July 14, 2020

Ohio Turnpike and Infrastructure
682 Prospect Street
Berea, OH 44017

Re: Equal Product Substitution Request
OTIC New Toll Plaza Faciltiy
Project # 58-20-01

Attn: Kevin Golick

Mule-Hide Products is requesting approval for the use of a Mule-Hide PVC roof system on behalf of our certified installers.

This proposed substitution meets or exceeds current ASTM standards and is equal to or superior in all aspects to the specified product. In addition, Mule-Hide Products will provide the specified system warranty.

I have included the formal substitution request along with the PVC membrane product data sheet, ICC-ES Report, and a sample warranty for your review. Please feel free to contact me if you would like additional information or product samples.

Thank you for your consideration.

Carolyn Dammen

Carolyn Dammen
Architectural Services /Strategic Accounts Coordinator
Phone: (608) 361-6828
carolyn.dammen@mulehide.com
www.mulehide.com

SUBSTITUTION REQUEST

(Use separate form for each request)

Date: 7/14/2020 Request No.:

TO: Architect or Project Manager

Phone:

PROJECT: OH Turnpike Toll Plaza Construction-Milepost 49 Project No.: 58-20-01

TRADE CONTRACTOR

SPECIFIED ITEM: 60 mil gray PVC Type III roof sytsem

Section: 075419 Page: 4 Paragraph: 2.1 Description: Part 2 Products

Drawing Number(s): Detail Number(s):

The undersigned request consideration of the following:

PROPOSED SUBSTITUTION: Mule-hide's PVC 60 mil gray PVC roof system. Can also offer TPO as an alternate/VE option

REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS: Contractor preference

SAVINGS or CREDIT to OWNER for ACCEPTING SUBSTITUTE: *product is priced competively--cost savings dependent upon contractor's proposal $

Attached data includes description, Specifications, Drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

OTIC Project No. 58-20-01
Ohio Turnpike: Toll Plaza Construction
Milepost 49, Lucas County, Ohio

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. Proposed substitution has been fully checked and coordinated with the Contract Documents.
2. The proposed substitution does not affect dimensions shown on Drawings.
3. The proposed substitution does not require revisions to mechanical or electrical work.
4. The undersigned will pay for changes to the building design, including architectural and engineering design, detailing, and construction costs caused by the requested substitution.
5. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
6. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Attachments: The attached data is furnished herewith for evaluation of the proposed substitution.

~ Catalog ~ Drawings ~ Samples aupon request Reports x~ Tests ~ Other: product data sheet, sample warranty

Submitted by: Carolyn Dammen, Strategic Accounts Coordinator

Mule-Hide Products

(Firm)

Carolyn Dammen

(Authorized Legal Signature)

1195 Prince Hall Drive, Beloit, WI 53511

(Address)

(608) 322-8496

(Telephone)

For use by the Architect: ~ Accepted ~ Accepted as Noted ~ Rejected: Submit Specified Item

BY: Mike Murphy, Architect

(Authorized Signature)

Date: 7/21/2020 Remarks: Approved as it is a rebranded Carlisle product - provide white not grey

Product Data Sheet

MULE-HIDE PVC MEMBRANE

PRODUCT DESCRIPTION

Revision Date: August 2018

Mule-Hide'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 HDP Fasteners and 2.4" Plates™, or EHD Fasteners and 2.4" 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 Mule-Hide 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.

MULE-HIDE PVC MEMBRANE

TYPICAL PHYSICAL PROPERTIES

Physical Property*	ASTM D4434 Requirement	50-mil	60-mil	80-mil
Thickness over scrim, in. (mm) ASTM D4434 optical method, ave of 3	0.016 min (0.40)	0.022 typ (0.559)	0.027 typ (0.686)	0.037 typ (0.940)
Weight, lbs/ft^2 (kg/m^2)	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
Tearing Strength (MD x CD), lbf (N) ASTM D751 proc. B, 8" x 8"	90 min (400)	100 x 120 (445 x 534)	100 x 130 (445 x 578)	100 x 132 (445 x 587)
Low Temperature Bend, no cracks @5x ASTM D2136	PASS	Pass -40ºF (-40ºC)	- Pass -40ºF (-40ºC)	Pass -40ºF (-40ºC)
Linear Dimensional Change % ASTM D1204, 6 hours @ 176° F (80° C)	±0.5 max	0.4 typ	0.4 typ	0.4 typ
Ozone Resistance, no cracks @ 7x ASTM D1149, 100 pphm, 168 hrs	PASS	PASS	PASS	PASS
Water absorption resistance, mass % ASTM D570 166 hrs @ 158° F (70° C)	±3.0 max	2.0 typ	2.0 typ	2.0 typ
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 Dynamic, J (ft-lb) ASTM D5635 Static, lbf (N) ASTM D5602	No Requirement 20 (14.7) 33 (145)	280 PASS PASS	320 PASS PASS	380 PASS PASS
Xenon-Arc Resistance, no cracks or crazing @ 10x, ASTM G155, 0.35 W/m^2 at 340 nm, 63ºC B.P.T, 12,600 kJ/m^2) total radiant exposure 10,000 hrs	PASS	PASS	PASS	PASS
Properties after heat aging ASTM D3045, 56 days @ 176ºF Breaking strength % retained Elongation rein., % 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	WHITE PVC	TAN PVC	GRAY PVC
ENERGY STAR® initial solar reflectance	Solar Spectrum Reflectometer	0.86	0.76	0.59
ENERGY STAR® solar reflectance – 3 yrs	Solar Spectrum Reflectometer (uncleaned)	0.63	pending	pending
CRRC initial solar reflectance	ASTM C1549	0.86	0.76	0.59
CRRC solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.63	0.60*	0.48*
CRRC initial thermal emittance	ASTMC1371	0.89	0.86	0.85
CRRC thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.87	0.82*	0.81*
CRRC SRI (Solar Reflectance Index)	ASTM E1980	108	89	69
CRRC SRI (Solar Reflectance Index - 3 yrs)	ASTM E1980	75	70*	53*
*Rapid Ratings				

LEED Information	
Pre-consumer Recycled Content	10%
Post-consumer Recycled Content	0%
Manufacturing Location	Greenville, IL
Solar Reflectance Index (SRI)	White: 108, Tan 89, Gray 69

SUPPLEMENTAL APPROVALS, STATEMENTS and CHARACTERISTICS

- Mule-Hide 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.
- Mule-Hide 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.
- Mule-Hide reinforced PVC was tested for static puncture resistance per ASTM D5602-98 and exceeded 33 lbf (145 N), which passes the ASTM D4434 requirement.

PROTECTION & SAFETY

Mule-Hide maintains Safety Data Sheets on all of its non-exempt products. 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 Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Mule-Hide products in your facilities.

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.

ICC-ES Evaluation Report

ESR-1463

Reissued October 2018
Revised December 2019
This report is subject to renewal October 2020.

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 53 23—Ethylene-Propylene-Diene-Monomer Roofing
Section: 07 54 19—Polyvinyl-Chloride Roofing
Section: 07 54 23—Thermoplastic-Polyolefin Roofing

REPORT HOLDER:

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC

EVALUATION SUBJECT:

CARLISLE EPDM, PVC AND TPO SINGLE-PLY ROOFING MEMBRANES

ADDITIONAL LISTEES:

KELLY COMPANY/2001 INC.

MULE-HIDE PRODUCTS COMPANY, INC.

VERSICO

WEATHERBOND

ROOFING PRODUCTS INTERNATIONAL, INC.

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1463 LABC and LARC Supplement.

Properties evaluated:

- Weather resistance
- Roof covering fire classification
- Wind uplift resistance
- Impact resistance

2.0 USES

Carlisle ethylene propylene diene monomer (EPDM), polyvinyl chloride (PVC) and thermoplastic polyolefin (TPO) single-ply roofing membranes are used as roof coverings in adhered and mechanically fastened membrane roofing systems.

3.0 DESCRIPTION

3.1 General:

The EPDM, PVC and TPO Membrane Roofing Systems described in this report consist of single-ply roofing membranes, insulation where used, barrier board or slip sheet where used, flashing, mechanical fasteners and adhesives that are installed on a combustible or noncombustible deck. See Table 1 for Carlisle product trade names and corresponding product names for Mule-Hide Products Company, Inc., WeatherBond, Versico, Kelly Company/2001 Inc., and Roofing Products International, Inc., the additional listees.

3.2 EPDM Membranes:

3.2.1 Sure-Seal: Sure-Seal is a black, nonreinforced EPDM membrane, 45 mils thick [0.045 inch (1.14 mm)].

3.2.2 Sure-Seal FR: Sure-Seal FR is a black, nonreinforced EPDM membrane with fire retardants. Available thicknesses range from 45 mils (0.045 inch [1.14 mm]) to 90 mils (0.090 inch [2.29 mm]).

3.2.3 Sure-White: Sure-White is a white, nonreinforced EPDM membrane. It is available in thicknesses of 60 mils [0.060 inch (1.52 mm)] and 90 mils [0.090 inch (2.29 mm)].

3.2.4 Sure-Tough: Sure-Tough is a black, reinforced membrane consisting of a polyester reinforcement encapsulated between two EPDM membrane plies. It is available in thicknesses ranging from 45 mils [0.045 inch (1.14 mm)] to 75 mils [0.075 inch (1.90 mm)].

3.2.5 Sure-Tough FR: Sure-Tough FR is a black, reinforced membrane consisting of a polyester reinforcement encapsulated between two EPDM membrane plies with fire retardants. Available thicknesses are 45 mils [0.045 inch (1.14 mm)] and 60 mils [0.060 inch (1.52 mm)].

3.2.6 Sure-Seal FleeceBACK: Sure-Seal FleeceBACK is a 45-mil to 90-mil [0.045 inch to 0.090 inch (1.14 mm to 2.29 mm)] non-reinforced EPDM bonded to a polyester fleece. Available product thicknesses range from 100 mils [0.100 inch (2.55 mm)] to 145 mils [0.145 inch (3.68 mm)].

3.2.7 Sure-White FleeceBACK: Sure-White FleeceBACK is a 45-, 60- or 90-mil [0.045, 0.060 or 0.090 inch

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(1.14, 1.52 or 2.29 mm)] nonreinforced white EPDM bonded to a polyester fleece. Available product thicknesses are 100, 115 and 145 mils [0.100, 0.115 or 0.145 inch (2.54, 2.92 or 3.68 mm)].

3.2.8 Sure-Seal AFX: Sure-Seal AFX is a 45-mil [0.045 inch (1.14 mm) or 60-mil [0.060 inch (1.52 mm)] non-reinforced EPDM bonded to a 7 polyester fleece. Available thicknesses are 90 mils [0.090 inch (2.29 mm)] and 105 mils [0.105 inch (2.67 mm)].

3.3 PVC Membranes:

3.3.1 Sure-Flex PVC: Sure-Flex PVC is a heat-weldable PVC thermoplastic membrane consisting of a weft-inserted polyester fabric that is encapsulated by PVC based top and bottom plies. Available thicknesses range from 50 mils [0.050 inch (1.27 mm)] to 80 mils [0.080 inch (203 mm)].

3.3.2 Sure-Flex KEE HP: Sure-Flex KEE HP is a heat-weldable theromoplastic membrane that consists of a polyester fabric that is encapsulated by KEE HP based top and bottom plies. Available thicknesses range from 50 mils [0.50 inch (1.27 mm)] to 80 mils [0.80 inch (2.03 mm)].

3.3.3 Sure-Flex PVC FRS: Sure-Flex PVC FRS is a heat-weldable thermoplastic membrane that consists of a fiberglass reinforcement encapsulated with PVC based top and bottom plies. Available thicknesses range from 60 mils [0.60 inch (1.52 mm)] to 80 mils [0.80 inch (2.03 mm)].

3.3.4 Sure-Flex PVC FleeceBACK: Sure-Flex PVC FleeceBACK membrane consists of polyester reinforcing scrim and polyester fleece backing. Available thicknesses range from 115 mils [0.115 inch (2.92 mm)] to 135 mils [0.135 inch (3.43 mm)].

3.3.5 Sure-Flex KEE HP FleeceBACK: Sure-Flex KEE HP FleeceBACK membrane consists of a polyester reinforcing scrim, polyester fleece backing, and DuPont® Elvaloy® KEE HP copolymer. Available thicknesses range from 105 mils [0.105 inch (2.67 mm)] to 135 mils [0.135 inch (3.43 mm)].

3.3.6 Sure-Flex PVC FRS FleeceBACK: Sure-Flex PVC FRS FleeceBACK membrane consists of a high-strength fiberglass scrim and polyester fleece backing. Available thicknesses range from 115 mils [0.115 inch (2.92 mm)] to 135 mils [0.135 inch (3.43 mm)].

3.3.7 Sure-Flex KEE HP FRS FleeceBACK: Sure-Flex KEE HP FRS FleeceBACK membrane consists of a fiberglass reinforcing scrim, polyester fleece backing, and DuPont® Elvaloy® KEE HP copolymer. Available thicknesses range from 105 mils [0.105 inch (2.67 mm)] to 135 mils [0.135 inch (3.43 mm)].

3.4 TPO Membranes:

3.4.1 Sure-Weld: Sure-Weld membrane consists of a polyester reinforcement encapsulated between two plies of TPO. The membrane is available in white, gray, tan and custom colors. Available thicknesses range from 45 mils [0.045 inch (1.14 mm)] to 80 mils [0.080 inch (2.03 mm)].

3.4.2 Sure-Weld HS: Sure-Weld HS is the Sure-Weld membrane formulated with an additional flame retardant for fire resistance at higher slopes. The membrane is available in white, gray, tan and custom colors. Available thicknesses are 45 mils (0.045 inch [1.14 mm]) and 60 mils (0.060 inch [1.52 mm]).

3.4.3 Sure-Weld SAT-TPO: Sure-Weld SAT-TPO is a self-adhered version of the Sure-Weld HS membrane with adhesive.

3.4.4 Sure-Weld FleeceBACK: Sure-Weld FleeceBACK is the Sure-Weld HS membrane, 45 mils [0.045 inch (1.14 mm)], 60 mils [0.60 inch (1.52 mm)] and 80 mils [0.60 inch (2.03 mm)] thick, with a laminated polyester fleece backing. Available thicknesses are 100 mils [0.100 inch (2.54 mm)], 115 mils [0.115 inch (2.92 mm)] and 135 mils [0.135 inch (3.43 mm)].

3.4.5 Sure-Weld AFX: Sure-Weld AFX is the Sure-Weld HS membrane with a laminated polyester fleece backing. Available thicknesses range from 120 mils [0.120 inch (3.05 mm)] to 155 mils [0.155 inch (3.94 mm)].

3.4.6 Spectro-Weld: Spectro-Weld is the Sure-Weld membrane, described in Section 3.4.1, formulated with a brighter white color. Available thicknesses are 60 mils [0.060 inch (1.52 mm)] and 80 mils [0.080 inch (2.03 mm)].

3.4.7 Spectro-Weld FleeceBACK: Spectro-Weld FleeceBACK is the Spectro-Weld membrane with a laminated 5.5-ounce-per-square-yard (0.18 kg/m^2) polyester fleece backing. It is 115 mils [0.115 inch (2.92 mm)] thick.

3.5 Insulation:

See Tables 2 through 5 for insulations for use with specific roofing systems. Foam plastic insulation, where used, must have a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 or UL 723.

3.6 Barrier Board:

Barrier board, where used, must be either minimum 1/4-inch-thick (6.4 mm) Georgia-Pacific Gypsum LLC "DensDeck® Roofboard" or "DensDeck Prime® Roofboard," minimum 1/4-inch-thick (6.4 mm) Owens Corning "StrataGuard," minimum 1/4-inch-thick (6.4 mm) USG Corporation "SECUROCK® Gypsum-Fiber Roof Board" or "SECUROCK® Glass-Mat Roof Board," or minimum 1/2-inch-thick (12.7 mm) gypsum board. Barrier board must be UL-classified for roofing applications or UL-classified gypsum board.

3.7 Slip Sheet:

The slip sheet, where used, must include Carlisle "FR Base Sheet 1S or 2S," GAF "VersaShield® Fire-Resistant Roof Deck Protection (ESR-2053)," Elk "VersaShield FB-1S or FB-2S", or Atlas "FR 10 or FR 50." Slip sheets must be UL-classified for roofing applications.

3.8 Flashing:

Flashing must be provided in accordance with IBC Section 1503.2 or IRC Section R903.2, as applicable. Where flashing is of metal, the metal must be corrosion-resistant, minimum No. 26 gage [0.019 inch (0.483 mm)] galvanized steel.

3.9 Fasteners:

Fasteners, used to mechanically attach insulation and membranes to the roof deck, must be corrosion-resistant, and must be Carlisle fasteners, plates or fastening bars, unless otherwise noted in this report. Refer to Table 4 and 5 for spacing of fasteners.

3.9.1 HP Fastener: This is an epoxy-coated steel screw used in combination with Carlisle's fastening plates or bars to mechanically attach roofing insulation and membranes to steel or wood substrate. Fastener length must be selected to penetrate through the steel deck a minimum of 3/4 inch (19.1 mm), and into the wood deck a minimum of 1 inch (25.4 mm).

3.9.2 InsulFast Insulation Fastener: This is an epoxy-coated steel screw used in combination with Carlisle's insulation plates to mechanically attach roofing insulation to steel or wood substrates. Fastener length must be selected to penetrate through the steel deck a minimum of 3/4 inch

(19.1 mm), or into the wood deck a minimum of 1 inch (25.4 mm).

3.9.3 HP Purlin Fastener: This is an epoxy-coated steel screw used in combination with Carlisle's fastening plates or bars to mechanically attach roofing insulation and membranes to structural steel members. Fastener length must be selected to penetrate through the steel member a minimum of $^3/_4$ inch (19.1 mm.)

3.9.4 HD 14-10 Fastener: This is a heavy-duty, epoxy-coated steel screw used in combination with Carlisle's fastening plates or bars to mechanically attach roofing insulation and membranes to concrete roof deck. Fastener length must be selected to penetrate into the concrete deck a minimum of 1 inch (25.4 mm).

3.9.5 CD-10 Fastener: The CD-10 is an epoxy-coated, hammer-driven, nonthreaded fastener specifically designed to be used with insulation and seam fastening plates to secure membrane and insulation to structural concrete. Fastener length must be selected to penetrate into the concrete deck a minimum of 1 inch (25.4 mm).

3.9.6 Lite-Deck Fastener: The Lite-Deck Fastener is used in conjunction with a specially designed 3-inch (76.2 mm) Lite-Deck Metal Plate for insulation attachment to gypsum, cementitious wood fiber (Tectum [ESR-1112]), and lightweight concrete decks. Fastener length must be selected to penetrate into the deck a minimum of 2 inches (50.8 mm).

3.9.7 GypTec Fastener: The GypTec Fastener is a glass-filled nylon auger fastener designed for securing mechanically attached membranes and insulation to gypsum and cementitious wood fiber (Tectum [ESR-1112]) decks. Fastener length must be selected to penetrate into the deck a minimum of 1.5 inches (38.1 mm).

3.9.8 HP Polymer Seam Plate: This is a 2-inch-diameter (50 mm) polymer plate designed to be used with HP and HD 14-10 fasteners to mechanically attach roofing membranes to the roof deck.

3.9.9 Sure-Tite Fastener and ST Fastening Bar: This is a heavy-duty, epoxy-coated steel screw and bar used to secure reinforced EPDM membranes to steel or wood deck. The bar is 1-inch-wide-by-0.040-inch-thick-by-10-foot-long (25.4 mm by 1.1 mm by 3.1 m) galvalume-coated steel with pre-punched holes 6 inches (150 mm) on center.

3.9.10 HP-X Fastener: This is an epoxy-coated carbon steel screw used in combination with the Piranha Fastening Plate to mechanically attach TPO membranes to steel or wood substrate. Fastener length must be selected to penetrate through the steel deck a minimum of $^3/_4$ inch (19.1 mm), and into the wood deck a minimum of 1 inch (25.4 mm).

3.9.11 Piranha Fastening Plate: This is a $2^3/_8$-inch-diameter galvalume-coated steel plate designed to be used with HP-X fasteners to mechanically attach PVC and TPO membranes to the roof deck.

3.9.12 HP-XTRA Fastener: This is an epoxy-coated carbon steel screw used in combination with the Piranha XTRA Fastening Plate to mechanically attach PVC and TPO membranes to steel or wood substrate. Fastener length must be selected to penetrate through the steel deck a minimum of $^3/_4$ inch (19.1 mm) and into the wood deck a minimum of 1 inch (25.4 mm).

3.9.13 Piranha XTRA Fastening Plate: This is a $2^3/_8$-inch-diameter galvalume-coated steel plate designed to be used with HP-XTRA fasteners to mechanically attach PVC and TPO membranes to the roof deck.

3.9.14 PVC Oval Barbed Plate: This is a $1^1/_2$-inch-by-$2^3/_4$-inch (35 mm by 69.85 mm) Oval Barbed Plate designed to be used with HP-X Fasteners to mechanically attach PVC membranes to the roof deck.

3.9.15 OMG Roofing Products RhinoBond Plate: The RhinoBond Plate is a 3-inch-diameter (76.2 mm), 0.028-inch-thick (0.7 mm) galvalume-coated steel plate, coated with a proprietary adhesive and used with the HP-X fastener to mechanically attach PVC and TPO membranes to the roof deck. The adhesive bonds the plate to the underside of the membrane.

3.10 Carlisle Syntec Adhesives: See Tables 2 and 5 for adhered roofing systems.

3.10.1 90-8-30A Bonding Adhesive: 90-8-30A Bonding Adhesive is a high-strength, solvent-based contact adhesive used to adhere EPDM membranes to the insulation or substrate. It has a coverage rate of approximately 60 square feet per gallon (1.5 m^2/L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers and has a shelf life of one year.

3.10.2 Aqua Base 120 Bonding Adhesive: Aqua Base 120 Bonding Adhesive is a high-strength, water-based contact adhesive used to adhere EPDM and TPO membranes to the insulation or substrate. It has a coverage rate of approximately 120 square feet per gallon (3 m^2/L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers and has a shelf life of one year.

3.10.3 Low-VOC PVC Bonding Adhesives: Low VOC PVC Bonding Adhesives is high-strength, solvent-based contact adhesives used to adhere PVC membranes to an insulation or substrate. They have a coverage rate of approximately 60 square feet per gallon (1.5 m^2/L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.4 Sure-Weld TPO Bonding Adhesive: Sure-Weld TPO Bonding Adhesive is a high-strength, solvent-based contact adhesive used to adhere TPO membranes to an insulation or substrate. It has a coverage rate of approximately 60 square feet per gallon (1.5 m^2/L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.5 Low VOC Bonding Adhesive: Low VOC Bonding Adhesive is a high-strength, solvent-based contact adhesive used to adhere EPDM and TPO membranes to an insulation or substrate. It has a coverage rate of approximately 60 square feet per gallon (1.5 m^2/ L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.6 HydroBond Water-Based Bonding Adhesive: HydroBond Water-Based Bonding Adhesive is a water-based, wet lay-in, one-sided adhesive to be used to adhere Sure-Flex PVC, Sure-Flex PVC FRS and FleeceBACK membranes to an insulation or substrate. It has a coverage rate of 100 square feet per gallon (2.5 m^2/L). The adhesive is supplied in 5-gallon (918.9 L) containers with a shelf life of one year.

3.10.7 Low VOC Bonding Adhesive 1168: Low VOC Bonding Adhesive 1168 is high-strength, solvent-based contact adhesive used to adhere EPDM and TPO membranes to an insulation or substrate. It has a coverage rate of approximately 60 square feet per gallon (1.58 m^2/L) when applied to the finished surface area. The adhesive is

supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.8 Solvent-Free EPDM Bonding Adhesive: Solvent-Free EPDM Bonding Adhesive is a high-strength, polymer-based adhesive. This adhesive can be used to adhere all Sure-Seal or Sure-White EPDM membranes as a one-sided, wet lay-in adhesive. It has a coverage rate of 100 square feet per gallon (2.5 m^2/L). The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of six months.

3.10.9 Cold Applied Adhesive: Cold Applied Adhesive is a solvent-free, asphalt-modified polyether adhesive. This adhesive can be used with all Sure-Seal or Sure-Weld AFX membranes as a one-sided, wet lay-in adhesive. It has a coverage rate of 67 square feet per gallon (1.6 m^2/L). The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.10 FAST Adhesives: FAST 100, FAST 100LV, and Flexible FAST Adhesives are two-component polyurethane adhesives used to adhere FleeceBACK membranes and insulations to various substrates. The adhesives have a coverage rate of approximately 100 square feet per gallon (2.5 m^2/L). The adhesives are supplied in 5-gallon (18.9 L) jugs, 15-gallon (56.7 L) and 50-gallon (189 L) drums, box sets, cartridge tubes, dual tanks, and/or cylinders, and have a shelf life of one year.

3.10.11 OlyBond 500 Adhesive: OMG Roofing Products OlyBond 500 Spot Shot and OlyBond 500 BA are two-component polyurethane adhesives used to adhere insulations to various substrates. The adhesives have a coverage rate of approximately 100 square feet per gallon (2.5 m^2/L). The adhesives are supplied in cartridge tubes and box sets, and have a shelf life of one year.

3.10.12 EPDM X-23 Low-VOC Bonding Adhesive: EPDM X-23 Low-VOC Bonding Adhesive is a high strength, solvent-based contact adhesive used to adhere EPDM membranes to an insulation or substrate. It has a coverage rate of approximately 60 square feet per gallon (1.5 m^2/L) when applied to the finished surface area. The adhesive is supplied in 5-gallon (18.9 L) containers with a shelf life of one year.

3.10.13 CAV-GRIP III Low-VOC Adhesive/Primer: CAV-GRIP III Low-VOC Adhesive/Primer is a contact adhesive used to adhere EPDM and TPO membranes to various substrates. It has a coverage rate of 1000 ft^2 per cylinder when applied to the finished surface area. The adhesive is supplied in No. 40 cylinders with a shelf life of one year (unopened).

3.11 Impact Resistance:

The EPDM, PVC, and TPO roofing membranes described in this report meet requirements for impact resistance in IBC Section 1504.7, based on testing in accordance with Section 4.6 of FM 4470.

4.0 INSTALLATION

4.1 General:

Installation of the EPDM, PVC, and TPO roofing membranes described in this report must comply with the applicable code, the manufacturer's published installation instructions and this report. The manufacturer's published installation instructions must be available at all times on the jobsite during installation.

The substrate to which the membrane is to be applied must be clean, dry, and free of frost, loose fasteners, and other protrusions or contaminates that will interfere with the adhesion or attachment of the membrane or that will puncture the membrane. All materials must be protected against contact with incompatible materials. Where gypsum board is used as barrier board in the roofing assembly, weather protection must be provided to prevent damage to the gypsum board prior to application of the roofing membrane.

The slope of the roof on which the single-ply membranes are installed must not be more than the maximum slope indicated for the particular assembly as listed in Tables 2 and 3.

Penetrations and terminations of the roof covering must be flashed and made weather tight in accordance with the requirements of the membrane manufacturer and the applicable code.

4.2 Fire Classification:

4.2.1 New Construction: The adhered and mechanically fastened EPDM, PVC, and TPO single-ply membrane roofing systems, when installed in accordance with this report, are Class A, B or C roof covering systems in accordance with ASTM E108 or UL 790, as noted in Tables 2 and 3.

4.2.2 Reroofing: The existing deck must be inspected to verify that the structure to be reroofed is structurally sound and adequate to support and secure the roofing membrane. Prior to installation of new roof coverings, inspection by and written approval from the code official having jurisdiction must be required.

Class A, B or C roof covering systems may be installed over existing classified roof covering systems under the following conditions without additional roof classification tests, provided the resulting classification is the lower of the new or existing roofing classification:

- New uninsulated systems installed only over existing uninsulated assemblies.
- New insulated systems installed over existing uninsulated systems only.

4.3 Wind Resistance:

4.3.1 New Construction: The allowable wind uplift pressures for the EPDM, PVC, and TPO roofing membranes as parts of roof assemblies are noted in Tables 4 and 5.

Metal edge securement systems must be listed in accordance with the 2011 edition of ANSI/SPRI/FM4435 ES-1 and designed and installed for wind loads in accordance with IBC Section 1504.5 and IBC Chapter 16.

4.3.2 Reroofing: Mechanically anchored systems may be accepted based on the adequacy of anchors penetrating through existing roof coverings into structural substrates. Since the composition and/or condition of any particular existing underlying material may vary widely, reroofing with adhered systems is outside the scope of this report.

5.0 CONDITIONS OF USE

The single-ply EPDM, PVC, and TPO roofing membranes described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with the applicable code, the manufacturer's published installation instructions and this report. The instructions within this report must govern if there are any conflicts between the manufacturer's installation instructions and this report.

5.2 The adhered and mechanically fastened single-ply membrane roofing systems must be installed by professional roofing contractors who are trained and approved by the manufacturer.

5.3 Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4.1.5 or IRC Section R316.4, as applicable.

5.4 Foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam plastic has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 or UL 723, subject to the approval of the code official.

5.5 Design wind uplift pressure on any roof area, including edge and corner zones, must not exceed the allowable wind uplift pressure for the system installed in that particular area. Refer to allowable wind uplift pressures for systems as listed in Tables 4 and 5.

5.6 The allowable wind uplift pressures listed in Tables 4 and 5 are for the roof covering system only. The deck and framing to which the system is attached must be designed for the applicable components and cladding wind loads in accordance with the applicable code.

5.7 When application is over existing roofs, documentation of the wind-uplift resistance of the composite roof construction must be submitted to the code official for approval at the time of permit application.

5.8 For buildings under the IBC, above deck thermal insulation board must comply with the applicable standards listed in IBC Table 1508.2 or IRC Table R906.2, as applicable.

5.9 The roofing membranes are manufactured at Carlisle, Pennsylvania; Greenville, Illinois; Tooele, Utah; and Senatobia, Mississippi, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Membrane Roof-covering Systems (AC75), dated July 2010 (editorially revised March 2018).

7.0 IDENTIFICATION

7.1 Each roll of the roofing membrane must bear a label noting the product name, the manufacturer's name (Carlisle SynTec Systems) or the name of the additional listee, the manufacturer's address or plant code and the ICC-ES evaluation report number (ESR-1463).

7.2 The report holder's contact information is the following:

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS
POST OFFICE BOX 7000
CARLISLE, PENNSYLVANIA 17013
(717) 245-7000
www.carlislesyntec.com

7.3 The Additional Listees' contact information is the following:

KELLY COMPANY/2001 INC.
325 THOMASTON AVENUE
WATERBURY, CONNECTICUT 06702
(203) 575-9220

MULE-HIDE PRODUCTS COMPANY, INC.
1195 PRINCE HALL DRIVE
BELOIT, WISCONSIN 53511
(800) 786-1492

VERSICO
POST OFFICE BOX 1289
CARLISLE, PA 17013
(800) 992-7663

WEATHERBOND
POST OFFICE BOX 251
PLAINFIELD, PENNSYLVANIA 17081
(866) 471-5125

ROOFING PRODUCTS INTERNATIONAL, INC.
57460 DEWITT STREET
ELKHART, INDIANA 46517
(800) 628-2957

TABLE 1—PRODUCT NAMES

CARLISLE PRODUCT NAME	KELLY CO./ 2001 INC. PRODUCT NAME	MULE-HIDE PRODUCT NAME	VERSICO PRODUCT NAME	WEATHERBOND PRODUCT NAME	ROOFING PRODUCTS INTERNATIONAL PRODUCT NAME
Sure-Seal	C-EPDM	Mule-Hide Standard Black EPDM	VersiGard Non-reinforced EPDM	WeatherBond EPDM Non-Reinforced Membrane	Royal Edge Non-Reinforced EPDM
Sure-Seal FR	C-EPDM-C	Mule-Hide FR EPDM	VersiGard FR Non-Reinforced EPDM	WeatherBond EPDM FR Non-Reinforced Membrane	Royal Edge Non-Reinforced FR EPDM
Sure-Seal FleeceBACK	C-EPDM-FB	-	VersiFleece EPDM	WeatherBond Fleece EPDM Membrane	Royal Edge EPDM FleeceBACK
Sure-Seal AFX	C-EPDM-AFX	-	VersiFleece AC EPDM	WeatherBond EPDM AC Fleece Membrane	-
Sure-Tough	C-EPDM-C, Type 2	Mule-Hide Standard Reinforced EPDM	VersiGard Reinforced EPDM	WeatherBond EPDM Reinforced Membrane	Royal Edge Reinforced EPDM
Sure-Tough FR	C-EPDM-CR Reinforced	Mule-Hide FR Reinforced EPDM	VersiGardFR Reinforced EPDM	WeatherBond EPDM FR Reinforced Membrane	Royal Edge Reinforced Fire Rated EPDM
Sure-White	C-EPDM-White	Mule-Hide White-on-Black EPDM	VersiGard –White Standard	WeatherBond EPDM White Membrane	Re-Flex White EPDM
Sure-White FleeceBACK	C-EPDM-FB-White	-	-	-	Re-Flex White EPDM FleeceBACK
Sure-Weld	TPO-K	Mule-Hide TPO-c	VersiWeld Reinforced TPO Membrane	WeatherBond TPO Membrane	Re-Flex TPO
Sure-Weld HS	TPO-K-FR	Mule-Hide TPO-c (FR)	VersiWeld HS	WeatherBond TPO High Slope Membrane	Re-Flex TPO HS
Sure-Weld SAT-TPO	TPO-K_SAT	Mule-Hide SA-TPO	VersiWeld QA TPO Membrane	WeatherBond TPO PAS Membrane	Re-Flex TPO SAT
Sure-Weld FleeceBACK	TPO-K-FB	Mule-Hide TPO-c Fleece Back	VersiFleece TPO	WeatherBond FleeceTPO Membrane	Re-Flex TPO FleeceBACK
Sure-Weld AFX	TPO-K-AFX	Mule-Hide TPO-c Fleece Back Plus	VersiFleece AC TPO	WeatherBond TPO AC Fleece Membrane	-
Spectro-Weld	-	-	-	-	-
Spectro-Weld FleeceBACK	-	-	-	-	-
Sure-Flex PVC	-	Mule-Hide PVC Membrane	VersiFlex PVC	WeatherBond PVC Membrane	Re-Flex PVC
Sure-Flex KEE HP	-	Mule-Hide PVC KEE HP Membrane	VersiFlex KEE HP	WeatherBond KEE HP Membrane	Re-Flex KEE HP
Sure-Flex PVC FRS	-	Mule-Hide PVC FRS Membrane	VersiFlex FRS PVC	WeatherBond PVC FRS Membrane	Re-Flex FRS PVC
Sure-Flex PVC FleeceBACK	-	Mule-Hide PVC FleeceBack Membrane	VersiFleece PVC	WeatherBond PVC Fleece Membrane	-
Sure-Flex KEE HP FleeceBACK	-	Mule-Hide PVC KEE HP Fleece Back Membrane	VersiFleece KEE HP	WeatherBond KEE HP Fleece Membrane	-
Sure-Flex PVC FRS FleeceBACK	-	-	VersiFleece FRS PVC	WeatherBond PVC FRS Fleece Membrane	Re-Flex FRS PVC FleeceBACK
Sure-Flex KEE HP FRS FleeceBACK	-	-	VersiFleece FRS KEE HP	WeatherBond KEE HP FRS Fleece Membrane	-
90-8-30A Bonding Adhesive	2001 Inc. Bonding Adhesive	Mule-Hide Bonding Adhesive	G200SA Yellow Substrate Adhesive	LC-60 Bonding Adhesive	Royal Edge Bonding Adhesive
EPDM X-23 Low- VOC Bonding Adhesive	-	EPDM X-23 Low VOC Bonding Adhesive	EPDM X-23 Low VOC Bonding Adhesive	EPDM X-23 Low VOC Bonding Adhesive	-
Solvent-Free EPDM Bonding Adhesive	-	-	Solvent-Free EPDM Bonding Adhesive	Solvent-Free EPDM Bonding Adhesive	Royal Edge Solvent-Free EPDM Bonding Adhesive
Aqua Base 120 Bonding Adhesive	-	Aqua Base 120 Bonding Adhesive	Aqua Base 120 Bonding Adhesive	Aqua Base 120 Bonding Adhesive	Royal Edge Water Based Bonding Adhesive
Sure-Weld TPO Bonding Adhesive	-	Mule-Hide TPO-c Bonding Adhesive	VersiWeld TPO Bonding Adhesive	TPO Bonding Adhesive	Royal Edge EPDM/TPO Bonding Adhesive
Low VOC Bonding Adhesive	-	Low VOC Bonding Adhesive	LOW VOC Bonding Adhesive	Low VOC Bonding Adhesive	Royal Edge Low VOC Bonding Adhesive
Low VOC Bonding Adhesive 1168	-	Low VOC Bonding Adhesive 1168	Low VOC Bonding Adhesive 1168	Low VOC Bonding Adhesive 1168	--
Low VOC PVC Bonding Adhesive	-	Low -VOC PVC Bonding Adhesive	Low-VOC PVC Bonding Adhesive	Low-VOC PVC Bonding Adhesive	Re-Flex PVC Low VOC Bonding Adhesive
HydroBond Water-Based Bonding Adhesive	-	HydroBond Water-Based Bonding Adhesive-	HydroBond Water-Based Bonding Adhesive	HydroBond Water-Based Bonding Adhesive	=
CAV-GRIP III Low VOC Adhesive/Primer		AeroWeb Adhesive	Cav-Grip 3V Low VOC Adhesive/Primer	Cav-Grip III Low VOC Adhesive/Primer	-

TABLE 1—PRODUCT NAMES (continued)

CARLISLE PRODUCT NAME	KELLY CO./ 2001 INC. PRODUCT NAME	MULE-HIDE PRODUCT NAME	VERSICO PRODUCT NAME	WEATHERBOND PRODUCT NAME	ROOFING PRODUCTS INTERNATIONAL PRODUCT NAME
Cold Applied Adhesive	-	Cold Applied Adhesive	Cold Applied Adhesive	Cold Applied Adhesive	RPI Cold Applied Adhesive
FAST 100 Adhesive	-		DASH 100 Adhesive	-	-
FAST 100-LV Adhesive	-	Helix® 2 Low-Rise Adhesive	DAST Adhesive	DASHAdhesive	FastBond 100 LV Adhesive
Flexible FAST Adhesive	-	Helix® Max Low-Rise Adhesive	Flexible DAST Adhesive	Flexible DASH Adhesive	FastBond Flex Adhesive
OlyBond 500 Adhesive	-	-	OlyBond 500 Adhesive	OlyBond 500 Adhesive	OlyBond 500 Adhesive

TABLE 2—FIRE CLASSIFICATION ASSEMBLIES—ADHERED ROOFING SYSTEMS[2,5]

SYSTEM NO.	ROOF CLASS	DECK	MAX SLOPE	BARRIER BOARD OR SLIP SHEET	INSULATION[1]	MEMBRANE
1	A	Noncombustible	$^1/_4$:12	—	Any of the following insulations, 1-inch min. to 6-inch max. thickness: Carlisle "SecurShield Polyiso", "InsulBase", Hunter Panels "H-Shield" or "H-Shield-CG"	Sure-Weld, Spectro-Weld
2			$^1/_2$:12			Sure-Seal FR, Sure-Tough, Sure-White, Sure-Seal FleeceBACK, Sure-Weld HS, Sure-Weld SAT-TPO, Sure-Weld FleeceBACK, Spectro-Weld FleeceBACK, Sure-White FleeceBACK
3			$^3/_4$:12			Sure-Flex PVC FleeceBACK, Sure-Flex KEE HP FleeceBACK, Sure-Flex PVC FRS FleeceBACK, Sure-Flex KEE HP FRS FleeceBACK
4			2:12			Sure-Flex PVC, Sure-Flex PVC FRS, Sure-Flex KEE HP
5	A	Noncombustible	$^3/_4$:12	—	$^1/_2$-inch-thick fiberboard[4], $^1/_2$-inch-thick fiberboard[4] or barrier board (see Section 3.6) over 5-inch max Insulfoam EPS[3], $^1/_2$-inch-thick fiberboard or barrier board (see Section 3.6) over System No. 1 insulations	Sure-White FleeceBACK
6			1:12			Sure-Seal FR, Sure-Tough
7			$1^1/_2$:12			Sure-White, Sure-Seal FleeceBACK, Sure-Weld, Spectro-Weld, Sure-Weld HS, Sure-Weld SAT-TPO, Sure-Weld FleeceBACK, Spectro-Weld FleeceBACK, Sure-Flex PVC, Sure-Flex PVC FRS, Sure-Flex KEE HP, Sure-Flex PVC FleeceBACK, Sure-Flex KEE HP FleeceBACK, Sure-Flex PVC FRS FleeceBACK, Sure-Flex KEE HP FRS FleeceBACK
8	A	Noncombustible or Combustible - min. $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB.	$^3/_4$:12	$^1/_4$-inch thick "DensDeck Prime" or $^1/_4$-inch thick "SECUROCK Gypsum Fiber Roof Board"	—	Sure-White FleeceBACK
9			$1^1/_2$:12			Sure-White, Sure-Seal FleeceBACK
10			3:12			Sure-Tough, Sure-Weld, Spectro-Weld, Sure-Weld FleeceBACK, Spectro-Weld FleeceBACK
11			4:12			Sure-Weld HS, Sure-Weld SAT-TPO
12			Unlimited			Sure-Seal FR, Sure-Flex PVC, Sure-Flex PVC FRS, Sure-Flex KEE HP
13			3:12			Sure-Flex PVC FleeceBACK, Sure-Flex KEE HP FleeceBACK, Sure-Flex PVC FRS FleeceBACK, Sure-Flex KEE HP FRS FleeceBack

TABLE 2—FIRE CLASSIFICATION ASSEMBLIES—ADHERED ROOFING SYSTEMS[2,5] (continued)

SYSTEM NO.	ROOF CLASS	DECK	MAX SLOPE	BARRIER BOARD OR SLIP SHEET	INSULATION[1]	MEMBRANE
14	A	Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^{7}/_{16}$-inch-thick OSB.	$^{1}/_{4}$:12	Barrier board (see Section 3.6) or Slip sheet: 2 layers (see Section 3.7)	Any of the following insulations, 1-inch min. to 6-inch max. thickness: Carlisle "SecurShield Polyiso", "InsulBase", Hunter Panels "H-Shield" or "H-Shield-CG"	Sure-Weld, Spectro-Weld
15			$^{1}/_{2}$:12			Sure-Seal FR, Sure-Tough, Sure-White, Sure-Seal FleeceBACK, Sure-Weld HS, Sure-Weld SAT-TPO, Sure-Weld FleeceBACK, Spectro-Weld FleeceBACK, Sure-White FleeceBACK
16			$^{3}/_{4}$:12			Sure-Flex PVC FleeceBACK, Sure-Flex KEE HP FleeceBACK, Sure-Flex PVC FRS FleeceBACK, Sure-Flex KEE FRS FleeceBACK
17			2:12			Sure-Flex PVC, Sure-Flex PVC FRS, Sure-Flex KEE HP
18	C	Noncombustible or Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^{7}/_{16}$-inch-thick OSB.	Unlimited	—	Any of the following insulations, min. 1- inch. thickness: Carlisle "InsulBase" or Hunter Panels "H-Shield"	EPDM, PVC and TPO Membranes
19	A	Combustible	$^{1}/_{2}$:12	—	Single layer of minimum 3.0" or double layer of minimum 1.5" Carlisle "SecurShield Polyiso" or Hunter Panels "H-Shield-CG"	EPDM, PVC, and TPO Membranes
20	B	Combustible	$^{1}/_{2}$:12	—	Single layer of minimum 1.9" Carlisle "SecurShield Polyiso" or Hunter Panels "H-Shield-CG"	EPDM, PVC, and TPO Membranes

For **SI:** 1 inch = 25.4 mm.

[1]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.
[2]See Section 3.10 for adhesive application rate.
[3]UL Classified EPS may be installed below min. 1-inch-thick Carlisle or Hunter Panels polyisocyanurate insulations (max slope 1:12) or below min. $^{1}/_{2}$-inch-thick Carlisle SecurShield HD or Hunter Panels H-Shield HD (max slope 2:12) on noncombustible decks.
[4]Carlisle SecurShield HD or Hunter Panels H-Shield HD may replace fiberboard and may be used as a coverboard over any insulation. When these two boards are used directly below the Sure-Weld membrane, the slope is limited to max. $^{1}/_{2}$:12.
[5]When these systems are used for reroofing or recovering, installation must be in accordance with Sections 4.2.2 and 5.7 of this report, and 2018 and 2015 IBC Section 1511 [2012 and 2009 IBC Section 1510], 2018 and 2015 IRC Section R908 [2012 and 2009 IRC Section R907], as applicable.

TABLE 3—FIRE CLASSIFICATION ASSEMBLIES—MECHANICALLY FASTENED ROOFING SYSTEMS[4]

SYSTEM NO.	ROOF CLASS	DECK	MAX. SLOPE	BARRIER BOARD OR SLIP SHEET	INSULATION[1]	MEMBRANE/MAX. ROOF SLOPE
1	A	Noncombustible	$^1/_2$:12	—	Any of the following insulations, 1-inch min. to 6-inch max. thickness: Carlisle "SecurShield Polyiso" or "InsulBase", Hunter Panels "H-Shield" or "H-Shield-CG"	Sure-Tough, Sure-Weld, Spectro-Weld
2			$1^1/_2$:12			Sure-Weld HS
3			$^3/_4$:12			Sure-Tough FR
4			$2^1/_2$:12			Sure-Flex PVC, Sure-Flex KEE HP
5	A	Noncombustible	1:12	—	$^1/_2$-inch-thick fiberboard[3], $^1/_2$-inch-thick fiberboard[4] or barrier board (see Section 3.6) over 5-inch max Insulfoam EPS[2], $^1/_2$-inch-thick fiberboard or barrier board (see Section 3.6) over System No. 1 insulations	Sure-Tough, Sure-Flex
6			$1^1/_2$:12			Sure-Weld, Spectro-Weld, Sure-Weld HS
7			$2^1/_2$:12			Sure-Tough FR
8	A	Noncombustible	$^1/_2$:12	—	To 5-inch max: Insulfoam SP	Sure-Weld, Spectro-Weld, Sure-Weld HS, Sure-Flex, Sure-Flex KEE HP
9	A	Noncombustible or Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB.	3:12	Barrier board (see Section 3.6)	—	Sure-Tough, Sure-Weld, Spectro-Weld
10			$3^1/_2$:12			Sure-Tough FR
11			Unlimited			Sure-Weld HS, Sure-Flex, Sure-Flex KEE HP
12	A	Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB.	$^1/_2$:12	Barrier board (see Section 3.6) or Slip sheet: 2 layers, (see Section 3.7)	Any of the following insulations, 1-inch min.to 6-inch max. thickness: Carlisle "SecurShield Polyiso" or "InsulBase", Hunter Panels "H-Shield" or "H-Shield-CG"	Sure-Tough, Sure-Weld, Spectro-Weld
13			$1^1/_2$:12			Sure-Weld HS
14			$^3/_4$:12			Sure-Tough FR
15			$2^1/_2$:12			Sure-Flex PVC, Sure-Flex KEE HP
16	A	Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB	1:12	Slip sheet, 2 layers (see Section 3.7)	—	Sure-Tough
17			$1^1/_2$:12			Sure-Tough FR, Sure Weld, Spectro-Weld, Sure-Weld HS, Sure-Flex, Sure-Flex KEE HP
18	B	Combustible min. $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB.	$1^1/_2$:12	Slip sheet, 1 layer (see Section 3.7)	—	Sure-Tough, Sure-Tough FR, Sure-Weld, Spectro-Weld,Sure-Weld HS, Sure-Flex, Sure-Flex KEE HP
19	C	Combustible min $^{15}/_{32}$-inch-thick plywood or min. $^7/_{16}$-inch-thick OSB.	Unlimited	—	Any of the following insulations, 1-inch min. thickness: Carlisle "SecurShield Polyiso" or "InsulBase", Hunter Panels "H-Shield" or H-Shield CG"	EPDM, PVC and TPO Membranes
20	A	Combustible	$^1/_2$:12	—	Single layer of minimum 3-inch or double layer of minimum 1.5-inch Carlisle "SecurShield Polyiso" or Hunter Panels "H-Shield-CG"	EPDM, PVC, and TPO Membranes
21	B	Combustible	$^1/_2$:12	—	Single layer of minimum 1.9-inch Carlisle "SecurShield Polyiso" or Hunter Panels "H-Shield-CG" or single layer of an inverted G3 cap sheet.	EPDM, PVC, and TPO Membranes

For **SI:** 1 inch = 25.4 mm.

[1]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

[2]UL Classified EPS may be installed below min. 1-inch-thick Carlisle or Hunter Panels polyisocyanurate insulations (max slope 1:12) or below min. $^1/_2$-inch-thick Carlisle SecurShield HD or Hunter Panels H-Shield HD (max slope 2:12) on noncombustible decks.

[3]Carlisle SecurShield HD or Hunter Panels H-Shield HD may replace fiberboard and may be used as a coverboard over any insulation. When these two boards are used directly below the Sure-Weld membrane, the slope is limited to $^1/_2$:12.

[4]When these systems are used for reroofing or recovering, installation must be in accordance with Sections 4.2.2 and 5.7 of this report, and 2018 and 2015 IBC Section 1511 [2012 and 2009 IBC Section 1510], 2018 and 2015 IRC Section R908 [2012 and 2009 IRC Section R907], as applicable.

TABLE 4—WIND RESISTANCE—MECHANICALLY FASTENED ASSEMBLIES[4,7]

SYSTEM NO.	MAXIMUM ALLOWABLE WIND UPLIFT (psf)	DECK[3]	INSULATION [5]	MEMBRANE	MEMBRANE FASTENING	MAXIMUM FASTENER SPACING (inches)	MAXIMUM FASTENER ROW SPACING[8]
1	45	Noncombustible	Foam plastic insulation[1,2], 1/2-inch-thick fiberboard[6] or barrier board (See Sect. 3.6)	Sure-Tough	HP-X Fastener & Metal Fastening Bar	12	6 ft 6 inches
2	75	Noncombustible	Same as System No. 1	Sure-Tough	HP-X Fastener & Metal Fastening Bar	6	6 ft 6 inches
3	52	Noncombustible	Same as System No. 1	Sure-Tough	HP Fastener & Polymer Seam Plate	6	9 ft 6 inches
4	45	Noncombustible	Same as System No. 1	Sure-Tough	Sure-Tite Fastener & ST Fastening Bar	12	9 ft 6 inches
5	30	Noncombustible	Same as System No. 1	Sure-Tough (75 mil)	HP Fastener & Polymer Seam Plate	12	9 ft 6 inches
6	60	Noncombustible	Same as System No. 1	Sure-Tough (75 mil)	HP Fastener & Polymer Seam Plate	6	9 ft 6 inches
7	45	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	12	7 ft 6 inches
8	45	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-Xtra Fasteners with Piranha Xtra Plates	12	9 ft 6 inches
9	60	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	6	9 ft 6 inches
10	67	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	6	7 ft 6 inches
11	30	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	12	11 ft 6 inches
12	60	Noncombustible	Same as System No. 1	Sure-Weld or Spectro-Weld	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	6	11 ft 6 inches
13	53	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X Fasteners with Piranha Plates	6	6 ft 4 inches
14	83	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X Fasteners with Piranha Plates	6	2 ft 11 inches
15	30	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	18	6 ft 4 inches
16	45	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X or HP-Xtra Fasteners with Piranha or Piranha Xtra Plates	12	6 ft 4 inches
17	53	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X Fasteners with Piranha Plates	12	2 ft 11 inches
18	60	Noncombustible	Same as System No. 1	Sure-Flex PVC or Sure-Flex KEE HP	HP-X or HP-Xtra Fasteners with Piranha Plates	6	9 ft 7 inches
19	45	Noncombustible	Same as System No. 1	Sure-Weld	HP-X Fasteners with OMG RhinoBond Plates	1 per 5.3 ft^2	N/A
20	60	Noncombustible	Same as System No. 1	Sure-Weld	HP-X Fasteners with OMG RhinoBond Plates	1 per 4 ft^2	N/A

For **SI:** 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa.

[1]Foam plastic insulation must be any of the following (1-inch min. to 6-inch max. thickness): Carlisle "SecurShield Polyiso", "InsulBase" Hunter Panels "H-Shield" or Hunter Panels "H-Shield- CG".

[2]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

[3]Steel deck must be minimum No. 22 gage galvanized steel [base-metal thickness 0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (f'_c) of 2500 psi. See Section 5.6 of this report.

[4]For existing metal roofing, the assemblies listed must be installed by fastening through the roofing and into structural members (purlins, angle iron, beams, etc.) capable of resisting all expected loads. The maximum allowable wind uplift (field) pressures are shown in Column 2.

[5]UL Classified EPS may be installed below min. 1-inch-thick Carlisle or Hunter Panels polyisocyanurate insulations (max slope1:12) or below min. 1/2-inch-thick Carlisle SecurShield HD or Hunter Panels H-Shield HD (max slope 2:12) on noncombustible decks.

[6]Carlisle SecurShield HD or Hunter Panels H-Shield HD may replace fiberboard and may be used as a coverboard over any insulation. When these two boards are used directly below the Sure-Weld membrane, the slope is limited to 1/2:12.

[7]When these systems are used for reroofing or recovering, installation must be in accordance with Sections 4.2.2 and 5.7 of this report, and 2018 and 2015 IBC Section 1511 [2012 and 2009 IBC Section 1510],2018 and 2015 IRC Section R908 [2012 and 2009 IRC Section R907], as applicable.

[8]Fastener row spaces shown are for field of roof only. See Section 4.3 for recognized fascia systems for mechanically fastened roof assemblies. Distance between the edge of the roof and the first row of fasteners must be determined accordingly.

PVC
ROOFING SYSTEMS

MULE-HIDE PRODUCTS®

"The name trusted in roofing since 1906"

OUR PROMISE

THROUGH ONGOING INTERCHANGE OF EXPERIENCES WITH CONTRACTORS, MULE-HIDE KEEPS ON TOP OF THE LATEST ROOFING REQUIREMENTS AND SOLUTIONS

Trusted in roofing since 1906, Mule-Hide is the right choice for all kinds of installations. Our time-tested and proven systems are affordable and easy to install and meet even the strictest demands of today's commercial, industrial and institutional buildings.

We can help you with everything from membrane selection to determining the best way to ensure a watertight roof. And because providing total roofing systems is our business, you can count on Mule-Hide to ensure the compatibility and performance of any and every component you choose.

WARRANTY PROGRAM

Mule-Hide offers an extensive warranty program with several options for commercial projects, including Membrane Warranties, Standard System Warranties and Premium System Warranties. Complete information on the warranties can be found at our website: www.mulehide.com, under the Warranty Information tab.

A Mule-Hide representative inspects all commercial projects for which a Standard System Warranty or a Premium System Warranty is requested prior to the issuance of the warranty. To be eligible for a System Warranty (either Standard or Premium), the installing contractor must be a Mule-Hide Warranty Eligible contractor. More information on becoming a Mule-Hide Warranty Eligible Contractor can be found at our Web site: www.mulehide.com, under the Warranty Information tab.

Mule-Hide also offers a selection of Membrane Warranties that are available for residential (single family dwelling) projects.

SYSTEM BENEFITS

EASY TO INSTALL, NEW OR RETROFIT ROOF

Mule-Hide PVC Roofing Systems install quickly in one pass with a small, trained crew. All the accessories you need to complete roof details around edges and penetrations are also available.

ENERGY EFFICIENT ROOF

White surfaces have been shown to reflect up to 78% of the sun's rays to reduce air-conditioning costs. The superb reflectivity of white PVC even reduces the heat build-up under the membrane. PVC white membrane adds to the aesthetics of the building while increasing energy efficiency.

FLEXIBILITY

The membrane remains flexible in hot and cold temperatures so it will not split or crack. PVC can handle the desert sun, sand, arctic freezes and torrential downpours.

THE BEST LIFECYCLE

PVC provides excellent resistance to fire, UV, airborne bacteria and industrial pollutants such as air conditioning coolants. Reinforced membrane is engineered to remain dimensionally stable over time.

LIGHTWEIGHT YET STRONG SYSTEM

Weighing less than 1 lb. per square foot makes it ideal for new construction and retrofit installations without adding excessive weight to the roof deck. Stands up to repeated exposure to severe climates, high winds, building movement and routine rooftop traffic.

HEAT-WELDED SEAM STRENGTH

Mule-Hide PVC roofs use a heat-welding process that fuses the membrane seams to form a permanent, watertight seal. Superior seam strength provides greater wind uplift resistance.

CODE COMPLIANCE

UL & FM listed assemblies are available upon request.

MEMBRANES

PVC KEE HP

Mule-Hide PVC KEE HP membranes are manufactured with DuPont™ Elvaloy® KEE HP polymer, which requires less plasticizers to make the membrane permanently flexible in addition to all the benefits of Mule-Hide PVC. Additionally, KEE HP provides the following advantages over standard PVC and standard KEE:

- Reduces plasticizer migration to maintain membrane integrity
- Increases weldability by 51% over standard KEE
- Improved low temperature flexibility (-51°F vs. -40°F)
- Provides greater chemical resistance for projects such as restaurants, laboratories, factories, etc.
- Improves aesthetics by resisting dirt pick up

PVC

Specially designed with weft-inserted polyester knit fabric. Even when punctured, the fabric is engineered to “rope up” and resists tearing for superior durability with excellent abrasion and puncture resistance.

- Weighs less than 1lb. per sq. ft. yet highly resistant to wind uplift
- Resistant to fire & fungus, ozone & UV
- Can be installed during winter months
- Ideal for new construction and reroofing
- Reinforced membrane easily handles building thermal expansion & contraction
- Meets or exceeds ASTM performance standards

PRODUCT INFORMATION

Features/Benefits		PVC Membrane (White, Cool Gray, Cool Tan)			PVC KEE HP Membrane (White, Cool Gray, Cool Tan)			PVC Fleeceback Membrane (White, Cool Gray, Cool Tan)		PVC KEE HP Fleeceback Membrane (White, Cool Gray, Cool Tan)		
		50 Mil	**60 Mil**	**80 Mil**	**50 Mil**	**60 Mil**	**80 Mil**	**60 Mil**	**80 Mil**	**50 Mil**	**60 Mil**	**80 Mil**
Warranties	**Residential-**10 Year Membrane Only	X	X	X	X	X	X	X	X	X	X	X
	Commercial- Material Only or Labor & Material*											
	10 Year	X	X	X	X	X	X	X	X	X	X	X
	15 Year	X	X	X	X	X	X	X	X	X	X	X
	20 Year**		X	X		X	X	X	X		X	X
Mechanically Attached	**Sheet Size-** 40.5”x 100’	X	X									
	40.5”x 65’			X								
	81”x 100’	X	X									
	81”x 65’			X								
	5’x 100’	X	X		X	X		X		X	X	
	5’x 75’			X			X		X			X
	10’x 75’			X			X		X			X
	10’x 100’	X	X		X	X		X		X	X	
Fully Adhered	**HydroBond**™ Water-Based PVC Bonding Adhesive 1-Sided wet lay-in application	X	X	X	X	X	X	X	X	X	X	X
	Low VOC PVC Bonding Adhesive 2-Sided solvent-based contact application	X	X	X	X	X	X					
Coverage Rate (Finished Surface)	HydroBond™ 100sf/gal (Roll on)	X	X	X	X	X	X	X	X	X	X	X
	Low VOC PVC Bonding 60 sf/gal	X	X	X	X	X	X					

Refer to Mule-Hide UL & FM listed assemblies for all product specific information.
Contact Mule-Hide Technical Support for additional information at 800-786-1492.
*Labor & material warranties are only available to Mule-Hide Warranty Eligible Applicators
**Refer to the 20 year Design Enhancement Documents

PVC
Fully Adhered with
HydroBond Water-Based
PVC Bonding Adhesive

PVC
Fully Adhered with
Solvent-Based Adhesive

PVC
Mechanically
Attached

WHY MULE-HIDE?

WE HELP YOU GROW YOUR BUSINESS

When you choose Mule-Hide roofing materials for a project, you get more than just the best products from a company that's been helping contractors for over a century now. You also get individualized service designed to help you get the job done right the first time – so you can get on to the next job, and get that one done right, as well. Mule-Hide products are available through the nation's largest distribution channel, and we truly care about your success.

Contact Mule-Hide Products for specific product approvals and ratings. Featured industry association/organization logos are U.S. registered trademarks. Mule-Hide is an AIA registered CES provider. Energy Star is only valid in the United States for Roofing Products.

"The name trusted in roofing since 1906"

Customer Line: 800-786-1492 • www.mulehide.com

Check our website monthly for the latest updates & technical bulletins.

National Support Center • 1195 Prince Hall Drive • Beloit, WI 53511 • tel. 608.365.3111 • fax. 608.365.7852

The information herein should not be considered all-inclusive and should always be accompanied by a review of the Mule-Hide specifications and guidelines and good application practices.

This information herein is based upon data and knowledge considered to be true and accurate at the time of printing and is provided for the reader's consideration, investigation and verification. No statement made by anyone may supersede this information, except when done in writing by Mule-Hide Products Co., Inc. Mule-Hide Products Co., Inc. does not warrant any results to be obtained. Statements concerning possible use of Mule-Hide products are made without knowledge of your particular roof and such an application may not be fit for your particular purpose. MULE-HIDE DISCLAIMS ALL WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, except written warranties attached to Mule-Hide products and written warranties signed by an officer of Mule-Hide.

Visit the Mule-Hide website at www.mulehide.com prior to any installation for updated technical specifications and details.
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Effective Date: Warranty Number:

Mule-Hide Products Co., Inc. Premium NDL System Warranty for Commercial Buildings

Building Owner:

Building Address:

SAMPLE

In consideration of the warranty fee paid by the above-named Building Owner ("Owner") and the representation to Mule-Hide by the independent contractor hired by the Owner and registered with Mule-Hide to apply for warranties ("Eligible Contractor") that the Mule-Hide Standard System ("System") has been constructed in accordance with Mule-Hide specifications, Mule-Hide Products Co., Inc. ("Mule-Hide") warrants to Owner, subject to the following Terms, Conditions and Limitations, that Mule-Hide will be responsible for the repair of leaks in the System installed on the Building for a period of _____ years from the above Effective Date ("Term of Warranty"); provided, however, that the System shall have been installed by Eligible Contractor using Mule-Hide products and/or other material approved in writing by Mule-Hide. "System" for purposes of this Warranty shall mean only the membrane, insulation, metal flashings and other components supplied by Mule-Hide, and shall exclude the roof deck and support system. The watertight integrity of walls, parapet walls and other adjacent structures is not covered. There is no dollar limitation ("NDL") on covered repairs. Any dispute, controversy or claim between Owner and Mule-Hide arising out of or related to this Warranty or the Building shall be settled by final and binding arbitration in accordance with the rules of the American Arbitration Association for the Construction Industry. By accepting this Warranty, Owner represents that the Building is a commercial structure and is not used for owner's personal or household purposes. In consideration of the protection afforded by this Warranty, Owner accepts the following Terms, Conditions and Limitations:

1. Within ten (10) days after Owner or any of its agents discovers (or a reasonable person in Owner's or agent's position would have discovered) any leak, Owner must give written notice (the "Notice") to Mule-Hide of the existence of each leak in the System.

2. Mule-Hide shall have the right to inspect the System after receiving the Notice to determine the cause(s) of the leak before incurring any obligation hereunder. A reinspection fee (in accordance with Mule-Hide's standard charges) shall be paid by Owner to Mule-Hide in the event the cause of the leak is not covered by the Warranty. If, upon Mule-Hide's inspection, Mule-Hide determines that the leaks in the system are caused by defects in Mule-Hide's materials or workmanship of the Contractor, Owner's remedies and Mule-Hide's liability shall be limited to Mule-Hide's repair of the System using methods determined to be suitable at Mule-Hide's discretion. In no event shall Mule-Hide be obligated to perform additional services (e.g. roof drains, equipment relocation, old roof removal, etc.) or provide materials beyond the scope of the Owner's original contract with Contractor.

3. This Warranty is not assignable by Owner; provided, however, Mule-Hide may authorize a new warranty if the following conditions are met:

   (a) A written request for a new warranty is submitted to Mule-Hide by Owner and the Owner is in good standing under this Warranty;
   (b) The roof is inspected by Mule-Hide within a thirty (30) day period prior to the proposed effective date of the new warranty and the condition of the roof is approved by Mule-Hide; and
   (c) An administrative and reinspection fee in an amount determined by Mule-Hide is paid to Mule-Hide.
   A new warranty will then be issued to the new Owner for the remaining Term of Warranty containing terms and conditions required by Mule-Hide.

4. If the System is damaged by any of the following causes, this Warranty shall not apply to such damages:

   (a) Any natural cause, including but not limited to lightning, peak gust wind speeds in excess of 55 mph, hurricane, tornado, hail, the infestation or presence of plant, mold, fungi, bacteria, insects or an animal, or earthquake, or any debris resulting from any of these causes.
   (b) Act of negligence, accident, misuse or abuse, including but not limited to vandalism, fire, falling object, civil disobedience, or act of war.
   (c) The use in the System of metal work, *coping, counter-flashing, rain-carrying components or other material not furnished* by Mule-Hide.
   (d) Environmental fallout, chemical attack or the presence within or outside the Building of any commercial or industrial solvent, acid, caustic fluid, petroleum product, wax, grease, absorbent, clay or plasticizer.
   (e) Negligence of a contractor who is not the Eligible Contractor, or failure of the material or the workmanship provided by such a contractor.
   (f) Interior condensation and any resulting damage or condition, including but not limited to, mold, fungi or bacteria.
   (g) The infiltration of moisture in, through or around the building through any mechanism other than through the System, including but not limited to, any structural defect, wall, or other Building structure, or anything that penetrates the System,, including but not limited to any vent, coping or rooftop equipment and any resulting damage or condition, including but not limited to, mold, fungi or bacteria.
   (h) Any failure, settlement or movement of the roof structure, roof deck or substrate.
   (i) Defects in the building or roof design

5. Occurrence of any of the following shall cancel Mule-Hide's obligations under this Warranty:

   (a) Alteration or repair made on or through the roof without prior written authorization from Mule-Hide.
   (b) Placement upon or attachment to the roof of any object (including but not limited to any structure, fixture or utility) without prior written authorization from Mule-Hide.
   c) Owner's or the Building occupant's failure to use reasonable care in maintaining the roof including, but not limited to, items listed on the reverse side of this document titled "Mule-Hide Owner's Care and Maintenance Information".
   (d) Internal positive pressure condition which causes or contributes to a partial or total failure of the roof.
   (e) Owner's sale of the Building or purported assignment of this Warranty.
   (f) Owner's failure to comply with every Term, Condition and Limitation in this Warranty.

6. Mule-Hide, its agents, employees and contractors shall have unrestricted access to the roof during regular business hours. By accepting this Warranty, Owner agrees to arrange for removal of water, snow, ice, equipment, any paving or overburden at Owner's expense to allow for investigation or repairs to be made.

7. All bills for installation, supplies and services shall have been paid in full to Eligible Contractor and all material suppliers before Mule-Hide incurs any obligation or liability under this Warranty. It is the Owner's sole responsibility to confirm that payment has been made to Eligible Contractor and all material suppliers.

8. The failure of Mule-Hide at any time to assert or enforce any Term, Condition and Limitation shall not be construed to be a waiver thereof, or of any other Term, Condition or Limitation.

9. Any and all other express warranties are superseded hereby and this Warranty is in lieu thereof.

10. Owner acknowledges that the Eligible Contractor is not an agent or other legal representative of Mule-Hide. Mule-Hide is not liable for any promise, representation or other responsibility of Eligible Contractor or any other party. This warranty is not binding upon Mule-Hide unless executed by an executive officer of Mule-Hide or a duly authorized employee of Mule-Hide's Warranty Department. No representative or employee of Mule-Hide, or any other party, may alter this Warranty without the prior written consent of an executive officer of Mule-Hide. This Warranty constitutes the entire understanding of the parties with respect to the subject matter contained herein, and revokes and supersedes all prior agreements, whether written or oral, between the parties. This Warranty shall take precedence over any other documents or representations (whether oral or written, and by whomever made) which may conflict with this Warranty.

11. The predominant factor in the construction and performance of the System is the design and construction services of the contractor and not the sale of goods. In addition, Owner acknowledges that Owner had a duty hereunder to exercise reasonable care in the selection of a contractor.

12. Mule-Hide is not liable for the cleanliness or discoloration of the System caused by environmental conditions including but not limited to dirt, pollutants or any biological agent.

MULE-HIDE DOES NOT EVALUATE THE ARCHITECTURE OR ENGINEERING USED IN THE DESIGN OF A ROOF OR THE SELECTION OF A ROOF SYSTEM. OWNER'S REMEDIES STATED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES FOR CLAIMS AND DAMAGES ARISING FROM FAILURE OF THE SYSTEM. MULE-HIDE MAKES NO WARRANTIES, EITHER EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE FACE HEREOF. MULE-HIDE SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. EXCEPT AS PROVIDED HEREIN, MULE-HIDE SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCE OR THEORY OF ACTION, INCLUDING BUT NOT LIMITED TO CONTRACT, TORT, PRODUCTS LIABILITY OR OTHERWISE,(I) FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO PERSONAL INJURY, LOSS OF PROFIT OR DAMAGE TO THE BUILDING OR ANY MERCHANDISE OR OTHER CONTENTS THEREIN, FOR WHATEVER CAUSE INCLUDING BUT NOT LIMITED TO MOLD, FUNGI, AND BACTERIA AND (II) FOR LOSS OR DAMAGE CAUSED OR CONTRIBUTED TO BY MULE-HIDE'S APPROVAL OF THE CONTRACTOR OR INSPECTION OF, OR FAILURE TO INSPECT, THE BUILDING ROOF, NOR SHALL Mule-Hide BE LIABLE FOR ANY DAMAGES WHICH ARE BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY OR ANY OTHER THEORY OTHER THAN THE LIABILITY SET FORTH ABOVE. INCIDENTAL AND CONSEQUENTIAL DAMAGES SHALL NOT BE RECOVERABLE EVEN IF THE REMEDY PROVIDED FOR HEREIN FAILS OF ITS PURPOSE. IN THE EVENT OF ANY ARBITRATION OR LITIGATION REGARDING THIS WARRANTY OR ITS SUBJECT MATTER, IF MULE-HIDE IS THE PREVAILING PARTY, OWNER SHALL REIMBURSE MULE-HIDE FOR ALL OF MULE-HIDE'S DISPUTE RESOLUTION COSTS, INCLUDING ATTORNEY'S FEES. FOR PURPOSES OF THIS WARRANTY, MULE-HIDE WILL BE DEEMED THE PREVAILING PARTY IF THE OWNER RECOVERS NOTHING OR A SUM LESS THAN WAS OFFERED IN SETTLEMENT.

Building Owner's Roof Care and Maintenance Guidelines

ver. 2.01

Thank you for choosing a Mule-Hide Roofing System! Following are guidelines on how to care for your roof to help ensure a long useful service life. The manufacturer's warranty is not a maintenance program or agreement. There are various items associated with your roof system that are not covered under the warranty. It is the responsibility of the Building Owner to regularly inspect and maintain the roof.

Mule-Hide strongly recommends the Building Owner institutes an annual maintenance program with written documentation of any activities on the roof. Maintain a log of maintenance procedures and people accessing the roof. This aids the building owner in determining the source of any damage to the roof. Your roofing system should be inspected at least twice a year (once in the spring and once in the fall) and after every major storm. These inspections should be performed by a Mule-Hide Warranty Eligible Applicator or by someone specially trained in roofing systems.

READ YOUR WARRANTY CAREFULLY BEFORE EXECUTING ANY ROOF-TOP WORK OR FILING OF A CLAIM.
Understand the Terms and Conditions to avoid adversely affecting the warranty.

General Guidelines

1. Keep the roof surface clean of debris, especially at drain areas to avoid clogging. Good roofing practice suggests that water not be allowed to remain on the roof for more than 48 hours after a rain. Keeping the roof clear of debris will allow for proper water run-off and avoid overloading the roof with standing water.

2. Keep chemical and petroleum products (acids, chemicals, solvents, greases, oils, or any liquids containing petroleum products) off the membrane to avoid degradation. If swelling occurs, contact Mule-Hide immediately.
3. Do not exhaust kitchen wastes (vegetable oils) or other animal fats directly onto the roof surface. If incidental contact is likely, contact Mule-Hide for recommendations on preventative measures.
4. TPO and PVC membranes may be used for restaurant roofs but must have a rooftop maintenance program in-place to ensure that accumulations of animal fats/grease are regularly removed and the membrane surface is cleaned periodically. See Mule-Hide's Care and Maintenance Overview for specific cleaning instructions.
5. Walkways must be provided if regular rooftop traffic is required, such as servicing of rooftop equipment. Exercise caution when not walking on walkways, especially on white membranes (White-on-Black EPDM, Elastomeric Acrylic Coatings, TPO and PVC) since ice or frost build-up may not be visible. All membranes are slippery when wet.
6. When it is necessary for workers to be on the roof to service rooftop equipment, e.g., HVAC units, antennas, etc., workers should be cautioned to use walkways and to exercise care with their tools and equipment to avoid puncturing the roofing membrane. Mule-Hide recommends that the building owner or property manager keep a "Roof-top Maintenance and Activity Log" to track dates and activities by personnel or other trades.
7. Handprints, footprints, general traffic grime, industrial pollutants and environmental dirt may be cleaned from the surface of the membrane by scrubbing with detergent and water, then rinsing with clean water. To maximize and maintain reflectivity, white membrane(s) should be cleaned once every two years.
8. Keep roof maintenance items, such as counterflashings, metal curbs, metal ducts, etc. sealed watertight at all times. All exposed mastics and sealants regardless of the purpose or function, are required maintenance items to be remediated by the Building Owner, including but not limited to pitch pan and metal flashing sealants.
9. Loss of granules from mineral surfaced membranes is typical and not a manufacturing defect. In cases of granule loss that becomes more noticeable, additional surfacing should be applied as directed by Mule-Hide.
10. Protective elastomeric coating systems will oxidize and weather, losing overall dry film thickness. This is normal and not a defect in the material. Warranties that include an elastomeric coating as a protective surfacing of a membrane may require periodic recoating at specified intervals to maintain the warranty coverage. The Building Owner is responsible for all costs to perform any specified recoating.
11. Examine all areas adjacent to the roof, parapet walls and adjoining structures. Damage to items such as masonry, failing mortar joints, loose or missing sealants, loose stone or tiles, loose and improperly sealed counterflashings, etc., may be the source of leaks that are inadvertently blamed on the roofing system. These items need to be addressed by properly trained personnel to avoid damage to the roof system.
12. If any changes are to be made to the roofing system (HVAC equipment, TV antennas, tie-ins to new roofing systems, etc), contact Mule-Hide for prior approval. Work directly related to the roofing system must be accomplished by a Mule-Hide Warranty Eligible Contractor.
13. If you have a leak, check for the obvious such as clogged roof drains, broken skylights, loose counterflashings, broken water pipes, leaking roof units, and storm damage. Note when the leaking occurs. Items such as heavy or light rain, wind direction, temperature and time of day are important clues for tracking suspected leaks. Does the leak start and stop with the rain, or does leaking continue after the rain has ceased?

If you believe that the leak is covered under the Mule-Hide warranty, please notify Mule-Hide's Warranty Department at (800) 786-1492 as soon as possible, and follow up with written notification in accordance with the warranty terms. Leaks resulting from the deterioration or failure of building components or physical damage are not covered by the Warranty. The building owner must pay the investigation and repair cost if the problem is found to be outside the scope of the Warranty.

For temporary repairs in the Mule-Hide membrane, use a one-part urethane sealant and contact Mule-Hide. **Do not use any Asphalt Product** to make repairs on any single-ply roof as it **WILL** degrade the membrane. If any asphalt product is used on a single-ply roofing membrane, that area will have to be removed and replaced at the Owner's expense.

The preceding **information for care and maintenance for Mule-Hide roofs** is not meant to be exhaustive and is for illustrative purposes only. Please refer to Mule-Hide's **Care and Maintenance Overview** literature on the Mule-Hide website(www.mulehide.com) for more information. Compliance with the above items will aid in assuring a durable, watertight roofing system.

Mule-Hide Products Co., Inc.

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Phone: 800-786-1492 Fax: 888-218-7838
www.mulehide.com

SAMPLE