CONSTRUCTION MATERIALS
TECHNOLOGIES

LABORATORY TEST RESULTS

Report for: Warrior Roofing Manufacturing
P.O. Box 40185
Tuscaloosa, AL 35404

Attention: Steven Crew

Product Name(s):	Elephant Skin	**Manufacturer:**	Warrior Roofing Manufacturing
PRI-CMT Project No.:	WRMI-015-02-01	**Source:**	Warrior Roofing Manufacturing
Date Received:	April 19, 2015	**Dates Tested:**	August 17 - 19, 2015

Purpose:

Evaluate Warrior Roofing Manufacturing's Elephant Skin synthetic roof underlayment as a substitute for ICC-ES AC 207 (Approved March 2012), *Acceptance Criteria for Polypropylene Roof Underlayments*.

Data from the following sections are provided herein:

1) Section 4.1 Water Vapor Transmission
2) Section 4.2 Pliability
3) Section 4.3 Liquid Water Transmission
4) Section 4.4 Pull Through Resistance
5) Section 4.5 Tear Resistance
6) Section 4.6 Accelerated Aging
7) Section 4.7 Ultraviolet-Light Exposure

Test Methods:

Testing completed from ASTM D 226: *Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing* includes: ASTM E 96 *Standard Test Methods for Water Vapor Transmission of Materials, ASTM D 146 Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing,* ICC-ES AC 48 *Acceptance criteria for Self-Adhered Roof Underlayments for Use as Ice Barriers* , ASTM D 4869 *Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing,* ASTM D 3462 *Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules*, ASTM D 1922 *Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method*

Sampling:

A sample roll of Warrior Roofing Manufacturing Elephant Skin was supplied on April 9, 2015.

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PRI Construction Materials Technologies LLC 6412 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

Results:

Property	Test Method	Result	Requirement
Physical Requirements			
Section 4.1			
Water Vapor Transmission (perms) 5 specimens; Inverted Water Method @ 73 °F & 50 %RH	ASTM E 96 (Method BW)	0.09	Report
Section 4.2			
Pliability *[Pass/Fail]* 5 specimens; 1" x 8" x thickness; Cond. 24h @ 14±4°F; Test 90° around ¾" radius mandrel in 2s	ASTM D 146		
Longitudinal (with fiber grain)		Pass	No Failures
Transverse (across fiber grain)		Pass	No Failures
Section 4.3			
Liquid Water Transmission *[Pass/Fail]* 2 specimens; 15" x 30"; Cond. 24h @ 70-80°F & 30-55%RH; Test @ 14° with 40-42gal/h for 4h	ASTM D 4869	Pass	N/A
Section 4.4			
Fastener Pull Through (lbf) 10 Specimens shall be conditioned at 73 ± 4°F (23 ± 2°C and tested at 73 ± 4°F (23 ± 2°C) Pull rate 4 in/min	ASTM D 3462		
12ga Roofing Nail Control 73 +/- 5F 50%+/- 2% RH		46	>25
12ga Roofing Nail Accelerated Aged (Aged Per Section 4.6 Accelerated Aging) 25 cycles: Oven Dried 120F 3h, Water Immersion 3h, air dry room temp 73 +/- 5F 18h. Tested 73 +/- 5F 50%+/- 2% RH		37	>25
12ga Roofing Nail Ultraviolet-light exposed (per Section 4.7 Ultraviolet-Light Exposure)10 cycles: 10h Radiated 14h Off per ICC-ES AC 48		40	>25
NO.16 ga Staple – 7/16" Crown Control 73 +/- 5F 50%+/- 2% RH		22	>17
NO.16 ga Staple – 7/16" Crown Accelerated Aged (Aged Per Section 4.6 Accelerated Aging) 25 cycles: Oven Dried 120F 3h, Water Immersion 3h, air dry room temp 73 +/- 5F 18h. Tested 73 +/- 5F 50%+/- 2% RH		21	>17

Continued on next Page

WRMI-015-02-01 PRI-CMT Accreditations: IAS TL-189; Miami-Dade 11-0429.05; Florida TST5878; Los Angeles TA24819; CRRC
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Property	Test Method	Result	Requirement
NO.16 ga Staple – 7/16" Crown Ultraviolet-light exposed (per Section 4.7 Ultraviolet-Light Exposure)10 cycles: 10h Radiated 14h Off per ICC-ES AC 48		24	>17
Section 4.5			
Tear Strength (grams-force) @ 73 ± 4°F	ASTM D 1922		
MD Control 73 +/- 5F 50%+/- 2% RH		4384	>2560
MD Accelerated Aged (Aged Per Section 4.6 Accelerated Aging) 25 cycles:Oven Dried 120F 3h, Water Immersion 3h, air dry room temp 73 +/- 5F 18h. Tested 73 +/- 5F 50%+/- 2% RH		5485	>2560
MD Ultraviolet-light exposed 10 cycles: 10h Radiated 14h Off per ICC-ES AC 48		4320	>2560
CD Control 73 +/- 5F 50%+/- 2% RH		4518	>2560
CD Accelerated Aged (Aged Per Section 4.6 Accelerated Aging) 25 cycles: Oven Dried 120F 3h, Water Immersion 3h, air dry room temp 73 +/- 5F 18h. Tested 73 +/- 5F 50%+/- 2% RH		5485	>2560
CD Ultraviolet-light exposed 10 cycles: 10h Radiated 14h Off per ICC-ES AC 48		4294	>2560

Statement of Attestation: The product was tested in accordance with consensus standard specifications as listed herein and passes the requirements for ICC-ES AC 207 *Acceptance Criteria for Polypropylene Roof Underlayments.*

Signed: _____
Christopher Freidner
Client Service Manager

Date: 8/19/2015

Signed: _____
Zachary R. Priest
Florida Registered Professional Engineer
P.E. Number: 74021

Date: 8/19/2015

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	8/19/2015	3	NA

END OF REPORT

WRMI-015-02-01 PRI-CMT Accreditations: IAS TL-189; Miami-Dade 11-0429.05; Florida TST5878; Los Angeles TA24819; CRRC
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CONSTRUCTION MATERIALS
TECHNOLOGIES

LABORATORY TEST RESULTS

Report for: Warrior Roofing Manufacturing
P.O. Box 40185
Tuscaloosa, AL 35404

Attention: Steven Crew

Product Name(s):	Elephant Skin	**Manufacturer:**	Warrior Roofing Manufacturing
PRI-CMT Project No.:	WRMI-017-02-01	**Source:**	Warrior Roofing Manufacturing
Date Received:	April 19, 2015	**Dates Tested:**	August 17 – 19, 2015

Purpose: Evaluate Warrior Roofing Manufacturing's Elephant Skin synthetic roof underlayment for compliance with the physical properties of **ASTM D 226 Asphalt-Saturated Felt Used in Roofing and Waterproofing, Type II.**

Test Methods: Testing completed from in accordance with ASTM D 226-06, -05, and -97a: *Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing* and ASTM D 146 *Test Methods for sampling and Testing Bitumen Saturated Felts and Woven Fabrics for Roofing and Waterproofing.*

Sampling: Product samples were received by PRI on April 9, 2015.

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PRI Construction Materials Technologies LLC 6408 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: materialstesting@pricmt.com WebSite: http://www.pricmt.com

Results: ASTM D 226

Property	Test Method	Result	Requirement
Physical Requirements			
Breaking Strength (lbf/in-width) 20 specimens; 1" x 6" x thickness; Cond. 2h @ 73.4±3.6°F & 50±5%RH; Test @ 73.4±3.6°F; Rate=2in/min	ASTM D 146		
Longitudinal (with fiber grain)		63	≥ 40
Transverse (across fiber grain)		64	≥ 20
Pliability *[Pass/Fail]* 10 specimens; 1" x 8" x thickness; Cond. 10-15min in water @ 77±1.8°F; Test 90° around 3/4" radius in 2s	ASTM D 146		
Longitudinal (with fiber grain)		Pass	No Failures
Transverse (across fiber grain)		Pass	No Failures
Loss on Heating (weight %) 2 specimens; 12" x 6" x thickness; Test Cond. 221±5°F for 5h±3min	ASTM D 146	0	≤ 4
Roll Properties			
Unrolling @ 32°F and 140°F *[Pass/Fail]*	ASTM D 226	Pass	Report
Width of Roll (in)	ASTM D 146	42	Report
Area (ft^2)	ASTM D 146	1001	Report
Net Mass ($lb/100ft^2$)	ASTM D 146	2.2	Report

Statement of Attestation: The product was tested has demonstrated compliance with the physical requirements of Type II prescribed in **ASTM D 226: *Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing*.**

Signed: _____
Christopher Freidner
Client Service Manager

Date: 8/19/2015

Signed: _____
Zachary R. Priest
Florida Registered Professional Engineer
P.E. Number: 74021

Date: 8/20/2015

ZACHARY R. PRIEST LICENSE NO. 74021 STATE OF FLORIDA PROFESSIONAL ENGINEER

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	8/20/2015	3	NA

END OF REPORT

WRMI-017-02-01 PRI-CMT Accreditations: IAS TL-189; Miami-Dade 11-0429.05; Florida TST5878; Los Angeles TA24819; CRRC
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CREEK
TECHNICAL SERVICES, LLC

Certificate of Authorization No. 29824
17520 Edinburgh Drive
Tampa, FL 33647
(813) 480-3421

EVALUATION REPORT

FLORIDA BUILDING CODE 5TH EDITION (2014)

Issued August 22, 2015

Manufacturer: WARRIOR ROOFING MANUFACTURING
3050 Warrior Road
Tuscaloosa, AL 35404
(205) 561-1024
www.warriorroofing.com

Manufacturing Locations: Gujarat, India

Quality Assurance: UL (QUA9625)

SCOPE

Category: Roofing
Subcategory: Underlayments
Code Sections: 1507.2.3, 1507.2.8, 1507.4.5.1, 1507.4.5.2, 1507.5.3, 1507.5.3.2, 1507.8.3, 1507.8.3.2, 1507.9.3, 1507.9.3.2, 1518.4
Properties: Physical properties

REFERENCES

Entity	Report No.	Standard	Year
PRI Construction Materials Technologies (TST5878)	WRMI-015-02-01	AC 207	2012
PRI Construction Materials Technologies (TST5878)	WRMI-017-02-01	ASTM D 226	2006

PRODUCT DESCRIPTION

ELEPHANT SKIN® A mechanically attached, woven polypropylene underlayment (nominal weight = 2.30 lb/100ft^2) used an alternative to ASTM D 226, Type I and Type II.

APPLICATION INSTRUCTIONS

Deck Type: The roof deck shall be constructed of closely fitted, solid sheathing for new or existing construction. Sheathing shall be installed in accordance with FBC requirements. Roof decks shall have no more than 1/8" gap at abutting joints.

Min. slope: 2:12. For slopes less than 4:12, the underlayment must be half-lapped a full 21" over the underlying course.

Attachment method (Non-HVHZ): Underlayment shall be attached in accordance with the FBC and manufacturer's installation instructions. At minimum, mechanically fastened with min. 12 ga. corrosion resistant ring shank nail with min. 1-inch diameter corrosion resistant round cap to a min. 3/4-inch penetration, 8" o.c. at side and end laps and 24" o.c in a staggered pattern along the center lines printed on the sheet. The side laps shall be a minimum 3" wide and minimum 6" wide at the end laps. The underlayment is installed starting at the eave, with the length of the roll parallel to the eave with the printed side facing up. All side laps shall be installed to shed water from the deck. End laps shall be offset by minimum 6-ft.

Attachment method (HVHZ): Mechanically fasten to deck in accordance with Manufacturer's published application instructions and FBC (HVHZ) requirements. The headlaps shall be a minimum 4-inch wide and minimum 6-inch wide at the end laps.

Allowable roof coverings: Asphalt shingles, composite shingles, metal roof panels and shingles, wood shakes and shingles

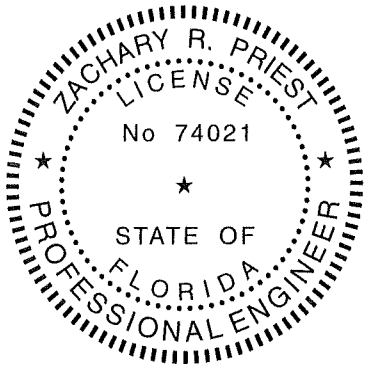
This evaluation report is provided for State of Florida product approval under Rule 61G20-3. The manufacturer shall notify CREEK Technical Services, LLC of any product changes or quality assurance changes throughout the duration for which this report is valid. This evaluation report does not express nor imply warranty, installation, recommended use, or other product attributes that are not specifically addressed herein.

LIMITATIONS

1) Fire Classification is not within the scope of this evaluation.
2) Wind uplift resistance is not within the scope of this evaluation.
3) Installation of the evaluated product shall comply with this report, the FBC, and the manufacturer's published application instructions. Where discrepancies exist between these sources, the more restrictive and FBC compliant installation detail shall prevail.
4) Deck substrates shall be clean, dry, and free from any irregularities and debris. All fasteners in the deck shall be checked for protrusion and corrected prior to underlayment application.
5) All underlayments shall be installed with the roll length parallel to the eave, starting at the eave, and lapped in success courses installed up the deck in a manner that effectively sheds water from the deck.
6) The underlayment may be used as described in other current FBC product approval documents.
7) Roof coverings shall not be adhered directly to the underlayment. Roof coverings shall be mechanically fastened through the underlayment to the roof deck.
8) The underlayment shall be exposed on the roof deck for a maximum 30 days unless otherwise stated.
9) All products listed in this report shall be manufactured under a quality assurance program in compliance with Rule 61G20-3.

COMPLIANCE STATEMENT

The products evaluated herein by Zachary R. Priest, P.E. have demonstrated compliance with the Florida Building Code 5th Edition (2014) as evidenced in the referenced documents submitted by the named manufacturer.



Digitally signed by Zachary R. Priest
2015.08.22 15:52:15 -04'00'

Zachary R. Priest, P.E.
Florida Registration No. 74021
Organization No. ANE9641

CERTIFICATION OF INDEPENDENCE

CREEK Technical Services, LLC does not have, nor will it acquire, a financial interest in any company manufacturing or distributing products under this evaluation.

CREEK Technical Services, LLC is not owned, operated, or controlled by any company manufacturing or distributing products under this evaluation.

Zachary R. Priest, P.E. does not have, nor will acquire, a financial interest in any company manufacturing or distributing products under this evaluation.

Zachary R. Priest, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

END OF REPORT

This evaluation report is provided for State of Florida product approval under Rule 61G20-3. The manufacturer shall notify CREEK Technical Services, LLC of any product changes or quality assurance changes throughout the duration for which this report is valid. This evaluation report does not express nor imply warranty, installation, recommended use, or other product attributes that are not specifically addressed herein.

August 28, 2015

WARRIOR ROOFING MFG CO INC
STEVEN CREW
PO BOX 40185
TUSCALOOSA , AL 35404-0185

Our Reference: 4787034017 \ R8876
Subject: Elephant Skin Synthetic Underlayment

Dear Steve Crew

This is a Report summarizing the results of tests conducted under the Commercial Inspection and Testing Services (CITS) program of UL LLC (UL) identified as Assignment No. 4787034017.

GENERAL:

The results relate only to items tested.

METHOD:

Each test was conducted in accordance with Standard ANSI/UL 790 (ASTM E108), dated July 29, 2014, "Tests for Fire Resistance of Roof Covering Materials".

SAMPLES:

The samples utilized in this investigation were neither prepared nor selected by a UL Laboratories' representative such that no verification of composition can be provided. Materials were tested in an as-received condition. The samples were manufactured from woven poly propylene known as "Elephant Skin Synthetic Underlayment".

RESULTS:

The results of these tests are summarized on the following pages:

Summary Of Results

Warrior Roofing

4787034017/R8876

Fire Test Construction Details

System #	Description
1	Underlayment : Elephant Skin Synthetic Underlayment Shingles: Owens Corning Supreme roofing shingles

INTERMITTENT FLAME TEST

Test Code	Sys. No.	Class	Slope of deck (in./ft.)	First Smoke on Underside (h:mm:ss)	Asphalt Dripping on Underside (h:mm:ss)	Depth of Char (in.)	Duration of Test (mins.)	Pass
08171505	1	A	5 :12	00:22:51	NA	1/8	70.4	Yes
08181504	1	A	5 :12	NA	00:17:54	0	72.3	Yes

Test Code	Time of glow on Underside (h:mm:ss)	Flames on Underside (h:mm:ss)
08181504	NA	NA

At no time during these tests were any flying flaming brands of the roof covering material produced or did exposure of the roof deck occur.

BURNING BRAND TEST

Test Code	Sys. No.	Class	Slope of deck (in./ft.)	First Smoke on Underside (h:mm:ss)	Asphalt Dripping on Underside (h:mm:ss)	Time of Glow on Underside (h:mm:ss)	Depth of Char (in.)	Duration of Test (mins.)	Pass
08171501	1	A	5 :12	00:04:46	00:05:27	00:28:05	3/8	43.8	Yes
08171502	1	A	5 :12	00:07:19	00:08:29	NA	3/8	55	Yes
08171503	1	A	5 :12	00:07:27	00:08:49	00:15:06	3/8	41.3	Yes
08171504	1	A	5 :12	00:05:23	00:07:44	00:14:55	3/8	47.3	Yes

At no time during these tests were any flying flaming brands of the roof covering material produced or did exposure of the roof deck occur. Also, at no time during these tests were any sparks or flames noted on the underside of the deck.

The Classification Marking of UL LLC on a product is the only method provided by UL to identify products which have been produced under its Classification and Follow-Up Service. No use of a Classification Marking has been authorized as a result of this investigation. It is understood that you agree not to use the name, abbreviation or symbol of UL LLC, nor permit such use by others in the connection with the release, publication or dissemination of the information obtained under this application.

Since the anticipated work has been completed, we have instructed our Accounting Department to terminate the investigation and invoice you for the charges incurred to date.

Should you have any questions, please feel free to contact the writer.

Very truly yours,

MARTIN K. ROWAN (42349)
Senior Project Engineer
Building Materials & Systems

Reviewed By:

Alpesh Patel (Ext. 42522)
Staff Engineer
Building Materials & Systems