

TEST REPORT

(Report No.) : 201712038101-1/4

<b>Name of Sample</b>	MVG587, MVG591, MVG595	<b>Received Date</b>	2017-12-03
		<b>Shape of Sample</b>	600mm x 600mm
<b>Testing Category</b>	See Below	<b>Quantity of Sample</b>	10
<b>Test Standard</b>		<b>Reported Date</b>	2017-12-07
Results of Inspection			

**EN ISO 10545-2: 1997 Determination of dimensions and surface quality**

Dimensions and Deviations		
	Maximum Deviation	Permissible Deviation
<b>Length &amp; Breadth</b> Work (co-ordinating) size is 600x600mm	- Maximum deviation from work (co-ordinating) size is 0.0% - Maximum deviation from average size is 0.0%.	- The permissible deviation is $\pm 0.75\%$ and so the tiles comply with the requirements - The permissible deviation is $\pm 0.5\%$ and so the tiles comply with requirements
<b>Thickness</b>	Work size is 10mm, Maximum deviation is -2.8%	The permissible deviation is $\pm 5\%$ and so the tiles comply with the requirements.
<b>Straightness of Sides</b>	Maximum deviation from straightness is 0.0%	The permissible deviation is $\pm 0.5\%$ and so the tiles comply with the requirements.
<b>Rectangularity</b>	Maximum deviation from rectangularity is -0.1%	The permissible deviation is $\pm 0.6\%$ and so the tiles comply with requirements.
<b>Edge Curvature</b>	Maximum deviation from flatness is -0.1%	The permissible deviation is $\pm 0.5\%$ and so the tiles comply with requirements.
<b>Centre Curvature</b>	Maximum deviation from flatness is 0.0%, related to the diagonal.	The permissible deviation is $\pm 0.5\%$ and so the tiles comply with the requirements.
<b>Warpage</b>	Maximum warpage is 0.0%, related to the diagonal.	The permissible deviation is $\pm 0.5\%$ and so the tiles comply with the requirements.
<b>Surface Quality</b>	When examined under the standard conditions of the test, not less than 95% of the tiles tested are acceptable and so the tiles comply with the requirements.	

**EN ISO 10545-3: 1997 Determination of water absorption**

**Water Absorption (Vacuum Method)**

Sample No	Water Absorption (%)
1	0.11
2	0.08
3	0.09
4	0.09
5	0.09
Average	0.09

The stipulation for Bla tiles/ quarries is that the average value should be  $\leq 0.5\%$  and the individual maximum is  $\leq 0.6\%$ . The tiles therefore comply with the requirements.

**Important Notes:**

The results in this report apply to the samples only.

EN ISO 10545-3: 1997 Determination of water absorption				
Modulus of Rupture				
Sample No	Thickness (mm)	Breaking Strength (N)	Load (N)	Modulus of Rupture (N/mm <sup>2</sup> )
1	9.86	2037	1969.1	37.6
2	9.86	2089	2019.4	39.6
3	9.75	2121	2050.3	39.5
4	9.70	2102	2031.9	38.8
5	9.79	2116	2045.5	39.7
6	9.74	2048	1979.7	38.9
7	9.82	1963	1897.6	37.6
Average		2068	1999.1	38.8

Thickness of Rubbers: 5mm, Diameter of Rod: 20mm, Overlap: 10mm, Span: 580mm  
 The individual value of modulus of rupture should be  $\geq 32\text{N/mm}^2$  and average value should be  $\geq 35\text{N/mm}^2$ .  
 Therefore the tiles comply with the requirements.  
 The stipulation of average breaking strength should be  $\geq 1300\text{N}$ .  
 Therefore the tiles comply with the requirements.

EN ISO 10545-7: 2012 Determination of resistance to surface abrasion - glazed floor tiles	
Surface Abrasion Resistance	
Revolutions	The failure visible at revolutions is 6000 revs
Resistance to surface abrasion	So ther resistance to surface abrasion of the tile is Class 4

EN ISO 10545-8:1996: Determination of linear thermal expansion	
Linear Thermal Expansion	
Two determinations of the coefficient of linear thermal expansion in mutually perpendicular directions gave the following values: $6.4 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ and $6.5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$	

EN ISO 10545-9:2013: Determination of resistance to thermal shock	
Thermal Shock	
After testing by total immersion there is no evidence of damage to the tiles.	

EN ISO 10545-10: 1997 Determination of moisture expansion		
Moisture Expansion		
Sample No	Moisture Expansion (%)	
1	0.000	
2	0.001	
3	0.001	
4	0.001	
5	0.001	
Average	0.001	

EN ISO 10545-11:1996: Determination of crazing resistance for glazed tiles	
Crazing Resistance	
When tested according to the standard, none of the five tiles tested shows signs of crazing. The tiles comply with the requirements.	

EN ISO 10545-12:1997: Determination of frost resistance	
Frost Resistance	
After 100 freeze-thaw cycles the tiles tested shows no evidence of damage	

**Important Notes:**

The results in this report apply to the samples only.

EN ISO 10545-13: 1997 <i>Determination of chemical resistance</i>	
Chemical Resistance (Glazed Tiles)	
Sample No	Water Absorption (%)
1. Ammonium Chloride solution 100g/l	GA
2. Sodium Hypochlorite solution 20mg/l	GA
3. Hydrochloric Acid solution 3% v/v	GLA
4. Citric Acid solution 100g/l	GLA
5. Potassium Hydroxide solution 30g/l	GLA
6. Hydrochloric Acid solution 18% v/v	GHA
7. Lactic Acid solution 5% v/v	GHA
8. Potassium Hydroxide solution 100g/l	GHA
For household chemicals and swimming pool salts (1 and 2), the Class is GA. The minimum class for solution 1 and 2 is GB, the sample complies with the requirement. For Low concentration acids and alkalis (3,4 and 5), the Class is GLA. For high concentration acids and alkalis (6,7 and 8), the Class is GHA.	

EN ISO 10545-14: 1997 <i>Determination of resistance to stains</i>	
Stain Resistance	
Staining Agent	Sample Number
1. Green/ Red past in light oil (paste)	5
2. Iodine in alcohol, 13g/L (chemical/oxidizing)	5
3. Olive Oil (Film)	5
Ceramic surfaces are divided into five classes; Class 5 corresponds to the greatest ease of removing the particular stain. The minimum class for all staining agent is 3, the sample complies with the requirement.	

EN ISO 10545-15: 1997 <i>Determination of lead and cadmium given off by glazed tiles</i>						
Metal Release						
Specimens	Leaching Volume (ml)	Sample Diameters (dm)	Lead (mg/L)	Cadmium (mg/L)	Lead (mg/dm <sup>2</sup> )	Lead (mg/dm <sup>2</sup> )
1	1800	6x6	<0.01	<0.01	<0.001	<0.001
2	1800	6x6	<0.01	<0.01	<0.001	<0.001
3	1800	6x6	<0.01	<0.01	<0.001	<0.001