



TEST REPORT

No. : XMML100401147

Date : Apr. 26, 2010

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COSMOS GRANITE & MARBLE
501 S. NEW HOPE ROAD, RALEIGH, NC 27610
USA

The following sample(s) was/were submitted and identified on behalf of the client as:

Sample Name : SL2001
SGS Ref. No. : AJD20100915, GZFDO100300732FD
Brand : COSMOS
Manufacturer : COSMOS GRANITE & MARBLE
Model/type : 3250 X 1620/1420mm, 3050 X 1620/1420mm
Sample Information : QUARTZ SURFACES
Test Required : 1. Absorption by weight and density 2. Compressive strength
3. Modulus of rupture 4. Abrasion resistance 5. Flexural strength 6. Coefficient of friction 7. Freeze-Thaw Cycling
8. Linear coefficient of thermal expansion 9. Resistance to chemical substance 10. Antimicrobial activity test
11. Surface burning characteristics
Test Method : See the following page(s)
Date of Receipt : Mar. 10, 2010
Test Period : Mar. 10, 2010 to Apr. 26, 2010
Test result(s) : For further details, please refer to the following page(s)

*****To be continued*****

Signed for and on behalf of
SGS-CSTC Ltd.

Ben Que
Materials Lab Manager

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1 Absorption by weight and density

Test Method:

The absorption by weight and density have been determined according to ASTM C97-09 Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone

Sample information:

Artificial stone, 50mm X 50mm X 30mm, 5 pcs, one surface polished

Test Result:

Specimens Identification NO	Weight of Dried Specimen (g)	Weight of Soaked Specimen Suspended In water (g)	Weight of Soaked and Surface-dried Specimen in Air (g)	Absorption By weight (%)	Mean Water Absorption (%)	Density (kg/m ³)	Mean Density (kg/m ³)
1	179.56	106.04	179.60	0.02	0.02	2440	2440
2	178.50	105.57	178.54	0.02	0.02	2450	2440
3	195.89	115.79	195.93	0.02	0.02	2440	2440
4	193.12	114.08	193.17	0.03	0.02	2440	2440
5	188.44	111.39	188.47	0.02	0.02	2440	2440

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2 Compressive Strength

Test Method:

The compressive strength have been determined according to ASTM C170-09 Standard Test Method for Compressive Strength of Dimension Stone

Sample information:

Artificial stone, 50mm X 50mm X 30mm. 10 pcs. One surface polished

Description of specimens prepare:

Dry condition: Dry the specimens for 48h at (60+/-2) degrees Celsius. At the 46th, 47th, and 48th h, weight the specimens to ensure that the weight is the same

Wet condition: Immerse the specimens in water for 48h at (22=/-2) degrees Celsius

Test Result:

Dry Condition:

Specimens identification NO	1	2	3	4	5
Individual Compressive Strength Value (MPa)	206.7	213.7	212.1	208.1	205.5
Mean Compressive Strength value (MPa)	209.2	209.2	209.2	209.2	209.2

Wet Condition:

Specimens identification NO	1	2	3	4	5
Individual Compressive Strength Value (MPa)	199.9	202.6	209.1	198.9	201.6
Mean Compressive Strength value (MPa)	202.4	202.4	202.4	202.4	202.4

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3 Modulus of rupture

Test Method:

The modulus of rupture have been determined according to ASTM C99-09 Standard Test Method for Modulus of Rupture of Dimension Stone

Sample description:

Artificial stone, 200mm X 103mm X 30mm. 10 pcs. One surface polished

Description of specimens prepare:

Dry condition: Dry the specimens for 48h at (60+/-2) degrees Celsius. At the 46th, 47th, and 48th h, weight the specimens to ensure that the weight is the same.

Wet condition: immerse the specimens in water for 48h at (22+/-2) degrees Celsius.

Test Result:

Dry Condition:

Specimens identification NO	1	2	3	4	5
Individual modulus of rupture value (MPa)	38.5	39.7	40.6	39.2	42.4
Mean modulus of rupture value (MPa)	40.1	40.1	40.1	40.1	40.1
Standard deviation (MPa)	1.5	1.5	1.5	1.5	1.5

Wet Condition:

Specimens identification NO	1	2	3	4	5
Individual modulus of rupture value (MPa)	46.1	48.0	48.6	50.5	48.9
Mean modulus of rupture value (MPa)	48.4	48.4	48.4	48.4	48.4
Standard deviation (MPa)	1.6	1.6	1.6	1.6	1.6

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4 Abrasion resistance

Test Method:

The abrasion resistance have been determined according to ASTM C241-90(97) Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic

Sample description:

Artificial stone, 50mm X 50mm X 20mm. 3 pcs. One surface polished

Test Result:

Specimens identification NO.	1	2	3
Individual value	48.5	39.7	49.0
Mean value	45.7	45.7	45.7

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5 Flexural strength

Test Method:

The flexural strength have been determined according to ASTM C880-09 Standard Test Method for Flexural Strength of Dimension Stone

Sample description:

Artificial stone, 300mm X 100mm X 20mm, 10 pcs. One surface polished

Description of specimens prepare:

Dry condition: Dry the specimens for 48h at (60 ±2) degrees Celsius. At the 46th, 47th, and 48th h, weight the specimens to ensure that the weight is the same.

Wet condition: immerse the specimens in water for 48h at (22±2) degrees Celsius.

Test Result:

Dry Condition:

Specimens identification NO	1	2	3	4	5
Individual flexural strength value (MPa)	33.6	31.1	31.4	28.2	32.2
Mean flexural strength value (MPa)	31.3	31.3	31.3	31.3	31.3
Standard deviation (MPa)	2.0	2.0	2.0	2.0	2.0

Wet Condition:

Specimens identification NO	1	2	3	4	5
Individual flexural strength value (MPa)	36.1	36.0	38.0	38.2	39.6
Mean flexural strength value (MPa)	37.6	37.6	37.6	37.6	37.6
Standard deviation (MPa)	1.5	1.5	1.5	1.5	1.5

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6 Coefficient of friction

Test method:

The coefficient of friction have been determined according to ASTM C1028-07 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

Sample description:

Artificial stone, 200mm X 150mm, 3 pcs. One surface polished

Test Result:

Static Coefficient of Friction for Dry Surface 0.81
Static Coefficient of Friction for Wet Surface 0.63

7 Freeze-Thaw Cycling

Test Method:

The Freeze-Thaw Cycling has been determined refer to ASTM C1026-87(2002) Standard Test Method for Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling

Sample description:

Artificial stone, 200mm X 200mm, 5 pcs. One surface polished

Test Result:

After 15 cycles of freeze-thaw cycling, there is not any visual damage for all the samples

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8 Linear coefficient of thermal expansion

Test Method:

The linear coefficient of thermal expansion have been determined according to ASTM C531-00 Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes

Sample description:

Artificial stone, 250mm X 50mm X 50mm, 4 pcs.

Test Result:

Room temperature: 21.6 degrees Celsius

Elevated temperature: 100.0 degrees Celsius

Specimens NO	1	2	3	4
Linear coefficient of thermal Expansion (10x6/degrees Celsius)	17.34	18.38	17.83	19.34
Mean value (10x6/degrees Celsius)	18.22	18.22	18.22	18.22

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9 Resistance to Chemical Substances

Test Method:

The Resistance to Chemical Substances have been determined according to ASTM C650-04 Standard Test Method for Resistance of Ceramic Tile to Chemical Substances

Sample description:

Artificial stone, 50mm X 50mm, 15 pcs. One surface polished

Test Result:

Test Solution	Test Solution	Visual Test (Affected/Not Affected)
Common Household and Cleaning Chemicals	Acetic acid, 3% (v/v)	Not Affected
	Acetic acid, 10% (v/v)	Not Affected
	Ammonium chloride, 100 g/L	Not Affected
	Citric acid solution, 30 g/L	Not Affected
	Citric acid solution, 100 g/L	Not Affected
	Lactic acid, 5% (v/v)	Not Affected
	Phosphoric acid, 3% (v/v)	Not Affected
	Phosphoric acid, 10% (v/v)	Not Affected
	Sulfamic acid, 30 g/L	Not Affected
	Sulfamic acid, 100 g/L	Not Affected
Swimming Pool Chemicals	Sodium hypochlorite solution, 20 mg/L	Not Affected
Acids and Bases	Hydrochloric acid solution, 3% (v/v)	Not Affected
	Hydrochloric acid solution, 18% (v/v)	Not Affected
	Potassium hydroxide, 100 g/L	Not Affected
	Potassium hydroxide, 30 g/L	Not Affected

Note: The test was carried out by external laboratory assessed as competent.

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10 Antimicrobial activity test

Test Method:

The antimicrobial activity test has been determined according to G21-96 (Reapproved 2002) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

Test Result:

Test Culture	Concentration of spores (spores / mL)	Level (after 28 days)
Aspergillus niger ATCC9642	2.3 X 10 ⁶	0 Grade
Aureobasidium pullulans ATCC15233	2.3 X 10 ⁶	0 Grade
Penicillium pinophilum ATCC11797	2.3 X 10 ⁶	0 Grade
Chaetomium globosum ATCC6205	2.3 X 10 ⁶	0 Grade
Trichoderma virens ATCC9645	2.3 X 10 ⁶	0 Grade

Note: 1.) According to ASTM G 21 – 1996 (Reapproved 2002) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi, observed fungi growth rating on the specimens include:

0 – None

1 – Traces of growth (less than 10%)

2 – Light growth (10 to 30%)

3 – Medium growth (30 to 60%)

4 – Heavy growth (60% to complete coverage)

2.) The test was carried out by a SGS laboratory

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11 Surface Burning Characteristics

I. TEST CONDUCTED

This test was conducted in accordance with ASTM E84:2009c Standard Test Method for Surface Burning Characteristics of Building Materials.

II. INTRODUCTION

The method designated as ASTM E 84:09C. "Standard Method of Test for Surface Burning Characteristics of Building Materials" is designed to determine the relative surface burning characteristics of materials under specific test conditions. Results are expressed in terms of flame spread index (FSI) and smoke developed index (SDI)

The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.

III. TEST PROCEDURE

The tunnel is preheated to 150 degrees Fahrenheit, as measured by the floor-embedded thermocouple located 23.25 feet downstream of the burner ports, and allowed to cool to 105 degrees Fahrenheit, as measured by the floor-embedded thermocouple located 13 feet from the burners. At this time the tunnel lid is raised and the test sample is placed along the ledges of the tunnel so as to form a continuous ceiling 24 feet long, 12 inches above the floor. The lid is then lowered into place.

Upon ignition of the gas burners, the flame spread distance is observed and recorded every 15 seconds. Flame spread distance versus time is plotted ignoring any flame front recessions. If the area under the curve (A) is less than or equal to 97.5 min-ft, $FSI = 0.515 \times A$, if greater, $FSI = 4900 / (195 - A)$. Smoke developed is determined by comparing the area under the obscuration curve for the test sample to that of inorganic reinforced cement board and red oak, arbitrarily established as 0 and 100, respectively.

IV. CONDITIONING

Prior to testing, the sample was conditioned to a constant weight at a temperature of 73.4 ± 5 degrees Fahrenheit (23 ± 2.8 degrees Celsius) and at a relative humidity of $50 \pm 5\%$

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VI. SAMPLE DETAILS

The details of the tested specimen given below have been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description	Agglomerated stone
Trade name / product reference	Agglomerated stone
Bulk Density / Mass per unit area	About 2500Kg/mx3
Thickness	20mm
Color	White
End use	Agglomerated stone – Modular tiles for flooring and stairs

EXPOSED FACE:

One face of the specimen was exposed to the flame.

MOUNTING METHODS:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

VI. TEST RESULTS

FSI	SDI
5	50

RATING:

The National Fire Protection Association Life Safety Code 101, Chapter 10, Section 10.2.3 “Interior Wall and Ceiling Finish Classification” has a means of classifying materials with respect to Flame Spread and Smoke Developed when tested in accordance with NFPA 255, ASTM E84, UL 723 “Method of Test of Surface Burning Characteristics of Building Materials”.

International Building Code, Chapter 8, Interior Finishes, Section 803 “Wall and Ceiling Finishes”, was classified in accordance with ASTM E 84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

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The classifications are as follows:

	Class A	Class B	Class C
Flame Spread Index	0-25	26-75	76-200
Smoke-developed Index	0-450	0-450	0-450

Since the tested sample received a Flame Spread Index 5 and a Smoke Developed 50, it would meet the requirement of Class A Interior Wall & Ceiling Finish Category.

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Figure 2 Smoke Developed Chart

WARNING:

The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support.

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

The test results relate only to the specimens of the product in the form in which were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

The specimen was supplied by the sponsor and SGS-CSTC ANJI Branch was not involved in any selection or sampling procedure.

Note: The test was carried out by a SGS laboratory.

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Sample photo:



SGS authenticate the photo on original report only

*****End of report*****

