



Concrete Masonry & Hardscapes Association  
 13750 Sunrise Valley Drive  
 Herndon, VA 20171  
 703.713.1900  
 MasonryAndHardscapes.org

**ASTM C39/C39M-21 Test Report**  
**Compressive Strength of Concrete Cylinders**

CMHA Project No.: 23-248-1A  
 Report Date: 11/22/2023

Client: Selkirk Stone, Inc.  
 Address: 122 Sand Creek Pkwy  
 Sandpoint, ID 83864

Testing Agency: Concrete Masonry & Hardscapes Association  
 Research and Development Laboratory  
 Address: 13750 Sunrise Valley Drive  
 Herndon, VA 20171-4662

Standard Specification: ASTM C1670/C1670M-23

Sampling Party: Selkirk Stone, Inc.  
 Date Samples Received: 5/30/2023

Unit Description: Cylinders from Manufactured Stone Veneer Mix  
 Mix ID: 1

**Summary of Test Results**

Physical Property	ASTM C1670/ C1670M-23 Specified Values	Average Test Results
7 Day Net Compressive Strength	---	6,080 psi
28 Day Net Compressive Strength	2,100 min psi	6,790 psi

**Individual Unit Test Results**

Date Cylinders Formed: 7/14/2023

7-Day Results

Date Tested:  
 7/21/2023

Specimen No.	Received Weight lb	Average Diameter in	Average Height in	Net Area in <sup>2</sup>	Max. Load lb	Compressive Strength psi
1	7.05	4.00	8.00	12.58	75,320	5,990
2	7.06	4.00	8.01	12.55	77,000	6,140
3	7.08	4.00	8.02	12.58	76,750	6,100
Average	7.06	4.00	8.01	12.57	76,360	6,080

28 Day Results

Date Tested:  
 8/11/2023

Specimen No.	Received Weight lb	Average Diameter in	Average Height in	Net Area in <sup>2</sup>	Max. Load lb	Compressive Strength psi
1	7.11	4.00	8.03	12.57	96,340	7,670
2	7.10	4.00	8.02	12.59	74,860	5,940
3	7.09	4.00	8.03	12.56	80,050	6,370
4	7.03	4.00	7.96	12.53	83,570	6,670
5	7.04	4.00	7.99	12.59	91,760	7,290
Average	7.07	4.00	8.00	12.57	85,320	6,790

Timothy Jones  
 Manager, Research and Development Laboratory

Nicholas R. Lang  
 Vice President of Engineering, Masonry



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November 22, 2023

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Selkirk Stone, Inc.  
122 Sand Creek Pkwy  
Sandpoint, ID 83864

CMHA Project Number: 23-248-1B

Please find enclosed the test report conducted in accordance with ASTM C666/C666M-15, *Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*, that we performed at your request on the manufactured stone veneer concrete mix that you supplied to the CMHA Research and Development Laboratory.

Please note that the contents of this report are not to be reproduced, except in full, without the written approval of the CMHA Research and Development Laboratory. The Concrete Masonry & Hardscapes Association Research and Development Laboratory is dedicated to the scientific testing and research of manufactured concrete products and systems and we are constantly working to improve our services. We would greatly appreciate any feedback regarding your experience with CMHA's Research and Development Laboratory. We have set up an anonymous online survey to solicit your feedback that can be accessed at the following link:

<https://forms.gle/37FghQXxScxat9By9>

After taking the online survey, make use of the many resources available at our website, [www.ncma.org](http://www.ncma.org). There you will find the latest industry news and events, a searchable directory of products and services, a vast collection of literature on the design, implementation, and marketing of manufactured concrete products and systems, as well as a list of the available laboratory services for future testing.

We take pride in meeting your product evaluation requirements and look forward to continuing to service your testing needs for years to come. Thank you for choosing CMHA's Research and Development Laboratory. Please feel free to contact me directly with any comments or questions at: 571-224-0924 or [tjones@ncma.org](mailto:tjones@ncma.org).

Sincerely,

A handwritten signature in black ink, appearing to read 'T. Jones', written over a horizontal line.

Timothy Jones  
Manager, Research and Development Laboratory



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**ASTM C666/C666M-15 Test Report**  
**Resistance of Concrete to Rapid Freezing and Thawing**

CMHA Project Number: 23-248-1B  
 Report Date: November 22, 2023

Client: Selkirk Stone, Inc.  
 Address: 122 Sand Creek Pkwy  
 Sandpoint, ID 83864

Testing Agency: Concrete Masonry & Hardscapes Association  
 Research and Development Laboratory  
 Address: 13750 Sunrise Valley Drive  
 Herndon, VA 20171-4662

Unit Specification: ASTM C1670/C1670M-23  
 Specimen Description:  
 Manufactured Stone Veneer Mix  
 Mix ID: 1

Sampling Party: Selkirk Stone, Inc.  
 Date Samples Were Produced: August 10, 2023  
 Date Testing Began: September 13, 2023  
 Age of Specimen at Start of Testing: 34 days

The client delivered constituent materials to the laboratory for freeze-thaw testing in accordance with Procedure A of ASTM C666/C666M-15. The laboratory batch these materials following the mix design provided by the client and cast five beams for freeze-thaw testing. Reported values of cumulative percent weight loss are provided as modified by ASTM C1670/C1670M-23.

**Test Medium: WATER**

Nominal Beam Dimensions: 3x4x16 in. Cast Beam

Specimen Number	Specimen Weight Pre-Soak (g)	Initial Specimen Saturated Weight	Final Specimen Saturated Weight	Mass Loss (g)	Mass Loss (%)	Specimen Fracture?
Specimen 1	6,006.5	6,100.1	6,121.5	-21.4	-0.4	No
Specimen 2	5,964.8	6,072.4	6,090.3	-17.9	-0.3	No
Specimen 3	5,974.6	6,070.1	6,093.8	-23.7	-0.4	No

ASTM C1670/C1670M-23 requires that no single specimen exhibit a mass loss greater than 1.5% or show any fracture completely through the cross-section of the specimen.

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CMHA Project Number: 23-248-2A

Report Date: November 22, 2023

**ASTM C140/C140M-23 Test Report**  
**For Manufactured Stone Veneer Units Under ASTM C1670/C1670M-23**

Client: Selkirk Stone  
 Address: 122 Sand Creek Pkwy  
 Sandpoint, ID 83864

Testing Agency: Concrete Masonry & Hardscapes Association  
 Research and Development Laboratory  
 Address: 13750 Sunrise Valley Drive  
 Herndon, VA 20171-4662

Standard Specification: ASTM C1670/C1670M-23

Sample Description: MVS Units-Profile: Country Cliffstone  
 Mix ID: 1

Sampling Party: Selkirk Stone  
 Date Samples Produced: May 11, 2023  
 Date Samples Received: May 30, 2023


**Summary of Test Results**


Physical Property	ASTM C1670/C1670M-23	
	Requirements	Tested Property
Average Saturated Density	Report Only	118.1 lb/ft <sup>3</sup>
Average Absorption	Report Only	12.4 lb/ft <sup>3</sup>
Average Saturated Unit Weight	15 lb/ft <sup>2</sup> Maximum	10.6 lb/ft <sup>2</sup>
Average Unit Thickness	2.625 in. Maximum	1.08 in.
Maximum Unit Face Dimension	36 in. Maximum	13.61 in.
Maximum Unit Face Area	5 ft <sup>2</sup> Maximum	0.32 ft <sup>2</sup>

**Individual Test Results**

Dates Tested:	Specimen	Average Height in.	Average Length in.	Maximum Face Dimension in.	Maximum Unit Face Area ft <sup>2</sup>
August 10, 2023	No. 1	3.62	9.29	9.97	0.23
to	No. 2	3.58	13.01	13.49	0.32
August 14, 2023	No. 3	2.93	13.30	13.61	0.27
	No. 4	3.65	9.47	10.15	0.24
	No. 5	2.90	5.48	6.20	0.11
	No. 6	3.63	6.84	7.74	0.17
	Average	3.38	9.56	10.19	0.22

Specimen	Received Weight lb	Immersed Weight lb	Saturated Weight lb	Oven-Dry Weight lb	Saturated Absorption lb/ft <sup>3</sup>	Saturated Density lb/ft <sup>3</sup>	Net Volume ft <sup>3</sup>	Average	Saturated
								Unit Thickness in.	Unit Weight lb/ft <sup>2</sup>
No. 1	2.61	1.33	2.79	2.48	12.9	119.0	0.0234	1.20	11.9
No. 2	3.59	1.75	3.77	3.39	11.7	116.7	0.0323	1.20	11.7
No. 3	2.03	1.06	2.25	2.01	12.6	118.5	0.0190	0.84	8.3
Average	2.74	1.38	2.93	2.63	12.4	118.1	0.0249	1.08	10.6

  
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 Manager, Research and Development Laboratory

  
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 Vice President of Engineering, Masonry



Representative Test Specimens



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**ASTM C482-20 Test Report**  
**Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste**

CMHA Project No: 23-248-2B  
 Report Date: 11/22/2023

Client: Selkirk Stone, Inc.  
 122 Sand Creek Pkwy  
 Sandpoint, ID 83864

Testing Agency: Concrete Masonry & Hardscapes Association  
 Research and Development Laboratory  
 Address: 13750 Sunrise Valley Drive  
 Herndon, VA 20171-4662

Unit Description: MSV Units - Profile: Country Cliffstone  
 Mix ID: 1

Sampling Party: Selkirk Stone, Inc.

Date Received: 5/30/2023

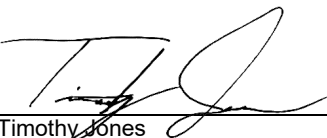
The client provided five manufactured stone veneer units for shear bond testing. Shear bond assemblies were constructed in accordance with ASTM C482-20 utilizing the mortar substrate for non-vitreous tile, as modified by ASTM C1670/C1670M-23, and portland cement paste substrate as a bonding matrix. Each assembly was tested for shear bond strength in accordance with ASTM C482-20.

**Individual Unit Test Results**  
 Date Tested: 8/18/2023

*Shear Bond Specimens*

	Stone Sample		Shear Bond Area* (in. <sup>2</sup> )	Maximum Load (lb)	Shear Bond Strength (psi)
	Avg. Width (in.)	Avg. Height (in.)			
	Unit #1	3.97			
Unit #2	3.96	3.98	15.72	3630	231
Unit #3	3.95	3.91	15.44	2090	135
Unit #4	3.96	4.00	15.82	5320	336
Unit #5	4.01	4.02	16.10	2260	140
Average	3.97	3.97	15.75	3434	218

\* Shear bond area calculated by multiplying the width and length of manufactured stone sample.

  
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**ASTM C157/C157M-17 Test Report**  
**Length Change of Hardened Hydraulic-Cement Mortar and Concrete**

CMHA Project Number: 23-248-1C  
 Report Date: November 22, 2023

Client: Selkirk Stone, Inc.  
 Address: 122 Sand Creek Pkwy  
 Sandpoint, ID 83864

Testing Agency: Concrete Masonry & Hardscapes Association  
 Research and Development Laboratory  
 Address: 13750 Sunrise Valley Drive  
 Herndon, VA 20171-4662

Standard Specification: ASTM C1670/C1670M-21b

Sampling Party: Selkirk Stone, Inc.

Sample Description: Manufactured Stone Veneer Mix  
 Mix ID: 1


Batching Party: CMHA Laboratory  
 Date Specimen Cast: 8/18/2023


**Summary of Test Results**

	ASTM C1670-21b Specified Value	Average Test Result
Linear Drying Shrinkage (%)	-0.1 max	-0.038

**Individual Specimen Test Results**

Specimen No.	Change in Specimen Length: 24-Hour Reference (%)					
	Initial 24-Hour Reference Reading (%)	Initial 7-Day Moist Cure Reading (%)	14-Day Air Cure Reading (%)	21-Day Air Cure Reading (%)	35-Day Air Cure Reading (%)	7 to 35-Day Relative Change (%)
No. 1	0.000	-0.004	-0.018	-0.029	-0.051	-0.047
No. 2	0.000	-0.004	-0.015	-0.027	-0.051	-0.047
No. 3	0.000	-0.002	-0.022	-0.018	-0.023	-0.021
Change in Specimen Length: 7-Day Reference (%)						
No. 1		0.000	-0.014	-0.025	-0.047	
No. 2		0.000	-0.011	-0.023	-0.047	
No. 3		0.000	-0.020	-0.016	-0.021	

  
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