up to 55 mph. Additional wind speed coverage may be available when design enhancements are incorporated. Contact Carlisle for specific requirements.

PART II PRODUCTS

2.01 GENERAL

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

2.02 MEMBRANE

FleeceBACK 100 or 115 Membrane incorporates .045" or .060" thick Sure-Seal (black) or Sure-White (white-on-black) non-reinforced EPDM or Sure-Weld (white, gray or tan) reinforced TPO membrane laminated to a .055" thick non-woven polyester fleece-backing resulting in a total finished sheet thickness of 100 or 115 mils.

Membrane is available in widths of 10' (EPDM FleeceBACK) and 12' (Sure-Weld FleeceBACK) and lengths of 50' and 100'. Selvage edges (fleece-backing is discontinued) are provided along the length of the membrane for splicing. For EPDM FleeceBACK membrane, 3" or 6" wide factory-applied SecurTAPE is provided along the selvage edge.

2.03 RELATED MATERIALS

- A. EPDM FleeceBACK Systems:

Aqua Base 120 Bonding Adhesive, Splice Cleaner, Splicing Cement, In-Seam Sealant, Lap Sealant, Primer, SecurTAPE, Cured EPDM Flashing, Pressure-Sensitive Flashing, Elastoform Flashing®, Termination Bars, Insulation Fasteners, Water Cut-Off Mastic, PT 304 Sealant and Pourable Sealer are required for use with this roofing system. Other Carlisle products, such as insulation and edgings are also required when a Total System Warranty is specified.

Other Products: Walkway Pads/Rolls, Pre-Molded Pipe Flashings, Pressure-Sensitive Inside/Outside Corners, Pipe Flashings and Pourable Sealer Pockets.

- B. Sure-Weld FleeceBACK Systems:

Aqua Base 120 Bonding Adhesive, Sure-Weld Reinforced and Non-Reinforced Flashing, Pressure Sensitive Cover Strips, Cut-Edge Sealant, PT-304 Sealant, Weathered Membrane Cleaner, Termination Bars, Insulation Fasteners and Water Cut-Off Mastic. Other Carlisle products such as insulation and edgings are also required when a Total System Warranty is specified.

Other Products: Heat Weldable Walkway Pads, Pre-Molded Pipe Flashings, Split Pipe Seals, Corners, TPO Curb Wrap Corners, Molded Sealant Pockets.

PART III EXECUTION

3.01 GENERAL

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

3.02 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 Carlisle Authorized Roofing Applicator shall not proceed unless the defects are corrected.
- C. Acceptable decks and the applicable Carlisle Fasteners (when mechanical attachment of insulation is specified).
 - 1. **Steel** – HP, InsulFast, HP-X or Pre-Assembled ASAP Fasteners (minimum pullout of 360 into 22 gauge or heavier steel; minimum 300 pounds into less than 22 gauge).
 - 2. **Structural Concrete, rated 3,000 psi or greater** - CD-10 (hammer driven) or HD 14-10 (threaded) Fasteners (minimum pullout of 800 pounds).
 - 3. **Wood Plank or minimum 15/32 (12 mm) thick Plywood** – HP, InsulFast, HP-X or Pre-Assembled ASAP Fasteners (minimum pullout of 360 pounds).
 - 4. **Minimum 7/16" (11 mm) thick oriented strand board (OSB)** – HP, HP-X or HP Woodie Fasteners (minimum pullout of 250 pounds).
 - 5. **Cementitious Wood Fiber and Gypsum** - HP-NTB Fasteners (minimum pullout of 300 pounds).
 - 6. **Lightweight Insulating Concrete** - For lightweight insulating concrete poured over steel, HP or HP-X Fasteners are recommended through the lightweight concrete into the steel deck below (minimum pullout of 300 pounds).

3.03 SUBSTRATE REQUIREMENTS

- A. The membrane may be adhered with Aqua Base 120 Bonding Adhesive directly over structural concrete or wood roof decks (new or tear-off). Direct application over certain types of cellular or perlite lightweight insulating concrete substrate may also be specified (contact Carlisle for acceptable lightweight insulating concretes).

CAUTION: Direct application of the membrane is not permitted over existing roofing systems or decks with residual adhesive or asphalt.

- B. Acceptable Carlisle insulations include all types currently

approved with Design "A" Adhered Roofing Systems.

- C. The substrate must be dry, relatively smooth, free of protrusions, debris, sharp edges or foreign materials and must be free of accumulated water, ice and snow. Cracks or voids in the substrate greater than 1/4" (6 mm) must be filled with a suitable material.
- D. On retrofit-recover projects, cut and remove wet insulation as identified by the specifier and fill all voids with new insulation, so that it is relatively flush, prior to installing an approved insulation.

3.04 INSTALLATION

Refer to the applicable Material Safety Data Sheets and Technical Data Bulletins for cautions and warnings.

A. Insulation Attachment

- 1. Carlisle FAST Adhesive, OlyBond Spot Shot or 500 BA or Versigrip Insulation Adhesive may be specified for insulation securement. As an option, type III or IV hot asphalt may also be specified.

Insulation board size shall not exceed 4' x 4' except when FAST Adhesive is spray applied, where 4' x 8' boards are permitted.

- 2. If mechanical securement of insulation is specified, Carlisle Insulation shall be mechanically fastened to the roof deck with 1 insulation fastener and plate per every 2 square feet.

Note: For structural concrete, minimum 22 gauge steel or minimum 15/32" thick plywood decks, Carlisle Polyisocyanurate Insulation which is 2" thick or greater (used as the top layer) may be fastened at the minimum rate of 1 every 4 square feet.

- 3. Insulations by others (when promoted by the respective manufacture and accepted by Carlisle) shall be mechanically fastened to the roof deck with a minimum of 1 insulation fastener and plate for every 2 square feet of insulation unless otherwise accepted in writing by the respective insulation manufacturer.

B. Membrane Adhesion

- 1. FleeceBACK Membrane shall be fully adhered to an acceptable substrate with Aqua Base 120 Bonding Adhesive supplied by Carlisle.

Aqua Base 120 Bonding Adhesive is applied to the substrate only and the membrane is rolled into the wet adhesive. Roll the membrane with a weighted steel roller (100 - 150 pounds) or push broom to set the membrane into the adhesive.

2. Aqua Base 120 Adhesive application procedures:

- a. Stir adhesive until settled material or phased liquid is redistributed and the adhesive is uniform in color.

- b. Apply adhesive to the substrate in a uniform manner avoiding globs, puddles and uncoated areas at a coverage rate of 100 - 120 square feet per gallon, avoiding heavy application of adhesive. On porous substrates such as lightweight insulating concrete, additional adhesive may be required.

c. Application methods:

- 1) Apply with a 1/8" notched squeegee to acquire proper coverage rate.
- 2) A mechanical sprayer can be used. A Graco 510 gun with a tip size between .019" to .023" is recommended.
- 3) A medium nap roller or mechanical roller can be used, but care must be taken to ensure the adhesive remains wet at the time of membrane placement.

3. **Membrane Splicing With SecurTape – EPDM FleeceBACK Systems**

Adjoining sheets of EPDM FleeceBACK Membrane are overlapped a minimum of 3" along length of membrane (at selvage edges) in preparation for splicing.

At end laps (along width of sheet), membrane shall be butted together and overlaid with 6" wide Pressure-Sensitive Cured Cover Strip.

- a. Prime the splice area with Sure-Seal Primer and allow to properly dry.
- b. Where SecurTAPE is not pre-applied, apply SecurTape to bottom membrane sheet with edge of release film along a line marked 1/2" out from top sheet. Press tape onto sheet using hand pressure, overlapping tape roll ends a minimum of 1".
- c. Remove the release film and press top sheet onto tape using hand pressure. Roll the splice with a 2" wide steel roller or Carlisle's Stand-Up Seam Roller.
- d. Install a 6" wide section of Pressure-Sensitive Flashing or Elastoform Flashing over all field splice intersections and seal edges of flashing with Lap Sealant.
- e. The use of Lap Sealant along the entire splice edge is optional, except at tape overlaps.
- f. Refer to Carlisle's EPDM FleeceBACK (with FAST Adhesive) Specification, Part II, "Application", for additional splicing procedures.

4. **Membrane Splicing – Heat Welding of Sure-Weld FleeceBACK membrane**

Along the length of the membrane (at selvage edges),

hot air weld membrane sheets a minimum of 1-1/2" with an Automated Heat Welder or Hot Air Hand Welder and silicone roller.

At end laps (along width of sheet), membrane shall be butted together and overlaid with 6" wide reinforced TPO membrane heat welded along all edges.

- a. Refer to Carlisle's Sure-Weld FleeceBACK Specification, Part II, "Application", for specific heat welding procedures.

- b. Membrane that has been exposed to the elements for approximately 7 days must be prepared by scrubbing the splice area with a Scotch Brite Pad and Carlisle Weathered Membrane Cleaner. Clean all residue from the prepared splice area with a HP Splice Wipe or clean natural fiber (cotton) rag prior to welding.

C. **ADDITIONAL MEMBRANE SECUREMENT**

Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb flashing, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2" in one horizontal foot, **and at other penetrations** in accordance with Carlisle's details.

- 1 Carlisle 2" diameter **Seam Fastening Plates** may be installed horizontally into the structural deck or vertically into walls or curbs.
- 2 Securement of the membrane with the approved Carlisle Fasteners and Seam Fastening Plates must be a maximum of 12" on center starting 6" minimum to 9" maximum from inside and outside corners.
- 3 After securing the Seam Fastening Plates, flash in accordance with the appropriate detail.

D. **Flashing**

- 1. When Sure-Weld (TPO) FleeceBACK membrane is used, it is recommended to use separate sections of standard Sure-Weld reinforced membrane (non-fleece-backed) to flash walls, curbs, etc.

Aqua Base 120 Bonding Adhesive is compatible with standard Sure-Weld membrane; however, it cannot be used in the "wet lay-in" one-sided application. Aqua Base 120 Bonding Adhesive must be used as a standard contact adhesive and be applied to both the back of the membrane and the substrate and allowed to properly dry prior to adhering to the appropriate surface.

The coverage rate is approximately 240 square feet per gallon per one surface or 120 square feet per gallon per finished surface (includes coverage on both membrane and substrate).

Note: Separate sections of standard EPDM membrane can be utilized; however, Carlisle 90-8-30A or B-500 Bonding Adhesive must be used to adhere the

flashing since Aqua Base 120 Bonding Adhesive is not approved as a contact adhesive for non-FleeceBACK EPDM membrane.

2. Sure-Weld or EPDM FleeceBACK membrane can be used to flash walls, curbs, etc., either as a continuous sheet (from deck to wall) or as a separate sheet (as referenced in paragraph D.1 above). In this instance, Aqua Base 120 Bonding Adhesive is applied as follows:
 - a. Apply Aqua Base 120 Bonding Adhesive to the back side of the FleeceBACK membrane (fleece side) with a medium nap roller and allow to dry.
 - b. After allowing the first coat to dry, apply a second coat of adhesive to the dried coat on the fleece side of the membrane while also applying a coat of adhesive on the substrate.
 - c. Allow to dry until the adhesive does not transfer to a dry finger touch or pull away from the membrane.
3. Adhere the membrane to the substrate and immediately broom with a soft bristle push broom.

Notes: Extended drying times can be expected in cool, overcast, humid, shaded or late day applications.

Aqua Base 120 Bonding Adhesive must be allowed to properly dry to avoid blisters caused by trapped moisture.

4. Uncured EPDM Elastoform Flashing, Pressure-Sensitive Uncured EPDM Flashing and non-reinforced Sure-Weld TPO membrane shall be limited to inside/outside corners, scuppers or other unusually shaped walls or penetrations where the use of Prefabricated accessories is not practical.

On EPDM systems, Uncured EPDM Elastoform Flashing or Pressure-Sensitive Uncured EPDM Flashing is also used for overlaying vertical field seams at the base of walls/curbs, etc. Refer to Carlisle's Universal Details for applicable requirements.

5. When using Pressure-Sensitive Flashing (semi-cured or cured EPDM or TPO) to overlay metal edging flanges, etc., Carlisle Primer must be used to prepare the membrane and metal surfaces.

Note: When using TPO Pressure-Sensitive Cover Strip to flash metal edge flanges, in areas where the flashing crosses a metal joint or membrane seam ("T" Joint), use a hot air welder to heat the top surface of the Cover Strip (TPO membrane side) and crease the material into the step off.

6. Terminate the flashing in accordance with an approved Termination Detail.

Note: Fleece backing must be removed from the back of the membrane prior to completing compression seal terminations so Water Cut-Off Mastic is applied directly to the membrane surface.

7. Copings, counterflashing and metal work, not supplied by Carlisle, shall be fastened to prevent metal from pulling free or buckling and sealed to prevent moisture from entering the roofing system or building.

8. Flashing of standard penetrations and edge conditions shall conform to Carlisle's Universal Details (EPDM and Sure-Weld) with the exception that "RUSS" details are not used with this system (since the fleece-backing prevents its use). Details not depicted in these publications should be submitted to Carlisle for review prior to installation.

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