TILE COUNCIL OF NORTH AMERICA, INC.

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

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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 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
Date

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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: 4/18/12

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:

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

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**]

Katelyn Simpson
Laboratory Manager

4/25/12
Date

TILE COUNCIL OF NORTH AMERICA, INC.
PRODUCT TESTING SERVICE
100 Clemson Research Blvd. • Anderson, SC 29625 • Tel (864) 646-TILE • Fax (864) 646-2821

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

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.

Katelyn Simpson
Laboratory Manager

4/25/12
Date

TILE COUNCIL OF NORTH AMERICA, INC.
100 Clemson Research Blvd. • Anderson, SC 29625 • Tel (864) 646-TILE • Fax (864) 646-2821

PRODUCT TESTING SERVICE

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: 4/18/12

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**."]

Katelyn Simpson
Laboratory Manager

4/25/12
Date

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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: 4/18/12

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 mm^3.]

Katelyn Simpson
Laboratory Manager

4/25/12
Date

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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: 4/23/12

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:

	As Received	After Cleaning
Tile 1		
Dry	**0.77**	**0.80**
Wet	**0.64**	**0.66**
Tile 2		
Dry	**0.78**	**0.80**
Wet	**0.64**	**0.66**
Tile 3		
Dry	**0.78**	**0.80**
Wet	**0.65**	**0.67**

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

	As Received	After Cleaning
Dry	**0.78**	**0.80**
Wet	**0.65**	**0.66**

Katelyn Simpson
Laboratory Manager

4/25/12
Date

TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICE

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

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

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	
Direction 1	0.62
Direction 2	0.60
Direction 3	0.61
Direction 4	0.60
Average	**0.61**

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

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

Katelyn Simpson
Laboratory Manager

4/25/12
Date