MIAMI-DADE COUNTY

BUILDING CODE COMPLIANCE OFFICE (BCCO)
PRODUCT CONTROL DIVISION

MIAMI-DADE COUNTY, FLORIDA
METRO-DADE FLAGLER BUILDING
140 WEST FLAGLER STREET, SUITE 1603
MIAMI, FLORIDA 33130-1563
(305) 375-2901 FAX (305) 375-2908

NOTICE OF ACCEPTANCE (NOA)

Mule-Hide Products Co., Inc.
1195 Prince Hall Dr.
Beloit, WI 53511

SCOPE:
This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed by Miami-Dade County Product Control Division and accepted by the Board of Rules and Appeals (BORA) to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Division (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. BORA reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Division that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein, and has been designed to comply with the Florida Building Code, including the High Velocity Hurricane Zone.

DESCRIPTION: Mule-Hide Single-Ply TPO Roof Systems over Concrete Decks

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA 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 renews and revises NOA# 03-0708.06 and consists of pages 1 through 19.
The submitted documentation was reviewed by Alex Tigera

ROOFING SYSTEM APPROVAL

Category:	Roofing
Sub-Category:	Single Ply
Material:	TPO
Deck Type:	Concrete
Maximum Design Pressure	-480 psf
Fire Classification:	See General Limitation #1

TRADE NAMES OF PRODUCTS MANUFACTURED OR LABELED BY APPLICANT:

TABLE 1

Product Name	Dimensions	Test Specifications	Product Description
TPO-c Fleece Back	various	TAS 131	Reinforced white or colored TPO membrane with fleece backing.
TPO-c Fleece Back Plus	various	TAS 131	Reinforced white or colored TPO membrane.
TPO-c, TPO-c EXTRA	various	TAS 131	Reinforced white or colored TPO membrane with fleece backing.
TPO-c FR	various	TAS 131	Reinforced white or colored FR TPO membrane.
TPO Pressure-Sensitive RUSS Strip	Various	TAS 131	Reinforced Securement Strip
Carlisle Foamular Durapink Insulation	various	TAS 110	Extruded Polystyrene for white or black mechanically fastened roof systems.
Carlisle Foamular ½" Board	various	TAS 110	Extruded Polystyrene recovery board.
Carlisle Foamular 150, 250, 400, 404, 600	various	TAS 110	Extruded Polystyrene insulation
CCW 702 Primer	various	TAS 110	Solvent-Based Primer
CCW 702LT Primer	various	TAS 110	Low-Temperature Solvent-Based Primer
CCW 714 Primer	various	TAS 110	Water-Based Primer
CCW 725 Vapor Barrier	various	TAS 110	40 mil Vapor Barrier
Sure-Weld Bonding Adhesive	various	TAS 110	Solvent-based bonding adhesive.
TPO-c Bonding Adhesive	various	TAS 110	Solvent-based bonding adhesive.
WBBA 2000	Various	TAS 110	Water-based bonding adhesive
Carlisle One Step	Various	TAS 110	Polyurethane Adhesive
Carlisle OlyBond 500BA	Various	TAS 110	Polyurethane Adhesive
Carlisle Versigrip	Various	TAS 110	Polyurethane Adhesive
Cold Applied Adhesive	Various	TAS 110	Asphalt-modified Polyether Adhesive

APPROVED INSULATIONS:

TABLE 2

Product Name	Product Description	Manufacturer (With Current NOA)
Pyrox, White Line	Isocyanurate Insulation	Apache Products Co.
ACFoam Composite	Isocyanurate Insulation with perlite facer	Atlas Roofing Corp.
ACFoam II	Isocyanurate Insulation	Atlas Roofing Corp.
Poly ISO 2 Composite	Isocyanurate Insulation with perlite facer	Mule-Hide Products Co., Inc.
Poly ISO 2	Isocyanurate Insulation	Mule-Hide Products Co., Inc.
Polyisocyanurate HP, HP-N, HP-H, HP-W	Polyisocyanurate roof insulation.	Carlisle Syntec, Inc.
Poly ISO 1, Poly ISO 1-NB	Polyisocyannurate roof insulation	Mule-Hide Products Co., Inc.
Sure-Seal HP Recovery Board	High Density Wood Fiberboard.	Carlisle Syntec, Inc.
Sure-Seal EPS/Fiberboard	High Density Wood Fiberboard bonded to EPS.	Carlisle Syntec, Inc.
Sure Seal EPS Insulation	Expanded Polystyrene.	Carlisle Syntec, Inc.
Styrofoam	Extruded polystyrene insulation	Dow
ISO 95+ GL, 95+ GW	Polyisocyanurate foam insulation	Firestone
Dens Deck, Dens Deck Prime	Silicon treated gypsum	G-P Products
Sturdi-Top	Wood fiber insulation board.	G-P Products
Ultra/M-II	Isocyanurate Insulation	Homasote Co.
H-Shield, H-Shield NB	Isocyanurate Insulation	Hunter Panels
ENRGY 2, ENERGY 3, PSI-25	Isocyanurate Insulation	Johns Manville
Fesco Foam	Isocyanurate Insulation with perlite facer	Johns Manville
Retro-Fit	A high-density perlite roof insulation.	Johns Manville
Wood Fiberboard	Regular wood fiber insulation	Generic
High Density Wood Fiberboard	High Density Wood Fiber insulation board.	Generic
Perlite Insulation Board	Perlite Insulation	Generic
Type X Gypsum	Gypsum Wallboard	Generic
XPS	Extruded polystyrene	Generic
Oriented Strand Board (OSB)	Oriented Strand Board	Generic
Multi-Max, FA	Polyisocyanurate foam insulation	Rmax, Inc.

APPROVED INSULATIONS:

TABLE 2

Product Name	Product Description	Manufacturer (With Current NOA)
Fiber Base	Asphalt coated wood fiber insulation	Temple Inland Forest Products Corp.
Structodeck	High Density Wood Fiber insulation board.	Wood Fiber Industries
Insulfoam I and VIII	Expanded Polystyrene	Insulfoam, Inc.

APPROVED FASTENERS:

TABLE 3

Fastener Number	Product Name	Product Description	Dimensions	Manufacturer (With Current NOA)
1.	HP Concrete-Spike	Insulation fastener for concrete decks.	Various	Carlisle Syntec, Inc.
2.	HD 14-10 Fastener	Insulation fastener for concrete decks.	Various	Carlisle Syntec, Inc.
3.	Sure-Seal HP, HP-X, HP-Xtra Fasteners	Insulation and membrane fastener	Various	Carlisle Syntec, Inc.
4.	Sure-Seal Insulation Plates	Metal plates used for membrane securement with Sure-Seal fasteners.	2-7/8" dia	Carlisle Syntec, Inc.
5.	Sure-Seal Seam Fastening Plates	Metal plates used for membrane securement with Sure-Seal fasteners.	2" dia	Carlisle Syntec, Inc.
6.	Sure-Seal Polymer Seam Plates	Plastic plates used for membrane securement with Sure-Seal fasteners.	2" dia	Carlisle Syntec, Inc.
7.	Piranha, Piranha Xtra Plates	Metal plates used for membrane securement with Sure-Seal fasteners.	2-3/8" dia	Carlisle Syntec, Inc.
8.	CD-10	Insulation fastener for concrete decks.		Carlisle Syntec, Inc.
9.	Dekfast Fasteners #14, #15	Insulation and membrane fastener	Various	Construction Fasteners, Inc.
10.	Dekfast Hex Plate	Insulation and membrane fastener	Various	Construction Fasteners, Inc.
11.	#14 Roofgrip	Insulation and membrane fastener	Various	ITW Buildex

APPROVED FASTENERS:

TABLE 3

Fastener Number	Product Name	Product Description	Dimensions	Manufacturer (With Current NOA)
12.	Metal Plate	Galvalume AZ50 stress plate	3" square	ITW Buildex
13.	Plastic Plate	Polyethylene stress plate	3.2" round	ITW Buildex
14.	Olympic CD-10	Insulation fastener for concrete decks.		Olympic Mfg. Group
15.	Olympic Fasteners #14	Insulation and membrane fastener	Various	Olympic Mfg. Group
16.	Olympic Stainless Fasteners #14	Stainless steel insulation and membrane fastener	Various	Olympic Mfg. Group
17.	Olympic Standard	Galvalume AZ55 stress plate	3" round	Olympic Mfg. Group
18.	Olympic Plastic	Plastic plates for fasteners.	3" round	Olympic Mfg. Group
19.	Rawl Fasteners #14	Insulation fastener for steel and wood decks	Various	Powers Fasteners Inc.
20.	Rawl Drive	Insulation fastener for concrete decks		Powers Fasteners Inc.
21.	Rawl Spike	Insulation fastener for concrete decks		Powers Fasteners Inc.
22.	Rawl Insulation Plate	3" round Galvalume AZ55 stress plate	3" round	Powers Fasteners Inc.
23.	Insul-Fixx Fastener	Insulation fastener for steel and wood decks	Various	SFS Stadler, Inc.
24.	Isofast Fasteners	Insulation fastener for steel and wood decks	Various	SFS Stadler, Inc.
25.	Insul-Fixx S	3" round Galvalume AZ55 stress plate	3" round	SFS Stadler, Inc.
26.	Insul-Fixx P	3" round polyethylene stress plate	3" round	SFS Stadler, Inc.
27.	Isofast Plate	Square or oblong Galvalume steel plates for use with Isofast fasteners		SFS Stadler, Inc.
28.	Tru-Fast Fasteners	Insulation and membrane fastener	Various	The Tru-Fast Corp.
29.	Tru-Fast Ultra Stainless Fasteners	Stainless steel insulation and membrane fastener	Various	The Tru-Fast Corp.
30.	Tru-Fast MP-3	3.23" round Galvalume AZ50 steel plate	3.23" round	The Tru-Fast Corp.

APPROVED FASTENERS:

TABLE 3

Fastener Number	Product Name	Product Description	Dimensions	Manufacturer (With Current NOA)
31.	Tru-Fast Plastic Plate	Polyethylene stress plate	3" round	The Tru-Fast Corp.
32.	Insta-Lock Screw	Insulation and membrane fastener	Various	Versico, Inc.
33.	Insta-Lock Plate	Galvalume AZ55 stress plate	3" round	Versico, Inc.
34.	Mule-Hide Fasteners Drill Point, HDP, EHD, EHD Plus	Insulation and membrane fastener	Various	Mule-Hide Products Co., Inc.
35.	Mule-Hide 3" Insulation Plates	Metal Plates used for insulation securement	3.23" round	Mule-Hide Products Co., Inc.
36.	Mule-Hide Plastic Plate	Polyethylene stress plate	3" round	Mule-Hide Products Co., Inc.
37.	Mule-Hide Ultra Stainless Fasteners	Stainless steel insulation and membrane fastener	Various	Mule-Hide Products Co., Inc.
38.	Mule-Hide 2.4" Seam Plates Plus Seam Plates	Metal plates used for membrane securement	2-3/8" round	Mule-Hide Products Co., Inc.

EVIDENCE SUBMITTED:

Test Agency	Test Identifier	Description	Date
Architectural Testing Inc.	ATI-37050.01	Wind Uplift Classification	3/13/00
Architectural Testing Inc.	ATI-37490-01	Membrane Brittleness Testing	7/7/00
Factory Mutual Research Corp.	3003393	Wind Uplift Classification	3/30/99
Factory Mutual Research Corp.	3003393 (Letter Report)	Wind Uplift Classification	3/26/99
Factory Mutual Research Corp.	3001522	Wind Uplift Classification	3/26/99
Factory Mutual Research Corp.	3001522 (Letter Report)	Wind Uplift Classification	11/3/98
Factory Mutual Research Corp.	3Z9A1.AM	Wind Uplift and Fire Classification	10/15/97
Factory Mutual Research Corp.	Approval Guide Excerpt	Wind Uplift and Fire Listings	5/00
Factory Mutual Research Corp.	3012879	Class 4470	04/86
Factory Mutual Research Corp.	3021941	Class 4470	03/20/06
Factory Mutual Research Corp.	3014692	Class 4470	08/05/03
Factory Mutual Research Corp.	3014751	Class 4470	08/27/03
Factory Mutual Research Corp.	3013584	Class 4470	06/27/03
Factory Mutual Research Corp.	3011329	Class 4470	06/10/02
Celotex Corporation Testing Services	520257	Membrane Physical Property Testing	4/19/00
SGS U.S. Testing Company Inc.	131248-R2	Membrane Ozone Testing	1/6/00

APPROVED ASSEMBLIES

Membrane Type: Single Ply, Thermoplastic, TPO, Reinforced, FleeceBacked

Deck Type 3I: Concrete Decks, Insulated

Deck Description: 2500 psi structural concrete.

System Type A(1): One or more layers of insulation adhered with approved asphalt, Carlisle OlyBond 500BA, Carlisle Versigrip, Carlisle One Step. Membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
HP-HNB, Hunter H-Shield NB, Poly ISO 1-NB Minimum 1.5" thick	**N/A**	**N/A**

Note: All insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-40 lbs/100 ft^2, or Carlisle Olybond 500BA at a rate of 1gal./sq, or Carlisle Versigrip at a rate of ½ gal./sq, or Carlisle One Step at a rate of 1/3gal./sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Vapor Retarder: None.

Barrier: None.

Membrane #1: TPO-c, TPO-c FR, Reinforced, 45 or 60 mil membrane or TPO-c EXTRA, 72 or 80 mil membrane fully adhered to the insulation using TPO Bonding Adhesive applied to the substrate at a rate of 1 gal/60 ft.^{2} or WBBA 2000 Bonding Adhesive applied to the substrate at a rate of 1 gal/60ft^2.

Membrane #2: TPO-c FleeceBack 100 or 115 mil membrane fully adhered to the insulation using WBBA 2000 Bonding Adhesive applied to the substrate at a rate of 1 gal/120ft^2.

Membrane #3: TPO-c FleeceBACK Plus membrane adhered to the insulation in a full mopping of approved asphalt applied within the EVT range and at a rate of 20-25 lbs./sq or Cold Applied Adhesive applied to the substrate at a rate of 1 gal/67 ft.^{2}

Maximum Design Pressure:
–187.5 psf with Asphalt, or OneStop (See General Limitation #9)
-150 psf with OlyBond BA (See General Limitation #9)
-157.5 psf with Versigrip (See General Limitation #9)

Membrane Type: Single Ply, Thermoplastic, TPO, Reinforced

Deck Type 3I: Concrete Decks, Insulated

Deck Description: 2500 psi structural concrete.

System Type A(2): One or more layers of insulation adhered with approved asphalt, Carlisle OlyBond 500BA, Carlisle Versigrip, or Carlisle One Step. Membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer

	Insulation Fasteners (Table 3)	Fastener Density/ft^2
One of the following covered with the boards listed in Top Layer or Base or Top Layer.		
Dens Deck, Dens Deck Prime **Minimum ¼" thick**	N/A	N/A

Base or Top Insulation Layer

	Insulation Fasteners (Table 3)	Fastener Density/ft^2
One or more layers of the following as a Base or Top Layer or over the Base Layer listed above: PYROX, AP, ISO 95+ HF, Rhoflex HF, Multi-Max FA, Polyisocyanurate HP, HP-H or HP-N, Poly ISO 1 **Minimum 1.2" thick**	N/A	N/A
ENRGY-3, ENRGY-2, PSI-25, UltraGard Gold **Minimum 1.4" thick**	N/A	N/A
ACFoam II, Poly ISO 2, ACFoam Composite, Poly ISO 2 Composite, Rhoflex Composite, Fesco Foam, Polyisocyanurate HP-W **Minimum 1.5" thick**	N/A	N/A
HP Recovery, Structodeck **Minimum ½" thick**	N/A	N/A
High Density Fiberboard **Minimum ¾" thick**	N/A	N/A
Dens Deck, Dens Deck Prime or Strataguard **Minimum 1/4" thick**	N/A	N/A

Note: Concrete deck shall be primed with ASTM D 41 asphalt primer and allowed to dry prior to application of insulation when using hot asphalt. All insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-40 lbs/100 ft^2. Insulation may be adhered to the deck with Carlisle OlyBond 500BA at a rate of 1 gal./sq., or Carlisle Versigrip at a rate of ½ gal/sq, or Carlisle One Step at a rate of 1/3 gal/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulation listed as base layer only shall be used only as base layers with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation panels used as a top layer shall be placed with the polyisocyanurate side facing down. Insulation can be adhered to the deck with Mule-Hide SP Adhesive or Fast Adhesive.

Vapor Retarder:	(Optional) Any UL of FMRC approved vapor retarder applied to the roof deck or over a base layer of insulation.
Barrier:	None.
Membrane #1:	TPO-c or TPO-c FR, Reinforced, 45 or 60 mil membrane or TPO-c EXTRA, 72 or 80 mil membrane fully adhered to the insulation using TPO Bonding Adhesive applied to the substrate at a rate of 1 gal/60 ft.^{2} or WBBA 2000 Bonding Adhesive applied to the substrate at a rate of 1 gal/60ft^2.
Membrane #2:	TPO-c FleeceBack 100 or 115 mil membrane fully adhered to the insulation using WBBA 2000 Bonding Adhesive applied to the substrate at a rate of 1 gal/120ft^2.
Membrane #3:	TPO-c Fleece Back Plus membrane adhered to the insulation in a full mopping of approved asphalt applied within the EVT range and at a rate of 20-25 lbs./sq or Cold Applied Adhesive applied to the substrate at a rate of 1 gal/67 ft.^{2}

Maximum Design Pressure:

–322.5 psf with Asphalt(See General Limitation #9)

–150 psf with Olybond 500BA & Gypsum Top Layer (See General Limitation #9)

–120 psf with Olybond 500BA & Fiberboard Top Layer (See General Limitation #9)

–105 psf with Versigrip(See General Limitation #9)

–127.5 psf with One Step & Fiberboard Top Layer, or Olybond 500BA Polyiso(See General Limitation #9)

–232.5 psf with One Step & Gypsum or Polyiso Top Layer (See General Limitation #9)

Membrane Type: Single Ply, Thermoplastic, TPO, Reinforced, Fleece Back

Deck Type 3I: Concrete Decks, Insulated

Deck Description: 2500 psi structural concrete.

System Type C(1): All layers of insulation simultaneously attached. Membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
One of the following covered with the boards listed in Top Layer or Base or Top Layer.		
Extruded Polystyrene, Energy-Lok, ACFoam-II, Poly ISO 2, Insulfoam I & VIII Minimum 1" thick	N/A	N/A
Perlite Minimum ¾" thick	N/A	N/A

Note: All insulation layers shall be simultaneously fastened; see Top Layer or Base or Top Layer below for fasteners and density.

Base or Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
ACFoam II, Poly ISO 2, ACFoam Composite, Poly ISO 2 Composite, Rhoflex Composite, Fesco Foam Minimum 1.5" thick	1, 3, 9, 11, 15, 20, 21, 23, 28 or 34	1:2 ft^2
ENRGY-2, ENRGY-3, PSI-25, WHITELINE, PYROX, AP, ISO 95+ HF, Rhoflex HF, Polyisocyanurate HP, Polyisocyanurate HP-N, HP-H, HP-W, Poly ISO 1 Minimum 1.4" thick	1, 3, 9, 11, 15, 20, 21, 23, 28 or 34	1:2 ft^2
Minimum 2" thick	1, 3, 9, 11, 15, 20, 21, 23, 28 or 34	1:4 ft^2
Ultra/M-II Iso/glas Minimum 1.2" thick	9, 11, 15, 20, 21, 24, 28 or 34	1:2 ft^2
Polyisocyanurate HP-W Minimum 2" thick	1, 3, 20, 21 or 34	1:4 ft^2
HP Recovery, Fiber Base Minimum ½" thick	1, 3, 20, 21 or 34	1:2 ft^2
Sturdi Top Minimum ½" thick	9, 15 or 34	1:2 ft^2
Wood Fiber Minimum 1" thick	1, 3, 20, 21 or 34	1:2 ft^2
High Density Fiberboard Minimum ¾" thick	9, 15, 28 or 34	1:2.67 ft^2

Dens Deck, Dens Deck Prime or Strataguard **Minimum 1/4" thick**	**1, 2, 7, 9, 11, 14, 15, 17, 21,or 34**	**1:2 ft²**
Oriented Strand Board **Minimum 7/16" thick**	**1, 2, 4, 7, 8, 9, 11, 14, 15, 17, 21, or 34**	**1:2 ft²**

Top Insulation Layer

	Insulation Fasteners (Table 3)	**Fastener Density/ft²**
Required over the insulations listed in Base Layer or optional over any of the insulations listed as Base or Top Layer : **HP Recovery** (for use over all insulation. types) **Fiber Base** (for use over polyisocyanurate, gypsum or perlite) **Minimum ½" thick**	**1, 3, 20, 21 or 34**	**1:2 ft²**

Note: Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Top layer of insulation may be adhered with Mule-Hide SP Adhesive or Fast Adhesive. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Vapor Retarder: (Optional) Any UL or FMRC approved vapor retarder applied to the roof deck or over a base layer of insulation.

Barrier: None.

Membrane: TPO-c or TPO-c FR, Reinforced, 45 or 60 mil membrane or TPO-c EXTRA, 72 or 80 mil membrane fully adhered to the insulation using TPO Bonding Adhesive applied to the substrate at a rate of 1 gal/60 ft² or WBBA 2000 adhesive applied to the substrate at a rate of 1 gal/120ft²

Or

TPO-c Fleece Back 100 or 115 membrane fully adhered to the insulation using WBBA 2000 adhesive applied to the substrate at a rate of 1 gal/120ft².

Or

TPO-c FleeceBACK Plus memmbrane fully adhered to the insulation in a mopping of approved asphalt applied within the EVT range and at a rate of 20-25 lbs./sq. or Cold Applied Adhesive applied to the substrate at a rate of 1 gal./67ft²

Maximum Design Pressure: -45 psf (See General Limitation #7)

Membrane Type: Single Ply, Thermoplastic, TPO, Reinforced

Deck Type 3I: Concrete Decks, Insulated

Deck Description: 2500 psi structural concrete.

System Type C(2): All layers of insulation simultaneously attached; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
One of the following covered with the boards listed in Top Layer.		
Extruded Polystyrene, Energy-Lok, ACFoam-II, Insulfoam I and VIII		
Minimum 1" thick	N/A	N/A
Perlite		
Minimum ¾" thick	N/A	N/A
ENRGY-2, ENRGY-3, PSI-25, AC Foam II, Polyisocyanurate HP, Polyisocyanurate HP-W, HP-H, Polyisocyanurate HP-N		
Minimum 1.5" thick	N/A	N/A
Minimum 2" thick	N/A	N/A
HP Recovery		
Minimum 1" thick	N/A	N/A
Multi-Max FA, WHITELINE, PYROX, AP, Ultra/M-II Iso/glas		
Minimum 1.2" thick	N/A	N/A
ACFoam Composite, Rhoflex Composite, Fesco Foam		
Minimum 1.5" thick	N/A	N/A
High Density Fiberboard		
Minimum ¾" thick	N/A	N/A
ISO 95+GL, HF, Rhoflex GL, HF		
Minimum 1.2" thick	N/A	N/A
Minimum 1.4" thick	N/A	N/A
Structodeck		
Minimum ½" thick	N/A	N/A
Wood Fiber		
Minimum 1" thick	N/A	N/A
Fiber Base, Retro-Fit		
Minimum ½" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Single and multiple layers of insulation can be attached to base layer with Carlisle Syntec FAST Adhesive.

Top Insulation Layer	**Insulation Fasteners (Table 3)**	**Fastener Density/ft^2**
Required over the insulations listed in Base Layer.		
Dens Deck Prime (For use over all insulation types.) Minimum ⅝" thick	**3, 15, 16, 17 or 34**	**1:1.33 ft^2**

Note: Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Vapor Retarder:	(Optional) Any UL or FMRC approved vapor retarder applied to the roof deck or over a base layer of insulation.
Barrier:	None.
Membrane:	TPO-c or TPO-c FR, Reinforced, 45 or 60 mil membrane or TPO-c EXTRA, 72 or 80 mil membrane fully adhered to the insulation using TPO Bonding Adhesive applied to the substrate at a rate of 1 gal/60 ft.^{2}.
Maximum Design Pressure:	–90 psf (See General Limitation #7)

Membrane Type: Single Ply, Thermoplastic, TPO, Reinforced

Deck Type 3I: Concrete Decks, Insulated

Deck Description: 2500 psi structural concrete.

System Type D: Membrane mechanically attached over preliminary fastened insulation.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
One of the following covered with the boards listed in Top Layer or Base or Top Layer.		
Extruded Polystyrene, Energy-Lok, ACFoam-II, Poly ISO 2, Insulfoam I and VIII Minimum 1" thick	N/A	N/A
Perlite Minimum ¾" thick	N/A	N/A

Base or Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft^2
Multi-Max FA, WHITELINE, PYROX, AP, Ultra/M-II Iso/glas, ISO 95+ HF, Rhoflex HF, Polyisocyanurate HP, HP-H, HP-N, HP-W, Poly ISO 1 Minimum 1.2" thick	N/A	N/A
UltraGard Gold, Isolite E Minimum 1.3" thick	N/A	N/A
ENRGY-2, ENRGY-3, PSI-25, Polyisocyanurate HP-N, ISO 95+GL, GW, Rhoflex GL, GW Minimum 1.4" thick	N/A	N/A
AC Foam II, Poly ISO 2, ACFoam Composite, Poly ISO 2 Composite, Rhoflex Composite, Fesco Foam, Polyisocyanurate HP-W Minimum 1.5" thick	N/A	N/A
HP Recovery, Structodeck, Wood Fiber, Fiber Base Minimum ½" thick	N/A	N/A
High Density Fiberboard Minimum ¾" thick	N/A	N/A
Dens Deck, Dens Deck Prime or Strataguard Minimum ¾" thick	N/A	N/A

Top Insulation Layer

	Insulation Fasteners (Table 3)	Fastener Density/ft^2
Required over the insulations listed in Base Layer or optional over any of the insulations listed as Base or Top Layer :		
HP Recovery (for use over all insulation. types) **Fiber Base** (for use over polyisocyanurate, gypsum or perlite)		
Minimum ½" thick	**N/A**	**N/A**

Note: All layers of insulation and base sheet shall be simultaneously attached. See base sheet below for fasteners and density. Refer to Roofing Application Standard RAS 117 for insulation attachment requirements. Insulation shall have preliminary attachment, prior to the installation of the roofing membrane. At an application rate of two fasteners per board for insulation boards having no dimension greater than 4 ft., and four fasteners for any insulation board having no dimension greater than 8 ft. Single and multiple layers of insulation can be attached to the deck with Carlisle Olybond 500BA, or Carlisle Versigrip or Carlisle One Step.

Vapor Retarder: (Optional) Any UL or FMRC approved vapor retarder applied to the roof deck or over a base layer of insulation.

Barrier: None.

Membrane: TPO-c, TPO-c FR or TPO-c EXTRA, Reinforced, secured through the preliminarily attached insulation as specified below.

Fastening #1: EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 6" o.c. through the TPO-c or TPO-c EXTRA Membrane in the lap in rows spaced 7'-7" o.c.
Maximum Design Pressure –67.5 psf. (See General Limitation #7)

Fastening #2: EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 6" o.c. through the TPO-c or TPO-c EXTRA Membrane in the lap or through a TPO Pressure-Sensitive RUSS Strip in rows spaced 9'-7" o.c.
Maximum Design Pressure -60 psf (See General Limitation #7)

Fastening #3: EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 9" o.c. through the TPO-c or TPO-c EXTRA Membrane in the lap or through a pressure sensitive RUSS Strip in rows spaced 9'-6" o.c.
Maximum Design Pressure -52.5 psf. (See General Limitation #7)

Fastening #4: EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 6" o.c. through the TPO-c FR Membrane in the lap or though a TPO Pressure-Sensitive RUSS Strip in rows spaced 9'-7" o.c.
Maximum Design Pressure -52.5 psf. (See General Limitation #7)

Fastening #5: EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 9" o.c. through the TPO-c FR Membrane in the lap or though a TPO Pressure-Sensitive RUSS Strip in rows spaced 9'-7" o.c.
Maximum Design Pressure -45 psf. (See General Limitation #7)

Fastening #6:	EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 12" o.c. through the TPO-c or TPO-c EXTRA Membrane in the lap or though a TPO Pressure-Sensitive RUSS Strip in rows spaced 9'-7" o.c. ***Maximum Design Pressure -45 psf. (See General Limitation #7)***
Fastening #7:	EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 6" o.c. through the TPO-c FR Membrane in the lap or though a TPO Pressure-Sensitive RUSS Strip in rows spaced 7'-7" o.c. ***Maximum Design Pressure –60 psf. (See General Limitation #7)***
Fastening #8:	EHD, HD 14-10, HP Concrete Spikes or CD-10 Fasteners with 2.4" Seam Plates 6" o.c. through the TPO-c or TPO-c EXTRA Membrane in the lap or though a TPO Pressure-Sensitive RUSS Strip in rows spaced 11'-7" o.c. ***Maximum Design Pressure –60 psf. (See General Limitation #7)***
Maximum Design Pressure:	–See Fastening Options Above

Membrane Type:	Single Ply, Thermoplastic, TPO, Reinforced, Fleece Back
Deck Type 3:	Concrete Decks, Insulated
Deck Description:	2500 psi structural concrete.
System Type F:	Membrane fully adhered with Mule-Hide SP Adhesive or FAST Adhesive.

All General and System Limitations apply.

Vapor Retarder:	None.
Barrier:	None.
Membrane #1:	TPO-c FleeceBACK 100 or 115 membrane fully adhered to the deck using WBBA 2000 Bonding Adhesive applied to the substrate at a rate of 1 gal/120 ft^2
Maximum Design Pressure:	-480 psf w/Aqua Base 120 Bonding Adhesive (See General Limitation #9)
Membrane #2:	TPO-c FleeceBACK Plus membrane adhered to the deck in a full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs./sq. or Cold Adhesive applied to the substrate at a rate of 1 gal./67ft^2
Maximum Design Pressure:	-60 psf with Cold Adhesive (See General Limitation #9) -367.5 psf with Asphalt (See General Limitation #9)

CONCRETE DECK SYSTEM LIMITATIONS:

1. If mechanical attachment to the structural deck through the lightweight insulating concrete is proposed, a field withdrawal resistance testing shall be performed to determine fastener 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 signed and sealed by a Florida Registered Engineer, Architect, or Registered Roof Consultant.

GENERAL LIMITATIONS:

1. Fire classification is not part of this acceptance, refer to a current Approved Roofing Materials Directory for fire ratings of this product.
2. Insulation may be installed in multiple layers. The first layer shall be attached in compliance with Product Control Approval guidelines. All other layers shall be adhered in a full mopping of approved asphalt applied within the EVT range and at a rate of 20-40 lbs./sq., or mechanically attached using the fastening pattern of the top layer
3. All standard panel sizes are acceptable for mechanical attachment. When applied in approved asphalt, panel size shall be 4' x 4' maximum.
4. An overlay and/or recovery board insulation panel is required on all applications over closed cell foam insulations when the base sheet is fully mopped. If no recovery board is used the base sheet shall be applied using spot mopping with approved asphalt, 12" diameter circles, 24" o.c.; or strip mopped 8" ribbons in three rows, one at each sidelap and one down the center of the sheet allowing a continuous area of ventilation. Encircling of the strips is not acceptable. A 6" break shall be placed every 12' in each ribbon to allow cross ventilation. Asphalt application of either system shall be at a minimum rate of 12 lbs./sq. **Note: Spot attached systems shall be limited to a maximum design pressure of -45 psf.**
5. Fastener spacing for insulation attachment is based on a Minimum Characteristic Force (F') value of 275 lbf., as tested in compliance with Testing Application Standard TAS 105. If the fastener value, as field-tested, are below 275 lbf. insulation attachment shall not be acceptable.
6. Fastener spacing for mechanical attachment of anchor/base sheet or membrane attachment is based on a minimum fastener resistance value in conjunction with the maximum design value listed within 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 Florida Registered Engineer, Architect, or Registered Roof Consultant may be submitted. Said revised fastener spacing shall utilize the withdrawal resistance value taken from Testing Application Standards TAS 105 and calculations in compliance with Roofing Application Standard RAS 117.
7. Perimeter and corner areas shall comply with the enhanced uplift pressure requirements of these areas. Fastener densities shall be increased for both insulation and base sheet as calculated in compliance with Roofing Application Standard RAS 117 and/or RAS 137. **(When this limitation is specifically referred within this NOA, General Limitation #9 will not be applicable.)**
8. All attachment and sizing of perimeter nailers, metal profile, and/or flashing termination designs shall conform with Roofing Application Standard RAS 111 and applicable wind load requirements.
9. The maximum designed pressure limitation listed shall be applicable to all roof pressure zones (i.e. field, perimeters, and corners). Neither rational analysis, nor extrapolation shall be permitted for enhanced fastening at enhanced pressure zones (i.e. perimeters, extended corners and corners). **(When this limitation is specifically referred within this NOA, General Limitation #7 will not be applicable.)**
10. All products listed herein shall have a quality assurance audit in accordance with the Florida Building Code and Rule 9B-72 of the Florida Administrative Code.

END OF THIS ACCEPTANCE