Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

Versetta Stone® Panelized Stone Veneer Applications Over Continuous Insulation

TER No. 1212-01

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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. *ASTM C1186 – Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets*

2.4. *ASTM 3679 – Annex 1 Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding Pressure Equalization Testing*

2.5. *ASTM D5206 – Standard Test Method for Windload Resistance of Rigid Poly Vinyl Chloride (PVC) Siding, Procedure B*

[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.

2.6. *ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials*

2.7. *ASTM 2273 – Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*

3. Performance Evaluation:

3.1. Versetta Stone® was evaluated for use as an exterior wall covering in accordance with *IBC* Section 1403 and *IRC* Section 703.

3.1.1. Specifically, Versetta Stone® was evaluated for use as a weather-resistant covering in accordance with *IBC* Section 1403.2 and *IRC* Section R703.1.1.

3.1.2. Versetta Stone® was evaluated to determine its ability to resist wind loads in accordance with *IBC* Section 1609 and *IRC* Section 703.1.2.

3.1.3. Versetta Stone® was evaluated for installation over wood framing and wood structural panel (WSP) sheathing with the addition of continuous insulation installed between the WSP and Versetta Stone® panels.

3.2. Versetta Stone® was evaluated for installation over steel framing and gypsum sheathing for use on the exterior side of the exterior wall with the addition of continuous insulation installed between the gypsum sheathing and the Versetta Stone® panels.

3.3. 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 wall framing.

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 framing and/or nail-base.

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 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 wood-framed walls and WSP 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 wood- or steel-framed walls where the WSPs are over sheathed with continuous insulation. Connections for this installation are as shown in Table 1.

5.3. Unless designed as provided in Section 6.3.1, 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 for wood-framed walls and Table 3 for steel-framed walls. See Table 4 for wind pressures associated with V_{ult} per *ASCE 7-10*.

5.3.1. Design in accordance with generally accepted engineering practice may be used as an alternative to Section 5.3.

5.4. Table 4 provides as an aid for designers in determining the allowable wind pressures for Versetta Stone® panel installation.

5.4.1. For example, given the following:

Wind Speed, V_{ult}= 180 MPH

Exposure D

Wood Framing

5.4.1.1. From Table 2, the maximum mean roof height allowed for this condition is 25'.

5.4.1.2. This application assumes at least two (2) fasteners into the studs and an additional fastener into the WSP sheathing.

5.4.1.3. The corresponding wind pressure from Table 4 shows that this installation corresponds to an allowable wind pressure of 125.6 psf.

5.5. For additional information or use in other applications, consult the manufacturer's installation instructions.

	Fastener Diameter	Fastener Length[1]	Thickness of Continuous Insulation								
			0"	0.5"	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4"
Nails	0.120"	2.5"	x	x	x						
	0.131"	2.5"	x	x	x	x					
	0.148"	3"	x	x	x	x					
	0.162"	3.5"	x	x	x	x	x	x			
	0.192"	4"	x	x	x	x	x	x	x	n	
Screws	#8 screw (0.164")	2"	x	x	x	n	n	n	n	n	
	#10 (0.190")	2.5"	x	x	x	x	n	n	n	n	
	#12 (0.216")	3"	x	x	x	x	x	n	n	n	N
	#14 (0.242")	4"	x	x	x	x	x	x	x	n	N

1. Fastener lengths are the maximum length commonly available for a given diameter. Longer fasteners may be available from proprietary sources. See note 4.
2. Table values are based on *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).
3. Each panel shall contain a minimum of four (4) fasteners. Two (2) of the fasteners must be installed into the stud and penetrate a minimum of 1" for wood studs or three (3) threads beyond the backside of steel studs. The other two (2) fasteners are permitted to be fastened through the WSP and must protrude out of the backside of the WSP a minimum of ½". Where nailable sheathing is not used or studs are greater than 16" o.c. and not greater than 24" o.c., Versetta Bridging must be used to transfer the loads back to the studs.
4. 'n' – Non-standard or proprietary fasteners may be available with the additional length required to meet the penetration requirements.
5. 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.

Table 1: Fastener Requirements to Support Versetta Stone® Installation over Continuous Insulation, Sheathing & Wood or Steel Framing[1]

Exposure Category	Wind Speed, (mph) (V_{ult}/V_{asd})	Mean Roof Height					
		15'	20'	25'	30'	35'	40'
B	≤200/155	ST	ST	ST	ST	ST	ST
C	≤180/140	ST	ST	ST	ST	ST	ST
	200/155	ST	NP	NP	NP	NP	NP
D	≤160/125	ST	ST	ST	ST	ST	ST
	180/140	ST	ST	ST	NP	NP	NP

1. Listed wind speed is Vult, per *ASCE 7-10*, the maximum allowed wind speed condition for the fastening method shown.
2. Maximum allowable wind speeds are based on the average ultimate loads tested for each condition divided by 1.5.
3. ST – Each Versetta Stone® panel contains two (2) fasteners installed into studs (ST) and at least one (1) fastener into WSP only.
4. NP – Not permitted.
5. Assumes a minimum 1/4"-diameter self-tapping, pan head screw with 2" of penetration into the wood framing (e.g., ½" WSP sheathing plus 1 1/2" into wood studs).
6. Pressure equalization factor in accordance with *ASTM D5206*, Procedure B equals 1.0.

Table 2: Wind Pressure Capacity of Versetta Stone® Installation in Wood Framing Over Continuous Insulation & WSP Sheathing

Exposure Category	Wind Speed, V_{ult} (mph)	Mean Roof Height					
		15'	20'	25'	30'	35'	40'
B	≤110/85	ST	ST	ST	ST	ST	STVB
	115/90	ST	ST	ST	ST	ST	STVB
	120/95	ST	ST	ST	ST	ST	STVB
	130/100	ST	ST	ST	ST	STVB	STVB
	140/110	STVB	STVB	STVB	STVB	STVB	STVB
	150/115	STVB	STVB	STVB	STVB	STVB	STVB
	160/125	STVB	STVB	STVB	STVB	NP	NP
C	≤110/85	ST	ST	ST	ST	STVB	STVB
	115/90	ST	ST	STVB	STVB	STVB	STVB
	120/95	ST	STVB	STVB	STVB	STVB	STVB
	130/100	STVB	STVB	STVB	STVB	STVB	STVB
	140/110	STVB	STVB	NP	NP	NP	NP
D	≤120/95	STVB	STVB	STVB	STVB	STVB	STVB
	130/100	STVB	STVB	NP	NP	NP	NP

1. Listed wind speed is V_{ult}, per *ASCE 7-10*, is the maximum allowed wind speed condition for the fastening method shown.
2. Maximum allowable wind speeds are based on the average ultimate loads tested for each condition divided by 1.5.
3. ST –Each panel contains two (2) fasteners installed into the studs (ST) only.
4. STVB – Each panel contains two (2) fasteners installed into studs and at least one (1) fastener into Versetta Bridging. Studs into Versetta Bridging (STVB).
5. NP – Not permitted.
6. Assumes a minimum 1 1/4" ceramic-coated self-tapping screw, pan head screw into studs. Where Versetta bridging is used, the additional fastener is a #8 x ¾" truss head screw.
7. Pressure Equalization factor in accordance with *ASTM D5206*, Procedure B equals 1.0.

Table 3: Wind Pressure Capacity of Versetta Stone® Installation in Steel Framing Over Exterior Gypsum Sheathing (DensGlass or Equal)

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

Table 4: General Wind Pressure Resistance Criteria per *ASCE 7-10* for Components & Cladding, Method 1

6. Installation:

6.1. General

6.1.1. Versetta Stone® shall be installed in accordance with the manufacturer's published 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. A water-resistive barrier (WRB) is required behind Versetta Stone® in accordance with *IBC* Section 1404.2 and *IRC* Section 703.2. The WRB may be comprised of a liquid-applied, sheet material or a continuous insulation product evaluated for use as a WRB with all joints taped per the manufacturer's installation instructions.

6.1.4. All Versetta Stone® vertical joints shall be staggered between courses.

6.1.5. All other installation and flashing details germane to the project shall be in accordance with the applicable building code and the manufacturer's installation instructions.

6.2. Wood-Framed Walls

6.2.1. Versetta Stone® shall be installed over nailable structural sheathing 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 four (4) fasteners as follows:

6.2.3.1. Two (2) of the fasteners must be installed into the wood stud framing and penetrate a minimum of 1" into the framing.

6.2.3.2. The other two (2) fasteners must be installed into the nail base and must protrude out the back side of the nail base a minimum of ½" (Table 2 cells with the "ST" designation).

6.2.4. Fastener sizes shall be in accordance with Table 1 or generally accepted engineering practice.

6.3. Steel-Framed Walls

6.3.1. Versetta Stone® shall be installed over sheathing capable of resisting 100% of the design wind loads and shall be attached, at a minimum, with screws in accordance with Table 1.

6.3.2. Versetta Stone® may be installed over (an) intervening layer(s) of continuous insulation and attached in accordance with Table 1.

6.3.3. Each Versetta Stone® panel shall be installed as follows:

6.3.3.1. Two (2) fasteners must be installed into the steel stud framing and penetrate a minimum of $^{3}/_{8}$" into the framing (i.e., one fastener into each stud covered by the Versetta Stone® panel)in accordance with Table 3 (i.e., cells with the "ST" designation)

6.3.3.2. Where additional fastening is required to achieve increased wind pressures, the Versetta Bridging shall be used at panel joints with fastening in accordance with Table 3 (i.e., cells with the "STVB" designation).

7. Substantiating Data:

7.1. Reports showing compliance with *ASTM C1186* for the physical and mechanical properties of the product.

7.2. Report showing strength of nail hem bond strength.

7.3. Reports of water drainage testing in accordance with *ASTM E2273*.

7.4. Reports of transverse wind load testing in accordance with *ASTM D5206-06a*, Procedure B.

7.5. Reports showing compliance with required quality control procedures and documentation.

7.6. 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.

7.7. 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.

7.8. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.

7.9. 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.

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 703.10.

8.2. Versetta Stone® is suitable for use as an exterior wall covering assembly when installed over sheathing 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 1-3.

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.

9.1.1. 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.

9.1.2. Installation shall be on exterior walls consisting of wood or steel framing and sheathing capable of supporting the imposed loads, including transverse wind loads.

9.1.3. A WRB is required over the sheathing and may consist of a liquid-applied, sheet good material or continuous insulation.

9.1.4. 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.

9.1.5. Walls shall be braced to resist shear (racking) load by other means in accordance with the applicable code.

9.1.6. This product shall not be used in areas where the design wind pressure exceeds the resistance of the product in accordance with Table 2 or Table 3.

9.1.7. 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.

9.1.8. Wall framing shall be limited to a maximum out of plane deflection of H/240 per *IBC* Table 1604.3 and *IRC* Table R301.7.

9.1.9. Where Versetta Bridging is used, wall framing shall be limited to a maximum stud spacing of 24" o.c.

9.1.10. Where Versetta Bridging is not used, wall framing shall be limited to a maximum stud spacing of 16" o.c.

9.1.11. Versetta Stone® panels are manufactured in Chester, South Carolina, under a quality control program with inspections by a qualified third-party inspection agency.

9.1.12. Use of Versetta Stone® panels in installations exceeding 30' in height are outside the scope of this TER.

9.1.13. 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.

9.2. Design

9.2.1. Building Designer Responsibility

9.2.1.1. 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.

9.2.1.2. 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.

9.2.2. Construction Documents

9.2.2.1. 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.

9.3. Responsibilities

9.3.1. 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.

9.3.2. 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.

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

9.3.4. 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 an identifier on the units and/or a label on the packaging 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