



Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

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

TER No. 1312-03

Issue Date: February 11, 2014

Updated: March 31, 2014

Subject to Renewal: April 1, 2015

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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 Evaluated:

- 1.1. Versetta Stone® Panelized Stone Veneer
- 1.2. For the most recent version of this report, visit drjengineering.org.

2. Applicable Codes and Standards:¹

- 2.1. 2006, 2009 and 2012 *International Building Code (IBC)*
- 2.2. 2006, 2009 and 2012 *International Residential Code (IRC)*
- 2.3. 2008 and 2012 *AWC NDS – National Design Specification for Wood Construction*
- 2.4. 2012 *AISI – North American Specification for the Design of Cold-Formed Steel Structural Members*

¹ Unless otherwise noted, all references in this TER are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product is also approved for use with the 2000-2009 versions of the *IBC* and *IRC* and the standards referenced therein.

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The *IBC* defines:

- **APPROVED SOURCE** – “An independent person, firm or corporation, approved by the building official, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.”

DrJ's building construction professionals meet the competency requirements as defined in the *IBC* and can seal their work. DrJ is regularly engaged in conducting and providing engineering evaluations of single-element and full-scale building systems. This TER is developed from data complying with *IBC* Section 104.11.1 Research reports, which states, “Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.”

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- 2.5. *ASTM C1185 – Standard Test Method for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.*
- 2.6. *ASTM C1186 – Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets*
- 2.7. *ASTM D3679 – Annex 1 Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding Pressure Equalization Testing*
- 2.8. *ASTM D5206 – Standard Test Method for Windload Resistance of Rigid Poly Vinyl Chloride (PVC) Siding, Procedure B*
- 2.9. *ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials*
- 2.10. *ASTM E2273 – Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*
- 2.11. *ASTM C1186 – Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets*
- 2.12. *ASTM D3679 – Annex 1 Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding Pressure Equalization Testing*
- 2.13. *ASTM D5206 – Standard Test Method for Windload Resistance of Rigid Poly Vinyl Chloride (PVC) Siding, Procedure B*
- 2.14. *ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials*

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 1403](#) and [IRC Section R703](#).
For use as a weather-resistant covering in accordance with [IBC Section 1403.2](#) and [IRC Section R703.1.1](#).
- 3.1.2. To determine the ability of the product to resist wind loads in accordance with [IBC Section 1609](#) and [IRC Section R703.1.2](#).
- 3.1.3. 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. 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.

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

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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 7-10.
 - 5.4.2. [Table 3](#) is provided as 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} .
 - 5.4.3. Design in accordance with generally accepted engineering practice may be used as an alternative to [Section 5.3](#).
- 5.5. For additional information or use in other applications, consult the [manufacturer's installation instructions](#).

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Material	Fastener	Fastener Diameter	Minimum Fastener Penetration	Thickness of Continuous Insulation								
				0"	0.5"	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4"
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					

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 APA 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 than nailable 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, .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 1: Fastener Requirements to Support Versetta Stone® Installation Over Continuous Insulation in Concrete or Masonry Construction

Fastener	Material	Minimum Fastener Penetration (in)	Maximum Wind Pressure (psf)
Hilti Pin X-C	Masonry (Lightweight)	1" or 3/4"	37.3
	Masonry (Medium/normal)	1" or 3/4"	37.3
	Concrete	1" 3/4"	117.3 67.2
Hilti Pin X-U	Masonry (Lightweight)	1" or 3/4"	37.3
	Masonry (Medium/normal)	1" or 3/4"	37.3
	Concrete	1" or 3/4"	117.3
Tapcon 3/16" Hex Screw	Masonry (Lightweight)	1"	54.3
	Masonry (Medium/normal)	1"	89.6
	Concrete	1.5"	136.6
Tapcon 1/4" Hex Screw	Masonry (Lightweight)	1"	65.7
	Masonry (Medium/normal)	1"	136.6
	Concrete	1.5"	136.6

1. Each panel shall contain a minimum of three (3) fasteners and penetrate the concrete or masonry wall as identified above.

2. 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 2: Wind Pressure Capacity of Versetta Stone® Installation Over Continuous Insulation on Concrete or Masonry Walls

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Exposure Category	Wind Speed, V_{ult} (mph)	Mean Roof Height					
		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

1. Design wind 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 Table 30.5-1

Table 3: General Wind Pressure Resistance Criteria per ASCE 7-10 for Components & Cladding, Method 1

5.6. Example for use of the tables in this TER

Given the following:

Wind Speed, V_{ult} = 180 mph

Exposure D

Mean roof height 25'

Concrete construction with 2" continuous insulation (CI)

Locate the appropriate fasteners in [Table 1](#). Many will work with 2" CI.

The corresponding wind pressure from [Table 3](#) shows that this installation corresponds to an allowable wind pressure of 125.6 psf.

Verify the withdrawal value of fasteners in [Table 2](#).

Either the $\frac{3}{16}$ " or $\frac{1}{4}$ " Tapcon Hex screws will provide both sufficient shear and withdrawal for this example.

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6. Installation:

6.1. General

- 6.1.1. Versetta Stone® shall be installed in accordance with the [manufacturer's installation instructions](#) and this TER. Where a discrepancy exists, this TER 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 panels 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 panels.
- 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 FPIS seams.

7. Test and Engineering Substantiating Data:

- 7.1. Reports by ATI showing compliance with *ASTM C1185* for evaluation of moisture movement through the product as well as nail hem bond strength, November 2010.
- 7.2. Reports by ATI showing compliance with *ASTM C1186* for the physical and mechanical properties of the product. November 2010.
- 7.3. Reports by ATI showing compliance with *ASTM D3679 – Annex 1* for Pressure Equalization, November 2010.
- 7.4. Reports by ATI of transverse wind load testing in accordance with *ASTM D5206-06a – Procedure B*, November 2010 and January 2013.
- 7.5. Reports by ATI showing compliance with *ASTM E84* for surface burning, November 2010.
- 7.6. Report of water drainage efficiency testing by ATI in accordance with *ASTM E2273*, November, 2010.
- 7.7. Foam Sheathing Committee Tech Matters, *Guide to Attaching Exterior Wall Coverings through Foam Sheathing to Wood or Steel Framing*, 2012.
- 7.8. New York State Energy Research and Development Authority, *Fastening Systems for Continuous Insulation*, 2010.
- 7.9. Report showing compliance with required quality control procedures and documentation.
- 7.10. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.
- 7.11. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.
- 7.12. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.
- 7.13. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through the codes and standards (e.g., *IRC, WFCM, IBC, SDPWS*, etc.), to undertake the review of test data that is comparative or shows equivalency to an intended end-use application.

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8. Findings:

- 8.1. Versetta Stone® is a suitable alternative to the products listed in the applicable building code for use as an exterior wall covering in accordance with [IBC Section 1404.10](#) and the [IRC Section R703.10](#).
- 8.2. Versetta Stone® is suitable for 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 1-2](#).
- 8.3. [IBC Section 104.11 and IRC Section R104.11 \(IFC Section 104.9 is similar\)](#) state:

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, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in 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*.²

9. Conditions of Use:

- 9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.
- 9.2. The Versetta Stone® panels described in this TER comply with, or are a code-compliant alternative material that is specified in the codes described in [Section 2](#), subject to the following conditions.
 - 9.2.1. Installation shall comply with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, this TER governs.
 - 9.2.2. Installation shall be on exterior walls consisting of concrete or masonry and shall be capable of supporting the imposed loads, including transverse wind loads.
 - 9.2.3. Where the seismic provisions of [IRC Section R301.2.2](#) apply, the Versetta Stone® wall assembly shall not exceed the weight limits of [Section R301.2.2.1](#), unless an engineered design is provided in accordance with [Section R301.1.3](#).
 - 9.2.4. Walls shall be braced to resist shear (racking) load by other means in accordance with the applicable code.
 - 9.2.5. This product shall not be used in areas where the design wind pressure exceeds the resistance of the product in accordance with [Table 2](#).
 - 9.2.6. Versetta Stone® panels shall be manufactured under the direction of a third-party quality assurance program to ensure continued compliance with this TER and the applicable building code.
 - 9.2.7. Concrete and masonry walls shall be designed in accordance with [IBC Chapter 19](#) and [21](#), respectively.
 - 9.2.8. Versetta Stone® panels are manufactured in Chester, South Carolina, under a quality control program with inspections by a qualified third-party inspection agency.
 - 9.2.9. Use of Versetta Stone® panels in installations exceeding 30' in height are outside the scope of this TER.
 - 9.2.10. Use of Versetta Stone® panels in the high velocity hurricane zone of southern Florida is outside the scope of this TER.

² The last sentence is adopted language in the 2015 codes.

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9.3. Design

9.3.1. Building Designer Responsibility

9.3.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).

9.3.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section 301](#) and [IBC Section 1603](#).

9.3.2. Construction Documents

9.3.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

9.4. Responsibilities

9.4.1. The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and good technical judgment.

9.4.2. Product, design and code compliance quality control are the responsibility of the referenced company. Consult the referenced company for the proper detailing and application for the intended purpose. Consult your local jurisdiction or design professional to assure compliance with the local building code.

9.4.3. DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.

9.4.4. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.

10. Identification:

10.1. Versetta Stone® described in this TER is identified by a label on the board or packaging material bearing the manufacturer's name, product name, 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 of this report, visit drjengineering.org.

11.2. For information on the current status of this report, contact [DrJ Engineering](#).



Scope of Responsibility / Work, Operations Policies, and Legal Responsibilities

- [Mission and Scope of Responsibility](#)
- [Product Evaluation Operations Concepts and Policies](#)
- [TERs Are Comparable to, Compatible with, and Equivalent to the Purpose of an ICC-ES ESR, IAPMO UES ER, Intertek IRR, Architectural Testing CCRR, etc.](#)
- [Legal Aspects of Product Approval](#)