

# TEST REPORT

**Intertek**

**REPORT NUMBER:** 3173059COQ-001

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## **EVALUATION CENTER**

INTERTEK TESTING SERVICES NA LTD.  
1500 BRIGANTINE DRIVE  
COQUITLAM, BC V3K 7C1

## **RENDERED TO**

CASTLEROCK BUILDING PRODUCTS  
P.O. BOX 1258  
MERIDIAN, ID 83680

**PRODUCT EVALUATED:** Insulstone Insulated Stone Veneer Panels  
**EVALUATION PROPERTY:** Structural Uniform Load and Drainage Efficiency

**Report of Insulstone Stone Insulated Panels for the selected requirements of the following criteria:**

- **ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference**
- **ASTM E2273-03, Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies**

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## 2 Introduction

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Intertek Testing Services NA Ltd. (Intertek) has conducted Structural Uniform Load and Drainage Efficiency tests for CastleRock Building Products, Inc. on an insulated stone panel system. The testing was carried out in accordance with the following:

- ASTM E330-02, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*
- ASTM E2273-03, *Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*

This evaluation was completed during the month of April 2009.

## 3 Test Samples

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### 3.1. SAMPLE SELECTION

Intertek representative, John Mulder, sampled and witnessed the manufacture of the Insulstone product on March 25, 2009. The sample selection process and witnessing was conducted at Insulstone, Inc., 5617 Cleveland Blvd., Building #3, Caldwell, ID, 83607. Products were selected in accordance with recognized independent sampling procedures, and were received at the Evaluation Center on April 15, 2009.

### 3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The product was identified as Insulstone, a modular stone or brick siding system, composed of a 2-3/16 in. to 4 in. thick high density polystyrene foam having an interlocking, machined tongue and groove perimeter. Insulstone is a manufactured stone or brick appearance from 1/2 in. to 2 in. in thickness manufactured primarily from Portland cement and pumice. The manufactured stone is adhered to the foam with a silicone adhesive, and is available in flat sections up to 24 in. x 36 in. in 3 stone styles and 4 colors. The product is also offered in corners, ends, and trims.

## 4 Testing and Evaluation Methods

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### 4.1. CONDITIONING

The sample materials were maintained in standard laboratory conditions for a minimum of 48 hours at a temperature of  $73 \pm 4^{\circ}\text{F}$  ( $23 \pm 2^{\circ}\text{C}$ ) and relative humidity of  $50 \pm 5\%$  prior to testing.

### 4.2. STRUCTURAL UNIFORM LOAD TEST

The structural uniform load test was conducted in accordance with ASTM E330-02. A test wall, measuring 6 ft. x 8 ft., was constructed using 1/2 in. APA sheathing installed over 2 in. x 4 in. SPF lumber studs spaced at 24 in. o/c. The studs and perimeter boards were secured using 3 in. long screws. The sheathing was covered with a loose sheet of 6 mm clear polyethylene film, and sealed around the outer perimeter of the test wall using construction adhesive tape.

The manufactured stone panels were installed on the test deck per the manufacturers' installation instructions (refer to Appendix B). The test specimen was sealed to a pressure

chamber and the air within the test chamber was evacuated using a vacuum pump, inducing a uniformly distributed load to the sample.

Deflection readings were recorded to establish deformation and set characteristics. Two gauges were set on the test specimen, one mid-span on the test panel and one mid-span on the sheathing. Gauge locations can be found on the data sheets in Appendix A. All deflection measurements were made independent of the test specimens.

After a 10 second preload (50% of test load), followed by 1 minute with the pressure released, the sample was subjected to a uniform load structural test using a specified test pressure for a time of 10 seconds. The test was performed in both the positive and negative directions. After the test loads were released, the permanent deflections were recorded. A visual examination of the specimen was made after the test to determine the failure mode.

#### **4.3. DRAINAGE EFFICIENCY TEST**

The drainage efficiency test was conducted in accordance with ASTM E2273-03. A test wall, measuring 4 ft. x 8 ft., was constructed using 1/2 in. sheathing applied to nominal 2 in. x 4 in. SPF lumber studs spaced 24 in. o/c. The manufactured stone panel product was installed to the test wall per the manufacturers' installation instructions.

A spray box was constructed, mounted, and sealed to the test specimen in such a manner that all water entered the slot fault. The spray box was centered with the bottom edge even with the bottom edge of the slot fault. The test specimen was positioned vertical and plumb.

A water spray system was installed with two spray nozzles at the spray box, oriented to apply all the water into the slot fault and located 13 mm (0.5 in.) from the open side of the spray box and 150 mm (6 in.) to the right and left of vertical center of the slot fault. A pressure regulator was employed to control the flow rate of water sprayed into the slot fault. The water spray system delivered water at a rate of 115 g (0.253 lb) per minute.

A water collection system using a trough and containers were used to collect and weigh the drained water. A calibrated scale was positioned under the trough to weigh the collection containers to the nearest 1.0 g (0.002 lb). The weight of the drained water was recorded at 15 minute intervals (5 times during the test period) to the nearest 0.1 g ( $2.2 \times 10^{-4}$  lb). After 75 minutes, the water spray was terminated. Water was continually collected for 60 minutes after termination of water spray. The containers of water were weighed and totaled to calculate the total weight of drained water.

The drainage efficiency was then calculated as follows:

$$\text{Drainage efficiency, \%} = (M_C / M_T) \times 100$$

Where  $M_C$  = Total weight of water collected  
 $M_T$  = Total weight of water delivered to test specimen

## **5 Testing and Evaluation Results**

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### **5.1. RESULTS AND OBSERVATIONS**

The product test results are shown in Table 1 and Table 2 below. A full set of test data is included in Appendix A.

<b>Table 1. Structural Uniform Load Test Results</b>		
<b>System Configuration</b>	<b>Ultimate Load, psf</b>	<b>Mode of Failure</b>
Insulstone Manufactured Stone Veneer installed over 1/2 in. sheathing and nominal 2 in. x 4 in. wood studs spaced 24 in. o/c using 1 in. x 2 in. crown staples every 3 in. o/c	<b>127</b>	Staples pulled through the foam EPS

<b>Table 2. Drainage Efficiency Test Results</b>	
<b>Properties</b>	<b>Weight of Water Collected (g)</b>
Water Flow Rate	
▪ 15 min	1101.6
▪ 30 min	1412.6
▪ 45 min	1450.9
▪ 60 min	1434.9
▪ 75 min	1431.3
▪ 135 min	228.0
Drainage Efficiency	<b>81.8%</b>

## 6 Conclusion

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The CastleRock Building Products, Inc. product identified and evaluated in this report has been tested in accordance with the following:


- ASTM E330-02, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*
- ASTM E2273-03, *Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*

The product has shown properties as presented in Section 5 of this report.

### INTERTEK TESTING SERVICES NA LTD.

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Chris Chang, EIT  
Project Leader / Test Engineer, Construction Products

Reviewed by:   
Heiko Neugebauer, ASCT  
Manager, Fenestration / Construction Products Group

## **APPENDIX A: Test Data (2 pages)**

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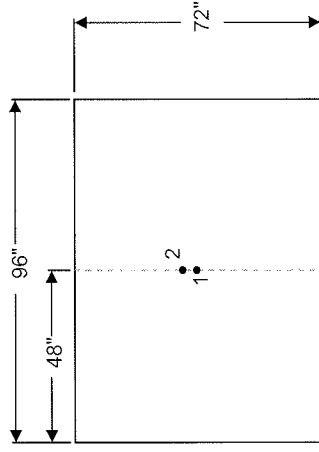
**Test:** Structural Uniform Load  
**Client:** CastleRock Building Products, Inc.  
**Date:** 20-Apr-09  
**Product:** Insulstone Manufactured Stone Veneer  
**Test Method:** ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference  
**Size:** Width: 96 in. Height: 72 in.  
**Equipment:** Manometer: Dwyer 0-36" H<sub>2</sub>O, Intertek ID# 2171  
Gauge #1: Starrett 2" Digital, Intertek ID# 2530  
Gauge #2: Starrett 2" Digital, Intertek ID# 2531

Project#: 3173059  
Technician(s): Riccardo DeSantis  
Andy Chase

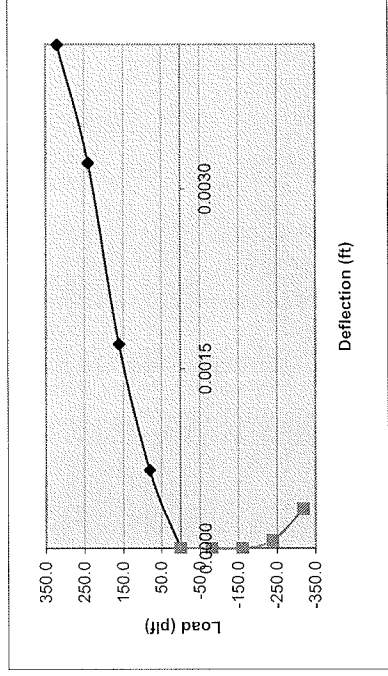
Deflection Gauge Locations:  
Mid-span on the stone cladding  
Mid-span on the sheathing

**Test Data:**

Loading Direction	Pressure			Gauge #1(in)		Gauge #2 (in)		Mid-Span Deflection (in)
	Pa	"H <sub>2</sub> O	psf	Actual	Residual	Actual	Residual	
Positive	479	1.9	10	0.06	0.00	0.05	0.00	0.008
Negative	479	1.9	10	-0.05	0.00	-0.05	0.00	0.000
Positive	958	3.8	20	0.13	0.01	0.11	0.00	0.021
Negative	958	3.8	20	-0.10	-0.01	-0.10	-0.01	0.000
Positive	1436	5.8	30	0.22	0.01	0.18	0.01	0.039
Negative	1436	5.8	30	-0.16	-0.01	-0.16	-0.01	-0.001
Positive	1915	7.7	40	0.31	0.01	0.26	0.01	0.050
Negative	1915	7.7	40	-0.23	-0.01	-0.22	-0.01	-0.004
Positive	3238	13.0	68	Removed gauges from getting damaged				
Negative	3487	14.0	73					
Positive	3736	15.0	78					
Negative	3985	16.0	83					
Positive	4235	17.0	88					
Negative	4484	18.0	94					
Positive	4733	19.0	99					
Negative	4982	20.0	104					
Positive	5231	21.0	109					
Negative	5480	22.0	114					
Positive	5729	23.0	120	Ultimate failure - staples pulled through EPS foam				
Negative	5854	23.5	122					
Positive	5978	24.0	125					
Negative	6103	24.5	127					



**Gauge Locations**







Test: **Drainage Efficiency** Project: 3173059  
Client: CastleRock Building Products, Inc. Eng./Tech: Kevin Penner  
Date: 22-Apr-09 Riccardo DeSantis  
Product: **Insulstone Manufactured Stone Veneer**  
Test Standard(s): ASTM E2273-03, *Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*  
Conditioning: Minimum 4 days at a temperature of  $23 \pm 2^\circ \text{C}$  and relative humidity of  $50 \pm 5\%$   
Equipment: Setra Scale 2000g (Intertek ID P52606, cal due March 2010)

Total weight of water sprayed into slot fault

	Initial (g)	Net water/ 15 min. X 5 (g)
Gross Water/15 min. (g)	2835.42	14177.10
Tare (g)	1109.19	5545.95
Net Water/15 min. (g)	1726.23	-
Net Water/75 min. (g)	8631.15	8631.15

Weights of water collected during test

	Initial (g)	15 minute (g)	30 minute (g)	45 minute (g)	60 minute (g)	75 minute (g)	1 Hour post shut off (g)
Gross (g)	0.0	1176.4	1486.7	1524.5	1509.0	1505.5	302.8
Tare (g)	0.0	74.8	74.2	73.6	74.1	74.2	74.8
Net Water (g)	0.0	1101.6	1412.6	1450.9	1434.9	1431.3	228.0
Accumulative (g)	0.0	1101.6	2514.1	3965.0	5399.9	6831.2	7059.2

EIFS clad wall assembly Drainage Efficiency (%)	81.8
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## **APPENDIX B: Installation Instructions (2 pages)**

# *CastleRock™ InsulStone*

## *Installation Instructions*

### **I). Interface with Other Work:**

Coordinate with installation of substrate required for installation. If Electrical, Plumbing and other Mechanical penetrations are installed after the exterior siding panels are installed, provisions for watertight sealing of all penetrations must be addressed.

### **II) General: Install in accordance with local building codes. In the absence of local building codes, install in accordance with the requirements of the IRC/IBC and the manufacturers installation instructions. Use a qualified installer.**

### **III). Flashings:**

Install flashings in accordance with the window and roofing manufacturer's installation instructions, or in the absence of these instructions, install per section 703.8 of the 2009 International Residential Code (IRC) at the following locations:

- a). Top of all doors and windows,
- b). Projecting lips or conversion to masonry or other sheathing, or an areas that may allow water to enter.
- c). At the base of a wall to prevent wicking into the plate or substrate.

### **VI). Weather Protective Barrier:**

A weather protective barrier (60 minute paper or approved equivalent) is required by the manufacturer to be installed behind the siding as a protective water barrier. Check with your local building official for weather protective barrier requirements in your area.

### **V). Installation of Interlocking Insulated Brick or Stone Panels:**

#### **a. Install the weather protective barrier.**

- b. **Prior to installation** of the starter section, determine its location in regard to windows and other opening to align with the stone height. Stone may be trimmed to fit at openings, but preplanning can save work and effort. Allow for the drip cap/sill to be located under the openings such as windows. Be sure to seal water tight any areas that may allow water penetration into the wall.

- c. **Install the Starter Section** (Part# 001-000) – Install the starter section at the bottom of area where the panels are to be installed a minimum of 6" above grade. Attach the starter section with 1 crown by 2" corrosion resistant staples to the sheathing every 3 inches on center. Starter section must be level and straight. Use of a transit or laser level is recommended.

- d. **Fastener Attachment Pattern:** Secure the panels to the wall using the specified fasteners. 1inch crown x 2 inch long corrosion resistant staples a minimum of every 3 inches on the tongue flange of the panel or equivalent.

#### **e. Panel placement**

The tongue flange must always be placed upward to prevent water intrusion into the wall. The panels are designed to be installed from bottom up and left and install to the right. Inspect each panel for flaws or damage prior to attaching to the wall. Use a level to ensure each row is straight and level before attaching to the wall or proceeding to the next row.

#### **f. Corners or ends**

Each row usually begins and ends at a corner or an end panel. Doors and windows require end panels or a protruding flange typically of wood or metal protruding 3 ½" outward from the wall to terminate a row. Inside corners are simply cut to fit and dead ended into the wall or adjoining panel. Panels may be miter cut for inside corners if desired. Install the outside corners and end panels for each row prior to the horizontal row of siding panels. The last panel may be trimmed to fit. Use silicone to seal it to the adjacent panel.

- g. **Flashing around Siding, Windows, Doors and Protrusions:** Prior to installing panels around windows, doors and protrusions install flashings in accordance with local building codes.

- h. **Windows Sill** –Allow the correct space between the bottom of the window protrusion and the panel for the sill. Install flashing and seal around doors and windows to prevent water intrusion into the wall. Consult your local building official for requirements in your area.

- i. **Header above doors and windows**– Install flashing above the window. Install a section of the starter strip in line with the top of the first course above the top of the window. This may create a void between the top of the window and the first row of stone siding above the window. If so, measure gap between top of the window and the bottom of the standard course above a window or door. Trim the color matched coated foam header (or filler) (part# 1005) to fill the void. Attach with styrofoam foam compatible adhesive and screws or finish nails and seal around the window to prevent water intrusion.

**Note:** Windows are usually designed with "weep" holes in the bottom flange. Do not block these openings when caulking and sealing around windows. Always drain water away from the wall. Do not allow water to drain into the wall.

- j. **Soffits:** Continue to the soffit and trim the last row to fit and/or Install a wood, metal, or plastic trim fascia at the soffit to finish.

- k. **Clean area** of trash and materials and touch-up chips or other damage. Inspect all locations for possible water leaks.

For additional information regarding installation, repair & maintenance, see our website:

[www.insulstone.com](http://www.insulstone.com)

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**Illustrations on next page**

CastleRock™  
*InsulStone™*  
 Patent Pending



Corner Sections

Drip Cap/Sill

Flat Sections

Starter Section  
 (attaches to wall)

End  
 Sections  
 Left & Right

Side Cut-away View of Wall

