



FLORIDA BUILDING CODE EVALUATION REPORT

Date | Mar 15, 2018
 File No. | 0064-1
 For | Davinci Roofscapes, LLC
 Address | 13890 W 101 St, Lenexa, KS 66215

Subject

DaVinci Slate, DaVinci Shake, Fancy Shake, Bellaforté Slate, Bellaforté Shake Roof Shingles

Evaluation Scope

This Evaluation Report is issued under Rule 61G20-3 and the applicable regulations governing the use of construction materials in the State of Florida. The product(s) described herein have been evaluated to the 6th Edition (2017) Florida Building Code.

Product Category: Roofing
Sub-Category: Products Introduced as a Result of New Technology

CODE SECTIONS AND STANDARDS:

HVHZ	FBC Section	Property	Standard	Year
	1504.3.1	Wind Uplift Resistance	UL 1897	2012
Y	1504.6 & 2615.2	Durability	ASTM G155	2005
Y	1523.6.5	Wind Driven Rain	TAS 100	1995
Y	1523.6.5.2.4.1	Wind Uplift Resistance	TAS 125	2003
	2606.4	Burning Rate	ASTM D635	2010
	2606.4	Self-Ignition Temp.	ASTM D1929	2012
	2606.4	Smoke Density	ASTM D2843	2010
Y	2615.2	Tensile after Weathering	ASTM D638	2003
Y	1516.1	Fire Classification	ASTM E108	2011

Compliance Statement: DaVinci Slate, DaVinci Shake, Fancy Shake, Bellaforté Slate, Bellaforté Shake Roof Shingles, as produced by Davinci Roofscapes, LLC., installed as described in this report, have demonstrated compliance with the listed sections of the 2017 Florida Building Code, including requirements for High Velocity Hurricane Zones (HVHZ), through testing in accordance with the listed Standards.

This report has been prepared and reviewed on behalf of Boca Engineering Co. by:

Christopher Bowness, P.Eng., P.E.

MAR 15 2018

Date





Evaluation

1.0 PRODUCT DESCRIPTION:

- 1.1 **DaVinci Slate** are synthetic roof slates from a polymer-injection-mold fabrication with thickness of 1/8-inch at head to 1/2-inch at tail, and dimensions 18-inch long by 6, 7, 9, 10 or 12-inch wide.
- 1.2 **DaVinci Shake** are synthetic roof shake from a polymer-injection-mold fabrication with thickness of 1/4-inch at head to 1/2-inch at tail, and dimensions 22-inch long by 4, 6, 7, 8, or 9-inch wide.
- 1.3 **Fancy Shake** are synthetic roof shakes from a polymer-injection-mold fabrication with thickness of 1/4-inch at head, 1/2-inch at tail, and dimensions 18-inch long by 5, 7, or 12-inch wide. Fancy Shake are available with a "Diamond Point" or "Beaver Tail" leading edge; these "Diamond Point" and "Beaver Tail" shakes are 5-inch wide.
- 1.4 **Bellaforté Slate** are synthetic roof slates from a polymer-injection-mold fabrication with thickness of 1/8-inch at head to 1/2-inch at tail, and dimensions 16 1/4-inch long by 13 3/8-inch wide.
- 1.5 **Bellaforté Shake** are synthetic roof shakes of from a polymer-injection-mold fabrication with thickness of 1/8-inch at head to 3/4 to 1 1/4 at tail, and dimensions 16 1/4-inch long by 13 3/8-inch wide.

2.0 REFERENCE TECHNICAL DOCUMENTS:

Entity	FBC Entity No.	Standards	Report No.	Issue Date
PRI	TST1509	ASTM D635	DRM-054-02-01	2015-11-16
PRI	TST1509	ASTM D1929	DRM-054-02-01	2015-11-16
PRI	TST1509	ASTM D2843	DRM-054-02-01	2015-11-16
PRI	TST1509	ASTM G155	DRM-156-02-01	2015-12-02
PRI	TST1509	ASTM D638	DRM-156-02-01	2015-12-02
Intertek	TST5878	UL 1897	3062037-02	2005-12-21
PRI	TST1509	TAS 100	DRM-009-02-01	2006-01-11
Intertek	TST5878	TAS 125	3118011COQ-004	2007-04-30
Intertek	TST5878	UL 1897	103032787COQ-004	2017-08-30
PRI	TST1509	TAS 100	DRM-010-02-01	2007-07-26
Intertek	TST5878	TAS 125	3128992COQ-004	2007-07-31
PRI	TST1509	TAS 100	DRM-017-02-01	2009-08-27
Intertek	TST5878	TAS 125	3169679COQ-033	2009-08-28
PRI	TST1509	TAS 125	DRM-025-02-01	2012-06-20
PRI	TST1509	TAS 100	DRM-034-02-01	2012-06-20
PRI	TST1509	TAS 125	DRM-035-02-01	2012-06-28
PRI	TST1509	TAS 100	DRM-037-02-01	2012-08-07
Intertek	TST5878	UL 1897	103032787COQ-003	2017-08-22
PRI	TST1509	TAS 100	DRM-013-02-01	2008-06-30
Intertek	TST5878	TAS 125	3155558COQ-003A	2008-06-27
Intertek	TST5878	TAS 125	100246786COQ-009	2010-12-22
QAI	QUA7628	Quality Assurance	B0150	2017-01-31
QAI	CER3916	Fire Classification	B0150	2017-01-31

Testing, certification, evaluation, and inspection agencies referenced have been verified to be accredited for the applicable scope and to be in good standing in accordance to Rule 61G20-3. All technical reference documents are current as of this date.

3.0 LIMITATIONS:

- 3.1 This Evaluation Report is for the roof covering products DaVinci Shake, DaVinci Fancy Shake, DaVinci Slate, DaVinci Bellaforté Slate and DaVinci Bellaforté Shake for use in both non-HVHZ and HVHZ jurisdictions, as installed in a roof assembly.
- 3.2 The installation details for each roof assembly evaluated for determining the maximum design wind uplift pressure are described in Section 4 limited to those conditions.



3.3 Materials used as components in the roof assembly shall comply with the FBC, and, if applicable possess the required product approval certification and labeling.

3.4 The minimum roof slope in all cases is 3:12.

3.5 Maximum design pressure has been determined through testing by applying a margin of safety of 2 to the ultimate pressure received in testing. The design values presented are Allowable Stress Design (ASD) as defined by ASCE-7.

4.0 INSTALLATION:

DaVinci Shake, DaVinci Fancy Shake, DaVinci Slate, DaVinci Bellaforté Slate and DaVinci Bellaforté Shake shall be installed in accordance with the DaVinci Roofscapes published installation instructions, subject to the Limitations noted in Section 3, and as described in Section 5 and detailed in Tables 1 and 2 of this report.

5.0 FIRE CLASSIFICATION:

Where roof fire classification of Class A, B, or C is required, follow the additional installation details published by the approved listing agency. DaVinci Roofscapes' Listed assemblies by QAI Laboratories may be found at <https://qai.org/directory/davinci-roofscapes-llc/> and shall be verified for each installation by the authority having jurisdiction.

6.0 QUALITY ASSURANCE ENTITY:

The products evaluated in this report are surveyed at the approved manufacturing locations with third-party quality assurance inspections and product certification labeling by QAI Laboratories.

7.0 MANUFACTURING PLANTS:

Manufacturing and labeling location(s): Lenexa, KS

8.0 LABELING:

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

9.0 EVALUATION RENEWALS: This Evaluation Report is valid until such time as the named product(s) changes, the Quality Assurance Agency changes, or provisions of the Code that relate to the product change. The Evaluation Report is re-issued to updated Code requirements at each Code Cycle.

10.0 CERTIFICATION OF INDEPENDENCE:

1. Boca Engineering Co. 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. Boca Engineering Co. is not owned, operated or controlled by any company manufacturing or distributing products it evaluates.
3. Christopher Bowness, 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. Christopher Bowness, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

11.0 EVALUATION REPORT TERMS:

This report is a general evaluation of the building code section requirements as identified and applies only to the samples that were evaluated. The evaluation report, including any drawings, do not imply that the signatory Engineer is the Designer of Record for any project on which this Evaluation Report is used.

Rule 61G20-3 (17)(a) Definition: Evaluation report means a report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity or a licensed Florida professional engineer or architect indicating that the product was evaluated to be in compliance with the Code or the intent of the Code and that the product complies with the Code or is, for the purpose intended, at least equivalent to that required by the Code.



TABLE 1: GENERAL ASSEMBLY COMPONENT DETAILS, GUIDE FOR USING ASSEMBLY TABLES 1A – 1G, INSTALLATIONS IN HVHZ REGIONS^{1,2}

SYSTEM NO.	Item number of assembly
PRODUCT:	Lists which specific Davinci product the assembly detail applies to
MDP:	Maximum design pressure in pounds-per-square-foot (psf) for wind uplift
SLOPE RANGE:	Slope is shown by Vertical:Horizontal (e.g. 3:12 = 3-inch rise to 12-inch run)
DECK SHEATHING:	HVHZ: Min. 19/32-inch plywood or wood plank, Non-HVHZ: Min. 15/32-inch plywood or wood plank
DECK ATTACHMENT:	In accordance with applicable Code, at minimum for HVHZ: 8d ring shank nails 6-inches (152 mm) on center at panel edges and at intermediate supports and 4-inches (102 mm) on center at gable ends of the following minimum dimensions: (a) 0.113-inch (2.9 mm) nominal shank diameter, (b) ring diameter of 0.012 inch (0.3 mm) over shank diameter, (c) 16 to 20 rings per inch, (d) 0.280-inch (7.1 mm) full round head diameter, (e) 2-inch (60.3 mm) nail length.
UNDERLAYMENT:	For HVHZ, minimum underlayment shall be ASTM D226, Type II (30# felt) in accordance with FBC Sections 1518.2 through 1518.4, or any HVHZ compliant underlayment listed by an approved certification agency. Not less than a full-width of approved ASTM D1970 self-adhering underlayment shall be applied around the perimeter of the entire roof. Per manufacturer’s instructions, for roof slopes less than 4:12 an approved self-adhering underlayment is to be used in all applications.
VALLEYS:	In accordance with published manufacturer’s instructions. Minimum for HVHZ shall be a full-width sheet of Approved ASTM D1970 self-adhering underlayment centered in the valley, followed by minimum 16-inch wide valley metal set in roofing cement and secured with roofing nails spaced 4-inch o.c., 1-inch from the edge of the metal. Prime metal edges and embed a minimum 4-inch strip of asphalt coated fabric over a minimum 6-inch wide bed of roofing cement.
STARTER: DaVinci Slate, DaVinci Shake, Fancy Shake	Each DaVinci Starter Slate should be installed extending approximately 1-inch over eaves and ¾-inch over rakes and with a 3/8-inch gap between starter shingles. (Note: If using Style D or Style F drip edge, the starter shingle can be allowed to overhang less if it is appropriate for the gutter system.) Each Starter Slate should be nailed approximately 3½-inch up from the butt edge and 1-inch from each side with 12-gage nails as specified. In high wind areas (greater than 110 mph in accordance with FBC Figure 1609), an additional nail should be placed in an area below the 8-inch line so that it will not be exposed through the shingles on the first course.
STARTER: Bellaforté Slate, Bellaforté Shake	Each Bellaforté Starter Slate/Shake should be installed extending approximately 1-inch over eaves and ¾-inch over rakes and with a 3/8-inch gap between starter shingles, adjusted as needed to achieve water-flow into the gutter (if present). Starter tiles are spaced 3/8 to ½ inch apart and nailed with a minimum of four 12-gage nails as specified.
SLATES/SHAKES:	Individual tables will specify the exposure length of the shingle in inches as the maximum course-to-course spacing, and number of fasteners required per shingle.
SLATES AND SHAKES NAIL FASTENING (HVHZ):	Minimum 12 gage, galvanized, annular ring shank nails having not less than 20 rings per inch, heads not less than 3/8 inch (9.5 mm) in diameter; and lengths sufficient to penetrate through the thickness of plywood panel or wood plank decking not less than 3/16 inch (4.8 mm), or to penetrate into a 1 inch (25 mm) or greater thickness of lumber not less than 1 inch. All nails shall be listed by a certification agency to the applicable Code.
SLATES AND SHAKES FASTENING (other):	See Tables for alternate fastening methods.

1. Additional assembly-specific components details are provided in some of the systems. The assembly-specific details govern if conflicting with those in Table 1.
2. HVHZ assemblies may be used in non-HVHZ regions to achieve the pressure design values as indicated. In such cases, all assembly details including fastener specifications for HVHZ must be used.



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TABLE 1A: HVHZ SYSTEM 1

SYSTEM NO.	1
PRODUCT:	DaVinci Slate
MDP:	-118.5 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 1
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SLATES:	In accordance with published manufacturer's instructions, maximum 6-inch exposure, using two (2) nails at the marked nail locations.
SLATES ATTACHMENT:	Per table 1

TABLE 1B: HVHZ SYSTEM 2

SYSTEM NO.	2
PRODUCT:	DaVinci Shake
MDP:	-93.5 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 1
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
INTERLAYMENT:	In accordance with published manufacturer's instructions, Interlayment is required for all roofs with pitch of less than 6:12.
VALLEYS:	Per table 1
STARTER:	Per table 1
SHAKES:	In accordance with published manufacturer's instructions, maximum 9-inch exposure, using two (2) nails at the marked nail locations.
SHAKES ATTACHMENT:	Per table 1

TABLE 1C: HVHZ SYSTEM 3

SYSTEM NO.	3
PRODUCT:	Fancy Shake
MDP:	-131 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 1
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SHAKES:	In accordance with published manufacturer's instructions, maximum 6-inch exposure, using two (2) nails at the marked nail locations.
SHAKES ATTACHMENT:	Per table 1



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TABLE 1D: HVHZ SYSTEM 4

SYSTEM NO.	4
PRODUCT:	Fancy Shake "Diamond Point" and "Beaver Tail"
MDP:	-161 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 1
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SHAKES:	In accordance with published manufacturer's instructions, maximum 5-inch exposure, using two (2) nails at the marked nail locations.
SHAKES ATTACHMENT:	Per table 1

TABLE 1E: HVHZ SYSTEM 5

SYSTEM NO.	5
PRODUCT:	Bellaforté Slate
MDP:	-65 psf
SLOPE RANGE:	3:12 or greater
DECK:	Min. 19/32-inch plywood or wood plank for HVHZ and non-HVHZ
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SLATES:	In accordance with published manufacturer's instructions, maximum 12-inch exposure, using five (5) nails per slate. Fasteners are placed four (4) at marked locations at the head of the slate and one (1) at the side-tab.
SLATES ATTACHMENT:	Per table 1

TABLE 1F: HVHZ SYSTEM 6

SYSTEM NO.	6
PRODUCT:	Bellaforté Slate
MDP:	-121 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 1
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SLATES:	In accordance with published manufacturer's instructions, maximum 12-inch exposure, using three screws as specified below. Fasteners are placed two (2) at marked locations at the head of the slate and one (1) at the side-tab.
SLATES ATTACHMENT:	Non-corrosive minimum #10 x 2-inch long screws with a #2 square drive pancake head per slate.



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TABLE 1G: HVHZ SYSTEM 7

SYSTEM NO.	7
PRODUCT:	Bellaforté Shake
MDP:	-80 psf
SLOPE RANGE:	3:12 or greater
DECK:	Min. 19/32-inch plywood or wood plank for HVHZ and non-HVHZ
DECK ATTACHMENT:	Per table 1
UNDERLAYMENT:	Per table 1
VALLEYS:	Per table 1
STARTER:	Per table 1
SHAKES:	In accordance with published manufacturer's instructions, maximum 12-inch exposure, using five (5) nails per slate. Fasteners are placed four (4) at marked locations at the head of the slate and one (1) at the side-tab.
SHAKES ATTACHMENT:	Per table 1

TABLE 2: GENERAL ASSEMBLY COMPENT DETAILS, GUIDE FOR USING ASSEMBLY TABLES 2A – 2E, INSTALLATIONS IN NON-HVHZ REGIONS¹

SYSTEM NO.	Item number of assembly
PRODUCT:	Lists which specific Davinci product the assembly detail applies to
MDP:	Maximum design pressure in pounds-per-square-foot (psf) for wind uplift
SLOPE RANGE:	Slope is shown by Vertical:Horizontal (e.g. 3:12 = 3-inch rise to 12-inch run)
DECK SHEATHING:	Non-HVHZ: Min. 15/32-inch plywood or wood plank
DECK ATTACHMENT:	In accordance with applicable Code
UNDERLAYMENT:	For non-HVHZ, minimum underlayment shall be in accordance with FBC 1507.1.1 or any Approved underlayment having current Florida Statewide or Local Product Approval. Per manufacturer's instructions, for roof slopes less than 4:12 an approved self-adhering underlayment is to be used in all applications.
VALLEYS:	In accordance with applicable Code and published manufacturer's instructions.
STARTER: DaVinci Slate, DaVinci Shake, Fancy Shake	Each DaVinci Starter Slate should be installed extending approximately 1-inch over eaves and ¾-inch over rakes and with a 3/8-inch gap between starter shingles. (Note: If using Style D or Style F drip edge, the starter shingle can be allowed to overhang less if it is appropriate for the gutter system.) Each Starter Slate should be nailed approximately 3½-inch up from the butt edge and 1-inch from each side with 12-gage nails as specified. In high wind areas (greater than 110 mph in accordance with FBC Figure 1609), an additional nail should be placed in an area below the 8-inch line so that it will not be exposed through the shingles on the first course.
STARTER: Bellaforté Slate, Bellaforté Shake	Each Bellaforte Starter Slate/Shake should be installed extending approximately 1-inch over eaves and ¾-inch over rakes and with a 3/8-inch gap between starter shingles, adjusted as needed to achieve water-flow into the gutter (if present). Starter tiles are spaced 3/8 to ½ inch apart and nailed with a minimum of four 12-gage nails as specified.
SLATES/SHAKES:	Individual tables will specify the exposure length of the shingle in inches as the maximum course-to-course spacing, and number of fasteners required per shingle.
SLATES AND SHAKES NAIL FASTENING (NON-HVHZ):	Galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum 3/8-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and a minimum of 3/4 inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than 3/4 inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667.



SLATES AND SHAKES FASTENING (other):	See Tables for alternate fastening methods
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1. Additional assembly-specific components details are provided in some of the systems. The assembly-specific details govern if conflicting with those in Table 2.

TABLE 2A: NON-HVHZ SYSTEM 8

SYSTEM NO.	8
PRODUCT:	Davinci Slate
MDP:	-75 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 2
DECK ATTACHMENT:	Per table 2
UNDERLAYMENT:	Per table 2
VALLEYS:	Per table 2
STARTER:	Per table 2
SHAKES:	In accordance with published manufacturer's instructions, maximum 6-inch exposure, using two (2) nails per slate.
SLATES ATTACHMENT:	Per table 2

TABLE 2B: NON-HVHZ SYSTEM 9

SYSTEM NO.	9
PRODUCT:	Davinci Slate
MDP:	-60 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 2
DECK ATTACHMENT:	Per table 2
UNDERLAYMENT:	Per table 2
VALLEYS:	Per table 2
STARTER:	Per table 2
SHAKES:	In accordance with published manufacturer's instructions, maximum 8-inch exposure, using two (2) nails per slate.
SLATES ATTACHMENT:	Per table 2

TABLE 2C: NON-HVHZ SYSTEM 10

SYSTEM NO.	10
PRODUCT:	Davinci Shake
MDP:	-75 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 2
DECK ATTACHMENT:	Per table 2
UNDERLAYMENT:	Per table 2
VALLEYS:	Per table 2
STARTER:	Per table 2
SHAKES:	In accordance with published manufacturer's instructions, maximum 10-inch exposure, using two (2) nails per slate.
SHAKES ATTACHMENT:	Per table 2

TABLE 2D: NON-HVHZ SYSTEM 11



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SYSTEM NO.	11
PRODUCT:	Bellaforté Slate or Bellaforté Shake
MDP:	-75 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 2
DECK ATTACHMENT:	Per table 2
UNDERLAYMENT:	Per table 2
VALLEYS:	Per table 2
STARTER:	Per table 2
SHAKES/SLATES:	In accordance with published manufacturer's instructions, maximum 12-inch exposure, using five (5) nails per slate. Fasteners are placed four (4) at marked locations at the head of the slate/shake and one (1) at the side-tab.
SHAKES ATTACHMENT:	Per table 2

TABLE 2E: NON-HVHZ SYSTEM 12

SYSTEM NO.	12
PRODUCT:	Bellaforté Slate or Bellaforté Shake
MDP:	-45 psf
SLOPE RANGE:	3:12 or greater
DECK:	Per table 2
DECK ATTACHMENT:	Per table 2
UNDERLAYMENT:	Per table 2
VALLEYS:	Per table 2
STARTER:	Per table 2
SHAKES/SLATES:	In accordance with published manufacturer's instructions, maximum 12-inch exposure, using three (3) nails per slate. Fasteners are placed two (2) at marked locations at the head of the slate/shake and one (1) at the side-tab.
SHAKES ATTACHMENT:	Per table 2

- END -