

# Sure-Flex™ KEE HP

## Membrane



### Overview

Carlisle's Sure-Flex KEE HP (High Performance) membrane is manufactured using DuPont® Elvaloy® KEE HP resin modifier. KEE HP enhances the performance of PVC compounds by providing outstanding thermal stability and flexibility while extending the low- and high-temperature performance limits of standard KEE. The addition of Elvaloy KEE HP, a non-volatile resin modifier, provides enhanced heat and chemical resistance.

The physical properties of the membrane are enhanced by a tenacious polyester fabric that is encapsulated by thick KEE HP-based top and bottom plies. The smooth surface of the KEE HP membrane allows a total surface fusion weld over a wide temperature range, creating a consistent, watertight, one-piece roof assembly.

### Features and Benefits

- » Chemical resistance
- » Energy efficiency
- » Wide window of weldability
- » Low-temperature flexibility
- » Impact and puncture resistance
- » Easy installation
- » Solar, UV, ozone, and oxidation resistance
- » Available in white, gray, and tan

### Installation

KEE HP roof systems are fast to install, as minimal labor and few components are required. The membranes weld quickly, cleanly, and consistently.

### 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 KEE HP reinforced 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 KEE HP membrane are overlapped over the fasteners and plates and joined together with a minimum 1½"-wide hot-air weld.

### Fully Adhered Roofing System

The fully adhered system starts with a suitable surface upon which to apply the appropriate bonding adhesive. Refer to respective product data sheets or Carlisle specifications and details for complete installation information.

*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. Roofing technicians should dress appropriately and wear sunscreen.
- » Smooth surfaces may be slippery 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 the 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 KEE HP membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. KEE HP membrane that has been exposed to the weather or contaminated with dirt must be prepared with PVC Membrane Cleaner prior to hot-air welding.

### Supplemental Approvals, Statements and Characteristics

1. KEE HP meets or exceeds the requirements of ASTM D4434 Standard Specification for Poly(Vinyl Chloride) Sheet Roofing. KEE HP is classified as Type III and/or Type IV as defined by ASTM D4434.

# Sure-Flex™ KEE HP Membrane

## Typical Properties and Characteristics

Physical Property	ASTM D4434 Requirement	50-mil	60-mil	80-mil
<b>Thickness over scrim</b> , in. (mm) ASTM D4434 optical method average of 3 areas	0.016 min (0.40)	0.024 (0.61)	0.029 (0.74)	0.036 (0.91)
<b>Weight</b> , lbs/ft <sup>2</sup> (kg/m <sup>2</sup> )	No requirement	0.33 (1.61)	0.38 (1.86)	0.51 (2.49)
<b>Breaking strength</b> (MD x CD), lbf/in (kN/m) ASTM D751 grab method	275 min (48)	290 x 290 (51 x 51)	320 x 300 (56 x 52)	330 x 320 (58 x 56)
<b>Elongation</b> break of reinforcement (MD x CD), % ASTM D751 grab method	25 min	30 x 30	30 x 30	30 x 30
<b>Tearing strength</b> (MD x CD), lbf (N) ASTM D751 proc. B, 8 in. x 8 in.	90 min (400)	120 x 125 (534 x 556)	120 x 125 (534 x 556)	140 x 150 (623 x 667)
<b>Low temperature bend</b> , ASTM D2136, no cracks 5x at -40°C	PASS	PASS (-46°C)	PASS (-46°C)	PASS (-46°C)
<b>Linear dimensional change</b> , % ASTM D1204, 6 hours at 176°F	±0.5 max	0.4 typ.	0.4 typ.	0.4 typ.
<b>Ozone resistance</b> , no cracks 7x ASTM D1149, 100pphm, 168 hrs	PASS	PASS	PASS	PASS
<b>Water absorption resistance</b> , mass % ASTM D570, 166 hours at 158°F water	±3.0 max	1.25	0.87	0.89
<b>Puncture resistance - Dynamic</b> , J (ft-lbf) ASTM D5635	20 (14.7)	PASS	PASS	PASS
<b>Puncture resistance - Static</b> , lbf (N) ASTM D5602	33 (145)	PASS	PASS	PASS
<b>Xenon-Arc resistance</b> , no cracks/crazing 10x, ASTM G155 0.35 W/m <sup>2</sup> at 340-nm, 63°C B.P.T. 12,600 kJ/m <sup>2</sup> total radiant exposure 10,000 hours	PASS	PASS	PASS	PASS
<b>Properties after heat aging</b> 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

For information pertaining to Carlisle's FleeceBACK® KEE HP membranes, refer to the FleeceBACK KEE HP FRS Product Data Sheet (601623).

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 or specification range for any particular property of this product.

## LEED® Information

Pre-consumer Recycled Content	10%
Post-consumer Recycled Content	0%
Manufacturing Location	Greenville, IL
Solar Reflectance Index (SRI), Initial	White: 103, Tan: 91, Gray: 67

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

Physical Property	Test Method	White KEE HP	Tan KEE HP	Gray KEE HP
ENERGY STAR - E-903 Initial Solar Reflectance	Solar Spectrum Reflectometer	0.82	0.74	0.57
ENERGY STAR - E-903 Solar Reflectance after 3 years	Solar Spectrum Reflectometer (Uncleaned)	Pending	Pending	Pending
CRRC - Initial Solar Reflectance	ASTM C1549	0.87	0.73	0.58
CRRC - Solar Reflectance after 3 years	ASTM C1549 (uncleaned)	0.71*	0.60*	0.50*
CRRC - Initial Thermal Emittance	ASTM C1371	0.89	0.88	0.88
CRRC - Thermal Emittance after 3 years	ASTM C1371 (uncleaned)	0.87*	0.86*	0.84*
Solar Reflective Index (SRI)	ASTM E1980	110	90	69
Solar Reflective Index (SRI) SRI after 3 years	ASTM E1980	87	71*	56*

\*Rapid Ratings

