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TEST REPORT

SGS Job No. : 15874870
Declared Description : ARTIFICIAL QUARTZ STONE
Applicant : FOSHAN HERO STONE CO., LTD
Sample Submitted Date : December 31, 2014
Testing Period : December 31, 2014 – February 26, 2015

This is to report that we, SGS-CSTC Standards Technical Services Co., Ltd., at the request of Messrs. **FOSHAN HERO STONE CO., LTD**, who submitted us samples declared description as above and were sent to SGS-CSTC Xiamen laboratory for required testing. We quote the results as follows:

1. Absorption by weight and density

Test Method:

ASTM C97/C97M-09 Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone

Specimens: Artificial stone, 50mm×50mm×30mm, 5pcs, one face polished

Test Result:

Specimens identification No.	1	2	3	4	5
Absorption by weight (%)	0.04	0.04	0.04	0.05	0.04
Mean water absorption (%)	0.04				
Density (kg/m ³)	2450	2450	2450	2450	2450
Mean density (kg/m ³)	2450				

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





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2. Flexural strength

Test Method:

ASTM C880/C880M-09 Standard Test Method for Flexural Strength of Dimension Stone

Specimens: Artificial stone, 350mm×100mm×30mm, 10pcs, one face polished

Test Result:

Dry Condition:

Specimens identification No.	1	2	3	4	5
Individual flexural strength value (MPa)	26.9	25.6	28.6	26.9	26.1
Mean flexural strength value (MPa)	26.8				
Standard deviation(MPa)	1.1				

Wet Condition:

Specimens identification No.	1	2	3	4	5
Individual flexural strength value (MPa)	33.4	34.6	35.4	33.6	34.6
Mean flexural strength value (MPa)	34.3				
Standard deviation(MPa)	0.8				

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



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3. Compressive strength

Test Method:

ASTM C170/C170M-14 Standard Test Method for Compressive Strength of Dimension Stone

Specimens: Artificial stone, 50mm×50mm×30mm, 10pcs, one face polished

Test Result:

Dry Condition:

Specimens identification No.	1	2	3	4	5
Individual compressive strength value (MPa)	215	218	211	210	213
Mean compressive strength value (MPa)	213				
Standard deviation(MPa)	4				

Wet Condition:

Specimens identification No.	1	2	3	4	5
Individual compressive strength value (MPa)	213	213	211	207	211
Mean compressive strength value (MPa)	211				
Standard deviation(MPa)	3				

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



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4. Resistance to Chemical Substances

Test Method:

ASTM C650-04 (Reapproved 2009) Standard Test Methods for Determination of Resistance of Ceramic Tile to Chemical Substances

Specimens: Artificial stone, 50mm×50mm×20mm, 15pcs, one face polished

Test Result:

Testing surface: polished

Specimen Number	Test Solution	Test Result
1	Acetic acid, 3%(V/V)	Not affected
2	Acetic acid, 10%(V/V)	Not affected
3	Ammonium chloride, 100 g/L	Not affected
4	Citric acid solution, 30 g/L	Not affected
5	Citric acid solution, 100 g/L	Not affected
6	Lactic acid, 5%(V/V)	Not affected
7	Phosphoric acid, 3%(V/V)	Not affected
8	Phosphoric acid, 10%(V/V)	Not affected
9	Sulfamic acid, 30 g/L	Not affected
10	Sulfamic acid, 100 g/L	Not affected
11	Sodium hypochlorite solution, 20 mg/L	Not affected
12	Hydrochloric acid solution, 3%(V/V)	Not affected
13	Hydrochloric acid solution, 18%(V/V)	Not affected
14	Potassium hydroxide, 30 g/L	Not affected
15	Potassium hydroxide, 100 g/L	Affected (loss of gloss)

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5. Boiling water resistance

Test Method:

NEMA LD-3-2005 High-Pressure Decorative Laminates – 3.5 Boiling water resistance

Specimens: Artificial stone, 300mm×300mm×20mm, 2pcs, one face polished

Test Result:

Testing surface: polished

After test, there was no blister, crazing, delamination, whitening or cracking. The resistance to high temperature shall be reported as Class a: No effect ^{note}.

Note:

- a. No effect – no change in color or surface finish.
- b. Slight effect – a change in color or surface finish only visible at certain angles or directions.
- c. Moderate effect – a change in color or surface finish visible from all angles and directions, but does not appreciably alter the original condition of the specimen.
- d. Severe effect – a change in color or surface finish which obviously and markedly alters the original condition of the specimen.

6. Ball impact resistance

Test Method:

NEMA LD-3-2005 High-Pressure Decorative Laminates – 3.8 Ball impact resistance

Specimens: Artificial stone, 300mm×300mm×20mm, 3pcs, one face polished

Test Result:

Testing surface: polished

After test, the actual height of impact resistance: 550mm.

Note:

- 1. The ball mass is 0.225kg.
- 2. The actual height of impact resistance is the maximum drop height in millimetres of the ball which keep the sample from fractures, such as hairline cracks, concentric circles, or chips.

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





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7. Stain resistance test

Test Method:

ANSI Z124.6-2007 Plastic Sinks - 5.2 Stain resistance test

Specimens: Artificial stone, 100mm×100mm×20mm, 10pcs, one face polished.

Test Result:

Testing surface: polished

Reagents	Test results			
	(Covered)		(Uncovered)	
	Individual stain rating	Depth removed	Individual stain rating	Depth removed
Black Crayon	2	/	2	/
Black Liquid Shoe Polish	2	/	2	/
Blue Washable Ink	2	/	2	/
Gentian Violet Solution	2	/	2	/
Beet Juice	1	/	1	/
Grape Juice	1	/	1	/
Lipstick	1	/	1	/
Hair Dye	1	/	1	/
Iodine solution	2	/	4	/
Wet Tea Bag	1	/	1	/
Total stain resistance rating	24			
Maximum individual depth of staining	/			

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





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8. Chemical resistance test

Test Method:

ANSI Z124.6-2007 Plastic Sinks - 5.5 Chemical resistance test

Specimens: Artificial stone, 100mm×100mm×20mm, 15pcs, one face polished

Test Result:

Testing surface: polished

Reagents	Test results	
	(covered)	(uncovered)
Naphtha	Unaffected	Unaffected
Ethyl alcohol	Unaffected	Unaffected
Amyl acetate	Unaffected	Unaffected
Commercial household ammonia (10% V/V)	Unaffected	Unaffected
Citric acid (10%)	Unaffected	Unaffected
Urea (6%)	Unaffected	Unaffected
Hydrogen peroxide solution (3%)	Unaffected	Unaffected
Concentrated sodium hypochlorite solution	Unaffected	Unaffected
Toluene	Unaffected	Unaffected
Ethyl acetate	Unaffected	Unaffected
Lye solution (2% sodium hydroxide)	Unaffected	Unaffected
Acetone	Unaffected	Unaffected
Trisodium phosphate (5%)	Unaffected	Unaffected
Vinegar	Unaffected	Unaffected
Pine oil	Unaffected	Unaffected

Note: 1. "Unaffected" - The surface finish shall be unaffected by the reagents except for superficial surface changes which are removable by sanding with 600 grit wet or dry sandpaper and water.

2. "Affected" – Any resulting damage shall impair the serviceability of the unit, and shall not be easily repairable by using abrasive and polishing compounds to approximate the original finish.

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

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9. Cigarette burn test

Test Method:

ANSI Z124.6-2007 Plastic Sinks - 5.4 Cigarette test

Specimens: Artificial stone, 100mm×100mm×20mm, 3pcs, one face polished.

Test Result:

Testing surface: polished

After test, there were visible burn marks which can be erased by water and paper towels.

10. Mohs' hardness

Test Method:

Refer to EN 101:1991 Ceramic tiles - Determination of scratch hardness of surface according to mohs

Specimens: Artificial stone, 100mm×100mm×20mm, 3pcs, one face polished

Test Result:

Testing surface: polished

Specimens identification No.	1	2	3
The Mohs' hardness	6~7	6~7	6~7
Mean value	6~7		

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



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11. Surface Burning Characteristics of Building Materials

Test Conducted:

This test was conducted in accordance with ASTM E84-14 Standard Test Method for Surface Burning Characteristics of Building Materials.

Sample Description:

Name (provided by sponsor)	:	ARTIFICIAL QUARTZ STONE
Thickness	:	Approximately 20 mm

Introduction:

The method, designated as ASTM E84-14, "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.

Sample Preparation:

Prior to testing, the specimen was conditioned to constant weight at a temperature of 73 ± 5°F (23 ± 3°C) and a relative humidity of 50 ± 5%.

The sections were butted together during testing to form the requisite specimen length. During testing the specimen was self-supporting.

Test Procedure:

The tunnel is preheated to 150°F, as measured by the floor-embedded thermocouple located 23.25 feet downstream of the burner ports, and allowed to cool to 105°F, 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.

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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·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.

Test Results:

Sample	Flame-Spread Index (FSI)	Smoke-developed Index (SDI)
ARTIFICIAL QUARTZ STONE	10	115

Observations of Burning Characteristics:

- The sample ignited approximately 120 seconds after exposure to the test flame.
- The flame front propagated to a maximum distance of 2.5 feet at approximately 480 seconds.

Rating:

The National Fire Protection Association Life Safety Code 101, “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) “Method of Test of Surface Burning Characteristics of Building Materials”.

The classifications are as follows:

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

Conclusion:

Refer to the National Fire Protection Association Life Safety Code 101, “Interior Wall and Ceiling Finish Classification”, the submitted sample met the requirement of Class A.

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





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Graphical Results:

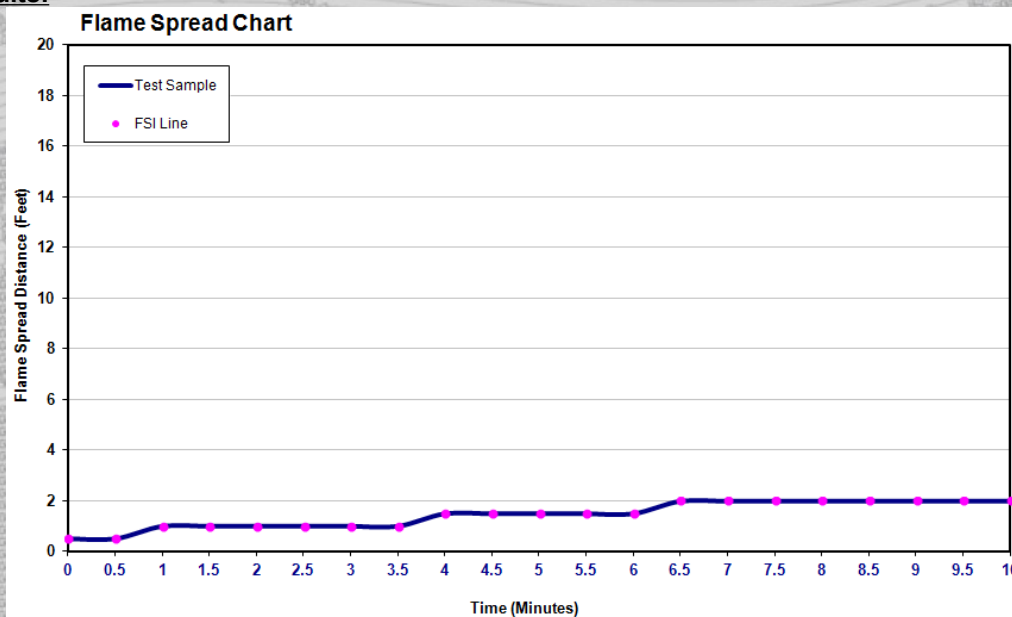


Figure 1. Flame Spread Chart

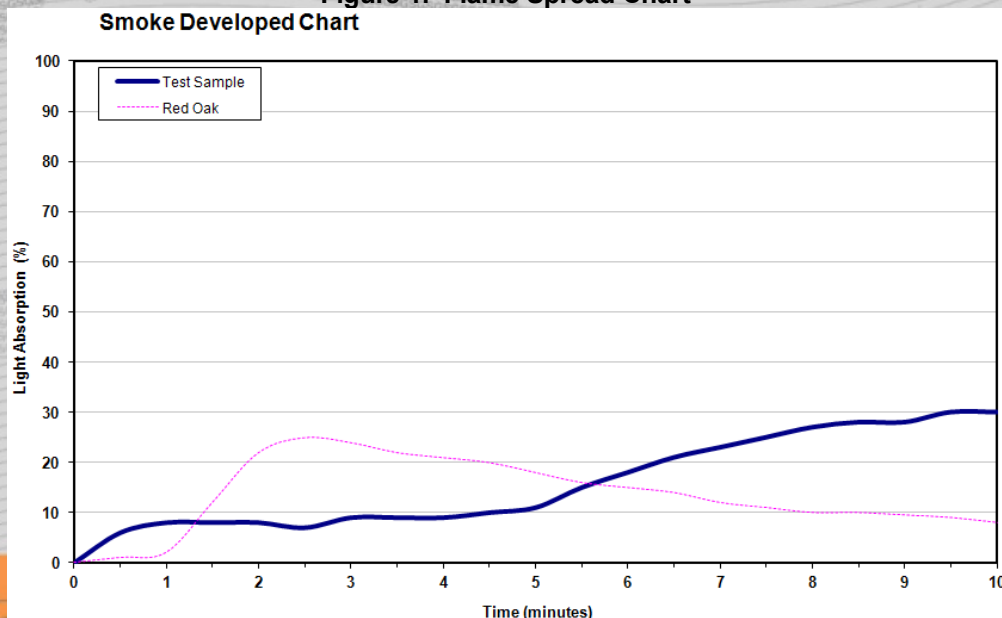


Figure 2. Smoke Developed Chart

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

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



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12. Fungus & bacteria resistance

Test Method:

Antimicrobial activity test: With reference to ASTM G 21-13 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

TEST ORGANISM(S):

Aspergillus niger ATCC 9642, Penicillium pinophilum ATCC 11797, Aureobasidium pullulans ATCC 15233, Chaetomium globosum ATCC 6205, Trichoderma virens ATCC 9645

Test result(s):

Testing surface: polished

Test Organism(s)	Concentration of spores (spores /mL)	Level (after 28 days)
Aspergillus niger ATCC 9642	1.0 x 10 ⁶	0 Grade*
Penicillium pinophilum ATCC 11797		
Aureobasidium pullulans ATCC 15233		
Chaetomium globosum ATCC 6205		
Trichoderma virens ATCC 9645		

Note:

1. According to ASTM G 21-13 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 microscope(50 X) was used to confirm the observation.

3. The test was carried out by a SGS laboratory.

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



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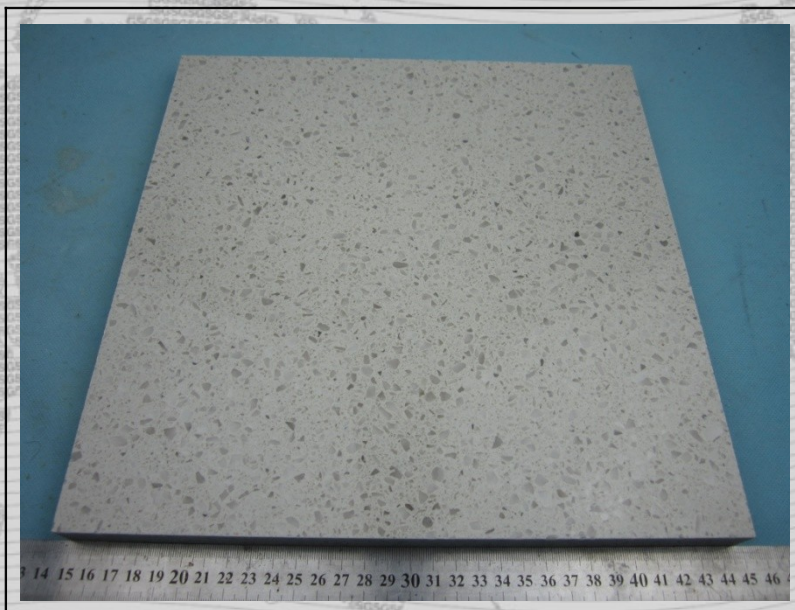
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Specimen photograph:



SGS authenticate the photo on original report only

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*****END*****

Xiamen, June 10, 2015

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