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### **REPORT 64495/G**

#### **TESTING OF**

#### **ICE BRANCO**

Classic Quartz Stone  
Unit 7, Nimrod Road  
Nimrod Industrial Estate  
Reading  
RG2 0EB

This report comprises  
4 pages of text  
Table 1 of 1 sheet  
Table 2 of 1 sheet  
Table 3 of 3 sheets

For the attention of Ms Natasha

10 May 2019

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### REPORT 64495/G

### TESTING OF

### ICE BRANCO

**Reference :** Instructions from Ms Natasha of Classic Quartz Stone.

#### 1. INTRODUCTION

We were instructed to undertake testing of a manufactured quartz stone, advised to be Ice Branco, in order to establish physical, mechanical and performance characteristics.

#### 2. SAMPLES

Test samples were received from Classic Quartz Stone at Sandberg laboratories on 25 February 2019, as follows.

Sandberg Reference	Specimen Size	Test
	<b>Ice Branco</b>	
G48483	1 no. 100 x 100 x 20mm	Mohs Hardness
G48482	6 no. 70 x 70 x 20mm <sup>1</sup>	Density and water absorption
G48486	6 no. 200 x 50 x 20mm <sup>2</sup>	Flexural strength (3-pt), dry Thermal shock resistance
G48484	7 no. 200 x 50 x 20mm <sup>2</sup>	- Flexural strength (3-pt) pre-cycling, dry
G48485	7 no. 200 x 50 x 20mm <sup>2</sup>	- Flexural strength (3-pt) post-cycling, dry

<sup>1</sup> Cut and prepared from 100 x 100 x 20mm samples by Sandberg

<sup>2</sup> Cut and prepared from 200 x 100 x 20mm samples by Sandberg

**3. TEST METHODS AND RESULTS**

**3.1 Mohs Hardness**

A specimen was tested with a set of Mohs hardness sticks.

The material was found to be 5-6 on the Mohs scale of hardness.

**3.2 Density and Water Absorption**

Specimens were tested in accordance with BS EN 14617-1:2013, except that the test specimens were 70 x 70 x 20mm in size.

Detailed test results are given in Table 1 of this report and are summarised as follows:

Sandberg Reference	Apparent Density (kg/m <sup>3</sup> )		Water Absorption (%)	
	Range	Mean	Range	Mean
G48482	2290 - 2320	2300	0.09 - 0.14	0.13

**3.3 Flexural Strength (3-point) Under Concentrated Load**

Specimens were tested in accordance with the method given in BS EN 14617-2:2016.

Tests were carried out in a dry / ambient condition.

The detailed test results are given in Table 2 of this report and may be summarised as follows:

Sandberg Reference	Condition	Flexural Strength (3-pt) (MPa)	
		Range	Mean
G48486	Dry	63.5 - 67.6	65.8

Statistical evaluation of the test results in accordance with the methods in BS EN 14617-2:2016 Annex A (normative) produced the following:

**Lowest Expected Value (MPa)**

Dry

62.2

**3.4 Thermal Shock Resistance**

Specimens were tested in accordance with BS EN 14617-6:2012.

Specimens were tested for loss in mass and flexural strength pre- and post-cycling in accordance with the method given in BS EN 14617-2:2016.

Tests were carried out in a dry / ambient condition.

The detailed test results are given in Table 3 of this report and may be summarised as follows:

Sandberg Reference	Condition	Flexural Strength (3-pt) (MPa)	
		Range	Mean
G48484	<b>Pre-cycling</b> Dry / Ambient	61.7 - 73.4	67.8
G48485	<b>Post-cycling</b> Dry / Ambient	65.0 - 76.6	70.5

Statistical evaluation of the test results in accordance with the methods in BS EN 14617-2: 2016 Annex A (normative) produced the following:-

<b>Lowest Expected Value (MPa)</b>		
<b>Pre-cycling</b>	Dry / Ambient	58.5
<b>Post-cycling</b>	Dry / Ambient	62.1

Sandberg Reference	Visual observations post- 20 cycles	Change in mass (%)	
		Range	Mean
G48485	No visible change	0.04 - 0.04	0.04

**4. REMARKS**

These results conclude the requested programme of testing. Please do not hesitate to contact us if we can be of any further assistance in this matter.

Classic Quartz Stone  
Unit 7, Nimrod Road  
Nimrod Industrial Estate  
Reading  
RG2 0EB

for Sandberg LLP

For the attention of Ms Natasha

D J Ellis  
Partner

DJE/Geoman/pd

10 May 2019

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Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.

Tests reported on sheets not bearing the UKAS logo in this report/certificate are not included in the UKAS accreditation schedule for this laboratory.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

**APPARENT DENSITY AND WATER ABSORPTION**

BS EN 14617-1:2013

Name	Ice Branco			Test By/Date	MB / 13.3.19	
Material Type	Quartz Stone			Checked/Date	MMc / 16.4.19	
Sandberg Sample Ref.	Oven Dried Mass in Air (kg)	Density of Water (kg/m <sup>3</sup> )	Saturated Surface Dried Mass (kg)	Saturated Mass in Water (kg)	Apparent Density (kg/m <sup>3</sup> )	Water Absorption (%)
G48482 a	0.2351	998	0.2354	0.1332	2300	0.13
G48482 b	0.2162	998	0.2164	0.1223	2290	0.09
G48482 c	0.2222	998	0.2225	0.1262	2300	0.14
G48482 d	0.2222	998	0.2225	0.1264	2310	0.14
G48482 e	0.2241	998	0.2244	0.1272	2300	0.13
G48482 f	0.2231	998	0.2234	0.1273	2320	0.13
Mean					2300	0.13

Note : Test specimens 70 x 70 x 20mm in size

**FLEXURAL STRENGTH (UNDER CONCENTRATED LOAD)**

BS EN 14617-2:2016

**Finish : As received****Test Condition : Dry**

Name	Ice Branco			Test By/Date	MB / 5.3.19	
Material Type	Quartz Stone			Checked/Date	MMc / 6.3.19	
Sandberg Sample Reference	Breaking Load (N)	Specimen Span (mm)	Specimen Width (mm)	Specimen Thickness (mm)	Flexural Strength (MPa)	Observations
G48486 a	4610	180	48.5	19.8	65.5	Normal Failure
G48486 b	4570	180	49.1	19.9	63.5	Normal Failure
G48486 c	4820	180	48.6	19.9	67.6	Normal Failure
G48486 d	4860	180	48.7	20.4	64.7	Normal Failure
G48486 e	4760	180	48.1	20.1	66.1	Normal Failure
G48486 f	4920	180	48.7	20.1	67.5	Normal Failure
Mean					65.8	
Std. Dev.					1.6	
Var. Coef.					0.0	

Lowest Expected Value (MPa) : 62.2

**FLEXURAL STRENGTH (UNDER CONCENTRATED LOAD)**

BS EN 14617-2:2016

**Finish : As received****Test Condition : Dry**

Name	Ice Branco			Test By/Date	MB / 5.3.19	
Material Type	Quartz Stone			Checked/Date	MMc / 6.3.19	
Sandberg Sample Reference	Breaking Load (N)	Specimen Span (mm)	Specimen Width (mm)	Specimen Thickness (mm)	Flexural Strength (MPa)	Observations
G48484 a	4410	180	49.7	19.7	61.7	Normal Failure
G48484 b	4820	180	48.4	19.7	69.3	Normal Failure
G48484 c	4920	180	48.7	19.7	70.0	Normal Failure
G48484 d	4690	180	49.0	20.0	64.6	Normal Failure
G48484 e	5200	180	49.3	19.7	73.4	Normal Failure
G48484 f	4610	180	48.6	20.0	64.0	Normal Failure
G48484 g	5080	180	49.8	19.6	71.7	Normal Failure
Mean					67.8	
Std. Dev.					4.4	
Var. Coef.					0.1	

Lowest Expected Value (MPa) : 58.5



**FLEXURAL STRENGTH (UNDER CONCENTRATED LOAD)**

BS EN 14617-2:2016

Post-20 thermal cycles to BS EN 140617-6:2012

**Finish : As received****Test Condition : Dry**

Name	Ice Branco			Test By/Date	MB / 11.4.19	
Material Type	Quartz Stone			Checked/Date	MMc / 16.4.19	
Sandberg Sample Reference	Breaking Load (N)	Specimen Span (mm)	Specimen Width (mm)	Specimen Thickness (mm)	Flexural Strength (MPa)	Observations
G48485 a	4620	180	47.7	19.8	66.7	Normal Failure
G48485 b	4700	180	48.8	20.0	65.0	Normal Failure
G48485 c	4990	180	48.4	20.0	69.6	Normal Failure
G48485 d	5370	180	48.3	19.8	76.6	Normal Failure
G48485 e	5180	180	49.0	19.7	73.5	Normal Failure
G48485 f	4960	180	48.5	19.8	70.4	Normal Failure
G48485 g	5050	180	49.8	19.5	72.0	Normal Failure
Mean					70.5	
Std. Dev.					4.0	
Var. Coef.					0.1	

Lowest Expected Value (MPa) : 62.1

**THERMAL SHOCK RESISTANCE**

BS EN 14617-6:2012

Name	Ice Branco			Test By/Date	
Material Type	Quartz Stone			Checked/Date	
Sandberg Sample Ref.	Visual observations post 20 cycles	Initial mass (g)	Final mass (g)	Change in mass (%)	
G48485 a	No visible change	438.61	438.44	0.04	
G48485 b	No visible change	450.00	449.84	0.04	
G48485 c	No visible change	447.74	447.57	0.04	
G48485 d	No visible change	445.22	445.03	0.04	
G48485 e	No visible change	448.78	448.60	0.04	
G48485 f	No visible change	445.14	444.95	0.04	
G48485 g	No visible change	452.61	452.45	0.04	
Mean				0.04	

Surface finish : As received

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Where our involvement consists exclusively of testing samples, the results and our conclusions relate only to the samples tested.

