TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT PERFORMANCE TESTING LABORATORY
100 Clemson Research Blvd., Anderson, SC 29625
Phone 864.646.8453 **Fax** 864.646.2821
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April 26, 2019

MS International, Inc.
Attn: Morgan Huang
2095 N. Batavia Street
Orange, CA 92865
USA

Dear Morgan Huang,

Tile Council of North America has tested the samples you submitted. Test report TCNA-0360-19 is enclosed. If you have any questions or concerns, please contact us.

Best Regards,

TILE COUNCIL OF NORTH AMERICA, INC.

Damon L. McDowell
Laboratory Team Leader
Enclosures

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TCNA TEST REPORT NUMBER: **TCNA-0360-19**

TEST REQUESTED BY: **MS International, Inc.**

TEST METHOD: **ANSI A137.1-2017 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: **"Sand matte"**
Approximate Size as Received: 12″x24″
Product Color: Not Provided

TEST DATE: 4/23/2019

TEST PROCEDURE NOTES:

- Sample Prep: Samples cut to 12″x12″ for testing.
- The tiles were cleaned with Bona Stone, Tile and Laminate Floor Cleaner 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. The DCOF measurement on the standard tile was 0.31, within the required range.
- 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 (calibration due: 8/22/2019).
- After testing the SBR sensor was verified again according to the procedure. The DCOF measurement on the standard tile after testing was 0.3, within the required range.

TEST RESULTS:

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

Direction	**Tile 1-Grey**	**Tile 2-Ivory**	**Tile 3-Crema**
Direction 1	0.29	0.29	0.38
Direction 2	0.29	0.28	0.40
Direction 3	0.30	0.30	0.43
Direction 4	0.30	0.30	0.44
Average	0.30	0.29	0.41

COMMENTS: The method states to test at least 3 samples of the same tile (series, color, and finish). The client provided 3 samples of different colors (tiles 1, 2, 3 from left to right in picture below). The samples were tested per the client's request.

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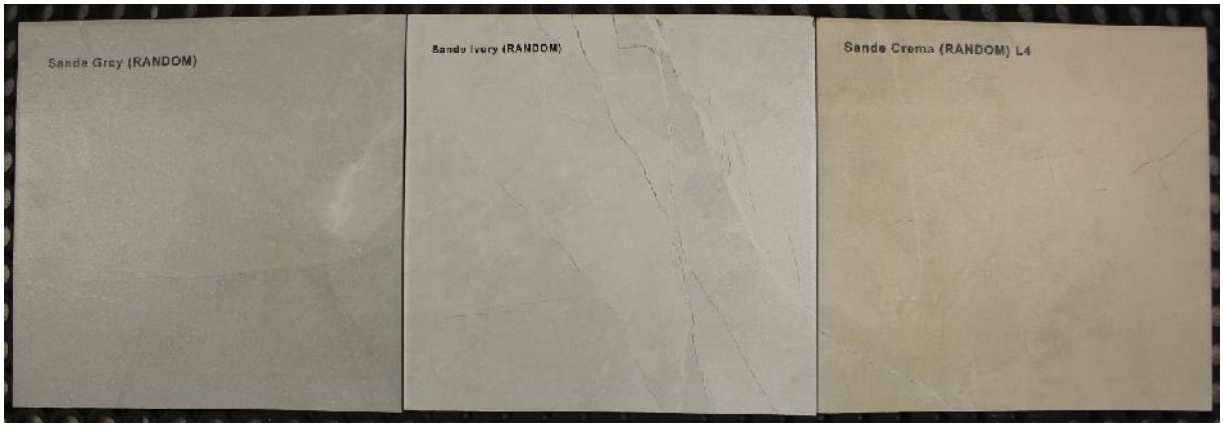
IMAGE OF PRODUCT TESTED:



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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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Unless otherwise expressly stated, TCNA tested the specific test subject material provided by the client and identified in the lab report, as indicated by the client. TCNA does not independently verify the information provided by the client, and it makes no representation that similar results would be achieve with other, untested materials, even if such other materials purportedly have the same product name, are purportedly of the same or similar type of tile or product made by the client, or are purportedly from the same batch of tile or product. Nor does TCNA state that the date in this report

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Katelyn Simpson
Laboratory Manager

Damon L. McDowell
Laboratory Team Leader

4/26/2019

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