

GUIDE - SPEC ADHERED ROOFING SYSTEM

December, 2004

This GUIDE-SPEC is a brief outline of Carlisle's Sure-Flex™ Adhered Roofing System requirements and is intended for use as a submittal with a bid package. Specifiers and Carlisle Authorized Roofing Applicators must comply with the Sure-Flex Specification prior to design or bid.

PART I GENERAL

1.01 DESCRIPTION

The Sure-Flex Adhered Roofing System incorporates maximum 81" wide white, gray or tan 50-mil, 60-mil or 80-mil thick reinforced Sure-Flex Polyvinyl Chloride (PVC) membrane. Carlisle Insulation is mechanically fastened to the roof deck or secured with an approved adhesive and the membrane is fully adhered to the substrate with Sure-Flex PVC Bonding Adhesive or Aqua Base 120 Bonding Adhesive. Adjoining sheets of membrane are overlapped and joined together with a minimum 1-1/2" wide heat weld.

Note: Projects utilizing 50-mil or 60-mil membrane are eligible for a maximum 10-year System Warranty or a 15-year Total System Warranty. When a 20-year Total System Warranty is required, 80-mil membrane must be used.

1.02 QUALITY ASSURANCE

- A. This roofing system must be installed by a Carlisle Authorized Applicator in compliance with shop drawings as approved by Carlisle. There must be no deviations made 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 the membrane roofing system has been installed according to Carlisle's published specifications and details applicable at the time of bid.
- C. This roofing system meets Underwriters Laboratories (UL) and Factory Mutual (FM) requirements. For specific code approvals achieved with this roofing system, refer to the Sure-Flex Code Approval Guide, Factory Mutual Approval Guide or Underwriters Fire Resistance and roofing Materials and Systems Directories.

1.03 SUBMITTALS

- A. To ensure compliance with Carlisle's warranty requirements, the following projects should be sent to Carlisle for review prior to installation, preferably prior to bid.
 1. Projects where the building height exceeds 250'.

2. Air pressurized buildings, canopies and buildings with large openings where the total wall opening exceeds 10% of the total wall area where openings are located.
 3. Cold storage buildings and freezer facilities.
 4. Projects where the membrane is expected to come in direct contact with petroleum based products or other chemicals.
- B. Along with the project submittals (shop drawings and Request for Warranty), the roofing contractor must include pullout tests when the pullout values are less than the Sure-Flex Specification requirements:
 - C. For all projects (prior to project inspection by Carlisle) a final shop drawing must be approved and assigned a number 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. Store Sure-Flex membrane on provided pallets in 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 loss of solvent, which will occur from flash off.
- F. 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. There are no maximum slope restrictions for application of this roofing system. When the roof slope exceeds 5" per horizontal foot, use of an automatic welding machine may be more difficult. A hand held welder should be specified.

- B. Existing roofing material must be investigated by the specifier and all wet material must be removed.
- C. Existing phenolic insulation and sprayed-in-place urethane roofs must be removed prior to installation of this system.
- D. 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).
- E. Coordination between trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent subsequent damage to the membrane system.

1.06 WARRANTY

All warranties are available for commercial projects only.

- A. A 10-year Membrane System or Total System Warranty is available for a charge for projects that use 50-mil, 60-mil or 80-mil membrane.
- B. A 15-year Total Roofing System Warranty is available for a charge for projects that use 50-mil, 60-mil or 80-mil membrane.
- C. A 20-year Total System Warranty is available for a charge for projects utilizing 80-mil thick Sure-Flex membrane and incorporating additional design enhancements as outlined in this specification.

- Note:** Total System Warranty projects require that only materials from among those manufactured or marketed by Carlisle be specified and used to complete the roofing system. Some of the materials included are: insulation, membrane, flashing, adhesives, sealants, fasteners and plates and termination bars. Carlisle Edgings and Copings must also be specified when metal fascia systems are to be covered by the Carlisle Warranty.
- D. Standard peak gust wind speed coverage is 55 mph (measured 10 meters above ground). Greater wind speed coverage, up to 72 mph peak gusts, is available upon request.

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-Flex white, gray or tan 50-mil (100' long), 60-mil (80' long) or 80-mil (65' long) reinforced Polyvinyl Chloride (PVC)

membrane is used for this system. Membrane sheets are 81" wide. For physical properties of the membrane, refer to page 4. (Gray and tan colored membrane are not standard stocking items and require a lead time).

2.03 RELATED MATERIALS

Sure-Flex Non-Reinforced or Reinforced Flashing, Bonding Adhesive, Cut Edge Sealant, Water Cut-Off Mastic, PT-304 Sealant, PVC Membrane Cleaner, One-Part Pourable Sealer, Heat Weldable Walkway Pads, Pre-Molded Inside and Outside Corners, Pipe Flashings 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.
- B. Follow criteria outlined in the Sure-Flex Specification to prepare the roof deck or the existing substrate prior to application of the new roofing system.

3.02 ROOF DECK CRITERIA

- A. The 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 the defects are corrected.
- C. Acceptable decks and applicable Carlisle Fasteners:
 1. **Steel, 22 gauge or heavier** - Carlisle HP or HP-X Fasteners are required; minimum pullout of 360 pounds per fastener.
 2. **Steel less than 22 gauge** - Carlisle HP, HP-X or HP-Xtra Fasteners are required; minimum pullout of 300 pounds per fastener.
 3. **Structural Concrete, rated 3,000 psi or greater** - Carlisle CD-10 or HD 14-10 Fastener are required; minimum pullout of 800 pounds per fastener.
 4. **Wood Plank or minimum 15/32" thick Plywood** - Carlisle HP or HP-X Fasteners are required; minimum pullout of 360 pounds per fastener.
 5. **Oriented Strand Board (OSB), minimum 7/16" thick** - Carlisle HP, HP-X or HP-Xtra Fasteners are required; minimum pullout of 250 pounds.
 6. **Gypsum and Cementitious Wood Fiber** - Carlisle HP-NTB Fasteners are required; minimum pullout of 300 pounds per fastener.

3.03 SUBSTRATE PREPARATION

- A. On retrofit-recover projects, cut and remove wet insulation, as identified by the specifier, and fill all voids with new insulation so it is relatively flush with the 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 Material Safety Data Sheets and Technical Data Bulletins for cautions and warnings.

A. Insulation Attachment

1. Carlisle Insulation shall be mechanically fastened to the roof deck at a minimum rate of 1 every 2 square feet except as follows.
 - a. When a single or top layer of **minimum 1-1/2" thick Carlisle Polyisocyanurate** Insulation is specified, Carlisle Insulation may be mechanically fastened at the minimum rate of 1 every **3.2 square feet** (10 fasteners per 4' x 8' board). Refer to Detail SWA-27D for requirements.
 - b. When a single or top layer of **minimum 2" thick Carlisle Polyisocyanurate** Insulation is specified, Carlisle Insulation may be mechanically fastened at the minimum rate of 1 every **4 square feet** (8 fasteners per 4' x 8' board). Refer to Detail SWA-27-B for requirements.
 - c. **Dens-Deck Prime**, 1/4" or 1/2" thick, may be fastened at the rate of 12 fasteners/plates per 4' x 8' boards (1 per 2.67 square feet). **Dens-Deck Prime**, 5/8" thick, may be fastened at the rate of 8 fasteners/plates per 4' x 8' board (1 per 4 square feet).
 - d. On reroof/no tearoff projects with a maximum roof height of 40' any Carlisle insulation (i.e., HP Recovery Board, Polyisocyanurate Insulation 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). This option is not applicable for 15 or 20 year Golden Seal Warranty projects or projects where extended wind speed coverage (greater than 55 mph) is desired. Refer to Sure-Flex Adhered – 27E Detail.
2. When an approved oriented strand board (OSB) is specified as the membrane underlayment, it must be mechanically fastened to the roof deck with 17 fasteners per 4' x 8' board in accordance with Carlisle Detail SWA-27C.
3. Carlisle Insulation Fastening Plates, nominal 3" diameter, must be used with the appropriate Carlisle

Fastener for insulation attachment.

4. When insulation by others is specified, the fastening density and pattern must be recommended by the insulation manufacturer. If the fastening density is specified to be less than 1 fastener and plate every 2 square feet, the assembly must be FM approved and the respective manufacturer must verify in writing their requirements concerning the fastening density, fastening pattern and acceptable fasteners.
5. When mechanical attachment of the insulation is not desired, an alternate insulation attachment method may be specified which incorporates the use of Carlisle FAST Adhesive, OlyBond 500 BA or Versigrip Insulation Adhesive or a solid mopping of hot asphalt.

B. Membrane Installation and Heat Welding

1. Sweep loose debris from the substrate.
2. Position Sure-Flex Membrane over acceptable substrate and fold membrane back so half the underside is exposed.
3. Apply Sure-Flex Bonding Adhesive or Aqua Base 120 Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area with a plastic core medium nap paint roller at the appropriate coverage rate.
4. Allow adhesive to dry and roll coated membrane into coated substrate. Avoid wrinkling.
5. Brush down the bonded section of membrane immediately with a soft bristle push broom.
6. Fold back the unbonded half of the sheet and repeat the bonding procedure.
7. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2" hot air weld. It is recommended that all splices be shingled to avoid bucking of water.
8. Heat weld the membrane sheets a minimum of 1-1/2" with an Automatic Heat Welding Machine.

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" per horizontal foot and at all other penetrations in accordance with Carlisle's published details.

D. Membrane Flashing

Flash all walls and curbs with Sure-Flex 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. Terminate the flashing in accordance with an appropriate Carlisle Termination Detail.

E. Other Related Work

1. **Walkways** are required for 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 Carlisle Warranty.
 - a. Sure-Flex Heat Weldable Walkway Rolls are required when walkway pads are specified and are heat welded to the Sure-Flex Membrane.
 - b. When concrete pavers are used, they shall be loose laid and installed in conjunction with a slip sheet of reinforced membrane.

Concrete pavers are not recommended when the roof slope is greater than 2" per horizontal foot.

- c. Carlisle Interlocking Rubber Pavers, 24" x 24" x 2", weighing approximately 6 pounds per square foot, may be interlocked and loose laid directly over the membrane. Installation instruction sheets are available from Carlisle.
2. **Copings, counterflashing and other 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.

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

Membrane Physical Properties

Physical Property	Test Method	Property of Unaged Sheet	Property After ASTM D3045 aging 56 days @ 176° F
Tolerance on Nominal Thickness, %	ASTM D 751	± 10	
Thickness over scrim, in. (mm) 50-mil & 60-mil 80-mil	ASTM D 4434 Optical Method (avg. of 3 areas)	0.016 (0.406) min. 0.025 (0.635) min.	
Breaking Strength, lbf/in. (kN/m)	ASTM D 751 (Grab Method)	200 (35) min. 300 (53) typical	90% min. retention of original breaking strength
Elongation at Break of fabric, %	D 751	15 min. 25 typical	90% min. retention of original elongation
Tearing Strength, lbf (N) 8 x 8 in. specimen	ASTM D 751 (B-Tongue Tear)	45 (200) min. 100 (445) typical	
Low Temperature Bend,	ASTM D 2136	-40 (-40) max. -50 (-46) typical	
Linear Dimensional Change (shrinkage), After 6 hours at 176° F (80° C)	ASTM D 1204	+/- 0.5 max. -0.3 typical	
Ozone resistance, 100 pphm, 168 hours	ASTM D1149	No cracks	
Resistance to water absorption After 7 days immersion 158° F (70° C) Change in mass, %	ASTM D 570	3.0 max. 2.0 typical	
Field seam strength lbf/in. (kN/m) Seam tested in peel after welding	ASTM D1876	25 (4.4) min. 60 (10.5) typical	
Water vapor permeance, Perms	ASTM E 96	0.10 max. 0.05 typical	
Puncture resistance, lbf (N) (see supplemental section for additional puncture data)	FTM 101C Method 2031	250 (1110) min. 280 (1245) typical 50-mil 320 (1423) typical 60-mil 380 (1690) typical 80-mil	
Resistance to xenon-arc weathering Xenon-Arc, 6300 kJ/m ² total radiant exposure, visual condition at 10X (ASTM D 4434 light & spray cycle)	ASTM G155 0.35 W/m ² 63 ° C 5000 hours	No cracks No crazing	
B.P.T. is black panel temperature			

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