CARLISLE SYNTEC SYSTEMS

# Sure-Flex™ PVC Membrane

## Overview

Carlisle's Sure-Flex PVC is an advanced-formula, heat-weldable PVC thermoplastic membrane that is designed for long-term weatherability and performance. The physical properties of the membrane are enhanced by a tenacious, weft-inserted polyester fabric that is encapsulated by thick PVC-based top and bottom plies. The smooth surface of the PVC membrane allows for a total-surface fusion and permanent weld, creating a consistent, watertight, monolithic roof assembly. PVC can be used in adhered and mechanically fastened systems. The gray-colored bottom ply provides a visual confirmation of a proper weld during the lap welding process.

## Features and Benefits

- Wide choice of membrane sizes, thicknesses and colors
- Enhanced chemical resistance
- Energy efficiency
- Wide window of weldability
- Flexibility in low temperatures
- Impact and puncture resistance
- UV, ozone and oxidation resistance
- Easy installation
- Available in white, gray, and tan

## Installation

With minimal labor and few components required, PVC is quick and easy to install. PVC systems are installed using an Automatic Heat Welder, making sheet welding fast, clean and consistent.

**Fully Adhered Roofing System**

The fully adhered system starts with a suitable surface upon which the Low-VOC PVC Bonding Adhesive or HydroBond™ Water-Based PVC Bonding Adhesive is applied.

**Mechanically Fastened Roofing System**

The mechanically fastened system starts with approved insulation being fastened with a minimum of 5 fasteners per 4' x 8' board. The PVC membrane is then mechanically fastened to the deck using HP-X™ Fasteners and Piranha Plates™, or HP-XTRA Fasteners and Piranha XTRA Plates. Adjoining sheets of PVC membrane are overlapped over the fasteners and plates and joined together with a minimum 1½"-wide hot-air weld.

*Review Carlisle specifications and details for complete installation information.*

## Precautions

- Sunglasses that filter out ultraviolet light are strongly recommended, as the membrane's white surface is highly reflective to sunlight. Roofing technicians should dress appropriately and wear sunscreen.
- Smooth surfaces may cause slippery conditions due to frost and ice buildup. Exercise caution during cold conditions to prevent falls.
- Care must be exercised when working close to a roof edge when surrounding area is snow-covered, as the roof edge may not be clearly visible.
- Use proper stacking procedures to ensure sufficient stability of the materials.
- Exercise caution when walking on wet membrane. Membranes may be slippery when wet.
- Store PVC membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. PVC membrane that has been exposed to the weather or contaminated with dirt must be prepared with PVC Membrane Cleaner prior to hot-air welding.

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## Typical Properties and Characteristics

| Physical Property | ASTM D4434 Requirement | 50-mil | 60-mil | 80-mil |
|---|---|---|---|---|
| **Thickness over scrim**, in. (mm) ASTM D4434 optical method average of 3 areas | 0.016 min (0.40) | 0.017 (0.432) | 0.025 (0.635) | 0.030 (0.762) |
| **Weight**, lbs/ft2 (kg/m²) | No requirement | 0.33 (1.61) | 0.40 (1.95) | 0.55 (2.68) |
| **Breaking strength** (MD x CD), lbf/in (kN/m) ASTM D751 grab method | 275 min (48) | 320 x 300 (56 x 53) | 330 x 300 (58 x 55) | 360 x 330 (63 x 58) |
| **Elongation** break of reinforcement (MD x CD), % ASTM D751 grab method | 25 min | 30 x 30 | 30 x 30 | 30 x 30 |
| **Seam strength**, min. ASTM D751 grab method (% of breaking strength) | >75 | PASS | PASS | PASS |
| **Tearing strength** (MD x CD), lbf (N) ASTM D751 proc. B, 8 in. x 8 in. | 90 min (400) | 100 x 120 (445 x 534) | 100 x 130 (445 x 578) | 100 x 132 (445 x 587) |
| **Low temperature bend**, ASTM D2135, no cracks 5x at -40°C | PASS | PASS (-40°C) | PASS (-40°C) | PASS (-40°C) |
| **Linear dimensional change**, % ASTM D1204, 6 hours at 176°F | ±0.5 max | 0.4 | 0.4 | 0.4 |
| **Ozone resistance**, no cracks 7x ASTM D1149, 100pphm, 168 hrs | PASS | PASS | PASS | PASS |
| **Water absorption resistance**, mass % ASTM D570, 166 hours at 158°F water | ±3.0 max | 2.0 | 2.0 | 2.0 |
| **Field seam strength**, lbf/in. (kN/m) ASTM D1876 tested in peel | No requirement | 25 (4.4) min 60 (10.5) typ. | 25 (4.4) min 60 (10.5) typ. | 25 (4.4) min 60 (10.5) 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 |
| **Puncture resistance** – Federal, lbf (kN) FTM 101C, method 2031 | No requirement | 280 | 320 | 380 |
| **Puncture resistance** – Dynamic, J (ft-lbf) ASTM D5635 | 20 (14.7) | PASS | PASS | PASS |
| **Puncture resistance** – Static, lbf (N) ASTM D5602 | 33 (145) | PASS | PASS | PASS |
| **Xenon-Arc resistance**, no cracks/ crazing 10x, ASTM G155 0.35 W/m² at 340-nm, 63°C B.P.T. 12,600 kJ/m² total radiant exposure 10,000 hours | PASS | PASS | PASS | PASS |
| **Properties after heat aging,** ASTM D3045, 56 days at 176°F Breaking strength, % retained Elongation reinf., % retained | 90 min 90 min | 90 min 90 min | 90 min 90 min | 90 min 90 min |

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

## Radiative Properties for ENERGY STAR®*, Cool Roof Rating Council (CRRC), and LEED®

| Physical Property | Test Method | Gray PVC | Tan PVC | White PVC |
|---|---|---|---|---|
| ENERGY STAR – E-903 Initial Solar Reflectance | Solar Spectrum Reflectometer | 0.59 | 0.73 | 0.87 |
| ENERGY STAR – E-903 Solar Reflectance after 3 years | Solar Spectrum Reflectometer (Uncleaned) | pending | pending | 0.61 |
| CRRC – Initial Solar Reflectance | ASTM C1549 | 0.59 | 0.73 | 0.87 |
| CRRC – Solar Reflectance after 3 years | ASTM C1549 (uncleaned) | pending | pending | 0.61 |
| CRRC – Initial Thermal Emittance | ASTM C1371 | 0.85 | 0.86 | 0.95 |
| CRRC – Thermal Emittance after 3 years | ASTM C1371 (uncleaned) | pending | pending | 0.86 |
| Solar Reflective Index (SRI) | ASTM E1980 | 69 | 89 | 111 |
| Solar Reflective Index (SRI) after 3 years | ASTM E1980 | pending | pending | 72 |

## LEED Information

| | |
|---|---|
| Pre-consumer Recycled Content | 10% |
| Post-consumer Recycled Content | 0% |
| Manufacturing Location | Greenville, IL |
| Solar Reflectance Index (SRI) | White: 111 |

## Supplemental Approvals, Statements and Characteristics

- Sure-Flex PVC meets or exceeds the requirements of ASTM D4434 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing. Sure-Flex PVC is classified as Type III and/or Type IV as defined by ASTM D4434.
- Sure-Flex reinforced PVC was tested for dynamic puncture resistance per ASTM D5635-04 using the most recently modified impact head. 50-mil thick membrane was watertight after an impact energy of 22.5 J (16.6 ft-lbf), which passes the ASTM D4434 requirement.
- Sure-Flex reinforced PVC was tested for static puncture resistance per ASTM D5602-98 and exceeded 33 lbf (145 N), which passes the ASTM D4434 requirement.

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