

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.

Date :

NCL/Glazed Vitrified Tile / EN/03/638/2020-21

March. 20. 2021

Receive date of test sample :-

09. 03. 2021

Issued To

Tile Merchant,
Dockrells Complex, Ballymount Rd Upper, Ballymount, Dublin 24
Rep. of Ireland

SAMPLE DESCRIPTION & NAME: Porcelain Tile (Ceramic Glazed Vitrified Tile) " First Grade ", Nominal size 900x600x20.0 mm
(Rectified) as submitted by the party. Sample not drawn by National Cera Lab

TEST DESIRED: EN : 14411 : 2016 (Group B I a) ANNEX - G

A Dimensions and surface quality

I Deviation in Length & Width

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 Crazeing Resistance

VIII Moisture Expansion (in mm/mm)

IX Impact resistance

X Scratch hardness of Surface (mohs scale)

XI Bulk density, lin (g/cc)

XII Small colour differences

XIII Reaction to fire

C Chemical Property

I Resistance Stain

II Resistance To Low Concentration of Acid & Alkali

III Resistance To High Concentration of Acid & Alkali

IV Resistance to house chemical

V Resistance to swimming pool salt

VI Lead and Cadmium Release

TEST REPORT

A Dimensions and surface quality

I Deviation in Length & Width

1 Length The deviation in mm of average size of each tile (2 sides) from the average of 10 test specimens (20 Sides)

2 Width The deviation in mm of the average size of each tile (2 sides) from the average of 10 test specimens (20 Sides)

II Thickness

The deviation in mm of average thickness of 10 tile from the work size thickness

Party given 10 Pices
Thickness Average
20.00 mm 19.93 mm

Require	Test Method	Result
≥ 15 cm		
± 1 mm	EN ISO 10545 - 2	Avg+ 0.47 mm Avg - 0.00 mm Pass
± 1 mm	EN ISO 10545 - 2	Avg+ 0.22 mm Avg - 0.00 mm Pass
± 0.5 mm	EN ISO 10545 - 2	Avg+ 0.00 mm Avg - 0.07 mm Pass

III Straightness of Sides

Maximum deviation from straightness in mm related to the corresponding work size

±0.8 mm	EN ISO 10545 - 2	Max+ 0.17 mm Max - 0.19 mm Pass
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IV Rectangularity

Maximum deviation from rectangularity in mm related to the corresponding work size

±1.5 mm	EN ISO 10545 - 2	Max+ 0.21 mm Max - 0.22 mm Pass
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TEST REPORT

March. 20. 2021

V Surface Flatness

(a) Centre Curvature

Centre curvature related to diagonal
calculated from the work size.

Test Method	Require	Result
EN ISO 10545 - 2	± 1.8 mm	Max+ 0.15 mm Max - 0.00 mm

(b) Edge curvature

Edge curvature related to the
corresponding work size.

EN ISO 10545 - 2	± 1.8 mm	Max+ 0.16 mm Max - 0.00 mm
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(c) Warpage

Warpage related to diagonal
calculated from the work size.

EN ISO 10545 - 2	± 1.8 mm	Max+ 0.14 mm Max - 0.00 mm Pass
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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.

EN ISO 10545 - 2	95%	100% Free from defects
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B PHYSICAL PROPERTIES :-

I Water Absorption %

1	0.042 %
2	0.012 %
3	0.034 %
4	0.038 %
5	0.015 %

Average 0.028 %

EN ISO 10545 - 3	Avg. 0.028% Max. 0.042%
------------------	----------------------------

Ev ≤ 0.5 %
Individual maximum 0.6%

II Breaking Strength in N N

1	8284.47 N	6	8799.41 N
2	8672.84 N	7	10038.75 N
3	11526.44 N	8	10789.39 N
4	10252.88 N		
5	11264.59 N	Average	9953.60 N

EN ISO 10545 - 4	Avg. 9953.60 N Min. 8284.47 N
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Not less than 1300
Thickness ≥ 7.5 mm

III Modulus of Rupture (MOR)

N/mm²

1	36.23 N/mm ²	6	38.07 N/mm ²
2	36.57 N/mm ²	7	43.15 N/mm ²
3	46.61 N/mm ²	8	46.18 N/mm ²
4	44.45 N/mm ²		
5	48.42 N/mm ²	Average	42.46 N/mm ²

EN ISO 10545 - 4	Avg. 42.46 N/mm ² Min. 36.23 N/mm ²
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Minimum 35
Individual minimum 32

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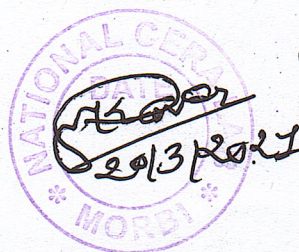
Ref. No.

Date :

TEST REPORT

March. 20. 2021

	Test Method	Require	Result
IV Resistance to surface abrasion Visual failure was observed at 12000 revolution when the tiles were subjected to abrasion stage of 150,600,750,1500, 2100,6000, up to 12000 revolution, 6000 revolution pass.	EN ISO 10545 - 7	Require Abrasion class and cycle passed	PEI Class - IV 6000 Revolution pass
V Coefficient of Liner Thermal Expansion Expansion from ambient temperature to 100°C (K - 1)	EN ISO 10545 - 8	Declared value	5.31x10 ⁻⁶
VI Thermal Shock Resistance 15/145°C 10cycle	EN ISO 10545 - 9	Pass according to ISO 10545-1	Confirm
VII Crazeing 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.	EN ISO 10545 - 11	Pass according to ISO 10545-1	Confirm
VIII Moisture Expansion (in mm/mm)	EN ISO 10545 - 10	Declared value	0.01 mm/m max
IX Impact resistance Coefficient of restitution (COR)	EN ISO 10545 - 5	Declared value	0.82
X Scratch hardness of Surface (mohs scale)	IS 13630 - 13	5 moh's scal	7 Moh's
XI Bulk density , lin (g/cc)	EN ISO 10545 - 3	2.2 min	2.2949 g/cc
XII SMALL COLOUR DIFFERENCES	EN ISO 10545 -16	Δ E cmc < 0.75	No Difference
XIII Reaction to fire			Class A1
C CHEMICAL PROPERTIES:			
I Resistance 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 weak cleaning agent Stain removed by weak cleaning agent Stain removed by hot water	EN ISO 10545 - 14 Min Class - 3 Min Class - 3 Min Class - 3	Class - 4 Class - 4 Class - 5
II Resistance To Low Concentration OF Acid & Alkali a Hydrochloric Acid solution 3% (V/V)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value Class GLA
b Citric Acid Soln. 100gm/l	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value Class GLA
c Potassium Hydroxide Soln 30gm/l	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value Class GLA



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Ref. No.

Date :

TEST REPORT

March. 20. 2021

	Test Method	Require	Result
III Resistance To High Concentration OF Acid & Alkali			
a Hydrochloric Acid solution 18% (V/V)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value
b Lactic Acid Soln. 5% (v/v)	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value
c Potassuim Hydroxide Soln. 100gm/l	No visual changes observed after immersion for 4 days, pencil line removed with soft wet cloth.	EN ISO 10545 - 13	Declared value
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.	EN ISO 10545 - 13	Min CLASS - GB
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.	EN ISO 10545 - 13	Min CLASS - GB
VI Lead And Cadmium Releas			
a Lead Release		EN ISO 10545 - 15	Limit
Test Solution			Result
Acetic Acid Solution 4% (v/v), (in 960ml distilled water)	Digestion time- 24 hrs (20±2°) Detected by ED XRF	Declared value	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	Declared value	0.004 mg/dm ²

CONCLUSION:

The sample drawn by party from the above lot complies with standard EN 14411 :2016 Group BI a
Test Procedure as per EN ISO 10545

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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



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Ref. No. NCL/Glazed Vitrified Tile / EN/03/638/2020-21

Date :

Receive date of test sample :- 09. 03. 2021

March. 20. 2021

Issued To

Tile Merchant,
Dockrells Complex, Ballymount Rd Upper, Ballymount, Dublin 24
Rep. of Ireland

SAMPLE DECIPTION & NAME: Porcelain Tile (Ceramic Glazed Vitrified Tile) " First Grade " , Nominal size 900x600x20.0 mm
(Rectified) as submitted by the party. Sample not drawn by National Cera Lab

TEST DESIRED: EN : 14411 : 2016 (Group B I a) ANNEX - G

Frost Resistance

Test Method EN ISO 10545 - 12 : 2007

The initial water absorptior 0.039%

The final water absorption 0.047%

Water absorption coefficient of tile $\leq 0.5\%$

The type of test performed

(with or without immersion) With immersion

Size of test specimen or m²

Number of test specimen

with visible defect after 100 cycle

Minimum area 0.25² , 300x200 mm

10 no specimen 0.60m²

Not a single tile visible defects

Result Pass the test

Specimen no	Visual defect before commencing the test	Cracks	Crazing	Dry spots	After methy
1		✓	✓	✓	✓
2		✓	✓	✓	✓
3		✓	✓	✓	✓
4		✓	✓	✓	✓
5		✓	✓	✓	✓
6		✓	✓	✓	✓
7		✓	✓	✓	✓
8		✓	✓	✓	✓
9		✓	✓	✓	✓
10		✓	✓	✓	✓

Specime no	Visual defect after commencing the test	Cracks	Crazing	Dry spots	After methy
1		✓	✓	✓	✓
2		✓	✓	✓	✓
3		✓	✓	✓	✓
4		✓	✓	✓	✓
5		✓	✓	✓	✓
6		✓	✓	✓	✓
7		✓	✓	✓	✓
8		✓	✓	✓	✓
9		✓	✓	✓	✓
10		✓	✓	✓	✓

X - Not conform

✓ - Conform

X - Not conform

✓ - Conform

Initial water absorption

Specimen no	Mass of each dry tile	Mass of each wet tile	Percent of W.A.
1	2630.50	2631.60	0.042
2	2603.00	2603.30	0.012
3	2657.00	2657.80	0.030
4	2615.60	2616.60	0.038
5	2592.00	2592.60	0.023
6	2635.20	2636.10	0.034
7	2632.10	2633.40	0.049
8	2634.60	2635.90	0.049
9	2642.20	2643.80	0.061
10	2644.40	2645.90	0.057

Average of ten specimen 0.039 %

Final water absorption

Specimen no	Mass of each wet tiles after test	Mass of each dry tile after the test	Percent of W.A.
1	2631.80	2630.50	0.049
2	2603.50	2603.00	0.019
3	2657.90	2657.00	0.034
4	2616.90	2615.70	0.046
5	2592.70	2592.00	0.027
6	2636.30	2635.20	0.042
7	2633.70	2632.10	0.061
8	2636.10	2634.60	0.057
9	2644.00	2642.20	0.068
10	2646.10	2644.40	0.064

Average of ten specimen 0.047 %

Verify by
Testing Engineer

Nimesh J. Kavar
(Nimesh J. Kavar)

Name of Authorised signatory :

J.M. Kavar

Designation of signatory :

Technical Manager

For
National Cera Lab

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Ref. No.

Date :

NCL/Glazed Vitrified Tile / EN/03/638/2020-21

Issue Date

March. 20. 2021

Receive date of test sample 09.03. 2021

Issued To

Tile Merchant,
Dockrells Complex, Ballymount Rd Upper, Ballymount, Dublin 24
Rep. of Ireland

SAMPLE DESRIPTION & NAME Porcelain Tile (Ceramic Glazed Vitrified Tile) " First Grade " , Nominal size 900x600x20.0 mm
(Rectified) as submitted by the party. Sample not drawn by National Cera Lab

TEST DESIRED: EN : 14411 : 2016 (Group B I a) ANNEX - G

1 CO-EFFICIENT OF FRICTION (ANTI SLIP TEST) "RAMP TEST"

Note Party submitted sample size 900x500 mm one sample Tiles.

CO-EFFICIENT OF FRICTION (ANTI SLIP TEST) "RAMP TEST"

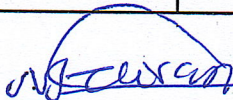
TEST METHOD As per Standard DIN 51130 : 2014 - 2 & ISO 10545 - 17

STANDARD LIMIT	CORRECTED MEAN OVERALL	SLIP RESISTANCE
S - I	5.7° - 11.7°	ACCEPTANCE ANGLE
		6° UP TO 10°
S - II	14.3° - 20.3°	OVER 10° UP TO 19°
		OVER 19° UP TO 27°
S - III	24.3° - 30.3°	OVER 27° UP TO 35°
		OVER 35°
		R 9
		R 10
		R 11
		R 12
		R 13

Sr No	Sample Name	Measured Value	Average Value	Class
1	900x600 mm Glazed Porcelain Tile Matt Finish Surface	(1) 26.6° , (2) 26.8° , (3) 27.0° (4) 27.2°	26.9°	R 11

Verify by
Testing Engineer

Nimesh J. Kavar



For
National Cera Lab

Name of Authorised signatory :
Designation of signatory :

J.M. Kavar
Technical Manager



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Ref. No.

Date :

NCL/Bond/EN/ 04/001/2021-22

April. 20. 2021

Receive date of test sample :- 09. 03. 2021

Issued To

Tile Merchant,
Dockrells Complex, Ballymount Rd Upper, Ballymount, Dublin 24
Rep. of Ireland

SAMPLE DECRPTION & NAME: Ceramic Glazed Porcelain tiles " First Grade " , Nominal size 900x600x20.0 mm (Rectified)
as submitted by the party. Sample not drawn by National Cera Lab

Test require as per EN : 14411 : 2016 (Group B I a) ANNEX - G

BOND STRENGTH As per EN 12004 - 1 : 2017

TEST REPORT

1 Determination of tensile adhesion for cementitious adhesives C 2

- Test materials
- Ceramic tiles.

The tiles shall be checked prior to conditioning to ensure that they are unused, clean and dry.
The tiles used for this test shall be dry pressed tile in accordance with EN 14411, Group BI a fully vitrified, with a water absorption of $\leq 0.5\%$ by mass, unglazed and with a plain matt, adhering surface, with a facial dimensions of (50 ± 1) mm x (50 ± 1) mm.
Condition all test material for at least 24 h under standard condition.

- Test Substrate
- Concrete slab

The mandatory concrete test substrate shall be 35 mm thick, have a moisture content of less than 3% by mass and have a water absorption at the surface after 4 hr in the range of 0.5cm^3 to 1.5cm^3 .
The tensile adhesion strength shall be at least 1.5 N/mm^2 .
The test surface have a finish similar to that obtain by using a wooden float and be clean dust-free at the of the test.
A method for manufacturing a suitable concrete test slab and the procedure for measuring the performances are given in Annex A

- Weight (mass)

A mass capable of exerting a force of $(20 \pm 0.05) \text{ N}$, with a cross sectional area of less than $50 \text{ mm} \times 50 \text{ mm}$

- Pull head plate

Square mettalic plates, with dimensions $(50 \pm 1) \text{ mm} \times (50 \pm 1) \text{ mm}$ and minimum thickness of 10 mm with a suitable fitting for connection to the test machine

- Air circulating oven.

An air - circulating oven capable of controlling the temperature to within $\pm 3^\circ \text{C}$

- Notched trowel

A notched trowel having 6 mm x 6 mm notched at 12 mm centre.

- Preparation of test units

Apply a thin layer of adhesive, to the concrete slab with a straight edge trowel. Than apply a thicker layer and comb with a notched trowel. The trowel shall be held at an angle of approximately 60° to the substrate at a right angle to one edge of the slab and drawn across the slab parallel to that edge (in a straight line).
After 5 min place tiles on the adhesive at a distance of 50 mm and load each tile with $(20 \pm 0.05) \text{ N}$ for 30 s.

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A Initial tessile adhesion strength

After 27 d storage under standard conditions bond the pull - head plate to the tiles with a suitable high strength adhesive e.g. (exopide),

After a furthe 24 h storage under standard conditions determine the tensile adhesion strength of the adhesive by applying force at a constant rate of (250 ± 50) N/s.

Tensile Strength in normal condition

Requirement
≥ 0.5N/mm²

Test Method
EN 12004 - : 2017

Result

Sample No.	Pull-head plate length in mm	Pull-head plate Width in mm	Square area pull-head plate mm ²	Maximun loadin N	Tensile Bond strength in N/mm ²	Failure Mode
1	50.01	50.02	2501.50	3284.6	1.31	Adhesive failure between adhesive and substrate (AF - S)
2	50.01	50.02	2501.50	3266.8	1.31	Adhesive failure between tile and adhesive (AF - T)
3	50.01	50.02	2501.50	3258.5	1.30	Adhesive failure between tile and adhesive (AF - T)
4	50.01	50.02	2501.50	3348.2	1.34	Adhesive failure between adhesive and substrate (AF - S)
5	50.01	50.02	2501.50	3280.6	1.31	Adhesive failure between adhesive and substrate (AF - S)

B Tensile adhesion strength after water immersion

Condition the test unit under standard conditions for 7 d, and immerse in water at the standard temperature.

After 20 d remove the test units from the water, wipe with a cloth and bond the pull-head plates to the tiles. After a further 7 h in standard conditions immerse the test units in water at the standard temperature.

The following day remove the test units from water and immediately carry out the tensile adhesion test.

Type of Test

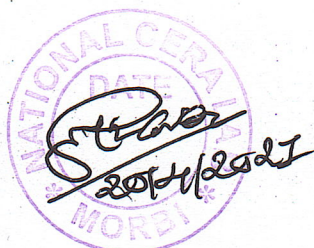
Tensile adhesion strength after water immersion

Requirement
≥ 0.5N/mm²

Test Method
EN 12004 - : 2017

Result

Sample No.	Pull-head plate length in mm	Pull-head plate Width in mm	Square area pull-head plate mm ²	Maximun loadin N	Tensile Bond strength in N/mm ²	Failure Mode
1	50.01	50.02	2501.50	3198.6	1.28	Adhesive failure between adhesive and substrate (AF - S)
2	50.01	50.02	2501.50	3242.4	1.30	Adhesive failure between adhesive and substrate (AF - S)
3	50.01	50.02	2501.50	3180.2	1.27	Adhesive failure between tile and adhesive (AF - T)
4	50.01	50.02	2501.50	3186.8	1.27	Adhesive failure between adhesive and substrate (AF - S)
5	50.01	50.02	2501.50	3212.4	1.28	Adhesive failure between adhesive and substrate (AF - S)



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C Tensile adhesion strength after heat ageing.

Condition the test units under standard conditions for 14 d and then place the units in an air - circulating oven at $(70 \pm 3)^\circ\text{C}$ for a further 14 d. Remove the oven and bond pull-head plates to the tiles with a suitable high strength adhesive (e.g. epoxide)

Condition the test units for a further 24 h under standard conditions. Determine the tensile adhesion strength.

1 Tensile Strength after heat ageing.

Requirement
 $\geq 0.5\text{N/mm}^2$

Test Method
EN 12004 - : 2017

Sample No.	Pull-head plate length in mm	Pull-head plate Width in mm	Square area pull-head plate mm^2	Maximum load in N	Tensile Bond strength in N/mm^2	Failure Mode
1	50.01	50.02	2501.50	3196.8	1.28	Adhesive failure between adhesive and substrate (AF - S)
2	50.01	50.02	2501.50	3216.4	1.29	Adhesive failure between tile and adhesive (AF - T)
3	50.01	50.02	2501.50	3180.6	1.27	Adhesive failure between adhesive and substrate (AF - S)
4	50.01	50.02	2501.50	3220.8	1.29	Adhesive failure between adhesive and substrate (AF - S)
5	50.01	50.02	2501.50	3186.8	1.27	Adhesive failure between adhesive and substrate (AF - S)

(Page 3 of 3)

Verify by
Testing Engineer

Nimesh J. Kavar
(Nimesh J. Kavar)

For
National Cera Lab

Name of Authorised signatory :
Designation of signatory :



