

UL Evaluation Report

UL ER18920-01

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UL Category Code: ULEZ

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Sub-level 2: 07 30 00 - Steep Slope Roofing

Sub-level 3: 07 31 00 - Shingles and Shakes

Sub-level 4: 07 31 53 - Plastic Shakes

Sub-level 3: 07 32 00 - Roof Tiles

Sub-level 4: 07 32 26 - Plastic Roof Tiles

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1. SUBJECT:

**EMPIRE SHAKE, EMPIRE PLUS SHAKE, EMPIRE SLATE, AND EMPIRE NIAGARA SLATE
POLYOLEFIN COMPOSITE TILES**

2. SCOPE OF EVALUATION:

- 2012, 2009, and 2006 *International Building Code* ® (IBC)
- 2012, 2009, and 2006 *International Residential Code* ® (IRC)
- ICC-ES Acceptance Criteria for Special Roofing Systems (AC07)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)



The products were evaluated for the following properties:

- Uplift Resistance (ANSI/UL 580)
- Uplift Resistance (ANSI/UL 1897)
- Roofing Systems for Exterior Fire Exposure (ANSI/UL790, ASTM E108)
- As Required in AC07 for Plastic Tiles and Panels

3. REFERENCED DOCUMENTS

- ICC-ES:
 - ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC07), dated February 2014
 - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated December 2012
- ANSI/UL:
 - ANSI/UL 580, Standard for Tests for Uplift Resistance of Roof Assemblies 5th Edition March 29, 2019
 - ANSI/UL 1897, Uplift Tests for Roof Covering Systems 7th Edition, September 23, 2015
 - ANSI/UL790, (ASTM E108), Standard Test Methods for Fire Tests of Roof Coverings, 8th Edition October 19, 2018

4. USES

Empire Shake, Empire Plus Shake, and Empire Slate tiles are used as roof covering materials in Class A or Class C roofing systems when installed in accordance with this report and the manufacturer's published installation instructions.

5. PRODUCT DESCRIPTION

EcoStar's Empire series products described in this report are synthetic composite roofing tiles manufactured using virgin and recycled polyolefin polymers. The Empire Slate tiles are available in 10" and 12" Traditional, Beaver Tail, Chisel Point and Beveled Edge Slate styles; the Empire Niagara Slate profile is available in 12" and 14" widths, and the two shake styles, the Empire Shake, and Empire Plus Shake are offered in blended bundles of 6", 9", and 12" tiles. The roofing tiles and accompanying hip and ridge products are available in standard sizes and thicknesses.

Fire Classification: EcoStar synthetic composite roofing tiles covered under this report have been tested for fire classifications Class A and Class C in accordance with ANSI/UL790 (ASTM E108) and qualify for use under [Section 1505.1](#) of the 2012, 2009 and 2006 IBC and [Section R902.1](#) of the 2012, 2009 and 2006 IRC. Refer to Table 1.

Wind Resistance: Roofing assemblies shall be designed to resist the design wind load pressures for components and cladding in accordance with [Chapter 16](#) and [Section 1504.3](#) of the 2012, 2009 and 2006 IBC and [Section R905.1](#) of the 2012, 2009 and 2006 IRC.

Wind Uplift Resistance: EcoStar synthetic composite roofing tiles covered under this report have been tested for wind uplift resistance in accordance with ANSI/UL 580/1897. Refer to Table 1.

Physical Properties: EcoStar composite roofing tiles covered under this report have been tested as Type I molded specimens, both as manufactured and Xenon Arc weathered, for tensile properties in accordance with ASTM D638, flexural properties in accordance with ASTM D790, and for temperature cycling as specified in AC07.

6. INSTALLATION

6.1 General:

Installation of EcoStar composite roofing tiles must be installed in accordance with [Section 1507.7](#) of the 2012, 2009 and 2006 IBC or [Section R905.6](#) of the 2012, 2009 and 2006 IRC, except as noted in this report, and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at all times on the jobsite during installation. The composite roofing tiles must be attached to the decked sheathing in a manner that will secure the tiles in place.

6.2 Slope:

Roofs having slopes less than 3:12 slope are not recommended for products covered under this report. Minimum slope of substrate for installation of Empire Shake and Empire Plus Shake composite roofing tiles is 3:12 for 7 inch exposure, and 6:12 for 8 inch exposure. For Empire Slate composite roofing tiles, the minimum slope of substrate for installation is 3:12 for 6 inch exposure and 6:12 for 7 inch exposure. The Empire Niagara Slate tiles can be installed at 9" exposure on roofs ranging from 3:12 to 6:12 slope and at 9" or 10" exposures at slopes greater than 6:12.

6.3 Sheathing:

The minimum required sheathing is to be ½ inch plywood decking, 7/16 inch OSB, or ¾ inch tongue and groove decking. The sheathing must be structurally sound and adequately fastened to resist wind loads for components and cladding as specified in [Section 1609](#) of the 2012, 2009, and 2006 IBC and [Section R301.6](#) of the 2012, 2009, and 2006 IRC

6.4 Underlayment:

An ice barrier must be installed along the eaves in locations historically prone to ice in accordance with [Section 1507.7.4](#) of the 2012, 2009 and 2006 IBC and [Section 905.5.3.1](#) of the 2012, 2009, and 2006 IRC. In addition to the ice barrier, an underlayment must be installed over the entire roof deck in accordance with [Section 1507.7.3](#) of the 2012, 2009, and 2006 IBC and [Section R905.6.3](#) of the 2012, 2009, and 2006 IRC.

6.5 Flashing:

Flashing materials are to be installed in accordance with [Section 1503.2](#) and [Section 1507.7.7](#) of the 2012, 2009, and 2006 IBC and [Section R903.2](#) and [Section R905.6.6](#) of the 2012, 2009, and 2006, as applicable.

6.6 Roofing Tiles:

Installation of the composite roofing tiles must begin at the eave edge with a starter row. An overlaying offset row is then installed to cover the starter row nail heads. Subsequent courses to be installed in accordance with the manufacturer's instructions.

6.7 Hips and Ridges:

Hips and ridges must be installed in accordance with EcoStar, LLC's published installation instructions for exposure, dimension, and fastener type.

6.8 Fasteners:

Fasteners supplied by EcoStar are minimum 1-½ inch long stainless steel ring-shanked nails. The nails have heads of ⅜ inch in diameter with 0.120 inch diameter shanks.

6.9 Reroofing:

Existing roof covering materials are to be removed prior to installation of the Empire composite roofing tiles. Installation is to be performed for new construction as described in Section 6 of this report.

7. CONDITIONS OF USE

7.1 General:

The composite roofing tiles described in this report comply with, or are suitable alternatives to, what is specified in those codes listed in Section 2 of this report, subject to the following conditions:

- 7.2** Materials and methods of installation shall comply with this report and the manufacturer's published installation instructions. In the event of a conflict between the installation instructions and this report, this report governs.
- 7.3** Only EcoStar specified fasteners shall be used in the installation of the roof covering system.
- 7.4** See the UL Online Certification Directory for Prepared Roof Covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood ([TFXX](#)), and Roof-covering Materials, Impact Resistance ([TGAM](#)).
- 7.5** Wind uplift pressures on any roof area, including edges and corner zones shall not exceed the allowable wind pressure for the roof covering installed in that particular area. The allowable wind uplift pressure for the roof assembly shall be based on a minimum factor of safety of 2.0. A safety factor of 2.0 has been applied to the test pressure for uplift resistance values shown in [Table 1](#). The allowable wind uplift pressure is for the roof system only. The deck and framing to which the roofing system is attached shall be designed for the applicable component and cladding, wind loads in accordance with the applicable code.
- 7.6** The Empire Shake, Empire Plus Shake, Empire Slate, and Empire Niagara Slate composite roofing tiles covered under this report are produced by EcoStar, LLC in Holland, New York under the UL LLC Listing/Classification and Follow-Up Service Program, which includes audits in accordance with quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC10.
- 7.7** Reroofing must be in accordance with Section 6.9.

8. SUPPORTING EVIDENCE

- 8.1** Data in accordance with ICC-ES Acceptance Criteria for Special Roofing Systems (AC07), dated February 2014.
- 8.2** Documentation of quality system elements described in ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated December 2012.
- 8.3** UL Classification reports in accordance with ANSI/UL 790, and UL 2218. See UL Product Certification Categories (TFXX) and (TGAM), respectively.

9. IDENTIFICATION

EcoStar composite roofing tiles described in this evaluation report are identified by a marking bearing the report holder's name (EcoStar,LLC) and address, the product name, the ASTM type designation, the UL Certification Mark where applicable, and the evaluation report number UL ER18920-01. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark certificate.

10. USE OF UL EVALUATION REPORT

- 10.1 The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.
- 10.2 UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- 10.3 The status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via the [Product iQ™ database](#).

TABLE 1: COMBUSTIBLE DECK ASSEMBLIES

System No.	Composite Roof Tile Attachment	Underlayment/Barrier Board Configuration	Deck ¹	Deck Attachment	Wind Uplift (psf)		Fire Rating (Unlimited Incline) ³
					Tested Pressure	Maximum Design Pressure ²	
EMPIRE SLATE					ANSI/UL 1897		ANSI/UL 790
1	Two 1-½ inches by 0.12 inches ring shank nails, 7 inches exposure	Minimum ¼ inch Georgia-Pacific Gypsum, LLC DensDeck mechanically fastened ⁴ and one ply Type 30 asphaltic felt, or one ply of: GAF VersaShield, or Atlas FR 50, or Layfast SBS TU43 ⁵	Minimum ¹⁹ / ₃₂ inch thick APA rated plywood Type C-D	8d annular ring-shank nails 6 inches oc	-240	-120	Class A
2	Four 1-½ inches by 0.12 inch ring shank nails, 7 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-330	-165	
3	Two 1-½ inches by 0.12 inch ring shank nails, 7 inch exposure		Minimum ¹⁵ / ₃₂ inch thick APA rated plywood Type C-D ⁶	8d annular ring-shank nails 6 inches oc	-187.5	-93.75	
4	Four 1-½ inches by 0.12 inch ring shank nails, 7 inch exposure			8d annular ring-shank nails 4 inches o.c. at board edges, 6 inches oc field of board	-255	-127.5	
5	Two 1-½ inches by 0.12 inch ring shank nails, 7 inch exposure		Minimum ⁷ / ₁₆ inch thick APA rated OSB ⁶	10d annular ring-shank nails 6 inches oc	-180	-90	
6	Four 1-½ inches by 0.12 inch ring shank nails, 7 inch exposure			10d annular ring-shank nails 6 inches oc	-255	-127.5	

TABLE 1: COMBUSTIBLE DECK ASSEMBLIES (CONTINUED)

System No.	Composite Roof Tile Attachment	Underlayment/Barrier Board Configuration	Deck ¹	Deck Attachment	Wind Uplift (psf)		Fire Rating (Unlimited Incline) ³
					Tested Pressure	Maximum Design Pressure ²	
EMPIRE NIAGARA SLATE					ANSI/UL 1897		ANSI/UL 790
7	Two 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}	Minimum ¹ / ₄ inch Georgia-Pacific Gypsum, LLC DensDeck mechanically fastened ⁴ and one ply Type 30 asphaltic felt, or one ply of: GAF VersaShield, or Atlas FR 50, or Layfast SBS TU43 ⁵	Minimum ¹⁹ / ₃₂ inch thick APA rated plywood Type C-D	0.113 X 2- ³ / ₈ inch ring-shank nails 6 inches oc	-180	-90	Class A
8	Four 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}				-225	-112.5	
9	Two 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}		Minimum ¹⁵ / ₃₂ inch thick APA rated plywood Type C-D	0.113 X 2- ³ / ₈ inch ring-shank nails 6 inches oc	-135	-117.5	
10	Four 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}				-195	-147.5	
11	Two 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}		Minimum ⁷ / ₁₆ inch thick APA rated OSB ⁶	0.113 X 2- ³ / ₈ inch ring-shank nails 6 inches oc	-75	-37.5	
12	Four 1- ³ / ₄ inches by 0.120 inch ring shank nails, 10 inch exposure ^{7, 8}				-165	-82.5	

TABLE 1: COMBUSTIBLE DECK ASSEMBLIES (CONTINUED)

System No.	Composite Roof Tile Attachment	Underlayment/Barrier Board Configuration	Deck ¹	Deck Attachment	Wind Uplift (psf)		Fire Rating (Unlimited Incline) ³
					Tested Pressure (psf)	Maximum Design Pressure ²	
EMPIRE SHAKE					ANSI/UL 1897		ANSI/UL 790
13	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure	Minimum ¼ inch Georgia-Pacific Gypsum, LLC DensDeck mechanically fastened ⁴ and one ply Type 30 asphaltic felt, or one ply of: GAF VersaShield, or Atlas FR 50, or Layfast SBS TU43 ⁵	Minimum ¹⁹ / ₃₂ inch thick APA rated plywood Type C-D	8d annular ring-shank nails 6 inches oc	-247.5	-123.75	Class A
14	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-285	-142.5	
15	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure		Minimum ¹⁵ / ₃₂ inch thick APA rated plywood Type C-D ⁶	8d annular ring-shank nails 6 inches oc	-195	-97.5	
16	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-315	-157.5	
17	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure		Minimum ⁷ / ₁₆ inch thick APA rated OSB ⁶	8d annular ring-shank nails 6 inches oc	-210	-105	
18	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-225	-112.5	

TABLE 1: COMBUSTIBLE DECK ASSEMBLIES (CONTINUED)							
System No.	Composite Roof Tile Attachment	Underlayment/Barrier Board Configuration	Deck ¹	Deck Attachment	Wind Uplift (psf)		Fire Rating (Unlimited Incline) ³
					Tested Pressure	Maximum Design Pressure ²	
EMPIRE PLUS SHAKE					ANSI/UL 1897		ANSI/UL 790
19	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure	Minimum ¼ inch Georgia-Pacific Gypsum, LLC DensDeck mechanically fastened ⁴ and one ply Type 30 asphaltic felt, or one ply of: GAF VersaShield, or Atlas FR 50, or Layfast SBS TU43 ⁵	Minimum ¹⁹ / ₃₂ inch thick APA rated plywood Type C-D	8d annular ring-shank nails 6 inches oc	-277.5	-138.75	Class A
20	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-375	-187.5	
21	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure		Minimum ¹⁵ / ₃₂ inch thick APA rated plywood Type C-D ⁶	8d annular ring-shank nails 6 inches oc	-217.5	-108.75	
22	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-330	-165	
23	Two 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure		Minimum ⁷ / ₁₆ inch thick APA rated OSB ⁶	8d annular ring-shank nails 6 inches oc	-195	-97.5	
24	Four 1-½ inches by 0.120 inch ring shank nails, 8 inch exposure			8d annular ring-shank nails 4 inch o.c. at board edges, 6 inches oc field of board	-255	-127.5	

1. Roof deck sheathing supports spaced 2-ft. on center
2. The maximum design wind uplift pressure utilizes a safety factor of 2 to the maximum tested load achieved without failure.
3. Class C Fire Rating achieved by substituting minimum of one ply Type 30 asphaltic felt for the underlayment/barrier board in any of the above assemblies.
4. Refer to Georgia-Pacific Gypsum, LLC's website for preliminary fastening patterns for mechanically attached roof coverings.
5. One layer of any UL Classified self-adhering underlayment optional underneath the underlayment/barrier board.
6. Refer to Guide Information for [Prepared Roof-Covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood](#).
7. Adjacent roof tiles to maintain a 3/8-inch wide gap between consecutive slates.
8. Course offset to be maintained at 7 inches.

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