



NATIONAL CERA LAB

CERAMIC LABORATORY

Ref. No.

NCL/Vitrified Tile /SASO ISO/10228/2017-18

Receive date of test sample :- 02.10.2017

Issue to

M/s Velsaa Vitrified LLP
8A N.H. , New Jambudia
Tal & Dist - Morbi ; Gujarat ; India

SAMPLE DESCRIPTION & NAME: Polished Glazed Vitrified Tiles size 1200x600mm as submitted by the party

TEST DESIRED:

As SASO ISO 13006:2012 Group B I a

A) *Dimantion and surface quality*

- (i) LENGTH & WIDTH
(ii) THICKNESS
(iii) STRAIGHTNESS OF SIDES (Facial sides)
(iv) RECTANGULARITY
(v) SURFACE FLATNESS
(vi) SURFACE QUALITY

- (v) THERMAL SHOCK RESISTANCE
(vi) CO EFFICIENT OF LINEAR THERMAL EXPANTION
(vii) RESISTANCE TO SURFACE ABRASION
(viii) SCRACH HARDNESS
(x) BULK DENSITY
(xi) MOISTURE EXPANSION

B) *Physical Property*

- (i) WATER ABSORPTION %
(ii) MODULUS OF RUPTURE (MOR) N/mm²
(iii) BREAKING STRENGTH
(iv) CRAZING RESISTANCE

C) *Chemical Property*

- (i) Resistance to house chemical
(II) Resistance to swimming pool salt
(III) Resistance To Low Concentration OF Acid & Alkali
(IV) Resistance to Stain

TEST REPORT

A) DIMANTION AND SURFACE QUALITY

III) DEVIATION IN LENGTH (l) & WIDTH(w) :-

	Result	Test Method	Require
3.1) (a) The deviation in percentage of the average size of each tile (2 or 4 sides) from the work size (W)	+ 0.02% - 0.00%	SASO ISO10545 - 2	± 0.60%
(b) The deviation in percentage of the average size of each tile (2 or 4 sides) from the average size of the 10 test specimen (20 or 40 sides)	+ 0.01% - 0.00%	SASO ISO10545 - 2	± 0.50%
3.2) THICKNESS :- 10.25 mm The deviation in percent of the average thickness of each tile from the work size thickness	+ 0.42% - 0.00%	SASO ISO10545 - 2	± 5%
3.3) STRAIGHTNESS OF SIDES :- The maximum deviation from straightness, in percent related to the corresponding work size	+ 0.05% - 0.04%	SASO ISO10545 - 2	± 0.50%
3.4) RECTANGULARITY :- The maximum deviation from rectangularity in percent related to the corresponding work size.	+ 0.05% - 0.04%	SASO ISO10545 - 2	± 0.50%

(Page 1 - 4)



NATIONAL CERA LAB

CERAMIC LABORATORY

TEST REPORT

3.5) SURFACE FLATNESS :-	Result	Test Method	Oct.06.2017 Require
The maximum deviation from flatness,in (percent)			
(a) Centre Curvature	+ 0.05%	SASO ISO10545 - 2	± 0.50%
Centre curvature related to diagonal calculated from the work size.	- 0.00%		
(b) Edge curvature	+ 0.06%		± 0.50%
Edge curvature related to the corresponding work size.	- 0.00%		
(c) Warpage	+ 0.03%		± 0.50%
Warpage related to diagonal calculated from the work size.	- 0.00%		

II) 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. 95% SASO ISO10545 - 2 95%

PHYSICAL PROPERTIES :-

j) WATER ABSORPTION:- %	Test Method	
	SASO ISO 10545 - 3	
1 0.116 %	6 0.099 %	Require As per SASO ISO 13006 < e 0.50% Individual maximum 0.60%
2 0.137 %	7 0.096 %	
3 0.098 %	8 0.098 %	
4 0.102 %	9 n.d, %	
5 0.104 %	10 n.d, %	

Average 0.11 %

II) MODULUS OF RUPTURE (MOR) :-

	N/mm ²	0.11 %	
1 43.63 N/mm ²	6 42.68 N/mm ²		SASO ISO 10545 - 4 Require Minimum 35 Individual minimum 32
2 38.86 N/mm ²	7 43.16 N/mm ²		
3 40.26 N/mm ²	8 40.98 N/mm ²		
4 41.28 N/mm ²	9 n.d, N/mm ²		
5 42.56 N/mm ²	10 n.d, N/mm ²		

Average: 41.68 N/mm²

III) BREAKING STRENGTH IN N

	N	N	
1 2593.16 N	6 2466.48 N		Test Method SASO ISO 10545 - 4 Require Thickness > e 7.5 mm Not less than 1300
2 2624.41 N	7 2562.18 N		
3 1518.62 N	8 2516.88 N		
4 2612.24 N	9 n.d. N		
5 2588.69 N	10 n.d. N		

Average:- 2435.33 N

(page 2 of 4)



NATIONAL CERA LAB

CERAMIC LABORATORY

TEST REPORT

IV	CRAZING RESISTANCE :-	SASO ISO 10545-11		Result
	NO CRAZING IN TWO CYCLE ONE HOUR DURATION At a steam pressure of 750±20Kpa			Confirm
	6 Nos of tiles ware 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.			
V)	THERMAL SHOCK RESISTANCE. 15/145°C 10cycle	Result	Test Method	Require
		Confirm	SASO ISO 10545 - 9	10 cycle,Min
VI)	COEFFICIENT OF LINEAR THERMAL EXPANTION:-	Result	SASO ISO 10545 - 8	Require
	Expantion from ambient temperature to 100°C (K - 1); 5.86x10 ⁻⁶			9X10 ⁻⁶ Max
VII)	RESISTANCE TO SURFACE ABRASION :-		Test Method	Result
	Visual failure was observed at 12000 revolution when the tiles ware subjected to abrasion stage of 150,600,750,1500 . 2100,6000, etc up to 12000 revolution pass		ISO 10545-7	Class - IV
VIII)	MOISTURE EXPANSION mm/m	Result	ISO 10545 - 10	Require
		no expansion		0.02 mm/m max
IX)	SRACH HARDNESS OF SURFACE (MOH'S SCALE) :-	Result	6 moh's scal	Require
				Min 6 Moh's
X)	BULK DENSITY , IN (g/cc)	Require	2.2 min	Result
				2.2664g/cc
C	CHEMICAL PROPERTIES:	SASO ISO 10545-13	Result	Require
i).	House hold chemical resistance: No visual changes observed after immersion		Class GA	Min Class-GC
	Ammonium chloride solution for 24 hrs ; Pencil lines removed with wet wiping removed			
	100G/L	SASO ISO 10545-13		
ii).	Swimming pool salt : No visual changes observed after immersion		Class GA	Min Class-GC
	Sodium hypochlorite solution for 24 hrs ; Pencil lines removed with wet wiping removed			
	20mg/L			
III)	Acid & Alkalies :-	SASO ISO 10545-13		
A	Low Concentrations (L)		Class GLA	Min Class-GLC
i)	Hydrochloric Acid solution 3% (V/V)	No visual changes observed after immersion for 4 days ; Pencil lines removed with wet wiping removed		
ii)	Citric Acid Soln. 100gm/l	No visual changes observed after immersion for 24 hrs ; Pencil lines removed with wet wiping removed	Class GLA	Min Class-GLC

(page 3 of 4)



NATIONAL CERA LAB

CERAMIC LABORATORY

TEST REPORT

iii) Potassium Hydroxide Soln 30gm/l	No visual changes observed after immersion for 4 days ; Pencil lines removed with wet wiping removed	Result Class GLA	Require Min Class-GLC
Test Method		SASO ISO 10545-14	
IV) 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 remove by hot water Stain remove by hot water Stain remove by hot water	Result Class -5 Class -5 Class -5	Require Min Class - 3 Min Class - 3 Min Class - 3
V) LEAD AND CADMIUM RELEASE in mg/dm ²	SASO ISO 10545 - 15	Result No Release	

CONCLUSION:

The sample drawn by party from the above lot complies with SASO ISO 13006 : 2012 Group B1 a

Test Procedure as per ISO 10545

Authorised signatory :- J.M. Kavar
(Dip in Ceramic Technology)

Name of signatory : J.M. Kavar

Designation of signatory :



For
National Cera Lab

J.M. Kavar
(Dip in Ceramic Technology)



(page 4 of 4)