



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1312-03

Versetta Stone® Panelized Stone
Veneer Applications Using Continuous
Insulation over Concrete or Masonry
Walls

Boral Stone Group

Product:

**Versetta Stone® Panelized Stone
Veneer**

Issue Date:

February 11, 2014

Revision Date:

April 1, 2022

Subject to Renewal:

April 1, 2023



COMPANY
INFORMATION:

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION
SECTION: 07 44 53 - Glass-Fiber-Reinforced Cementitious Panels
SECTION: 07 44 63 - Fabricated Faced Panel Assemblies

1 PRODUCT EVALUATED¹

- 1.1 Versetta Stone® Panelized Stone Veneer

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*

2.2 Standards and Referenced Documents

- 2.2.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*
- 2.2.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.2.3 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 2.2.4 *ASTM C1185: Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards*
- 2.2.5 *ASTM C1186: Standard Specification for Flat Fiber-Cement Sheets*
- 2.2.6 *ASTM C90: Standard Specification for Loadbearing Concrete Masonry Units*
- 2.2.7 *ASTM D3679: Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding*
- 2.2.8 *ASTM D5206: Standard Test Method for Windload Resistance of Rigid Plastic Siding*
- 2.2.9 *ASTM E2273: Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*
- 2.2.10 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

¹ For more information, visit drjcertification.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

³ All terms defined in the applicable building codes are italicized.



- 2.2.11 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*
- 2.2.12 *SBCA ANSI/FS 100: Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies*

3 PERFORMANCE EVALUATION

- 3.1 Versetta Stone® was evaluated:
 - 3.1.1 For use as an exterior wall covering on new or existing concrete or masonry walls in accordance with IBC Section 1402⁴ and IRC Section R703.
 - 3.1.2 For use as a weather-resistant covering in accordance with IBC Section 1403.2⁵ and IRC Section R703.1.1.
 - 3.1.3 To determine the ability of the product to resist wind loads in accordance with IBC Section 1609 and IRC Section R703.1.2.
 - 3.1.4 For use as an exterior finish over concrete or masonry walls with the addition of continuous insulation installed between the concrete or masonry walls and the Versetta Stone®.
 - 3.1.4.1 Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with *ASTM C578* or *ASTM C1289* and be qualified for wind pressure resistance in accordance with *SBCA ANSI/FS 100*.
 - 3.1.5 To determine the ability of various fasteners to support the gravity and transverse loads induced by the products when installed over concrete and masonry construction with the addition of continuous insulation installed between the framing and the Versetta Stone®.
- 3.2 Use in applications requiring a fire-resistance rating are outside the scope of this evaluation.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB accredited ICS code scope and/or the defined professional engineering scope of work on the dates provided herein.

4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 Versetta Stone® is a non-structural, fiber-reinforced, cement-based masonry wall cladding that is mechanically attached to masonry or concrete walls.
- 4.2 The panels have a simulated stone veneer surface.
- 4.3 The panels measure 36.4" long x 9.5" tall and 1.8" thick and have tongue-and-groove edges that engage adjacent panels.
 - 4.3.1 The finished exposure of the panels is 8" x 36".
- 4.4 A 0.0217"-thick painted G90 galvanized steel nailing flange is molded along the top edge of the panels for attachment to the substrate (Figure 1).
- 4.5 The bottom edge and the ends of the panels fit together using tongue-and-groove technology.
- 4.6 The panels have an installed weight of approximately 8.5 psf (17 pounds per panel).

⁴ 2015 IBC Section 1403

⁵ 2015 IBC Section 1404.2

- 4.7 Additionally, the stone veneer panels are supplemented with various accessories (such as starter strips, bridging, corner pieces, etc.) to aid with installation.



FIGURE 1: VERSETTA STONE® PANEL WITH NAILING HEM (ACROSS TOP OF PANEL)

5 APPLICATIONS

- 5.1 Versetta Stone® is used as an exterior wall covering in accordance with the applicable sections of IBC Chapter 14 and IRC Section R703 and is installed over concrete and masonry walls capable of supporting the imposed loads in accordance with IBC Section 1609 and IRC Section R301.2.1, including all required transverse wind loads.
- 5.2 Versetta Stone® is also used as an exterior wall covering installed over concrete and masonry walls where the walls are over sheathed with continuous insulation.
- 5.3 Fasteners for gravity loaded single shear connections for this installation are as shown in Table 1.
- 5.4 Versetta Stone® shall not be installed in areas where the design wind pressure exceeds the capacity of the cladding and its attachment to resist the load in accordance with Table 2.
- 5.4.1 See Table 3 for wind pressures associated with V_{ult} per ASCE 7.
- 5.4.2 Design in accordance with generally accepted engineering practice may be used as an alternative to Section 5.3.
- 5.5 Table 3 provides an aid for designers in determining the allowable wind pressures for Versetta Stone® panel installation. Wind speeds are included for both V_{ult} and V_{asd} .
- 5.5.1 For example:
- 5.5.1.1 Given the following:
- 5.5.1.1.1 Wind Speed, V_{ult} = 180 mph
- 5.5.1.1.2 Exposure D
- 5.5.1.1.3 Mean roof height = 25'
- 5.5.1.1.4 Concrete construction with 2" continuous insulation (CI)
- 5.5.1.2 Locate the appropriate fasteners in Table 1. Many will work with 2" CI.
- 5.5.1.3 The corresponding wind pressure from Table 3 shows that this installation corresponds to an allowable wind pressure of 125.6 psf.
- 5.5.1.4 Verify the withdrawal value of fasteners in Table 2.
- 5.5.1.5 For this example, either the $3/16"$ or $1/4"$ Tapcon® Hex screws will provide both sufficient shear and withdrawal.



- 5.6 For additional information or use in other applications, consult the manufacturer's installation instructions.
- 5.7 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

TABLE 1: FASTENER REQUIREMENTS TO SUPPORT VERSETTA STONE® INSTALLATION OVER CONTINUOUS INSULATION IN CONCRETE OR MASONRY CONSTRUCTION^{1,3}

Material	Fastener ⁵	Fastener Diameter (in)	Minimum Fastener Penetration ⁶ (in)	Thickness of Continuous Insulation Allowed ^{2,4} (in)								
				0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Concrete (minimum 2,500 psi)	3/16" Tapcon®	0.1875	1.5	X	X	X	X	X	X	X		
	1/4" Tapcon®	0.25	1.5	X	X	X	X	X	X	X	X	X
	Hilti X-C	0.138	0.75	X	X	X	X					
	Hilti X-U	0.157	0.75	X	X	X	X	X	X			
	Hilti X-C	0.138	1	X	X	X	X	X				
	Hilti X-U	0.157	1	X	X	X	X	X	X	X		
Masonry (medium/normal hollow CMU per ASTM C90)	3/16" Tapcon®	0.1875	1	X	X	X	X	X	X	X		
	1/4" Tapcon®	0.25	1	X	X	X	X	X	X	X	X	X
Masonry (lightweight hollow CMU per ASTM C90)	Masonry Nail	0.148	1	X	X	X	X	X				
	3/16" Tapcon®	0.1875	1	X	X	X	X	X				
	1/4" Tapcon®	0.25	1	X	X	X	X	X	X	X	X	X
	Hilti X-C	0.138	1	X	X							
	Hilti X-U	0.157	1	X	X	X	X					

SI: 1 in = 25.4 mm

1. Table values are based on the manufacturer's published fastener properties. The methodology for reducing the fastener capacities to account for the insulation are based on the NDS allowable lateral loads for fasteners as modified by AWC TR12 for use with a gap parameter for gravity load only (i.e., fasteners sized to support weight of cladding, while cantilevered from framing a distance equal to the foam sheathing thickness).
2. Maximum thickness of continuous insulation shall include any rain screen material, sheathing that does not serve as a nail base, and airspace between the cladding and the continuous insulation, where present.
3. Each panel shall contain a minimum of three (3) fasteners and penetrate the concrete or masonry wall as identified above.
4. Where a substrate other thanailable sheathing is used, its thickness shall be added to the continuous insulation thickness for the purpose of determining the fastener size.
5. Fasteners shall have the following minimum head diameter: Masonry nails, 0.312"; Hilti fasteners, 0.322"; Tapcon® fasteners, 0.325".
6. Tools used for driving pneumatic or powder actuated fasteners shall be adjusted to avoid over driving the fasteners and damaging the panel.



TABLE 2: WIND PRESSURE CAPACITY OF VERSETTA STONE® INSTALLATION OVER CONTINUOUS INSULATION ON CONCRETE OR MASONRY WALLS¹

Fastener	Material	Minimum Fastener Penetration (in)	Maximum Wind Pressure ² (psf)
Hilti Pin X-C	Masonry (Lightweight)	1 or ¾	37.3
	Masonry (Medium/normal)	1 or ¾	37.3
	Concrete	1	117.3
		¾	67.2
Hilti Pin X-U	Masonry (Lightweight)	1 or ¾	37.3
	Masonry (Medium/normal)	1 or ¾	37.3
	Concrete	1 or ¾	117.3
Tapcon® ¾" Hex Screw	Masonry (Lightweight)	1	54.3
	Masonry (Medium/normal)	1	89.6
	Concrete	1.5	136.6
Tapcon® ¼" Hex Screw	Masonry (Lightweight)	1	65.7
	Masonry (Medium/normal)	1	136.6
	Concrete	1.5	136.6

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

- Each panel shall contain a minimum of three (3) fasteners and penetrate the concrete or masonry wall as identified above.
- Reported maximum wind pressure is the lower of the manufacturer published withdraw capacity per fastener or the calculated allowable pull over capacity using 2.5 lb. metal lath, converted to psf.

TABLE 3: WIND PRESSURE RESISTANCE

Exposure Category	Wind Speed, V_{ult} (mph)	Wind Pressure Resistance ¹ (psf)					
		Mean Roof Height (ft)					
		15	20	25	30	35	40
B	110	29.1	29.1	29.1	29.1	30.6	31.7
	115	31.9	31.9	31.9	31.9	33.5	34.8
	120	34.7	34.7	34.7	34.7	36.4	37.8
	130	40.7	40.7	40.7	40.7	42.7	44.4
	140	47.2	47.2	47.2	47.2	49.6	51.4
	150	54.2	54.2	54.2	54.2	56.9	59.1
	160	61.7	61.7	61.7	61.7	64.8	67.3
	180	78.0	78.0	78.0	78.0	81.9	85.0
	200	96.3	96.3	96.3	96.3	101.1	105.0
C	110	35.2	37.5	39.3	40.7	42.2	43.4
	115	38.6	41.2	43.1	44.7	46.3	47.5
	120	42.0	44.8	46.8	48.6	50.3	51.7
	130	49.2	52.5	54.9	57.0	59.0	60.6
	140	57.1	60.9	63.7	66.1	68.4	70.3
	150	65.6	69.9	73.2	75.9	78.6	80.8
	160	74.7	79.6	83.3	86.4	89.5	91.9
	180	94.4	100.6	105.3	109.2	113.1	116.2
	200	116.5	124.2	130.0	134.8	139.6	143.5
D	110	42.8	45.1	46.9	48.3	49.5	50.6
	115	46.9	49.4	51.4	53.0	54.2	55.5
	120	51.0	53.8	55.9	57.6	59.0	60.4
	130	59.8	63.1	65.5	67.6	69.2	70.8
	140	69.4	73.2	76.0	78.4	80.2	82.1
	150	79.7	84.0	87.3	90.0	92.1	94.3
	160	90.7	95.6	99.3	102.4	104.9	107.4
	180	114.7	120.9	125.6	129.5	132.6	135.7
	200	141.6	149.3	155.0	159.9	163.7	167.6

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m², 1 mph = 1.61 km/h

1. Design wind pressures per ASCE 7 Chapter 30 Components and Cladding Method 1. Pressures shown are for 30' mean roof height, effective wind area of 10 sq. ft., wall corner Zone 5. For other conditions, see ASCE 7-10 and 7-16 Table 30.5-1



6 INSTALLATION

6.1 General

- 6.1.1 Versetta Stone® shall be installed in accordance with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.1.2 Installation is subject to the conditions of use set forth in Section 9.
- 6.1.3 All Versetta Stone® vertical joints shall be staggered between courses.
- 6.1.4 All other installation and flashing details germane to the project shall be in accordance with the applicable building code, the building designer's details, and the manufacturer's installation instructions.

6.2 Concrete and Masonry Walls

- 6.2.1 Versetta Stone® shall be installed over walls capable of resisting 100% of the design wind loads and shall be attached, at a minimum, in accordance with Table 1.
- 6.2.2 Versetta Stone® may be installed with (an) intervening layer(s) of continuous insulation and attached in accordance with Table 1.
- 6.2.3 Each Versetta Stone® panel shall be installed with a minimum of three (3) fasteners as follows:
 - 6.2.3.1 Two (2) of the fasteners must be installed into the concrete or masonry at each end of the panel and have a minimum penetration depth as shown in Table 1.
 - 6.2.3.2 The other fastener must be installed into the concrete or masonry at the center of the panel.
- 6.2.4 Fastener sizes shall be in accordance with Table 1 or generally accepted engineering practice.
- 6.2.5 A water-resistive barrier (WRB) is not required in this application; however, a WRB is permitted and may be mechanically attached, liquid applied or taped foam plastic insulating sheathing (FPIS) seams.

7 SUBSTANTIATING DATA

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 7.1.1 Moisture movement testing in accordance with *ASTM C1185*
 - 7.1.2 Nail hem bond strength testing in accordance with *ASTM C1185*
 - 7.1.3 Physical and mechanical properties testing in accordance with *ASTM C1186*
 - 7.1.4 Pressure equalization testing in accordance with *ASTM D3679, Annex 1*
 - 7.1.5 Transverse wind load testing in accordance with Procedure 2 of *ASTM D5206*
 - 7.1.6 Surface burning characteristics testing in accordance with *ASTM E84*
 - 7.1.7 Water drainage efficiency testing in accordance with *ASTM E2273*
- 7.2 *Fastening Systems for Continuous Insulation, Final Report 10-11*; New York State Energy Research and Development Authority (NYSERDA); Albany, NY; April 2010.
- 7.3 Baker, P. and Lepage, R.; *Cladding Attachment Over Thick Exterior Insulating Sheathing*; Prepared by the Building Science Corporation for the National Renewable Energy Laboratory on behalf of the U.S. Department of Energy's Building America Program; January 2014.
- 7.4 Baker, P.; *Initial and Long-Term Movement of Cladding Installed Over Exterior Rigid Insulation*; Prepared by the Building Science Corporation for the National Renewable Energy Laboratory on behalf of the U.S. Department of Energy's Building America Program; September, 2014.
- 7.5 Report showing compliance with required quality control procedures and documentation.



- 7.6 Information contained herein is the result of testing and/or data analysis by sources which conform to IBC Section 1703 and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.
- 7.7 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product listed in Section 1.1 is approved for the following:
- 8.1.1 Use as an exterior wall covering in accordance with IBC Section 1403.10⁶ and the IRC Section R703.10
- 8.1.2 Use as an exterior wall covering assembly when installed over concrete and masonry walls separately capable of resisting 100% of the design wind pressures; an intervening layer(s) of continuous insulation may be installed between the Versetta Stone® and the sheathing in accordance with Table 1 and Table 2
- 8.2 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.
- 8.2.1 No known variations
- 8.3 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
- 8.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.4 Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the building official. DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs RDPs.
- 8.5 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “certified once, accepted everywhere.”
- 8.6 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

⁶ 2015 IBC Section 1404.10



9 CONDITIONS OF USE

- 9.1 Installation shall be on exterior walls consisting of concrete or masonry and shall be capable of supporting the imposed loads, including transverse wind loads.
- 9.2 Where the seismic provisions of IRC Section R301.2.2 apply, the Versetta Stone® wall assembly shall not exceed the weight limits of IRC Section R301.2.2.1, unless an engineered design is provided in accordance with IRC Section R301.1.3.
- 9.3 Walls shall be braced to resist shear (racking) load by other means in accordance with the applicable code.
- 9.4 This product shall not be used in areas where the design wind pressure exceeds the resistance of the product in accordance with Table 2.
- 9.5 Concrete and masonry walls shall be designed in accordance with IBC Chapter 19 and Chapter 21, respectively.
- 9.6 Use of Versetta Stone® panels in installations exceeding 30' in height are outside the scope of this TER.
- 9.7 Use of Versetta Stone® panels in the high velocity hurricane zone of southern Florida is outside the scope of this TER.
- 9.8 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.9 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.10 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (e.g., owner or RDP).
- 9.11 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.12 This product has an internal quality control program and a third-party quality assurance program in accordance with IBC Section 104.4 and Section 110.4 and IRC Section R104.4 and Section R109.2.
- 9.13 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.
- 9.14 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.15 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.

10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at versettastone.com.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.