



NEMO|etc.

Certificate of Authorization #32455
353 Christian Street, Unit #13
Oxford, CT 06478
(203) 262-9245

ENGINEER

EVALUATE

TEST

CONSULT

P.E. EVALUATION REPORT (PEER)

Mule-Hide Products Co., Inc.
1195 Prince Hall Drive, Suite A
Beloit, WI 53511
(608) 365-3111

PEER-MHPLYG-002.A.R1
FL41940-R1 (NON-HVHZ)
Date of Issuance: 02/13/2023
Revision 1: 10/05/2023

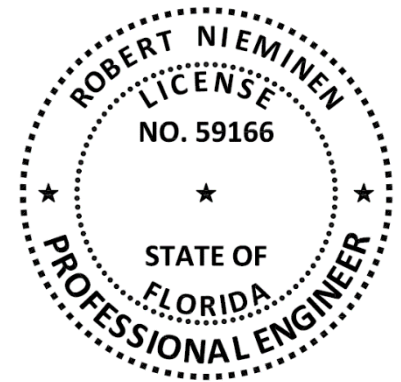
SCOPE:
This P.E. Evaluation Report (henceforth 'PEER') is issued under **F.A.C. Rule 61G20-3** and the applicable rules and regulations governing the use of construction materials in the State of Florida. The documentation submitted has been reviewed by Robert Nieminen, P.E. for use of the product under the Florida Building Code. The product described herein has been evaluated for compliance with the **8th Edition (2023) Florida Building Code sections noted herein.**

DESCRIPTION: Mule-Hide Roof Underlayments (NON-HVHZ)

LABELING: Labeling shall be in accordance with the requirements the Accredited Quality Assurance Agency noted herein and FBC 1507.1.1.
CONTINUED COMPLIANCE: This PEER is valid until such time as the named product(s) changes, the referenced Quality Assurance or production facility location(s) changes, or Code provisions that relate to the product(s) change. Acceptance of our PEERs by the named client constitutes agreement to notify NEMO ETC, LLC of any changes to the product(s), the Quality Assurance or the production facility location(s). NEMO ETC, LLC requires a complete review of its PEER relative to updated Code requirements with each Code Cycle.
ADVERTISEMENT: The Florida Product Approval Number (FL#) preceded by the words "NEMO P.E. Evaluated" may be displayed in advertising literature. If any portion of the PEER is displayed, then it shall be done in its entirety.
INSPECTION: Upon request, a copy of this entire PEER shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This PEER consists of pages 1 through 11.

Prepared by:



CERTIFICATION OF INDEPENDENCE:

1. NEMO ETC, LLC does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products it evaluates.
2. NEMO ETC, LLC is not owned, operated or controlled by any company manufacturing or distributing products it evaluates.
3. Robert Nieminen, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the PEERs are being issued.
4. Robert Nieminen, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.
5. This is a building code evaluation. Neither NEMO ETC, LLC nor Robert Nieminen, P.E. are, in any way, the Designer of Record for any project on which this PEER, or previous versions thereof, is/was used for permitting or design guidance unless retained specifically for that purpose.

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ROOFING COMPONENT EVALUATION:

1. SCOPE:

Product Category: Roofing
Sub-Category: Underlayment
Product Approval Method: Method 1, Option D – Codified Material, Evaluation by Engineer
Compliance Statement: Mule-Hide Roof Underlayments, as produced by Mule-Hide Products Co., Inc., have demonstrated compliance with the following sections of the 8th Edition (2023) Florida Building Code through testing in accordance with the following Standards. Compliance is subject to the [Installation Requirements](#) and [Limitations of Use](#) set forth herein.

2. STANDARDS:

SECTION	PROPERTY	STANDARD	YEAR
1504.3.1	Wind resistance	FM 4474	2011
1504.3.1	Wind resistance	UL 1897	2015
1504.7	Impact resistance	ASTM D3746	2015
1507.1.1 / R905.1.1	Material standard	ASTM D226	2017
1507.1.1, 1507.2.9.2 / R905.1.1, R905.2.8.2	Material standard	ASTM D1970	2017
1507.3.3 / R905.3.3	Material standard	FRSA/TRI, Seventh Edition	2023
1507.11.2 / R905.11.2	Material standard	ASTM D6163	2016
1507.11.2 / R905.11.2	Material standard	ASTM D6222	2016
TAS 110	Accelerated Weathering	ASTM D4798	2011
TAS 110	Material standard	TAS 103	2020 (from 2023 Code)

3. REFERENCES:

ENTITY	EXAM	REFERENCE	DATE
NEMO	PEER	PEER-PLYG-002.A.R38	09/15/2023
NEMO	Traceability	FBC Cross-Listing Agreement	02/13/2023
UL (QUA9625)	Quality Control	Service Confirmation	02/07/2023

4. PRODUCT DESCRIPTION:

TABLE 1: EVALUATED UNDERLAYMENTS			
PRODUCT	MATERIAL STANDARD	PLANT(S)	DESCRIPTION
Nail Base	ASTM D6163	FL	Fiberglass-reinforced, SBS modified bitumen base sheet
APP Torch G Premier	ASTM D6222 FRSA/TRI	FL	Polyester-reinforced, APP modified bitumen cap sheet
APP Torch G FR Premier	ASTM D6222 FRSA/TRI	FL	Polyester-reinforced, APP modified bitumen cap sheet
SA-APP Cap Sheet	ASTM D6222 FRSA/TRI	FL, TX	Polyester-reinforced, APP modified bitumen cap sheet
SA-APP Cap Sheet FR	ASTM D6222 FRSA/TRI	FL, TX	Polyester-reinforced, APP modified bitumen cap sheet
Shur-Gard MU Force HT	ASTM D1970 FRSA/TRI TAS 103	FL, NV, PA, TX	Nominal 60-mil thick rubberized asphalt waterproofing membrane, glass fiber reinforced, surfaced with polyolefinic film surface
Shur-Gard TU Ultra HT	ASTM D1970 FRSA/TRI TAS 103	FL, PA, TX	Nominal 60-mil thick rubberized asphalt waterproofing membrane with a 190 g/m ² polyester fabric surface
Shur-Gard TU Force HT	ASTM D1970 FRSA/TRI TAS 103	FL, PA, TX	Nominal 80-mil thick rubberized asphalt waterproofing membrane, glass fiber reinforced, with a polyester fabric surface

5. LIMITATIONS:

- 5.1 This is a building code evaluation. Neither NEMO ETC, LLC nor Robert Nieminen, P.E. are, in any way, the Designer of Record for any project on which this PEER, or previous versions thereof, is/was used for permitting or design guidance. PEERs are not to be construed as representing any attributes not specifically listed, nor are PEERs to be construed as an endorsement of the subject, or a recommendation for its use. There is no warranty by NEMO ETC, LLC or Robert Nieminen, P.E., express or implied, as to any finding or other matter in this PEER, or as to any product covered by the PEER.
- 5.2 This PEER is not for use in FBC High Velocity Hurricane Zone jurisdictions, as defined in FBC Chapter 2 (Broward and Miami-Dade Counties).
- 5.3 This PEER pertains to above-deck roof components. Roof decks and structural members shall be in accordance with FBC requirements to the satisfaction of the Authority Having Jurisdiction.
- 5.4 This PEER does not include evaluation of fire classification. Refer to **FBC 1505** for requirements and limitations regarding roof assembly fire classification. Refer to **FBC 2603** for requirements and limitations concerning the use of foam plastic insulation.
- 5.5 **Mule-Hide Roof Underlayments** may be used with any prepared roof cover where the product is specifically referenced within FBC approval documents. If not listed, a request may be made to the Authority Having Jurisdiction for approval based on this evaluation combined with supporting data for the prepared roof covering.
- 5.6 Allowable Roof Covers:

TABLE 2: ROOF COVER OPTIONS						
<u>FBC NON-HVHZ:</u>	1507.2	1507.3		1507.4 & 1507.5	1507.7	1507.8 & 1507.9
UNDERLAYMENT	ASPHALT SHINGLES	CLAY AND CONCRETE TILE		METAL	SLATE OR SLATE-TYPE SHINGLES	WOOD
		MECHANICAL ATTACH	ADHESIVE-SET			
Nail Base	Yes (Alternate to D226, Type II)	Yes (as Base Sheet, See Table 4B)	Yes (as Base Sheet, See Table 4B)	Yes (Alternate to D226, Type II)	Yes (Alternate to D226, Type II)	Yes (Alternate to D226, Type II)
APP Torch G Premier	No	Yes	Yes (Table 2A)	No	No	No
APP Torch G FR Premier	No	Yes	No	No	No	No
SA-APP Cap Sheet	No	Yes	Yes (Table 2A)	No	No	No
SA-APP Cap Sheet FR	No	Yes	Yes (Table 2A)	No	No	No
Shur-Gard MU Force HT	Yes	Yes	No	Yes	Yes	Yes ¹
Shur-Gard TU Ultra HT	No	Yes	Yes (Table 2A)	Yes	No	Yes ¹
Shur-Gard TU Force HT	Yes	Yes	Yes (Table 2A)	Yes	Yes	Yes ¹

5.6.1 Adhesive-set tile is limited to use of the following underlayment / tile-adhesive combinations.

TABLE 2A: ALLOWABLE UNDERLAYMENT / TILE-ADHESIVE COMBINATIONS ²					
UNDERLAYMENT	TILE-ADHESIVE OPTIONS AND FLORIDA PRODUCT APPROVAL				
	DAP GLOBAL		DUPONT DE NEMOURS	ICP CONSTRUCTION	
	STORMBOND	STORMBOND 2	TILE BOND	POLYSET AH-160	POLYSET RTA-1
	FL14506	FL14506	FL22525	FL6332	FL6276
APP Torch G Premier	No	No	No	No	Yes
SA-APP Cap Sheet	No	No	No	Yes	Yes

¹ Used as min. 3 ¼-inch wide joint-strips per FBC 1507.1.1.1(2) / FBC R905.1.1.1(2) or installed in full-coverage atop ASTM D226, Type II felt, Nail Base mechanically attached in accordance with FBC Table 1507.1.1.1 or FBC Residential Table R905.1.1.1.

² Refer to Tile Manufacturer's or Adhesive Manufacturer's Florida Product Approval for Overturning Moment Resistance Performance.

TABLE 2A: ALLOWABLE UNDERLAYMENT / TILE-ADHESIVE COMBINATIONS ²					
UNDERLAYMENT	TILE-ADHESIVE OPTIONS AND FLORIDA PRODUCT APPROVAL				
	DAP GLOBAL		DUPONT DE NEMOURS	ICP CONSTRUCTION	
	STORMBOND	STORMBOND 2	TILE BOND	POLYSET AH-160	POLYSET RTA-1
	FL14506	FL14506	FL22525	FL6332	FL6276
SA-APP Cap Sheet FR	No	No	No	No	Yes
Shur-Gard TU Ultra HT	No	Yes	Yes	Yes	Yes
Shur-Gard TU Force HT	No	Yes	Yes	Yes	Yes

5.7 Allowable Substrates:

TABLE 3: SUBSTRATE OPTIONS FOR ADHERED UNDERLAYMENTS				
UNDERLAYMENT	APPLICATION	SUBSTRATES (DESIGNED TO MEET WIND LOADS FOR PROJECT)		
		TYPE	PRIMER	MATERIAL(S)
Shur-Gard MU Force HT, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT, SA-APP Cap Sheet or SA-APP Cap Sheet FR	self-adhering	Deck / sheathing	(Optional) ASTM D41	plywood, OSB, Southern Yellow Pine or Huber Engineered Woods "ZIP System" Panels
			ASTM D41	structural concrete
		Insulation	(Optional) ASTM D41	ASTM C1289 Type II Class 1 polyisocyanurate, ASTM C1289 Type V polyisocyanurate-composite, DensDeck Prime or SECUROCK Gypsum-Fiber Roof Board
		Base Sheet	N/A	ASTM D226, Type II felt or Nail Base
APP Torch G Premier or APP Torch G FR Premier	torch-applied	Deck	ASTM D41	structural concrete
		Insulation	(Optional) ASTM D41	DensDeck Prime or SECUROCK Gypsum-Fiber Roof Board
		Base Sheet	N/A	Nail Base

5.8 Attachment Limitations:

5.8.1 For use under mechanically attached NON-TILE prepared roof coverings, attachment shall be in accordance with the manufacturer's installation instructions subject to the following limitations:

- For mechanically attached underlayments or base sheets over wood sheathing, attachment shall be not less than **FBC 1507.1.1** or **R905.1.1**.
- For mechanically attached underlayments or base sheets over insulated steel deck, fasteners shall consist of FBC Approved steel-deck roofing screws fitted with stress plates (Category: Roofing; Subcategory: Roofing Fasteners), spaced as noted in **1507.1.1** or **R905.1.1**. Screws and stress plates shall come from the same Product Manufacturer.

5.8.2 Wind Resistance for Underlayment Systems in Tile Roof Applications:

The following wind uplift limitations apply to tile underlayment systems. The Maximum Design Pressure is the result of testing for wind load resistance based on allowable wind loads, and reflects the ultimate passing pressure divided by 2 (the 2 to 1 margin of safety per **FBC 1504.9** has already been applied).

5.8.2.1 Direct-to-Deck:

The maximum design pressure for the selected assembly shall meet or exceed that required under **FRSA/TRI Manual, 7th Edition**, Appendix A or the critical (highest) design pressure determined in accordance with **FBC 1609** or **FBC Residential Chapter 3**.

TABLE 4A: ALLOWABLE DESIGN PRESSURES, DIRECT-TO-DECK UNDERLAYMENT IN TILE ROOF APPLICATIONS						
SYSTEM No.	DECK	PRIMER	JOINT TREATMENT	BASE PLY	CAP PLY	MDP (PSF)
UDL-1.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	None	Min. 4-inch wide strips of SA Base Sheet over all OSB joints	Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-52.5

**TABLE 4A: ALLOWABLE DESIGN PRESSURES,
DIRECT-TO-DECK UNDERLAYMENT IN TILE ROOF APPLICATIONS**

SYSTEM No.	DECK	PRIMER	JOINT TREATMENT	BASE PLY	CAP PLY	MDP (PSF)
UDL-2.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category or nominal 1-inch SYP wood plank	None	None	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-90.0
UDL-3.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category or nominal 1-inch SYP wood plank	121 Asphalt Primer or ASTM D41	None	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1½" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.	-97.5
UDL-4.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	(Optional) 121 Asphalt Primer or ASTM D41	Min. 4-inch wide strips of SA Base Sheet over all plywood joints	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-135.0
UDL-5.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category or nominal 1-inch SYP wood plank	None	None	None	Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1½" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.	-165.0
UDL-6.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category or nominal 1-inch SYP wood plank	(Optional) 121 Asphalt Primer at 0.5 gal/sq.	None	Shur-Gard MU Force HT, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1½" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.	Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1½" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.	-202.5
UDL-7.	Plywood , APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category or nominal 1-inch SYP wood plank	121 Asphalt Primer at 0.5 gal/sq.	None	None	Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1½" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.	-255.0
UDL-8.	Structural concrete	121 Asphalt Primer or ASTM D41	None	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-202.5
UDL-9.	Structural concrete	121 Asphalt Primer or ASTM D41	None	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-622.5

5.8.2.2 Mechanically-Attached Base Sheet:

The maximum design pressure for the selected assembly shall meet or exceed that required under **FRSA/TRI Manual, 7th Edition**, Appendix A or the critical (highest) design pressure determined in accordance with **FBC 1609** or **FBC Residential Chapter 3**.

Alternatively, the maximum design pressure for the selected assembly shall meet or exceed at least the Zone 1 design pressure determined in accordance with **FBC 1609** or **FBC Residential Chapter 3**. Elevated pressure zones shall employ an attachment density by a qualified design professional to resist the elevated pressure criteria. Commonly used methods are [ANSI/SPRI WD1](#), [FM Loss Prevention Data Sheet](#) 1-29 or [Roofing Application Standard](#) RAS 117 or RAS 137. Assemblies marked with an asterisk* carry the limitations set forth in Section 2.2.10.1 of [FM Loss Prevention Data Sheet](#) 1-29 for enhancements.

TABLE 4B: ALLOWABLE DESIGN PRESSURES, 2-PLY UNDERLAYMENT SYSTEMS IN TILE ROOF APPLICATIONS						
SYSTEM No.	DECK	BASE SHEET		BASE PLY	CAP PLY	MDP (PSF)
		TYPE	ATTACH			
UDL-10.	OSB, APA rated sheathing, 32/16, Exposure 1, PS2, 15/32 category	Nail Base	11 ga. x 1.25-inch long x 1-inch head diameter round metal cap nails; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at two (2) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-30.0*
UDL-11.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	11 ga. x 1.25-inch long x 1-inch head diameter round metal cap nails; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at two (2) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-37.5*
UDL-12.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	One (1) layer ASTM D226, Type II felt	11 ga. x 1.25-inch x 3/8-inch head diameter annular ring shank roofing nails at 1-5/8-inch diameter tin caps; 4-inch o.c. at the 2-inch wide side laps and 4-inch o.c. at two (2) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-45.0*
UDL-13.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	Two (2) layers ASTM D226, Type II felt	11 ga. x 1.25-inch long x 3/8-inch head diameter annular ring shank roofing nails at 1-5/8-inch diameter tin caps; 9-inch o.c. at the 2-inch wide side laps and 9-inch o.c. at two (2) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-45.0*
UDL-14.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 9-inch o.c. at the 2-inch wide side laps and 18-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-45.0
UDL-15.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	12 ga. annular ring shank nails with 1-5/8" diameter tin caps; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-45.0

**TABLE 4B: ALLOWABLE DESIGN PRESSURES,
2-PLY UNDERLAYMENT SYSTEMS IN TILE ROOF APPLICATIONS**

SYSTEM NO.	DECK	BASE SHEET		BASE PLY	CAP PLY	MDP (psf)
		TYPE	ATTACH			
UDL-16.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	12 ga. annular ring shank nails with 1-5/8" diameter tin caps; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-45.0
UDL-17.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 9-inch o.c. at the 2-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-52.5
UDL-18.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex Original Cap Nails; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-52.5
UDL-19.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex Original Cap Nails; 6-inch o.c. at the 3-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-52.5
UDL-20.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	Nail Base	11 ga. x 1.25-inch long x 3/8-inch head diameter annular ring shank roofing nails at 1-5/8-inch diameter tin caps; 8-inch o.c. at the 4-inch wide side laps and 8-inch o.c. at three (3) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-60.0
UDL-21.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	Nail Base	OMG #12 Standard Roofgrip with OMG Flat Bottom Metal Plates (FL699); 12-inch o.c. at the 4-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-60.0
UDL-22.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 8-inch o.c. at the 3-inch wide side laps and 8-inch o.c. at three (3) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer applied to stress plates.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-60.0
UDL-23.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 8-inch o.c. at the 3-inch wide side laps and 8-inch o.c. at three (3) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-60.0

**TABLE 4B: ALLOWABLE DESIGN PRESSURES,
2-PLY UNDERLAYMENT SYSTEMS IN TILE ROOF APPLICATIONS**

SYSTEM NO.	DECK	BASE SHEET		BASE PLY	CAP PLY	MDP (psf)
		TYPE	ATTACH			
UDL-24.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	TRUFAST Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 12-inch o.c. at the 4-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-67.5
UDL-25.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	TRUFAST Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 12-inch o.c. at the 4-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-67.5
UDL-26.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 6-inch o.c. at the 2-inch wide side laps and 6-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-90.0
UDL-27.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	OMG #12 Standard Roofgrip or OMG #14 Heavy Duty with OMG 3" Round Metal Plates or OMG AccuTrac Flat Bottom Metal Plates (FL699); 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at three (3) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-90.0
UDL-28.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	TRUFAST Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 9-inch o.c. at the 2-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer applied to stress plates.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-90.0
UDL-29.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	TRUFAST Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 9-inch o.c. at the 2-inch wide side laps and 12-inch o.c. at two (2) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-90.0
UDL-30.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	Nail Base	11 ga. x 1.25-inch x 3/8-inch head diameter annular ring shank roofing nails at 1-5/8-inch diameter tin caps; 4-inch o.c. at the 4-inch wide side laps and 4-inch o.c. at four (4) equally spaced staggered center rows.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-97.5
UDL-31.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer applied to stress plates.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-97.5

**TABLE 4B: ALLOWABLE DESIGN PRESSURES,
2-PLY UNDERLAYMENT SYSTEMS IN TILE ROOF APPLICATIONS**

SYSTEM NO.	DECK	BASE SHEET		BASE PLY	CAP PLY	MDP (psf)
		TYPE	ATTACH			
UDL-32.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-97.5
UDL-33.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	Simplex MAXX Cap Fasteners (NOA 18-1227.05); 6-inch o.c. at the 2-inch wide side laps and 6-inch o.c. at three (3) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-105.0
UDL-34.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	TRUFast Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at three (3) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer applied to stress plates.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-105.0
UDL-35.	OSB, APA rated sheathing, 24/16, Exposure 1, PS2, 7/16 category	Nail Base	TRUFast Versa-Fast Fasteners & Plates (FL4500); two (2) screws per plate installed 180° into the holes of the plate, parallel to the width direction of the sheet; 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at three (3) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-105.0
UDL-36.	Plywood, APA rated sheathing, 40/20, Exposure 1, PS1, 19/32 category	Nail Base	11 ga. x 1.25-inch x 3/8-inch head diameter annular ring shank roofing nails at 1-5/8-inch diameter tin caps; 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at four (4) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer at all tin-caps.	Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-112.5
UDL-37.	Plywood, APA rated sheathing, 32/16, Exposure 1, PS1, 15/32 category	Nail Base	OMG #12 Standard Roofgrip or OMG #14 Heavy Duty with OMG 3" Round Metal Plates or OMG AccuTrac Flat Bottom Metal Plates (FL699); 6-inch o.c. at the 4-inch wide side laps and 6-inch o.c. at five (5) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-120.0
UDL-38.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	TRUFast Versa-Fast Fasteners & Plates (FL4500); one (1) screw per plate in the center hole; 9-inch o.c. at the 4-inch wide side laps and 9-inch o.c. at four (4) equally spaced staggered center rows. 121 Asphalt Primer or ASTM D41 primer applied to stress plates.	(Optional) Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT or Shur-Gard MU Force HT, self-adhered and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-127.5
UDL-39.	OSB, APA rated sheathing, 40/20, Exposure 1, PS2, 19/32 category	Nail Base	TRUFast Versa-Fast Fasteners & Plates (FL4500); one (1) screw per plate in the center hole; 9-inch o.c. at the 4-inch wide side laps and 9-inch o.c. at four (4) equally spaced staggered center rows.	None	APP Torch G Premier, torch-applied and back-nailed in accordance with Mule-Hide's installation instructions, max. 12-inch o.c.	-127.5

5.9 Exposure Limitations:

TABLE 5: EXPOSURE LIMITATIONS		
UNDERLAYMENT	PREPARED ROOF COVER INSTALLATION TYPE	MAXIMUM EXPOSURE (DAYS)
Nail Base	Mechanically attached	30
Shur-Gard MU Force HT or Shur-Gard TU Ultra HT	Any type (per Table 2)	180
Shur-Gard TU Force HT	Any type (per Table 2)	360
APP Torch G Premier, APP Torch G FR Premier, SA-APP Cap Sheet or SA-APP Cap Sheet FR	Adhesive-set tile roof system	180
	Mechanically attached	UNLIMITED

5.10 Tile Slippage Limitations: When loading roof tiles on the underlayment, the maximum roof pitch shall be as follows. These pitch limitations can only be exceeded by using battens or loading boards during loading of the roof tiles.

TABLE 6: TILE SLIPPAGE LIMITATIONS			
UNDERLAYMENT	TILE PROFILE	STAGING METHOD	MAXIMUM STAGING SLOPE
APP Torch G Premier or APP Torch G FR Premier	Flat or Lugged	6-tile stack (4 over 2)	4:12
SA-APP Cap Sheet or SA-APP Cap Sheet FR	Flat or Lugged	6-tile stack (4 over 2)	4:12
Shur-Gard MU Force HT	Flat	6-tile stack (4 over 2)	5:12
	Lugged	6-tile stack (4 over 2)	4:12
Shur-Gard TU Ultra HT	Flat	6-tile stack (4 over 2) or 10-tile stack	7:12
	Lugged	6-tile stack (4 over 2)	7:12
	Lugged	10-tile stack	6:12
Shur-Gard TU Force HT	Flat or Lugged	6-tile stack (4 over 2)	7:12
	Flat or Lugged	10-tile stack	6:12

6. INSTALLATION:

6.1 Mule-Hide Roof Underlayments shall be installed in accordance with Mule-Hide published installation instructions subject to the [Limitations of Use](#) herein and the specifics noted below.

6.1.1 Consult Mule-Hide requirements for back-nailing at pitch of 2:12 or greater.

6.1.2 All fabric-surfaced, aggregate-surfaced and granule-surfaced end-laps shall have a 6-inch wide, uniform layer of 241 Premium Modified Flashing Cement, 421 Mod Bit Adhesive – Trowel Grade, 251 Premium Wet/Dry Elastomeric Flashing Cement or RGA 1 Flashing Cement applied within the end-lap.

6.2 Re-fasten any loose decking panels, and check for protruding nail heads. Sweep the substrate thoroughly to remove any dust and debris prior to application, and prime the substrate (if applicable).

6.3 Nail Base:

6.3.1 Non-Tile Applications:

Shall be installed in compliance with requirements for an approved mechanically attached underlayment (ASTM D226, Type II) in **FBC Table 1507.1.1.1** or **FBC Residential Table R905.1.1.1** for the type of prepared roof covering to be installed, and the manufacturer’s installation instructions. FBC requirements take precedence over the manufacturer’s installation instructions.

Nail Base may be covered with a layer of Shur-Gard MU Force HT, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT, SA-APP Cap Sheet or SA-APP Cap Sheet FR, self-adhered, APP Torch G Premier or APP Torch G FR Premier, torch applied. Roof cover limitations are those associated with the top-layer underlayment, as set forth in [Table 2](#).

6.3.2 Tile Applications:

Nail Base is limited to use as a mechanically attached base sheet in the “TWO-PLY SYSTEM” from **FRSA/TRI Manual, 7th Edition**.

Nail Base shall be installed in compliance with the selected assembly from [Table 4B](#), which take precedence over the manufacturer's installation instructions.

Nail Base shall be covered with Shur-Gard MU Force HT, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT, SA-APP Cap Sheet or SA-APP Cap Sheet FR, self-adhered or APP Torch G Premier or APP Torch G FR Premier, torch-applied. Tile roof installation method is limited by the selected Cap Sheet, as set forth in [Table 2](#).

6.4 SA-APP Cap Sheet, SA-APP Cap Sheet FR, Shur-Gard MU Force HT, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT:

6.4.1 General:

All seal-lap seams (selvage laps) must be firmly rolled with a in accordance with Mule-Hide requirements to ensure full contact and adhesion.

6.4.2 Non-Tile Applications:

Shall be installed in compliance with requirements for an approved self-adhering underlayment (ASTM D1970) in **FBC 1507.1.1.1** or **FBC Residential R905.1.1.1** for the type of prepared roof covering to be installed, and the manufacturer's installation instructions.

When installed over a mechanically attached base sheet of Nail Base or FBC Approved ASTM D226, Type II felt, the base sheet shall be fastened in accordance with **FBC 1507.1.1** or **R905.1.1**.

6.4.3 Tile Applications:

Shall be installed in compliance with the requirements for Self-Adhered Membrane set forth in **FRSA/TRI Manual, 7th Edition** and the manufacturer's installation instructions.

Refer to [Section 5.8](#) herein for attachment limitations.

Refer to [Table 6](#) herein for tile staging limitations.

6.4.4 Multi-Ply Underlayment Systems:

Shur-Gard MU Force HT followed by SA-APP Cap Sheet, Shur-Gard MU Force HT, Shur-Gard TU Ultra HT, Shur-Gard TU Force HT is allowable for use under mechanically attached prepared roof systems. Limits of use are those associated with the top-layer material. This is not a requirement, but is allowable if a 2-ply underlayment system is desired.

Shur-Gard MU Force HT followed by SA-APP Cap Sheet, Shur-Gard TU Ultra HT or Shur-Gard TU Force HT is allowable for use under adhesive-set tile systems. Limits of use are those associated with the top-layer material. This is not a requirement, but is allowable if a 2-ply underlayment system is desired.

6.5 APP Torch G Premier or APP Torch G FR Premier:

Shall be installed in compliance with requirements as an alternate to the "Heat Applied Cap Sheet" in the "TWO-PLY SYSTEM" in the **FRSA/TRI Manual, 7th Edition**, and the manufacturer's installation instructions.

Refer to [Section 5.8](#) herein for attachment limitations.

Refer to [Table 6](#) herein for tile staging limitations.

7. BUILDING PERMIT REQUIREMENTS:

As required by the Building Official or Authority Having Jurisdiction to properly evaluate the installation of this product.

8. MANUFACTURING PLANTS:

Contact the named QA entity for manufacturing facilities covered by **F.A.C. Rule 61G20-3** QA requirements. Refer to [Section 4](#) herein for products and production locations having met codified material standards.

9. QUALITY ASSURANCE ENTITY:

[UL, LLC – QUA9625](#); (360) 817-5512; bsai.inspections@ul.com

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