



PRODUCT TESTING SERVICE

100 Clemson Research Blvd. • Anderson, SC 29625 • Tel (864) 646-TILE • Fax (864) 646-2821

April 25, 2012

StonePeak Ceramics, Inc.
Attn: Noah Chitty
238 Porcelain Tile Dr.
Crossville, TN 38555

Dear Mr. Chitty,

Tile Council of North America has tested the samples you submitted. Test report TCNA-179-12 is enclosed. If you have any questions or concerns, please contact us.

Best Regards,

TILE COUNCIL OF NORTH AMERICA, INC.

Katelyn Simpson
Laboratory Manager
Enclosures



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TCNA TEST REPORT NUMBER: TCNA-179-12

PAGE: 1 OF 1

TEST REQUESTED BY:

StonePeak Ceramics, Inc.
Attn: Noah Chitty
238 Porcelain Tile Dr
Crossville, TN 38555

TEST SUBJECT MATERIAL:

Identified by client as: StonePeak Plane Collection

TEST DATE:

4/16/12- 4/17/12

TEST PROCEDURE:

ASTM C650: "Resistance of Ceramic Tile to Chemical Substances"

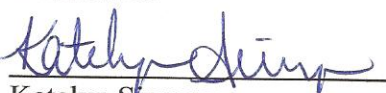
-One 2" x 2" glazed specimen was tested for each test solution.

-The specimens were exposed to the test solutions for 24 hrs. at 74°F.

TEST RESULTS:

Test Solution	Visual Test (Affected?)	Pencil Test (Affected?)
Common Household and Cleaning Chemicals		
Acetic acid, 3% (v/v)	NO	NO
Acetic acid, 10% (v/v)	NO	NO
Ammonium chloride, 100 g/L	NO	NO
Citric acid solution, 30 g/L	NO	NO
Citric acid solution, 100 g/L	NO	NO
Lactic acid, 5% (v/v)	NO	NO
Phosphoric acid, 3% (v/v)	NO	NO
Phosphoric acid, 10% (v/v)	NO	NO
Sulfamic acid, 30 g/L	NO	NO
Sulfamic acid, 100 g/L	NO	NO
Swimming Pool Chemicals		
Sodium hypochlorite solution, 20 mg/L	NO	NO
Acids and Bases		
Hydrochloric acid solution, 3% (v/v)	NO	NO
Hydrochloric acid solution, 18% (v/v)	NO	NO
Potassium hydroxide, 30 g/L	NO	NO
Potassium hydroxide, 100 g/L	NO	NO

According to ANSI A137.1-2008, the subject tile received a Class A classification.


Katelyn Simpson
Laboratory Manager

4/25/12
Date



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TEST DATE:

4/16/12-4/17/12

TEST PROCEDURE:

ASTM C373: "Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products"

-Five specimens were tested.

-The specimens were subjected to a five-hour boil and 24 hour soak to room temperature.

TEST RESULTS:

The average water absorption of five (5) specimens was: 0.24%. This value classifies the subject material as impervious (with a water absorption of less than 0.5 percent).

The individual results of water absorption were as follows:

Specimen 1: 0.23 %


Specimen 2: 0.25 %

Specimen 3: 0.22 %

Specimen 4: 0.23 %

Specimen 5: 0.27 %

[The ANSI A137.1 specification states that Porcelain Tile shall be impervious.]


Katelyn Simpson
Laboratory Manager

4/25/12
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Testing Services: testing@tileusa.com • Literature Orders: literature@tileusa.com • Web Site: www.tileusa.com

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TEST SUBJECT MATERIAL:

Identified by client as: StonePeak Plane Collection

TEST DATE:

4/18/12

TEST PROCEDURE:

ISO 10545-4: "Determination of Modulus of Rupture and Breaking Strength"

-Seven whole tiles with a thickness of 6.3 mm were tested.
- Modulus of Rupture (MOR) and Breaking Strength were calculated using the following equations:

$$MOR, M = \frac{3PL}{2bh^2} \quad \text{Breaking Strength, } F_{bs} = \frac{PL}{b}$$

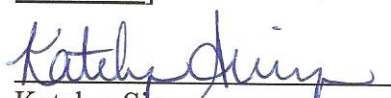
Where P is the breaking load, L is the span (240 mm), b is the width (250 mm), and h is the thickness of the test specimen (6.3 mm).

-The diameter (d) of the test rods was 20 mm, thickness (t) of the rubber was 5 ± 1 mm, and overlap (l) of the test specimen on the supporting rod was 10 mm (5 mm on each side).

TEST RESULTS:

Specimen #	P=Load (N)	M=MOR (N/mm ²)	B=Break Strength (N)
1	1200.5	43.6	1152.5
2	1169.1	42.4	1122.4
3	1137.8	41.3	1092.3
4	1172.1	42.5	1125.2
5	1268.1	46.0	1217.4
6	1175.0	42.6	1128.0
7	1093.7	39.7	1049.9
Average	1173.8	42.6	1126.8

[The ISO 13006 Group BIa requirement is: the breaking strength for tiles with thickness less than 7.5 mm shall be not less than 700 N and the modulus of rupture shall be a minimum of 35 N/mm² with no individual minimums below 32 N/mm²]


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TEST SUBJECT MATERIAL:

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TEST DATE:

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TEST PROCEDURE:

Mohs Scratch Hardness

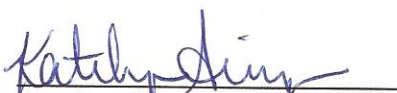
-Three whole tiles were tested.

-The tiles were tested using a Deluxe Hardness Pick Set from Mineralab, LLC. The following minerals are used as standard:

- 1 – Talc
- 2 – Gypsum
- 3 – Calcite
- 4 – Fluorite
- 5 – Apatite
- 6 – Feldspar
- 7 – Quartz
- 8 – Topaz
- 9 – Corundum
- 10 – Diamond

TEST RESULTS:

The Mohs Scratch Hardness was determined to be: 7.


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TEST SUBJECT MATERIAL:

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TEST PROCEDURE:

ASTM C648: "Standard Test Method for Breaking Strength of Ceramic Tile"

- Ten whole glazed tiles were tested.
- The tiles were loaded at a rate of 1000 pounds per minute.
- A three-inch equilateral triangular support was used to hold the tiles during loading.
- Testing was performed on an Instron Universal Tester, model #3385-H


TEST RESULTS:

The average breaking strength of ten (10) tiles was: 253 lbf.

The individual results of breaking strength are as follows:

Specimen 1: 240 lbf
Specimen 2: 290 lbf
Specimen 3: 238 lbf
Specimen 4: 263 lbf
Specimen 5: 254 lbf
Specimen 6: 246 lbf
Specimen 7: 248 lbf
Specimen 8: 253 lbf
Specimen 9: 260 lbf
Specimen 10: 235 lbf

[The ANSI A137.1 Specification for Porcelain Tile states: "the average breaking strength shall be 250 lbf or greater with no individual specimen below 225 lbf."]


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TEST PROCEDURE:

ASTM C1243: "Relative Resistance to Deep Abrasive Wear of Unglazed Ceramic Tile by Rotating Disc"

- Five 4 x 4-in. specimens cut from whole tiles were tested.
- The volume measurements were calculated using the equations found in the method.

TEST RESULTS:

Specimen #	L=Chord Length (mm)	V=Volume of Chord (mm ³)
1a	24.5	123
1b	24.5	123
2a	24.5	123
2b	25.0	131
3a	25.0	131
3b	24.5	123
4a	25.0	131
4b	24.5	123
5a	25	131
5b	24.5	123
Average		126

[According to Table 11 in the ANSI A137.1 specification, class P1, E1, and O1 tiles shall have a maximum value of 175 mm³.]


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TEST PROCEDURE:

ASTM C1028: "Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method"
-A Chatillon DFIS 100 digital force gauge was used to measure each pull in pounds-force.
-A 3 x 3 x 1/8-inch piece of Neolite was used as the sensor.


TEST RESULTS:

The average static coefficient of friction of four (4) pulls on each tile was as follows:

	<u>As Received</u>	<u>After Cleaning</u>
<u>Tile 1</u>		
Dry	<u>0.77</u>	<u>0.80</u>
Wet	<u>0.64</u>	<u>0.66</u>
<u>Tile 2</u>		
Dry	<u>0.78</u>	<u>0.80</u>
Wet	<u>0.64</u>	<u>0.66</u>
<u>Tile 3</u>		
Dry	<u>0.78</u>	<u>0.80</u>
Wet	<u>0.65</u>	<u>0.67</u>

The average static coefficient of friction of twelve (12) pulls was as follows:

	<u>As Received</u>	<u>After Cleaning</u>
Dry	<u>0.78</u>	<u>0.80</u>
Wet	<u>0.65</u>	<u>0.66</u>


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TEST PROCEDURE:

BOT 3000 "Dynamic Coefficient of Friction (DCOF)"

-Three (3) pieces of tile were tested in all four directions.

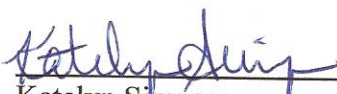
-The SBR sensor was verified using a standard tile prior to testing.

-Testing was done in the wet condition using 0.05% SLS water

-Testing was conducted in a laboratory at approximately 70 °F and 50% relative humidity using a calibrated BOT 3000 device.

TEST RESULTS: The individual and average DCOF data for each tile was as follows:

Tile 1		Tile 3	
Direction 1	0.62	Direction 1	0.60
Direction 2	0.60	Direction 2	0.61
Direction 3	0.61	Direction 3	0.59
Direction 4	0.60	Direction 4	0.61
Average	0.61	Average	0.60
Tile 2			
Direction 1	0.61		
Direction 2	0.61		
Direction 3	0.60		
Direction 4	0.62		
Average	0.61		


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