



Certificate No. : TC-6265

NATIONAL CERA LAB

CERAMIC LABORATORY

Shop No. 16, 17, Ground Floor, Dariyalal Plaza,
Nr. Argil Ceramic, 8-A, N/H, Morbi - 363 642 (Guj.) INDIA.

Ph. : 02822 244049, Mo. : 98252 62649, 96622 97005, 98257 99418
E-mail : nationalceralab@rediffmail.com

As per all Countries Export report of Wall, Floor, Vitrified Tiles & Sanitary Wares

Ref. No. NCL/Glazed Vitrified Tile /ISO/10/356/2020-21

Date :

Oct. 18. 2020

Receive date of test sample :- 09.10.2020

Sample description and name Digital Printed Glazed Ceramic Vitrified Tile "First Grade", Nominal size 1600x800x9 mm
(Rectified) as submitted by the party. Sample not drawn by National Cera Lab.

Test desired As per Standard ISO 13006 : 2018 Group BI a Annex G

A Dimensions and surface quality

- I Deviation in Length (l) & Width (w)
- II Thickness
- III Straightness of Sides
- IV Rectangularity
- V Surface Flatness
- VI Surface quality
- B Physical Property**
 - I Water Absorption %
 - II Breaking Strength in N
 - III Modulus of Rupture (MOR) N/mm²
 - IV Resistance to surface abrasion
 - V Coefficient of Linear Thermal Expansion
 - VI Thermal Shock Resistance

- VII Crazing Resistance
- VIII Moisture Expansion (in mm/mm)
- IX Impact resistance
- X Scratch hardness of Srface (mohs scale)
- XI Bulk density , lin (g/cc)

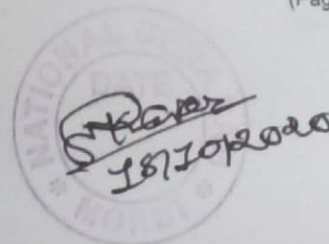
C Chemical Property

- I Resistance to Stain
- II Resistance to Low Concentration of acid and alkali
- III Resistance to High Concentration of acid and alkali
- IV Resistance to house chemical
- V Resistance to swimming pool salt
- VI Lead and Cadmium release

TEST REPORT

A Dimensions and surface quality		Require	Test Method	Result	
I Deviation in Length (l) & Width (w)					
1 Length	The deviation in mm of average size of each tile (2 sides) from the average of 10 test specimens (20 Sides)	± 1 mm	ISO 10545 - 2	Avg+ Avg -	0.39 mm 0.00 mm Pass
2 Width	The deviation in mm of the average size of each tile (2 sides) from the average of 10 test specimens (20 Sides)	± 1 mm	ISO 10545 - 2	Avg+ Avg -	0.31 mm 0.00 mm Pass
II Thickness	Party given 10 Pices The deviation in mm of average thickness of 10 tile from the work size thickness	± 0.5 mm	ISO 10545 - 2	Avg+ Avg -	0.14 mm 0.00 mm Pass
	Thickness Average 9.00 mm 9.14 mm				
III Straightness of Sides	Maximum deviation from straightness in mm related to the corresponding work size	±0.8 mm	ISO 10545 - 2	Max+ Max -	0.17 mm 0.19 mm Pass
IV Rectangularity	Maximum deviation from rectangularity in mm related to the corresponding work size	±1.5 mm	ISO 10545 - 2	Max+ Max -	0.21 mm 0.22 mm Pass

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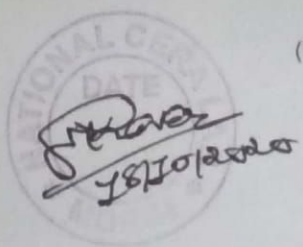
	Test Method	Require	Result
V Surface Flatness			
(a) Centre Curvature Centre curvature related to diagonal calculated from the work size.	ISO 10545 - 2	± 1.8 mm	Max+ 0.19 mm Max - 0.00 mm
(b) Edge curvature Edge curvature related to the corresponding work size.		± 1.8 mm	Max+ 0.21 mm Max - 0.00 mm
(c) Warpage Warpage related to diagonal calculated from the work size.		± 1.8 mm	Max+ 0.20 mm Max - 0.00 mm Pass

VI Surface quality Tested by the visually Minimum 95 percent of tile shall be free from visible defect that would impair the appearance of the major area of tiles. No any defect found in the tiles surface area and lot pass the test.	ISO 10545 - 2	95%	100% free from defects Pass
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B Physical Property			Avg. 0.066%
I Water Absorption %	ISO 10545 - 3		Max. 0.076% Pass
1 0.071 %			
2 0.045 %			
3 0.076 %			
4 0.069 %		< e 0.50%	
5 0.070 %		Individual maximum 0.60%	
Average 0.066 %			

II Breaking Strength in N	ISO 10545 - 4		Avg. 2285.89 N
1 2282.80 N 6 2294.50 N			Min. 2267.20 N
2 2285.40 N 7 2301.00 N		Not less than 1300	Pass
3 2267.20 N 8 2269.80 N		Thickness ≥ 7.5 mm	
4 2288.00 N			
5 2298.40 N Average 2285.89 N			

III Modulus of Rupter (MOR)N/mm²	ISO 10545 - 4		Avg. 46.25 N/mm ²
1 46.73 N/mm ² 6 45.89 N/mm ²			Min. 45.76 N/mm ²
2 46.57 N/mm ² 7 46.24 N/mm ²		Minimum 35	Pass
3 46.30 N/mm ² 8 46.14 N/mm ²		Individual minimum 32	
4 45.76 N/mm ²			
5 46.40 N/mm ² Average 46.25 N/mm ²			



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Test Method	Require	Result	
ISO 10545-7		PEI Class - III 1500 Revolution pass	
IV Resistance to surface abrasion Visual failure was observed at 2100 revolution when the tiles were subjected to abrasion stage of 150,600,750, 1500, up to 2100 revolution, 1500 revolution pass.			
V Coefficient of Liner Thermal Expansion Expansion from ambient temperature to 100°C (K - 1)	ISO 10545 - 8	9X10 ⁻⁶ Max 5.29x10 ⁻⁶	
VI Thermal Shock Resistance (With Immersion W.A. < 10%)	ISO 10545 - 9	10 cycle, Min Confirm	
VII Craze Resistance No crazing in two cycle one hour duration at a steam pressure of 750±20kpa 6 Nos of tiles were subjected to autoclaving at a steam pressure of 750±20 Kpa of saturated steam for Two hour consisting of Two cycle. None of the tiles show any sign of the crazing on the glaze surface and the lot pass the test.	ISO 10545-11	No Craze in Two Cycle Confirm	
VIII Moisture Expansion (in mm/mm)	ISO 10545 -10	0.02 mm/m max 0.001 mm/m max	
IX Impact resistance Coefficient of restitution (COR)	ISO 10545 - 5	0.55 Min 0.84	
X Scratch hardness of Srface (mohs scale)	IS 13630 - 13	5 moh's scal 5 Moh's	
XI Bulk density , lin (g/cc)	ISO 10545 - 3	2.2 min 2.2892 g/cc	
C Chemical Property			
I Resistance to Stain Red Past in Light Oil (Fe2O3) Iodine in Alcohol 13g/l Olive Oil	Stain put on tiles up to 24 hrs. Stain removed by hot water Stain removed by weak cleaning agent Stain removed by hot water	ISO 10545-14 Min Class - 3 Min Class - 3 Min Class - 3	Class - 5 Class - 4 Class - 5
II Resistance to Low Concentration of acid and alkali			
a Hydrochloric Acid solution 3% (V/V)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class-GLC Class GLA
b Citric Acid Soln. 100gm/l	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class-GLC Class GLA
c Potassium Hydroxide Soln 30gm/l	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class-GLC Class GLA

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	Test Method	Require	Result
III Resistance to High Concentration of acid and Aakali			
a Hydrochloric Acid solution 18% (V/V)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class GHC Class GHA
b Lactic Acid Soln. 5% (v/v)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class GHC Class GHA
c Potassium Hydroxide Soln. 100gm/l	visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	ISO 10545-13	Min Class GHC Class GHB
IV House hold chemical resistance Ammonium chloride solution 100gm/l	No visual changes observed after immersion for 24 hrs, pencil line removed with soft wet cloth.	ISO 10545-13	Min CLASS - GC Class GA
V Swimming pool salt Sodium Hypochlorite solution 20mg/l	No visual changes observed after immersion for 24 hrs, pencil line removed with soft wet cloth.	ISO 10545-13	Min CLASS - GC Class GA
VI Lead and Cadmium release		ISO 10545-15	Limit Result
a Lead release			
Test Solution Acetic Acid Solution 4% (v/v), (in 960ml distilled water)	Digestion time- 24 hrs (20±2°) Detected by ED XRF	0.1mg/dm ²	0.004 mg/dm ²
b Cadmium release			
Test Solution Acetic Acid Solution 4% (v/v), (in 960ml distilled water)	Digestion time- 24 hrs (20±2°) Detected by ED XRF	0.1mg/dm ²	0.00 mg/dm ²

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CONCLUSION:

The sample drawn by party from the above lot complies with ISO STANDARD ISO 13006 :2018 Group BI a Test Procedure as per ISO 10545

Verify by
Testing Engineer

Nimesh J. Kavar
(Nimesh J. Kavar)

For
National Cera Lab

Name of Authorised signatory :
Designation of signatory :

J.M. Kavar
Technical Manager

Jerambhai M. Kavar

QM/TM.

