



Product Data Sheet

MULE-HIDE PVC HP FLEECE BACK MEMBRANE

PRODUCT DESCRIPTION

Mule-Hide PVC KEE HP (High Performance) Fleece Back Membrane is manufactured using DuPont® Elvaloy® resin modifier and provides outstanding thermal stability and flexibility, extended upper and lower temperature performance limits and enhanced chemical resistance. The dimensional stability of the membrane is enhanced by a fiberglass reinforcing scrim.

BASIC USES

Mule-Hide PVC KEE HP Fleece Back Membrane is used in fully adhered roofing systems in new construction, reroofing and recover (retrofit) applications. The polyester fleece backing enhances the puncture resistance of the membrane, and can also serve as a built-in separation layer for rough surfaces or existing asphalt-based roofing systems. The system must be installed over acceptable roof insulation or other suitable substrate. See the Mule-Hide PVC Specifications Manual for complete specifications and details.

TYPICAL PHYSICAL PROPERTIES

Physical Properties	Test Method	Specification (min.)	Mule-Hide PVC KEE HP FB
Tolerance on Nominal Thickness, %	ASTM D638	± -10	± -10
Thickness over fleece FB-50 (105 mils total thickness) FB-60 (115 mils total thickness) FB-80 (135 mils total thickness)	ASTM D4637	0.030 inch (.762 mm) 0.045 inch (1.14 mm) 0.080 inch (2.03 mm)	0.050 inch (1.27 mm) 0.060 inch (1.52 mm) 0.080 inch (2.03 mm)
Thickness over scrim FB-50 (105 mils total thickness) FB-60 (115 mils total thickness) FB-80 (135 mils total thickness)	ASTM D4434	0.016 inch 0.016 inch 0.016 inch	0.016 inch 0.022 inch 0.035 inch
Weight FB-50 (105 mils total thickness) FB-60 (115 mils total thickness) FB-80 (135 mils total thickness)	---	---	0.41 lbm/ft ² 0.49 lbm/ft ² 0.58 lbm/ft ²
Breaking Strength FB-50 (105 mils total thickness) FB-60 (115 mils total thickness) FB-80 (135 mils total thickness)	ASTM D751 (Grab Method MD)	90 lb (0.4 kN)	300 lb (1.3 kN) 400 lb (1.8 kN) 425 lb (1.9 kN)
Elongation at break of internal fabric-MD Cross Machine Direction	ASTM D638	250% min. 220% min.	270% 250%
Tearing Strength, B Tongue Tear	ASTM D1004	10 lb (45 kN)	12 lb (53 kN)
Puncture resistance FB-50 (105 mils total thickness) FB-60 (115 mils total thickness) FB-80 (135 mils total thickness)	ASTM D5635 (Joules) (FTM 101C Method 2031 (lbf))	10 J (---) 10 J (---) 10 J (---)	12.5 J (350 lbf) 12.5 J (365 lbf) 25.0 J (465 lbf)
Static puncture resistance, lbf (kg)	---	33	Pass
Low temperature bend	ASTM D2136	-40 F° (-40 C°) max.	Pass
Linear Dimensional Change	ASTM D1204	0.1% max	0.05% typical
Water vapor permeance, Proc B	ASTM E-96	0.10 perms max	0.05 perms typical
Properties after heat aging Breaking Strength - % retained Elongation Reinforced - % retained Tearing Strength - % retained Weight Change - %	ASTM D573 56 days @ 176 °F 56 days @ 176 °F 56 days @ 176 °F 670 hrs @ 240 °F	--- --- --- ---	90% min 90% min 60% min pending
Ozone resistance, 100 pphm, 168 hours	ASTM D1149	No cracks	No cracks
Resistance to water absorption After 7 days immersion 158°F (70°C) Change in mass, %	ASTM D-471 (fleece removed, edges sealed)	+ 3.0%	+1.25%
Resistance to Outdoor (UV) Weathering Xenon-Arc, 17.640 kj/m ² total radiant exposure at 0.35 W/ m ² irradiance, 63 C° black panel temperature	ASTM G155	No cracks No loss of breaking or tearing strength	No cracks No loss of breaking or tearing strength

*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.



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BENEFITS & SUPPLEMENTAL STATEMENTS

- Heat weldable – Wide window of weldability, welds quickly, cleanly and consistently
- Durable – scrim reinforcement offer superior resistance to impact, wind uplift
- UV, ozone and oxidation resistance
- Energy efficiency – white color reflects sunlight
- Enhanced chemical resistance
- Low temperature flexibility

CODE APPROVALS/COMPLIANCE

A variety of Factory Mutual Ratings and Underwriters Laboratories Classifications are available. Contact Mule-Hide Technical Department for additional information.

INSTALLATION INSTRUCTIONS

- 1) Approved insulation shall be attached to the roof deck with an approved insulation adhesive or approved fasteners and plates. Install insulation with its largest dimension perpendicular to the direction of the membrane seams where possible.
- 2) Mechanically Attached Roofing System
 - a) Perimeter sheets to be installed in an approved pattern along all exterior roof edges.
 - b) Mechanical fasteners and plates are installed in the seams of both the perimeter sheets and field sheets and into the roof deck. Use approved fasteners and maintain proper penetration for specific roof deck.
- 3) Fully Adhered Roofing System
 - a) Perimeter sheets are not required.
 - b) The membrane is required to be mechanically attached at the base of all vertical surfaces, roof edges, and angle changes.
 - c) The field of the roof is fully adhered to the substrate with Mule-Hide HydroBond Water-Based PVC Bonding Adhesive or WBBA-2000 bonding adhesive.
- 4) All seams are hot air welded and checked by probing.
- 5) All details will be done in accordance with Mule-Hide details.
- 6) On projects where a Mule-Hide Standard or Premium Warranty is requested, an authorized Mule-Hide representative shall inspect all completed work. This is only a brief summary and not the complete specification. The Mule-Hide Specifications, Details, Technical Bulletins, and associated documents should be thoroughly reviewed prior to starting any project. Contact Mule-Hide Products for additional information.

PRECAUTIONS

- Surfaces may be slippery when wet, or due to frost and ice build-up. Exercise caution to prevent falls.
- Mule-Hide PVC KEE HP Membranes are highly reflective to sunlight. Workers should dress appropriately, wear sunscreen, and wear sunglasses that filter out UV light.
- Exercise care when working near roof edge. Roof edges may not be visible when surrounding area is covered with snow.
- Use proper stacking procedures to ensure sufficient stability of the materials.
- Store Mule-Hide membrane in original wrappings in a cool, shaded area. Cover with light-colored, breathable, waterproof tarpaulins. Mule-Hide membrane that has been exposed to the elements for approximately 7 days or longer must be prepared with Weathered Membrane Cleaner prior to hot air welding.



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PROTECTION & SAFETY

Mule-Hide maintains Material Safety Data Sheets on all of its products. Material Safety Data Sheets contain health and safety information for your development of appropriate product handling procedures to protect your employees and customers. Mule-Hide's Material Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Mule-Hide products in your facilities.

SUPPLEMENTAL APPROVALS, STATEMENTS AND CHARACTERISTICS

1. Mule-Hide PVC KEE HP Membranes meet or exceeds ASTM D 4434 Standard Specification for Poly Vinyl Chloride Sheet Roofing. Mule-Hide PVC KEE HP Membrane is classified as Type III as defined by ASTM D 4434.
2. Mule-Hide reinforced PVC KEE HP Membrane was tested for static puncture resistance as per ASTM D5602 and exceeded 33 lbf (145 N) which passes the ASTM D4434 requirement.
3. Radiative Properties for Energy Star®, Cool Roof Rating Council (CRRC) and LEED™

DESCRIPTION	TEST METHOD	WHITE PVC	TAN PVC	GRAY PVC
ENERGY STAR® initial solar reflectance	Solar Spectrum Reflectometer	0.86	pending	pending
ENERGY STAR® solar reflectance - 3 yrs	Solar Spectrum Reflectometer (uncleaned)	0.70	pending	pending
CRRC initial solar reflectance	ASTM C1549	0.86	pending	pending
CRRC solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.70	pending	pending
CRRC initial thermal emittance	ASTMC1371	0.86	pending	pending
CRRC thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.82	pending	pending
CRRC SRI (Solar Reflectance Index)	ASTM E1980	108	pending	pending
CRRC Product ID	N/A	0670-0015		
LEED™ thermal emittance	ASTM E408	0.94	pending	pending

Mule-Hide White PVC KEE HP Membranes are LEED compliant. Mule Hide White PVC is also an ENERGY STAR® and California Title 24 rated roof product.

An ENERGY STAR qualified low slop roof product must have an initial solar reflectance of at least 0.65 and a 3-year aged solar reflectance of at least 0.50. Cleaning the aged roof surface is not permitted by the ENERGY STAR test protocol. Energy Star is only valid in the United States for Roofing Products.

The Cool Roof Rating Council (CRRC) does not specify minimums for reflectance or emittance but they do require specific protocols for testing and reporting. Cleaning of the aged roof surface is not permitted for determination of radiative properties after 3 years.

A LEED “point” may be earned if a roof material is ENERGY STAR qualified and has a thermal emittance of at least 0.90 as determined by ASTM E408.

Solar Reflectance Index (SRI) is calculated per ASTM E 1980. The SRI is a measure of the roof's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. Materials with the highest SRI values are the coolest choices for roofing. Due to the way SRI is defined, particularly hot materials can even take slightly negative values, and particularly cool materials can even exceed 100.

California Title 24 requires an initial minimum reflectance of 0.70 and emittance of 0.75 as determined by CRRC.



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ADDITIONAL INFORMATION

The information given on this PDS is subject to change without notice. Always check the Mule-Hide website at www.mulehide.com for the latest information, changes and updates or contact Mule-Hide Products Company at 800-786-1492.

DISCLAIMER

The statements provided concerning the material shown are intended as a guide for material usage and are believed to be true and accurate at the time of printing. No statement made by anyone may supersede this information, except when done in writing by Mule-Hide Products Co., Inc. Since the manner of use is beyond our control, Mule-Hide does not authorize anyone to make any warranty of merchantability or fitness for any particular purpose or any other warranty, guarantee or representation, expressed or implied, concerning this material. This product may be eligible for a Mule-Hide warranty, please check the Mule-Hide website at www.mulehide.com or contact Mule-Hide directly at 800-786-1492 for details. Buyer and user accept the product under these conditions and assume the risk of any failure, any injury person or property (including that of the user), loss or liability resulting from the handling, storage or use of the product whether or not it is handled, stored or used in accordance with the directions or specifications. Mule-Hide must be notified in writing of any claims and be given the opportunity to inspect the alleged failure before repairs are made.