NEMO|etc.
Certificate of Authorization #32455
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ENGINEER | EVALUATE | TEST | CONSULT | CERTIFY

EVALUATION REPORT

Mule-Hide Products Co., Inc.
1195 Prince Hall Drive, Suite A
Beloit, WI 53511-5481
(608) 365-3111

Evaluation Report 1-MH-18-003.10.18
FL28296
Date of Issuance: 10/12/2018

SCOPE:
This Evaluation Report is issued under **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 **6th Edition (2017) Florida Building Code, High Velocity Hurricane Zone (HVHZ)** sections noted herein.

DESCRIPTION: Mule-Hide TPO-c Single Ply Roof Systems

LABELING: Labeling shall be in accordance with the requirements of the Accredited Quality Assurance Agency noted herein.

CONTINUED COMPLIANCE: This Evaluation Report is valid until such time as the named product(s) changes, the referenced Quality Assurance documentation changes, or provisions of the Code that relate to the product change. Acceptance of this Evaluation Report by the named client constitutes agreement to notify Robert Nieminen, P.E. of any changes to the product(s), the Quality Assurance or the production facility location(s). NEMO|etc. requires a complete review of this Evaluation Report relative to updated Code requirements with each Code Cycle.

ADVERTISEMENT: The Evaluation Report number preceded by the words "NEMO|etc. Evaluated" may be displayed in advertising literature. If any portion of the Evaluation Report is displayed, then it shall be done in its entirety.

INSPECTION: Upon request, a copy of this entire Evaluation Report 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 Evaluation Report consists of pages 1 through 3, plus a 5-page Appendix.

Prepared by:

Robert J.M. Nieminen, P.E.
Florida Registration No. 59166, Florida DCA ANE1983

The facsimile seal appearing was authorized by Robert Nieminen, P.E. on 10/12/2018. This does not serve as an electronically signed document.

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 evaluation reports 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 Evaluation Report, or previous versions thereof, is/was used for permitting or design guidance unless retained specifically for that purpose.

ROOFING SYSTEMS EVALUATION:

1. SCOPE:

Product Category: Roofing
Sub-Category: Single Ply Roof Systems
Material: TPO

Compliance Statement: **Mule-Hide TPO-c Single Ply Roof Systems**, as produced by **Mule-Hide Products Co., Ltd**, have demonstrated compliance with the following sections of the **6th Edition (2017) Florida Building Code, High Velocity Hurricane Zone (HVHZ)** through testing in accordance with the following Standards. Compliance is subject to the Installation Requirements and Limitations / Conditions of Use set forth herein.

2. STANDARDS:

Section	Property	Standard	Year
1523.6.2	Testing Requirements	TAS 110	2000
TAS 110	Wind, Hail, Leakage	TAS 114	2011
TAS 110	Physical Properties	TAS 131	1995

3. REFERENCES:

Entity	Examination	Reference	Date
ERD (TST 6049)	Physical Properties	A35880.04.12-R1	10/26/2012
ERD (TST 6049)	Physical Properties	C46470.07.14-1A	07/16/2014
ERD (TST 6049)	Physical Properties	C46470.07.14-1B	07/16/2014
ERD (TST 6049)	Physical Properties	C46470.07.14-4-R1	07/21/2014
ERD (TST 6049)	Physical Properties	C46470.07.14-2A	07/30/2014
ERD (TST 6049)	Physical Properties	C46470.07.14-2B	07/30/2014
ERD (TST 6049)	Physical Properties	CRL-SC14240.17	03/21/2017
FM Approvals (TST1867)	FM4470/4474	3056207	02/09/2016
Various	TAS 114	FL12772	Various
UL, LLC (QUA9625)	Quality Control	MLA; R13850	08/22/2007
UL, LLC (QUA9625)	Quality Control	Inspection Report	08/15/2020

4. PRODUCT DESCRIPTION:

4.1 The following roof covers are mechanically attached or fully adhered to Approved substrates using fasteners, stress plates and adhesives, as outlined in the Limitations / Conditions of Use herein.

4.1.1 **Mule-Hide TPO-c** membranes are nominal 45-mil (1.1-mm) or 60-mil (1.5-mm) thick, polyester-scrim reinforced, thermoplastic olefin (TPO) single-ply roof membranes; meets TAS 131.

4.1.2 **Mule-Hide TPO-c EXTRA** membranes are nominal 72-mil (1.8-mm) or 80-mil (2.0-mm) thick, polyester-scrim reinforced, thermoplastic olefin (TPO), single-ply roof membranes; meets TAS 131.

4.1.3 **Mule-Hide TPO-c Fleece Back** membrane is a nominal 45-mil (1.1mm) or 60-mil (1.5 mm) thick, polyester-scrim reinforced, thermoplastic olefin (TPO) single-ply roof membrane with a polyester fleece backing; meets TAS 131.

5. LIMITATIONS:

5.1 This is a building code evaluation. Neither NEMO ETC nor Robert Nieminen, P.E. are, in any way, the Designer of Record for any project on which this Evaluation Report, or previous versions thereof, is/was used for permitting or design guidance unless retained specifically for that purpose.

5.2 Fire classification is not part of this Evaluation Report; refer to a current Approved Roofing Materials Directory for fire ratings of this product.

5.3 For steel deck installations, foam plastic insulation shall be separated from the building interior in accordance with **FBC 2603.4** unless the exceptions stated in **FBC 2603.4.1** and **2603.6** apply.

5.4 The evaluation herein pertains to above-deck roof components; deck-attachment details pertain to 'as-tested' conditions under **Testing Application Standard TAS 114, Appendix J**. Roof decks shall be in accordance with **FBC (HVHZ)** requirements to the satisfaction of the Authority Having Jurisdiction.

5.5 Fastener spacing for mechanical attachment of anchor/base sheet or membrane is based on a minimum fastener resistance value in conjunction with the maximum design pressure (MDP) listed for a specific system. Should the fastener resistance be less than that required, as determined by the Building Official, a revised fastener spacing – prepared, signed and sealed by a qualified design professional – may be submitted. Said revised fastener spacing shall utilize the withdrawal resistance value taken from **Testing Application Standard TAS 105** and calculations in compliance with **Roofing Application Standard RAS 117** or **RAS 137**.

5.5.1 If mechanical attachment to the structural deck through lightweight insulating concrete is proposed, field withdrawal resistance testing shall be performed to confirm equivalent or determine enhanced fastening patterns and density. All testing and fastening design shall be in compliance with **Testing Application Standard TAS 105** and **Roofing Application Standard RAS 117** and/or **RAS 137**. Calculations shall be prepared, signed and sealed by a qualified design professional.

5.6 For systems where specific lightweight insulating concrete is referenced, consult the current HVHZ product approval documentation for specific deck construction and limitations. For systems where specific lightweight insulating concrete is not referenced, the minimum design mix shall be for minimum 300 psi cellular material.

5.7 For recover installations, the existing roof shall be examined in accordance with **FBC 1521**.

5.8 Perimeter and corner areas shall comply with the enhanced uplift pressure requirements of these areas. Fastener densities shall be increased, as calculated in compliance with **Roofing Application Standard RAS 117** and/or **RAS 137** by a qualified design professional. ***This extrapolation is not permitted for systems marked with an asterisk*.***

5.9 All attachment and sizing of perimeter nailers, metal profile and/or flashing termination designs shall conform to **Roofing Application Standard RAS 111** and applicable wind load requirements.

5.10 For assemblies marked with an asterisk*, the maximum design pressure (MDP) limitation listed shall be applicable to all roof pressure zones (i.e., field, perimeters and corners). Neither rational analysis, nor extrapolation is permitted for enhanced attachment at enhanced pressure zones (i.e., perimeters, corners and extended corners).

5.11 For bonded insulation or membrane over existing substrates in a recover installation, the existing roof system shall be capable of resisting project design pressures on its own merit to the satisfaction of the Authority Having Jurisdiction, as documented through field uplift testing in accordance with **Testing Application Standard TAS 124**.

5.12 All products listed herein shall have quality assurance audit in accordance with the **F.A.C. Rule 61G20-3**.

6. INSTALLATION:

6.1 **Mule-Hide TPO-c Single Ply Roof Systems** shall be installed in accordance with **Mule-Hide Products Co., Ltd** published installation instructions, subject to the Limitations / Conditions of Use noted herein.

6.2 System attachment requirements for wind load resistance are set forth in Appendix 1. "MDP" = 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 **Testing Application Standard TAS 114** has already been applied). Refer to **FBC 1620** and **Roofing Application Standard RAS 128** for determination of design wind loads.

6.3 For mechanically fastened membrane systems (Type D) over profiled steel deck, membrane shall be installed running perpendicular to steel deck flutes.

7. QUALITY ASSURANCE ENTITY:

UL, LLC – QUA9625; (414) 248-6409; karen.buchmann@ul.com

- THE 5-PAGES THAT FOLLOW FORM PART OF THIS EVALUATION REPORT -

APPENDIX 1: ATTACHMENT REQUIREMENTS FOR WIND UPLIFT RESISTANCE

TABLE	DECK	APPLICATION	TYPE	DESCRIPTION	PAGE
1A	Steel or Structural Concrete	New, Reroof (Tear-Off), Recover	B-1	Mech. Attached Base Insulation, Bonded Top Insulation, Bonded Roof Cover	3
1B	Steel	New, Reroof (Tear-Off), Recover	B-2	Mech. Attached Thermal Barrier, Bonded Vapor Barrier, Bonded Insulation, Bonded Roof Cover	4
2A	Structural Concrete	New, Reroof (Tear-Off)	A-1	Bonded Insulation, Bonded Roof Cover	5

The following notes apply to the systems outlined herein:

1. The evaluation herein pertains to above-deck roof components; deck-attachment details and pertain to 'as-tested' conditions under TAS 114, Appendix J. Roof decks shall be in accordance with FBC (HVHZ) requirements to the satisfaction of the Authority Having Jurisdiction.

2. Unless otherwise noted, fasteners and stress plates for insulation attachment shall be as follows. Fasteners shall be of sufficient length for the following engagements:
   - Steel Deck: Mule-Hide Drill Point Fastener or Mule-Hide HDP Fastener with Mule-Hide 3 in. Insulation Plate. Minimum 0.75-inch steel penetration, engage the top flute of the steel deck.
   - Structural Concrete: Mule-Hide HDP Fastener or Mule-Hide Fluted Concrete Nail with Mule-Hide 3 in. Insulation Plate. Minimum 1.25-inch embedment. Fasteners installed with a pilot hole in accordance with the fastener manufacturer's published installation instructions.

3. Unless otherwise noted, insulation may be any one layer or combination of polyisocyanurate, polystyrene, fiberboard, perlite and/or gypsum-based insulation board that meets the QA requirements of F.A.C. Rule 61G20-3 and is documented as meeting FBC 1516 and, for foam plastic, FBC Chapter 26, when installed with the roof cover.

4. If mechanical attachment to the structural deck through lightweight insulating concrete is proposed, field withdrawal resistance testing shall be performed to confirm equivalent or determine enhanced fastening patterns and density. All testing and fastening design shall be in compliance with Testing Application Standard TAS 105 and Roofing Application Standard RAS 117 and/or RAS 137. Calculations shall be prepared, signed and sealed by a qualified design professional.

5. Unless otherwise noted, insulation adhesive application rates are as follows. Ribbon or bead width is at the time of application; the ribbons/beads shall expand as noted in the manufacturer's published instructions:
   - Mule-Hide Helix® Low-Rise Adhesive (HELIX): Continuous ¾ to 1-inch wide beads, 12-inch o.c.
   - *Note: When multiple layers(s) of insulation and/or coverboard are installed in ribbon-applied adhesive, boards shall be staggered from layer-to-layer.*
   - *Note: The maximum edge distance from the adhesive ribbon to the edge of the insulation board shall be not less than one-half the specified ribbons spacing.*

6. Unless otherwise noted, all insulations are flat stock or taper board of the minimum thickness noted.

7. Bonded polyisocyanurate insulation boards shall be maximum 4 x 4 ft.

8. Perimeter and corner areas shall comply with the enhanced uplift pressure requirements of these areas. Fastener densities shall be increased, as calculated in compliance with Roofing Application Standard RAS 117 and/or RAS 137 by a qualified design professional. ***This extrapolation is not permitted for systems marked with an asterisk****.

9. For assemblies marked with an asterisk*, the maximum design pressure (MDP) limitation listed shall be applicable to all roof pressure zones (i.e., field, perimeters and corners). Neither rational analysis, nor extrapolation is permitted for enhanced attachment at enhanced pressure zones (i.e., perimeters, corners and extended corners).

10. Fastener spacing for mechanical attachment is based on a minimum fastener resistance value in conjunction with the maximum design pressure (MDP) listed for a specific system. Should the fastener resistance be less than that required, as determined by the Building Official, a revised fastener spacing – prepared, signed and sealed by a qualified design professional – may be submitted. Said revised fastener spacing shall utilize the withdrawal resistance value taken from Testing Application Standard TAS 105 and calculations in compliance with Roofing Application Standard RAS 117 or RAS 137.

11. For adhered membrane systems, side laps shall be minimum 2-inch wide sealed with min. 1.5-inch heat weld. Unless otherwise noted, membrane adhesive application rates are as follows:

MULE-HIDE ROOF COVER / ADHESIVE COMBINATIONS			
MEMBRANE	**ADHESIVE**	**METHOD**	**RATE**
Mule-Hide TPO-c	Mule-Hide TPO-c Bonding Adhesive (TPO-c BA)	Contact (both sides)	60 ft^2/gal
Mule-Hide TPO-c	Aqua Base 120 BA	Contact (both sides)	120 ft^2/gal
Mule-Hide TPO-c	AeroWeb Low-VOC Aerosol Contact Adhesive/Primer (AeroWeb)	Contact (both sides)	220 ft^2/gal
Mule-Hide TPO-c Fleece Back	Aqua Base 120 BA	Wet lay (substrate)	120 ft^2/gal
Mule-Hide TPO-c Fleece Back	Mule-Hide Helix® Low-Rise Adhesive (HELIX)	Wet lay (substrate)	FULL = continuous ribbons, maximum 4-inch o.c.

12. For adhered membrane systems, unless otherwise noted, reference to "Mule-Hide TPO-c" membrane below also includes "Mule-Hide TPO-c EXTRA".

13. Vapor barrier options for use over **structural concrete deck** followed by adhesive-applied insulation carry the following Maximum Design Pressure (MDP) limitations. The **lesser** of the MDP listings below vs. those in **Table 3A or 3B** applies.

VAPOR BARRIER OPTIONS; STRUCTURAL CONCRETE DECK; FOLLOWED BY ADHESIVE-APPLIED INSULATION PER TABLE 3A OR 3B:					
Option #	**Primer**	**Vapor Barrier**		**Insulation Adhesive**	**MDP (psf)**
		Type	**Application**		
VB-1.	Carlisle CAV-GRIP Primer	F5™ Air & Vapor Barrier	Self-adhering	HELIX (RIBBON, 12-inch o.c.)	-97.5
VB-2.	ASTM D41	Carlisle SureMB 90TG Base or SureMB 120 TG Poly Base	Torch-applied	HELIX (RIBBON, 12-inch o.c.)	-97.5
VB-3.	ASTM D41	Carlisle SureMB 90 Base or SureMB 120 Poly Base	Hot-asphalt	HELIX (RIBBON, 12-inch o.c.)	-97.5

14. "MDP" = Maximum Design Pressure is the result of testing for wind load resistance based on allowable wind loads. Refer to FBC (HVHZ) 1620 and Roofing Application Standard RAS 128 for determination of design wind loads.

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TABLE 1A: STEEL OR STRUCTURAL CONCRETE DECKS - NEW CONSTRUCTION, REROOF (TEAR-OFF) OR RECOVER SYSTEM TYPE B-1: MECHANICALLY ATTACHED BASE INSULATION, BONDED TOP INSULATION, BONDED ROOF COVER								
System No.	Deck (Note 1)	Base Insulation Layer			Top Insulation Layer		Roof Cover / Adhesive (Note 11)	MDP (psf)
		Type	Fastener	Attach	Type	Attach		
MULE-HIDE TPO-C APPLICATIONS:								
SC-1	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	Note 2	1 per 3.2 ft²	Min. 1.0-inch base insulation and/or Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c / AeroWeb, Aqua Base 120 BA or TPO-c BA	-45.0*
SC-2	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 2-inch H-Shield, InsulBase, Poly ISO 1	Note 2	1 per 4.0 ft²	Min. 1.0-inch base insulation and/or Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c / AeroWeb, Aqua Base 120 BA or TPO-c BA	-45.0*
MULE-HIDE TPO-C FLEECE BACK APPLICATIONS:								
SC-3	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	Note 2	1 per 3.2 ft²	Min. 1.0-inch base insulation and/or Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c Fleece Back / HELIX (FULL)	-45.0*
SC-4	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 2-inch H-Shield, InsulBase, Poly ISO 1	Note 2	1 per 4.0 ft²	Min. 1.0-inch base insulation and/or Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c Fleece Back / HELIX (FULL)	-45.0*
SC-5	Min. 22 ga., type B, Grade 33 steel; 6 ft span, Traxx/5 screws, 6" o.c. or min. 2,500 psi structural concrete	Min. 2-inch H-Shield, InsulBase, Poly ISO 1	Note 2	1 per 1.6 ft²	Min 0.25-inch SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c Fleece Back / HELIX (FULL)	-60.0

TABLE 1B: STEEL OR STRUCTURAL CONCRETE DECKS - NEW CONSTRUCTION, REROOF (TEAR-OFF) OR RECOVER SYSTEM TYPE B-2: MECHANICALLY ATTACHED THERMAL BARRIER, BONDED VAPOR BARRIER, BONDED INSULATION, BONDED ROOF COVER												
System No.	Deck (Note 1)	Thermal Barrier			Primer	Vapor Barrier	Base Insulation		Top Insulation		Roof Cover / Adhesive (Note 11)	MDP (psf)
		Type	Fasten	Attach			Type	Attach	Type	Attach		
MULE-HIDE TPO-C APPLICATIONS:												
SC-6	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 0.5-inch Dens Deck Prime or min. 0.625-inch SECUROCK Gypsum-Fiber Roof Board	Note 2	1 per 2 ft²	Carlisle CAV-GRIP Primer	F5™ Air & Vapor Barrier, self-adhering	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c / AeroWeb or TPO-c BA	-45.0*
SC-7	Min. 22 ga., type B, Grade 33 steel; 6 ft span, Tek/5 screws 6" o.c. or min. 2,500 psi structural concrete	Min. 0.5-inch Dens Deck Prime or min. 0.625-inch SECUROCK Gypsum-Fiber Roof Board	Note 2	1 per 2 ft²	Carlisle CAV-GRIP Primer	F5™ Air & Vapor Barrier, self-adhering	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	(Optional) Additional layers base insulation	HELIX	Mule-Hide TPO-c / AeroWeb or TPO-c BA	-52.5
MULE-HIDE TPO-C FLEECE BACK APPLICATIONS:												
SC-8	Min. 22 ga., type B, Grade 33 steel or min. 2,500 psi structural concrete	Min. 0.5-inch Dens Deck Prime or min. 0.625-inch SECUROCK Gypsum-Fiber Roof Board	Note 2	1 per 2 ft²	Carlisle CAV-GRIP Primer	F5™ Air & Vapor Barrier, self-adhering	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	Min. 0.25-inch Dens Deck Prime or SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c Fleece Back / HELIX (FULL)	-45.0*
SC-9	Min. 22 ga., type B, Grade 33 steel; 6 ft span, Tek/5 screws 6" o.c. or min. 2,500 psi structural concrete	Min. 0.5-inch Dens Deck Prime or min. 0.625-inch SECUROCK Gypsum-Fiber Roof Board	Note 2	1 per 2 ft²	Carlisle CAV-GRIP Primer	F5™ Air & Vapor Barrier, self-adhering	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	(Optional) Additional layers base insulation	HELIX	Mule-Hide TPO-c Fleece Back / HELIX (FULL)	-52.5

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TABLE 2A: STRUCTURAL CONCRETE DECKS – NEW CONSTRUCTION OR REROOF (TEAR-OFF) SYSTEM TYPE A-1A: BONDED INSULATION, BONDED ROOF COVER REFER TO NOTE 13 FOR VAPOR BARRIER OPTIONS								
System No.	Deck (Note 1)	Base Insulation Layer		Top Insulation Layer		Roof Cover (Note 11)		MDP (psf)
		Type	Attach	Type	Attach	Membrane	Application	
MULE-HIDE TPO-C APPLICATIONS:								
C-1.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	0.5-inch H-Shield HD, Poly ISO 1-HD, SecurShield HD	HELIX	Mule-Hide TPO-c	AeroWeb or TPO-c BA	-120.0*
C-2.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	(Optional) Additional layers of base insulation	HELIX	Mule-Hide TPO-c	Aqua Base 120 BA	-127.5*
C-3.	Min. 2,500 psi structural concrete	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	(Optional) Min. 0.5-inch base insulation	HELIX	Mule-Hide TPO-c	AeroWeb or TPO-c BA	-157.5*
C-4.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	Min. 0.25-inch Dens Deck Prime	HELIX	Mule-Hide TPO-c	AeroWeb or TPO-c BA	-195.0*
C-5.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	Min. 0.25-inch SECUROCK Gypsum-Fiber Roof Board	HELIX	Mule-Hide TPO-c	AeroWeb, Aqua Base 120 BA or TPO-c BA	-195.0*
C-6.	Min. 2,500 psi structural concrete	Min. 1.5-inch H-Shield, InsulBase, Poly ISO 1	HELIX	(Optional) Additional layers of base insulation	HELIX	Mule-Hide TPO-c	Aero-Web or TPO-c BA	-322.5*
MULE-HIDE TPO-C FLEECE BACK APPLICATIONS:								
C-7.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	0.5-inch ACFoam-III HD CoverBoard, H-Shield HD, Poly ISO 1-HD, SecurShield HD	HELIX	Mule-Hide TPO-c Fleece Back	HELIX (FULL)	-165.0
C-8.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	Min. 0.25-inch Dens Deck Prime, DEXcell FA Glass Mat Roof Board, SECUROCK Gypsum-Fiber Roof Board or min. 7/16-inch DEXcell Cement Roof Board	HELIX	Mule-Hide TPO-c Fleece Back	HELIX (FULL)	-195.0
C-9.	Min. 2,500 psi structural concrete	Min. 1.5-inch ACFoam II, H-Shield, H-Shield CG, InsulBase, Poly ISO 1, Poly ISO 2, SecurShield	HELIX	(Optional) Additional layers of base insulation	HELIX	Mule-Hide TPO-c Fleece Back	HELIX (FULL)	-322.5