



PRODUCT TESTING SERVICE

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

September 24, 2015

Stone and Equipment Inc.
Attn: Daniel Tormo
4681 SW 72nd Ave
Miami, FL 33155

Dear Mr. Tormo,

Tile Council of North America has tested the samples you submitted. Test report TCNA-600-15 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-600-15 PAGE: 1 OF 2

TEST REQUESTED BY: Stone and Equipment Inc.

TEST METHOD: ASTM C97: "Absorption and Bulk Specific Gravity of Dimension Stone"

Informal Test Method Description: These test methods cover the tests for determining the absorption and bulk specific gravity of all types of dimension stone, except slate. These test methods are useful in indicating the differences in absorption between the various dimension stones. See ASTM C97 for all method details and information.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"
Approximate Size as Received: 3"x3"x3"

TEST DATE: 9/14/2015 – 9/16/2015


TEST PROCEDURE:

- Sample prep: None
- The specimens were dried in an oven for 48 hours before a dry weight was recorded for each specimen.
- The specimens were then submerged in water for an additional 48 hours before measuring the saturated and suspended weights.
- The weight percent absorption and the density were then calculated based on the weight measurements made.

TEST RESULTS:

	% Water Absorption	Density (lb/ft ³)
Specimen 1	7.90	131.2
Specimen 2	6.13	136.7
Specimen 3	5.91	138.0
Specimen 4	6.10	138.1
Specimen 5	5.69	138.6
Average:	6.35	136.5

COMMENTS: None


Katelyn Simpson
Laboratory Manager

9/24/2015

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TCNA TEST REPORT NUMBER: TCNA-600-15 PAGE: 2 OF 2

TEST REQUESTED BY: Stone and Equipment Inc.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"

TEST METHOD: ASTM C97: "Absorption and Bulk Specific Gravity of Dimension Stone"

ASTM SPECIFICATIONS*:

ASTM standard	Stone Type	Specification
ASTM C503	Marble – Calcite	Maximum 0.20% Absorption; Minimum 162 lb/ft ³ Density
ASTM C503	Marble – Dolomite	Maximum 0.20% Absorption; Minimum 175 lb/ft ³ Density
ASTM C1527	Travertine (Interior or Exterior)	Maximum 2.5% Absorption; Minimum 144 lb/ft ³ Density
ASTM C568	Limestone (Low Density)	Maximum 12.0% Absorption; Minimum 110 lb/ft ³ Density
ASTM C568	Limestone (Medium Density)	Maximum 7.5% Absorption; Minimum 135 lb/ft ³ Density
ASTM C568	Limestone (High Density)	Maximum 3.0% Absorption; Minimum 160 lb/ft ³ Density
ASTM C615	Granite	Maximum 0.40% Absorption; Minimum 160 lb/ft ³ Density
ASTM C616	Quartz (Sandstone)	Maximum 8% Absorption; Minimum 125 lb/ft ³ Density
ASTM C616	Quartz (Quartzitic Sandstone)	Maximum 3% Absorption; Minimum 150 lb/ft ³ Density
ASTM C616	Quartz (Quartzite)	Maximum 1% Absorption; Minimum 160 lb/ft ³ Density

*For more detailed information, refer to ASTM C503 Specification for Marble Dimension Stone, ASTM C1527 Specification for Travertine Dimension Stone, ASTM C568 Specification for Limestone Dimension Stone, ASTM C616 Specification for Quartz-Based Dimension Stone and ASTM C615 Specification for Granite Dimension Stone

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TCNA TEST REPORT NUMBER: TCNA-600-15 PAGE: 1 OF 2

TEST REQUESTED BY: Stone and Equipment Inc.

TEST METHOD: ASTM C99: "Modulus of Rupture of Dimension Stone"

Informal Test Method Description: This test method covers the determination of the modulus of rupture of all types of dimension stone, except slate. This test method is useful in indicating the differences in modulus of rupture between the various dimension stones. See ASTM C99 for all method details and information.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"
Approximate Size as Received: 4"x8"x2.25"

TEST DATE: 9/14/2015–9/16/2015

TEST PROCEDURE:

- Sample prep: None
- Five of ten specimens were dried in an oven for 48 hours. The remaining five were submerged in water for 48 hours.
- All ten specimens were broken by a three-point load on the Instron universal tester with a load rate of 1000 lbf/min and a span of 7 inches.

TEST RESULTS:

Dry Condition	Modulus of Rupture (psi)	Wet Condition	Modulus of Rupture (psi)
Specimen 1	832	Specimen 1	595
Specimen 2	1007	Specimen 2	770
Specimen 3	769	Specimen 3	579
Specimen 4	926	Specimen 4	729
Specimen 5	994	Specimen 5	843
Average	906	Average	703

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TCNA TEST REPORT NUMBER: TCNA-600-15 PAGE: 2 OF 2

TEST REQUESTED BY: Stone and Equipment Inc.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"

TEST METHOD: ASTM C99: "Modulus of Rupture of Dimension Stone"

COMMENTS: None

ASTM SPECIFICATIONS*:

ASTM standard	Stone Type	Specification
ASTM C503	Marble (Calcite or Dolomite)	Minimum 1000 psi
ASTM C1527	Travertine (Interior or Exterior)	No Requirement
ASTM C568	Limestone (Low Density)	Minimum 400 psi
ASTM C568	Limestone (Medium Density)	Minimum 500 psi
ASTM C568	Limestone (High Density)	Minimum 1000 psi
ASTM C615	Granite	Minimum 1500 psi
ASTM C616	Quartz (Sandstone)	Minimum 350 psi
ASTM C616	Quartz (Quartzitic Sandstone)	Minimum 1000 psi
ASTM C616	Quartz (Quartzite)	Minimum 2000 psi

**For more detailed information, refer to ASTM C503 Specification for Marble Dimension Stone, ASTM C1527 Specification for Travertine Dimension Stone, ASTM C568 Specification for Limestone Dimension Stone, ASTM C616 Specification for Quartz-Based Dimension Stone and ASTM C615 Specification for Granite Dimension Stone*

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TCNA TEST REPORT NUMBER: TCNA-600-15 PAGE: 1 OF 2

TEST REQUESTED BY: Stone and Equipment Inc.

TEST METHOD: ASTM C1353-15: "Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser"

Informal Test Method Description: This test method covers the establishment of an index of abrasion resistance by determination of loss of volume resulting from abrasion of dimension stone. A specimen is abraded using rotary rubbing action under controlled conditions of pressure and abrasive action. See ASTM C1353 for all method details and information.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"
Approximate Size as Received: 4"x4"x0.50"

TEST DATE: 9/14/2015 – 9/18/2015


TEST PROCEDURE:

- Sample prep: None
- Three specimens were tested.
- The bulk density of the specimens was determined by following the procedure in ASTM C97.
- After, drying the specimens the average index of abrasion (I_w) resistance was determined by following the procedure in ASTM C1353 using a Taber Abraser for 1,000 revolutions
- The relative humidity of the test area was 50%

TEST RESULTS:

	Index of Abrasion (I_w)
Specimen 1	10
Specimen 2	12
Specimen 3	9
Average:	10

COMMENTS: None


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TEST REQUESTED BY: Stone and Equipment Inc.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"

TEST METHOD: ASTM C1353-15: "Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser"

ASTM SPECIFICATIONS*:

ASTM standard	Stone Type	Specification
ASTM C503	Marble (Calcite or Dolomite)	Minimum H_A 10 (ASTM C241)
ASTM C1527	Travertine (Interior or Exterior)	Minimum H_A 10 (ASTM C241)
ASTM C568	Limestone (Low Density)	Minimum H_A 10 (ASTM C241)
ASTM C568	Limestone (Medium Density)	Minimum H_A 10 (ASTM C241)
ASTM C568	Limestone (High Density)	Minimum H_A 10 (ASTM C241)
ASTM C615	Granite	Minimum H_A 25 (ASTM C241)
ASTM C616	Quartz (Sandstone)	Minimum H_A 2 (ASTM C241)
ASTM C616	Quartz (Quartzitic Sandstone)	Minimum H_A 8 (ASTM C241)
ASTM C616	Quartz (Quartzite)	Minimum H_A 8 (ASTM C241)

*For more detailed information, refer to ASTM C503 Specification for Marble Dimension Stone, ASTM C1527 Specification for Travertine Dimension Stone, ASTM C568 Specification for Limestone Dimension Stone, ASTM C616 Specification for Quartz-Based Dimension Stone and ASTM C615 Specification for Granite Dimension Stone

Note: I_W and H_A are similar values for softer stones like marble and limestone, but not for harder stones like granite. The specifications state the following regarding the abrasion methods: "The supplier of the No. 60 Alundum abrasive, Norton, has indicated that the formula for Norton treatment 138S has been changed. The new abrasive is currently more aggressive, resulting in lower abrasive hardness values (H_A) than when the standard (ASTM C241) was initially established. As such, care should be taken when interpreting H_A values from tests using the new abrasive, particularly with regard to current ASTM stone standard specification requirements for abrasion resistance, which were developed when the original abrasive was still in use. Committee C18 is actively studying alternatives to address this issue." "Abrasion resistance test method C1353 will eventually replace test method C241 and it is not necessary to perform both tests"

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TCNA TEST REPORT NUMBER: TCNA-600-15 PAGE: 1 OF 3

TEST REQUESTED BY: Stone and Equipment Inc.

TEST METHOD: ANSI A137.1-2012 Section 9.6.1: "Wet Dynamic Coefficient of Friction (DCOF)"

Informal Test Method Description: This test method covers the measurement of dynamic coefficient of friction of ceramic tile or other surfaces under the wet condition using the BOT 3000 device.

This summary is provided for the reader's convenience and is not a complete description of the method. See ANSI A137.1 Section 9.6.1 for all method details and information.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"
Approximate Size as Received: 10"x10"
Product color: Not Provided

TEST DATE: 9/14/2015

TEST PROCEDURE:


- Sample Prep: None
- The tiles were cleaned with Renovator #120 prior to testing.
- Three (3) pieces of tile were tested in all four directions with 10" long measurements.
- The SBR sensor was verified using a standard tile prior to testing.
- Testing was performed under wet conditions using 0.05% SLS water
- Testing was conducted under laboratory conditions at approximately 70°F and 50% relative humidity using a calibrated BOT 3000E device.

TEST RESULTS:

The individual and average DCOF data for each tile were as follows:

Direction	Tile 1	Tile 2	Tile 3
Direction 1	0.60	0.61	0.62
Direction 2	0.55	0.57	0.58
Direction 3	0.54	0.58	0.56
Direction 4	0.55	0.62	0.62
Average	0.56	0.60	0.60

COMMENTS: None


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TEST REQUESTED BY: Stone and Equipment Inc.

TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"

TEST METHOD: ANSI A137.1-2012 Section 9.6.1: "Wet Dynamic Coefficient of Friction (DCOF)"

ANSI SPECIFICATIONS*:

According to the ANSI A137.1 standard for ceramic tile, "Unless otherwise specified, tiles suitable for level interior spaces expected to be walked upon when wet shall have a wet DCOF of 0.42 or greater when tested using SLS solution as per the procedure in section 9.6.1. However, tiles with a DCOF of 0.42 or greater are not necessarily suitable for all projects. The specifier shall determine tiles appropriate for specific project conditions, considering by way of example, but not in limitation, type of use, traffic, expected contaminants, expected maintenance, expected wear, and manufacturers' guidelines and recommendations."

This paragraph is excerpted from Section 6.2.2.1.10 of the standard. For the complete section, including necessary information for specifiers, this section can be viewed and downloaded at no cost at

http://www.tcnatile.com/images/pdfs/COF_excerpt_from_ANSI_A137.1-2012_release_date_November_2012.pdf

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TEST SUBJECT MATERIAL: Identified by client as: "Shellreef"

TEST METHOD: ANSI A137.1-2012 Section 9.6.1: "Wet Dynamic Coefficient of Friction (DCOF)"

APPENDIX: Image of product tested



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