

PRODUCT DATA SHEET

MULE-HIDE TPO-c Fleece Back MEMBRANE

PRODUCT DESCRIPTION

Mule-Hide's TPO-c Fleece Back FB-045 and FB-060 Membranes are polyester reinforced, .045" or .060 thick, polyolefin based, thermoplastic, heat-weldable membranes with a polyester fleece backing. They are used in fully adhered and mechanically attached roofing assemblies. These may also be used as flexible membrane flashings for walls, curbs, etc, when installing TPO-c Fleece Back membrane roofing systems.

BASIC USES

The TPO-c Fleece Back membrane is used in fully adhered and mechanically attached roofing systems in new construction, reroofing and recover (retrofit) applications. The system must be installed over an acceptable roof insulation or other suitable substrate. See the Mule-Hide TPO Fleece Back Specifications Manual for complete specifications and details.

SPECIFICATIONS

Colors: White top/Black bottom (Standard)
(Special Order Top Colors) Tan and Gray.
Material: .045-inch and .060-inch (nominal) thick polyester reinforced thermoplastic
Sizes: 6' X 100', 12' X 50' and 12' X 100'

Physical Properties	Test Method	Property of Unaged Sheet	Property After Aging ¹ 28 days at 240°F
Thickness of reinforced sheet over fleece, in. (mm) (tolerance is ± 10%)	ASTM D-751	0.045 (1.14) – FB-045 0.060 (1.52) – FB-060	
Breaking Strength, lbf (kN)	ASTM D-751 (Grab Method)	300 (1.3) min. – FB-045 400 (1.8) typical – FB-045 400 (1.8) min. – FB-060 500 (2.2) typical – FB-060	300 (1.3) min. – FB-045 400 (1.8) typical – FB-045 400 (1.8) min. – FB-060 500 (2.2) typical – FB-060
Elongation at break of internal fabric, %	ASTM D-751	25 typical	25 typical
Tearing Strength, lbf (N) 8 by 8 in. specimen	ASTM D-751 (B Tongue Tear)	55 (245) min. 130 (578) typical	55 (245) min. 130 (578) typical
Brittleness point, F° (C°)	ASTM D-2137	-40 (-40) max. -50 (-46) typical	
Linear Dimensional Change (shrinkage), % after 6 hours @ 158° F (70° C)	ASTM D-1204	+/- 0.5 max - 0.2 typical	
Ozone resistance, 100 pphm, 168 hours	ASTM D-1149	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)	4.0 max. 2.0 typical	
Resistance to microbial surface growth, rating (1 is very poor, 10 is no growth)	ASTM D-3274 2-yr S. Florida	9-10 typical	
Field seam strength, lbf/in. (kN/m) Seam tested in peel	ASTM D-1876	40 (7.0) min. 60 (10.5) typical	
Water vapor permeance, Perms	ASTM E-96	0.10 max. 0.05 typical	
Puncture resistance, lbf (N)	FTM 101C Method 2031	350 (1.6) min. - FB-045 450 (2.0) typical - FB-045 400 (1.8) min. - FB-060 500 (2.2) typical - FB-060	350 (1.6) min. - FB-045 450 (2.0) typical - FB-045 400 (1.8) min. - FB-060 500 (2.2) typical - FB-060
Resistance to xenon-arc weathering ² Xenon-Arc, 17,640 kJ/m ² total radiant exposure, visual condition at 10X	ASTM G-155 0.70 W/m ² 80°C B.P.T.	No cracks No loss of breaking or tearing strength	
¹ Aging conditions are 28 days at 240°F (116° C) equivalent to 400 days at 176°F (80°C) for breaking strength, elongation, tearing strength, ozone and puncture resistance ² Approximately equivalent to 14,000 hour exposure at 0.35 W/m ² irradiance B.P.T. is black panel temperature			

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MULE-HIDE PRODUCTS CO., INC.

P.O. Box 1057, Beloit, WI 53512-1057 • 608/365-3111 • Fax: 608/365-7852

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SYSTEM BENEFITS

- Wide window of weldability
- Outstanding puncture resistance which is enhanced further by the fleece backing
- Chlorine-free with no halogenated flame retardants
- Excellent low temperature impact resistance
- Excellent chemical resistance to acids, bases, restaurant oils and greases
- Plasticizer-free, does not contain liquid or polymeric plasticizer
- Exceptional resistance to solar UV, ozone and oxidation
- Hot melt extrusion processed for complete scrim encapsulation
- Warp knitted fabric (not woven) for smooth surface and greater thickness-over-scrim
- Low vapor permeance and water absorption
- Polyester reinforcing fabric and fleece backing which are resistant to degradation by bacteria, mildew and fungi
- Polyester fleece backing for fully adhered systems provided exceptional wind uplift resistance
- TPO-c Fleece Back is 100% recyclable

CODE APPROVALS

FM Class 1-90 and UL Class A classifications available. Contact Mule-Hide for other rated assemblies.

INSTALLATION INSTRUCTIONS

(1) A proper substrate shall be provided to receive the Mule-Hide TPO-c Fleece Back Membrane Roofing System. (2) The Mule-Hide TPO-c Fleece Back membrane shall be fully adhered to the properly installed and prepared substrate using the techniques stated in Mule-Hide's specifications. (3) The membrane seams shall be overlapped before being hot air welded. All welded seams must be probed. (4) The membrane is required to be mechanically attached only at the base of all vertical surfaces, roof edges, and angle changes. (5) The field of the roof is fully adhered to the substrate with Mule-Hide TPO Bonding Adhesive or Mule-Hide Water Based Bonding Adhesive if used as a wet lay in. (6) All details will be done in accordance with Mule-Hide details. (7) 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 TPO-c Fleece Back Specifications, Details, Technical Bulletins, associated documents should be thoroughly reviewed prior to starting any project.

SUPPLEMENTAL APPROVALS, STATEMENTS AND CHARACTERISTICS:

	TEST METHOD	WHITE TPO-c	TAN TPO-c	GRAY TPO-c
ENERGY STAR® initial solar reflectance	Solar Spectrum Reflectometer	0.87	0.68	N/A
ENERGY STAR® solar reflectance after 3 years	Solar Spectrum Reflectometer (after cleaning)	0.83	0.64	N/A
CRRC initial solar reflectance	ASTM C1549	0.79	0.71	0.46
CRRC solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.70	Pending	0.43
CRRC initial thermal emittance	ASTMC1371	0.90	0.86	0.90
CRRC thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.86	Pending	0.88
LEED™ thermal emittance	ASTM E408	0.95	0.95	0.95
SRI (Solar Reflectance Index)	ASTM E1980	110	88	55

- 1) The fabric reinforced membrane component of Mule-Hide TPO-c Fleece Back meets and exceeds the requirements of **ASTM D6878¹** Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing
- 2) **Radiative Properties** for ENERGY STAR®, Cool Roof Rating Council (CRRC) and LEED™

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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 permitted by the ENERGY STAR test protocol.

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.

- 3) TPO-c Fleece Back membranes conform to requirements of the U.S.E.P.A. Toxic Leachate Test (40 CFR part 136) performed by an independent analytical laboratory.
- 4) TPO-c Fleece Back was tested for dynamic puncture resistance per ASTM D5635-04 using the most recently modified impact head. 45-mil was watertight after an impact energy of 17.5 J (12.9 ft-lbf) and 60-mil was watertight after 22.5 J (16.6 ft-lbf)

TECHNICAL SERVICES

Contact Mule-Hide Products Co., Inc. at 608/365-3111 for technical service information.

DISCLAIMER

The statements provided concerning the material shown are intended as a guide for material usage and are believed to be true and accurate. 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 make nor does it 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 except that it conforms to Mule-Hide's physical properties. Buyer and user accept the product under these conditions and assume the risk of any failure, any injury of 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 complaint or failure before repairs are made.

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