

Test Report

Test Report No.: HL/MT/210101001

Issued To: BLUETONE IMPEX LLP

ULR No.: TC902220000000101F

Issue Date: 12-01-2021

TEST REPORT OF TILE

Name of Agency : BLUETONE IMPEX LLP
Address : S-21 & 22, SECOND FLOOR, SHAKTI CHAMBER-2,
8A-NH, MORBI-363642.GUJARAT,INDIA
Sample Name : Pressed Ceramic Tiles (Glazed Tiles)
Make : BLUETONE
Sample Code : Not Mentioned
Sample Received on : 01-01-2021
Analysis End On : 12-01-2021

SAMPLE DETAILS

Type : Dry Pressed Ceramic Tiles water absorption (Ev > 10 %)
Group : BIII (Annexure-L)
Nominal Size (N) : 600 x 300 x 9.0 mm (Rectified)
Work Size : 600 x 300 mm
Nature of Surface : Glazed (GL)
Quantity of sample : 40 Pieces
Batch No./Lot No. : A-1
Date of Manufacturing : 03-09-2020
Design : CHICAGO DARK GREY
Indication of First Quality : Provided (Premium)
Country of Origin : India
Any Other Information : Declared Thickness 9.0 mm
Total Weight of Box : Provided (14 kg per box)
Specification : SASO-ISO: 13006 Third Edition 2018-09 (Ceramic tiles- Definitions,
Classification,
Reference Standards : SASO-ISO: 10545 (Part - 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16) with Latest
Edition.

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TEST REPORT OF TILE

S. No.	Name of Test	Reference Standards
1	Determination of Dimensions and Surface Quality	SASO-ISO 10545 (Part-2) - 2019
2	Determination of Water Absorption & Bulk Density	SASO-ISO 10545 (Part-3) - 2018
3	Determination of Modulus of Rupture and Breaking Strength	SASO-ISO 10545 (Part-4) - 2019
4	Determination of Impact Resistance by Measurement of Coefficient of Restitution	SASO-ISO 10545 (Part-5) - 2006
5	Determination of Resistance to Surface Abrasion	SASO-ISO 10545 (Part-7) - 2007
6	Determination of Linear Thermal Expansion	SASO-ISO 10545 (Part-8) - 2016
7	Determination of Resistance to Thermal Shock	SASO-ISO 10545 (Part-9) - 2016
8	Determination of Moisture Expansion	SASO-ISO 10545 (Part-10) - 2006
9	Determination of Craze Resistance	SASO-ISO 10545 (Part-11) - 2007
10	Determination of Frost Resistance	SASO-ISO 10545 (Part-12) - 2007
11	Determination of Chemical Resistance	SASO-ISO 10545 (Part-13) - 2018
12	Determination of Resistance to Stains	SASO-ISO 10545 (Part-14) - 2016
13	Determination of Lead and Cadmium	SASO-ISO 10545 (Part-15) - 2006
14	Determination of Small Colour Differences	SASO-ISO 10545 (Part-16) - 2014

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(i) Measurements of Average Size Lengthwise (Measurement of Length)

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Vernier Caliper					

Average Size Lengthwise

Parameters	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Individual Size (mm) side 1 Lengthwise	599.82	599.76	599.88	599.78	599.76	599.82	599.90	599.96	599.82	599.76
Individual Size (mm) side 2 Lengthwise	599.80	599.72	599.84	599.72	599.80	599.86	599.94	599.90	599.86	599.80
Average Size of each Specimen(mm) Both Sides Lengthwise	599.81	599.74	599.86	599.75	599.78	599.84	599.92	599.93	599.84	599.78
Average Size of 10 specimens (mm) Lengthwise	599.83 mm									
Deviation of the average size of each specimen from the work size (mm) Lengthwise	-0.190	-0.260	-0.140	-0.250	-0.220	-0.160	-0.080	-0.070	-0.160	-0.220
Deviation of the average size for the average of 10 specimens (mm) lengthwise	-0.175 mm					Required Value: ± 1.0 mm				
Deviation of the average size of each specimen from the work size (%) Lengthwise	-0.032	-0.043	-0.023	-0.042	-0.037	-0.027	-0.013	-0.012	-0.027	-0.037
% Deviation of the average size from the Work size Lengthwise	-0.029 %					Required Value: ± 0.3 %				
Deviation of the average size of each specimen from the average of 10 specimen (mm) Lengthwise	-0.015	-0.085	0.035	-0.075	-0.045	0.015	0.095	0.105	0.015	-0.045
Deviation of the average size of each specimen from average of 10 specimens (%) Lengthwise	-0.003	-0.014	0.006	-0.013	-0.008	0.003	0.016	0.018	0.003	-0.008

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(ii) Measurements of Average Size Widthwise (Measurements of Width)

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Vernier Caliper					

Average Size Widthwise

Parameters	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Individual Size (mm) side 1 Widthwise	300.04	299.98	299.94	299.90	299.80	299.84	299.90	300.04	300.06	299.90
Individual Size (mm) side 2 Widthwise	300.08	299.96	299.96	299.92	299.86	299.88	299.92	300.08	300.04	299.92
Average Size of each Specimen(mm) Both Sides Widthwise	300.060	299.970	299.950	299.910	299.830	299.860	299.910	300.060	300.050	299.910
Average Size of 10 specimens (mm) Widthwise	299.951 mm									
Deviation of the average size of each specimen from the work size (mm) Widthwise	0.060	-0.030	-0.050	-0.090	-0.170	-0.140	-0.090	0.060	0.050	-0.090
Deviation of the average size for the average of 10 specimens (mm) Widthwise	-0.049 mm					Required Value: ± 1.0 mm				
Deviation of the average size of each specimen from the work size (%) Widthwise	0.020	-0.010	-0.017	-0.030	-0.057	-0.047	-0.030	0.020	0.017	-0.030
% Deviation of the average size from the Work Size Widthwise	-0.016 %					Required Value: ± 0.3 %				
Deviation of the average size of each specimen from the average of 10 specimen (mm) Widthwise	0.109	0.019	-0.001	-0.041	-0.121	-0.091	-0.041	0.109	0.099	-0.041
Deviation of the average size of each specimen from average of 10 specimens (%) Widthwise	0.036	0.006	0.000	-0.014	-0.040	-0.030	-0.014	0.036	0.033	-0.014

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(iii) Measurements of Thickness

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Micrometer					

Thickness Parameters	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Thickness (mm) Position 1	8.78	8.88	8.98	8.96	8.78	8.93	8.85	8.83	8.98	8.94
Thickness (mm) Position 2	8.85	8.78	8.78	8.97	8.76	8.85	8.81	8.86	8.92	9.00
Thickness (mm) Position 3	8.79	8.84	8.96	8.88	8.80	8.93	8.88	8.81	8.83	8.86
Thickness (mm) Position 4	8.78	8.83	8.97	8.98	8.97	8.92	8.93	8.97	8.76	8.89
Average Tickness (mm)	8.800	8.833	8.923	8.948	8.828	8.908	8.868	8.868	8.873	8.923
Average Thickness of 10 specimens (mm) all positions	8.877 mm									
Deviation of the average thickness of each tile from the work size thickness(mm)	-0.200	-0.168	-0.078	-0.052	-0.172	-0.092	-0.133	-0.133	-0.128	-0.078
Deviation of the average thickness from the average of 10 specimens (mm)	-0.123 mm					Required Value: ± 0.5 mm				
Deviation of the average thickness of each specimen from the work size (%)	-2.222	-1.861	-0.861	-0.583	-1.917	-1.028	-1.472	-1.472	-1.417	-0.861
% Deviation of the average thickness from the average of 10 Specimens	-1.369 %					Required Value: ± 10.0 %				

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(iv) Measurements of Straightness of Sides

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Steel Square, Dial gauge, Steel Plate with Straight flat sides					

Straightness of Sides

(a) Lengthwise

	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Straightness of sides (mm) side 1	0.24	0.08	0.23	-0.07	0.03	-0.01	0.20	0.08	0.17	0.09
Straightness of sides (mm) side 2	0.11	-0.15	0.09	0.03	-0.20	0.08	0.10	0.18	0.04	-0.17
Maximum deviation of Straightness of both sides (mm)	0.24 mm		Required Value: ± 0.8 mm							
	-0.20 mm									
Maximum deviation from straightness related to the corresponding work size (%)	0.040 %		Required Value: ± 0.3 %							
	-0.033 %									

(b) Widthwise

	1	2	3	4	5	6	7	8	9	10
Straightness of sides (mm) side 1	-0.09	-0.02	-0.17	0.05	0.22	-0.19	-0.20	0.26	0.01	0.24
Straightness of sides (mm) side 2	0.10	-0.09	0.13	-0.07	-0.10	0.02	-0.11	0.07	-0.13	0.28
Maximum deviation of Straightness of both sides (mm)	0.28 mm		Required Value: ± 0.8 mm							
	-0.20 mm									
Maximum deviation from straightness related to the corresponding work size (%)	0.093 %		Required Value: ± 0.3 %							
	-0.067 %									

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(v) Measurements of Rectangularity

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Steel Square, Dial gauge, Steel Plate with Straight flat sides					

Rectangularity of Sides

(a) Lengthwise

	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Rectangularity (mm) side 1	-0.11	-0.30	-0.06	0.11	-0.05	0.16	0.16	0.22	-0.26	0.24
Rectangularity (mm) side 1	-0.12	0.11	0.15	0.29	0.05	0.09	0.22	0.23	0.06	0.07

Maximum deviation of
Rectangularity of both sides
(mm)

0.29 mm
-0.30 mm

Required Value: ± 1.5 mm

Maximum deviation from
Rectangularity related to the
corresponding work size (%)

0.048 %
-0.050 %

Required Value: ± 0.3 %

(b) Widthwise

	1	2	3	4	5	6	7	8	9	10
Rectangularity (mm) side 1	0.00	0.00	0.19	-0.04	-0.25	-0.13	0.24	0.14	0.18	0.16
Rectangularity (mm) side 2	-0.17	-0.13	0.12	0.15	-0.04	0.16	0.13	0.25	0.20	0.01

Maximum deviation of
Rectangularity of both sides
(mm)

0.25 mm
-0.25 mm

Required Value: ± 1.5 mm

Maximum deviation from
Rectangularity related to the
corresponding work size (%)

0.083 %
-0.083 %

Required Value: ± 0.3 %

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(vi) Measurements of Surface Flatness (Curvature and Warpage)

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Surface Flatness Measurement Apparatus, Dial gauge, Glass Calibration Plate					

A. Centre Curvature:

Centre Curvature	Number of Specimens									
	1	2	3	4	5	6	7	8	9	10
Centre curvature (mm) Diagonal 1	0.02	-0.09	0.18	-0.18	0.12	-0.06	0.23	0.14	0.27	-0.03
Centre curvature (mm) Diagonal 2	-0.11	-0.25	-0.16	-0.07	-0.11	0.09	0.26	0.16	-0.16	0.21
Maximum centre curvature related to the diagonal work size (mm)	0.27 mm				Required Value: ± 1.8 mm					
	-0.25 mm									
Maximum centre curvature related to the diagonal calculated from work size (%)	0.040 %				Required Value: ± 0.4 %					
	-0.037 %									

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(vi) Measurements of Surface Flatness (Curvature and Warpage)

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Surface Flatness Measurement Apparatus, Dial gauge, Glass Calibration Plate					

B. Edge Curvature of Length

(a) Lengthwise	1	2	3	4	5	6	7	8	9	10
Edge curvature(mm) side 1	0.20	0.31	0.32	0.22	-0.17	0.00	-0.21	0.10	0.00	-0.09
Edge curvature(mm) side 2	0.29	0.11	-0.07	-0.17	0.30	-0.21	0.08	0.25	-0.06	-0.15
Maximum edge curvature related to the corresponding work size (mm)	0.32 mm		Required Value: ± 1.8 mm							
	-0.21 mm									
Maximum edge curvature related to the corresponding work size (%)	0.053 %		Required Value: ± 0.4 %							
	-0.035 %									

C. Edge Curvature of Width

(b) Widthwise	1	2	3	4	5	6	7	8	9	10
Edge curvature(mm) side 1	0.16	0.22	0.15	0.16	0.09	0.01	0.19	-0.08	-0.08	0.25
Edge curvature(mm) side 2	0.22	-0.08	0.04	0.23	0.19	0.22	0.19	0.16	-0.07	0.19
Maximum edge curvature related to the corresponding work size (mm)	0.25 mm		Required Value: ± 1.8 mm							
	-0.08 mm									
Maximum edge curvature related to the corresponding work size (%)	0.083 %		Required Value: ± 0.4 %							
	-0.027 %									

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(a) Dimensions

(vi) Measurements of Surface Flatness (Curvature and Warpage)

a) Description of tiles :	Glazed Pressed Ceramic Tiles					
b) Number of Specimen:	10 Whole Tiles					
c) Nominal Size:	600	x	300	x	9.0	mm
d) Work Size:	600	x	300	x	9.0	mm
e) Thickness:	9.0	mm				
f) Instruments Used:	Surface Flatness Measurement Apparatus, Dial gauge, Glass Calibration Plate					

D. Warpage

(a) Lengthwise

	1	2	3	4	5	6	7	8	9	10
Warpage (mm) side 1	0.13	0.11	-0.25	0.11	0.05	0.02	-0.08	-0.16	0.13	0.08
Warpage (mm) side 2	-0.02	0.04	-0.19	-0.25	0.03	-0.04	-0.26	0.17	-0.20	-0.10

Maximum warpage related to the diagonal from work size (mm) 0.17 mm
-0.26 mm

Required Value: ± 1.8 mm

Maximum warpage related to the diagonal from work size (%) 0.025 %
-0.039 %

Required Value: ± 0.4 %

E. Warpage

(b) Widthwise

	1	2	3	4	5	6	7	8	9	10
Warpage (mm) side 1	-0.06	-0.15	0.04	-0.23	0.05	0.16	0.19	0.18	0.15	0.16
Warpage (mm) side 2	-0.03	-0.15	-0.08	-0.10	0.16	-0.27	-0.05	0.07	0.11	0.14

Maximum warpage related to the diagonal from work size (mm) 0.19 mm
-0.27 mm

Required Value: ± 1.8 mm

Maximum warpage related to the diagonal from work size (%) 0.028 %
-0.040 %

Required Value: ± 0.4 %

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A. Determination of Dimensions and Surface Quality

Reference Standard : SASO-ISO: 10545 (Part - 2) - 2019

(vii) Measurements of Surface Quality

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 20 Whole Tiles
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Fluorescent Lighting of Colour, Temp., Meter Rule, Light

Number of Specimen	Cracks	Crazing	Dry Spot	Unevenness	Pin Hole	Glaze Devitrification	Specks and Spots	Under glaze fault	Decorating fault	Chip	Blister	Rough Edge	Polishing defect
1	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	C	C	C	C	C	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C

Remark: - C = Conform the Requirement

Procedure: Tile have been Placed in the observation table under 275 ± 25 lux light by 6000 K lighting source and observed for the surface defects and Intentional effects-

Observation: No cracks, crazing, dry spots, unevenness, pin hole, glaze devitrification, specks or spots, underglaze fault, polishing defects, polishing effects, decorating fault, chip, blister, rough edge, welt, etc. have been Observed. Also In order to judge whether there is a defect or an intentional decorative effect, the intentionality and aesthetics of the effect have been assessed, including a review of the manufacturer documentation. Cracks, chipped edges and chipped corners have not been detected. 100 % Tile is free from Visual Defects.

Required Value: Tiles should not have Above mentioned Defects in 95 % Tiles Observed

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B. Physical Property

(i) Water Absorption

- Description of tiles :
- Number of Specimen:
- Nominal Size:
- Work Size:
- Thickness:
- Instruments Used:
- Test Specimen Dimension:

Reference Standard : SASO-ISO: 10545 (Part - 3) - 2018

Glazed Pressed Ceramic Tiles

5 Whole Tiles

600 x 300 x 9 mm

600 x 300 x 9 mm

9.0 mm

Drying Oven, Water Bath, Balance, Wire loop, Basket, Vacuum Chamber

Specimen Number	Dimension Before Test Specimen Preparation (mm)	Dimension After Test Specimen Preparation (mm)
1	600 x 300 x 9 mm	200 x 200 x 9 mm
2	600 x 300 x 9 mm	200 x 200 x 9 mm
3	600 x 300 x 9 mm	200 x 200 x 9 mm
4	600 x 300 x 9 mm	200 x 200 x 9 mm
5	600 x 300 x 9 mm	200 x 200 x 9 mm

Specimen Number	Mass of the Dry Sample (gm) (M1)	Mass of the Wet Sample (gm) (M2)	Water absorption of Individual Specimen (%) (M2-M1) x 100/M1
1	609.81	723.09	18.5763
2	602.19	717.18	19.0953
3	616.54	730.90	18.5487
4	600.91	715.02	18.9895
5	611.33	726.84	18.8949

Average Water Absorption of the all specimens tested in %

18.821 %

Required Value > 10.0 %

Individual Max. Value of Water Absorption of the Specimen in %

19.095 %

Individual Min. Value of Water Absorption of the Specimen in %

18.549 %

Required Value individual Min. 9.0 %

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B. Physical Property

(ii) Modulus of Rupture

Reference Standard : SASO-ISO: 10545 (Part - 4) - 2019

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 7 Whole Tiles
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Drying Oven, MOR Apparatus, Pressure gauge, Two Cylindrical Support Rods, Central Cylindrical Rod
g) Diameter of Rods (d): 20 mm
h) Thickness of Rubber(t): 5.0 mm
i) Overlap of tile beyond the edge supports(l1) : 10 mm
j) Span between the Support Rods (l2) : 580 mm

Specimen Number	Breaking Load (Newton) F	Span between the support rods (mm) l ₂	Width of the test Specimen (mm) b	Minimum thickness of the test specimen measured after the along the broken edge (mm) h	Modulus of Rupture of Individual Specimen (N/mm ²) $3Fl_2/2bh^2$
1	403.0	580	300	8.69	15.48
2	411.5	580	300	8.69	15.80
3	397.0	580	300	8.69	15.25
4	395.5	580	300	8.69	15.19
5	404.5	580	300	8.69	15.53
6	415.5	580	300	8.69	15.96
7	409.0	580	300	8.69	15.71

Average Breaking Load, N 405.14 Newton

Average Modulus of Rupture, N/mm² 15.56 N/mm²

Individual Minimum Modulus of Rupture, N/mm² 15.19 N/mm²

Required Value: Min 12 N/mm²
(Thickness > 7.5 mm),

Min 15 N/mm² for Thickness < 7.5 mm

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B. Physical Property

(iii) Breaking Strength

Reference Standard : SASO-ISO: 10545 (Part - 4) - 2019

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 7 Whole Tiles
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: Drying Oven, MOR Apparatus, Pressure gauge, Two Cylindrical Support Rods, Central Cylindrical Rod
- g) Diameter of Rods (d): 20 mm
- h) Thickness of Rubber(t): 5.0 mm
- i) Overlap of tile beyond the edge supports(l1) : 10 mm
- j) Span between the Support Rods (l2) : 580 mm

Specimen Number	Breaking Load (Newton) F	Span between the support rods (mm) l ₂	Width of the test Specimen (mm) b	Breaking Strength of Individual Specimen (N) F _{l2} /b
1	403.0	580	300	779.13
2	411.5	580	300	795.57
3	397.0	580	300	767.53
4	395.5	580	300	764.63
5	404.5	580	300	782.03
6	415.5	580	300	803.30
7	409.0	580	300	790.73

Average Breaking Load, N

405.14 Newton

Average Breaking Strength, N

783.28 Newton

Required Value: Min 600 Newton for
Thickness > 7.5 mm,
Min. 200 Newton for Thic. < 7.5 mm

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B. Physical Property

(iv) Determination of Impact Resistance by measurement of coefficient of restitution

Reference Standard : SASO-ISO: 10545 (Part - 5) - 2006

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 5 Test Specimen
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Ball Release Apparatus, Chrome Steel Ball (19±0.05 dia), Electronic Timing Device
g) Test Specimen Size: 100 x 100 mm

Specimen Number	Dropping height of the ball (h1) mm	Indentation or Cracking	Coefficient of restitution of Specimen
1	1000	No Indentation or Cracking	0.626
2	1000	No Indentation or Cracking	0.670
3	1000	No Indentation or Cracking	0.591
4	1000	No Indentation or Cracking	0.584
5	1000	No Indentation or Cracking	0.613

Average Coefficient of Restitution of the all specimens tested

0.617

Required Value : Min 0.55

Any indentation or Cracking in the Test Specimen

No Indentation or Cracking Observed in all the test specimen tested

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B. Physical Property

(v) Determination of Resistance to surface abrasion for glazed tiles

Reference Standard : SASO-ISO: 10545 (Part - 7) - 2007

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 11 specimen of 100 x 100 mm
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Abrasion Apparatus, Drying Oven, Balance, Load, Abrasive Powder
g) Preparation of Test Specimen: The Specimen Cut through cutting tool to Size of 100 x 100 mm further the glazed surface of each Specimen is Clean and dry before the test

Specimen Number	Abrasion stage at Revolutions	Failure Occur	Class of stain resistance for tiles of Abrasion	Average Class of stain resistance for tiles of Abrasion
1	100	No	NA	
2	150	No	NA	
3	600	No	NA	
4	750	No	NA	
5	1500	No	NA	4
6	2100	No	NA	
7	6000	Yes	4	
8	12000	NA	NA	

Resistance to surface abrasion of glazed tiles intended for use on floors

Class 4, Passed 2100 Revolutions

Required Vale: NA

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B. Physical Property

(vi) Determination of Linear Thermal Expansion

Reference Standard : SASO-ISO: 10545 (Part - 8) - 2016

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 2 specimen of 25 x 10 mm
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: Thermal Expansion Apparatus, Vernier Calipers, Drying Oven, Desiccator
- g) Preparation of Test Specimen: Cut Two test specimen at right angle from the central portion of one tile to length of 25 mm. The ends of the test specimen grounded flat and parallel.

Coefficient of Linear Thermal Expansion

Test Parameters	Length of Test Specimen at Ambient Temperature	Ambient Temperature	Length Increase at 100°C in mm	Required	Results
a. Coefficient of linear thermal expansion, ambient to 100°C, Specimen 2	25.40	26.2	0.011	NA	5.87×10^{-6}
b. Coefficient of linear thermal expansion, ambient to 100°C, Specimen 2	25.33	25.7	0.010	NA	5.31×10^{-6}
Average Coefficient of linear thermal expansion, ambient to 100°C	5.59 x 10 ⁻⁶			NA	

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B. Physical Property

(vii) Determination of Resistance to Thermal Shock

Reference Standard : SASO-ISO: 10545 (Part - 9) - 2016

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 5 Whole Tiles
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: Low Temperature Bath & Oven
- g) Temperature Cycle: Specimen put 15 minutes at 15°C, immediately transfer the Test Specimen to the oven maintained at 150°C until a uniform temperature is achieved, then immediately transfer them back to the 15°C, repeat this cycle 10 times.
- h) Type of test Performed: Test Without Immersion
- i) Water Absorption Coefficient: 18.821 %

Specimen Number	Visual defect examine before the test					Visual defect examine after the test				
	Cracks (Naked eye)	Crazing (Naked eye)	Dryspot (Naked eye)	Using Methylene Blue Staining (Naked eye)	Using Methylene Blue Staining (Naked eye)	Cracks (Naked eye)	Crazing (Naked eye)	Dryspot (Naked eye)	Using Methylene Blue Staining (Naked eye)	Using Methylene Blue Staining (Naked eye)
1	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	No Defects	No Defects	No Defects	No Defects	No Defects
2	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	No Defects	No Defects	No Defects	No Defects	No Defects
3	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	No Defects	No Defects	No Defects	No Defects	No Defects
4	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	No Defects	No Defects	No Defects	No Defects	No Defects
5	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	No Defects	No Defects	No Defects	No Defects	No Defects

Remarks and Observation: No visual defects like Crack, Crazing, Dry Spots in all the five test specimen.

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B. Physical Property

(viii) Determination of Moisture Expansion

Reference Standard : SASO-ISO: 10545 (Part - 10) - 2006

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 5 specimen of 100 x 35 mm
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Measuring Frame, Furnace, Vernier Calipers, Invar

Specimen Number	Length of Specimen after re-firing (mm)		Length of Specimen after treatment in boiling water (mm)		Moisture Expansion of each test Specimen (mm/m)
	Initial Length (mm)	Length after 3 h from the initial measurement	Length After 1 h removal from the boiling	Length after 3 h from the first measurement	
1	100.220	100.220	100.223	100.221	0.00998
2	100.123	100.123	100.125	100.125	0.01998
3	100.201	100.201	100.203	100.202	0.00998
4	100.187	100.187	100.19	100.188	0.00998
5	100.291	100.291	100.294	100.293	0.01994
Average Moisture Expansion (mm/m)					0.01397
Maximum Value of Moisture Expansion (mm/m)			0.01998	Required Value	0.6 mm/m

(ix) Determination of Frost Resistance

Reference Standard : SASO-ISO: 10545 (Part - 12) - 2007

The Test is Not Required for product groups which are generally unsuitable for use where frost is present.

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B. Physical Property

(x) Determination of Craze Resistance for glazed tiles

Reference Standard : SASO-ISO: 10545 (Part - 11) - 2007

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 5 specimen of 100 x 35 mm
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: Autoclave (Pressure 500±20 kPa, Steam Temperature 159±1°C)

Specimen Number	Examine the test Specimen for Craze	Test Condition for the Specimen
1	No Craze	Kept in Autoclave at Pressure 500±20 kPa, Steam Temperature 159±1°C
2	No Craze	
3	No Craze	
4	No Craze	
5	No Craze	

Remark: No test specimen shows any sign of Craze after performing the test.

(xi) Small Colour Differences

Reference Standard : SASO-ISO: 10545 (Part - 16) - 2014

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 5 Whole Tiles
- c) Nominal Size: 600 x 300 x 9 mm
- d) Work Size: 600 x 300 x 9 mm
- e) Thickness: 9 mm
- f) Instruments Used: Reflectance Spectrophotometer

Observation No.	1	2	3	4	5
Observation Value ΔE	0.2	0.3	0.3	0.3	0.3
Average Value of colour Difference ΔE	0.28		Required Value: < 0.75		

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C. Chemical Property

(i) Determination of Chemical Resistance

Reference Standard : SASO-ISO: 10545 (Part - 13) - 2018

- a) Description of tiles : Glazed Pressed Ceramic Tiles
b) Number of Specimen: 5 Whole Tiles, Three Specimens for each Chemical
c) Nominal Size: 600 x 300 x 9.0 mm
d) Work Size: 600 x 300 x 9.0 mm
e) Thickness: 9.0 mm
f) Instruments Used: Vessel with lid, Cylinder, Oven, Balance, Electric Lamp
g) Test Solution Used: Ammonium Chloride Solution, Sodium hypochlorite solution, HCl Solution (3%), Citric acid solution (100 g/L), Potassium hydroxide solution(30g/L) HCl Solution (18%), Lactic acid solution (5%), Potassium hydroxide solution(100g/L)
h) Procedure followed: Contact on Proper Surface

a. House hold chemical Resistance:

Specimen Number	Characteristic/ Test Parameter	Requirements	Test Results	Remark
1	Ammonium Chloride solution 100 gm/L	Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	
2		Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	
3		Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	

b. Swimming Pool Salt:

Specimen Number	Characteristic/ Test	Requirements	Test Results	Remark
1	Sodium Hypochlorite Solution 20mg/l	Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	
2		Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	
3		Min. class B(V)	Class-A(V) No visual change observed after 24h, Pencil lines removed with wet wiping	

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Resistance to acid & alkalies

c. Low Concentration (L):

Specimen Number	Characteristic/ Test	Requirements	Test Results	Remark
1	i) Hydrochloric Acid solution 3% (v/v)	Min Class LB(V)	Class-LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	
2		Min Class LB(V)	Class-LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	
3		Min Class LB(V)	Class-LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	
1	ii) Citric acid Solution 100 gm/l	Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 24h, pencil lines removed with wet wiping	
2		Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 24h, pencil lines removed with wet wiping	
3		Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 24h, pencil lines removed with wet wiping	
1	iii) Potassium Hydroxide Solution 30gm/l	Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	
2		Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	
3		Min Class LB(V)	Class- LA(V) No visual changes observed after immersion for 96 h, pencil lines removed with wet wiping	

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Resistance to acid & alkalies

d. High Concentration (H):

Specimen Number	Characteristic/ Test	Requirements	Test Results	Remark
1	i) Hydrochloric Acid Solution 18% (v/v)	Min Class HB(V)	Class-HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
2		Min Class HB(V)	Class-HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
3		Min Class HB(V)	Class-HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
1	ii) Lactic Acid Solution 5% (v/v)	Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
2		Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
3		Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
1	iii) Potassium Hydroxide Solution 100gm/l	Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
2		Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	
3		Min Class HB(V)	Class- HA(V) No visual changes observed after immersion for 96 h, pencil lines removed with soft wet cloth	

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C. Chemical Property

(ii) Determination of Resistance to stains

Reference Standard : SASO-ISO: 10545 (Part - 14) - 2016

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 5 Whole Tiles, Three Specimens for each Chemical
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: Drying Oven
- g) Test Solution Used: Light Oil, Iodine, Olive Oil, HCl, Potassium Hydroxide, Acetone, Chromium Oxide, Iron Oxide

a. Stain Leaving Trace:

Specimen Number	Characteristic/ Test Parameter	Requirements	Test Results	Remark
			Class 5	
1		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
	Green Staining Agent in light oil (Cr2O3 in light oil), for all tiles except green colored tiles		Class 5	
2		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
			Class 5	
3		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	

b. Stain having chemical/oxidizing action:

Specimen Number	Characteristic/ Test	Requirements	Test Results	Remark
			Class 5	
1		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
	Iodine, 13gm/l solution in alcohol		Class 5	
2		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
			Class 5	
3		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	

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c. Stain Forming a film:

Specimen Number	Characteristic/ Test	Requirements	Test Results	Remark
			Class 5	
1		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
			Class 5	
2	Olive oil	Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	
			Class 5	
3		Min Class 3	4 drops of stain are applied in Tile and kept covered for 24h, Stain Removed by Hot Water after 24h	

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C. Chemical Property

(iii) Determination of Lead and Cadmium given off by glazed tiles

Reference Standard : SASO-ISO: 10545 (Part - 15) - 2006

- a) Description of tiles : Glazed Pressed Ceramic Tiles
- b) Number of Specimen: 3 Hole Tiles
- c) Nominal Size: 600 x 300 x 9.0 mm
- d) Work Size: 600 x 300 x 9.0 mm
- e) Thickness: 9.0 mm
- f) Instruments Used: ICP OES, Silicone Sealant, Measuring Cylinder
- g) Test Solution Used: Each test specimen surface of tile clean and free from grease or other material by washing with detergent and rinse with water. Proper care to protect glaze surface. Apply silicone sealant 6mm wide to glazed surface around the whole perimeter.

Lead and Cadmium Release

Lead Release (mg/l & mg/dm²)

Specimen Number	Characteristic/ Test Parameter	Requirements	Test Results	Remark
1	Mass Concentration of lead in extract $\rho(\text{Pb})$ mg/l	NA	Not Detected	
	Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ²	4.0 mg/dm ²	Not Detected	
2	Mass Concentration of lead in extract $\rho(\text{Pb})$ mg/l	NA	Not Detected	
	Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ²	4.0 mg/dm ²	Not Detected	
3	Mass Concentration of lead in extract $\rho(\text{Pb})$ mg/l	NA	Not Detected	
	Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ²	4.0 mg/dm ²	Not Detected	

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Lead and Cadmium Release

Cadmium Release (mg/l & mg/dm²)

Specimen Number	Characteristic/ Test Parameter	Requirements	Test Results	Remark
1	Mass Concentration of cadmium in extract $\rho(\text{Cd})$ mg/l	NA	Not Detected	
	Mass of cadmium in extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ²	0.3 mg/dm ²	Not Detected	
2	Mass Concentration of cadmium in extract $\rho(\text{Cd})$ mg/l	NA	Not Detected	
	Mass of cadmium in extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ²	0.3 mg/dm ²	Not Detected	
3	Mass Concentration of cadmium in extract $\rho(\text{Cd})$ mg/l	NA	Not Detected	
	Mass of cadmium in extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ²	0.3 mg/dm ²	Not Detected	

Conclusion: The Sample provided by the Party for testing as per SASO-ISO 13006: 2018, Conforms the Requirements of the Specifications mentioned and other test methods used.



For, Hexiqon Laboratory

Pavitra Singh
(Authorised Signatory)

Note:

1. This report, in full or in part, shall not be published, advertised, used for any legal action, unless prior permission has been secured from the CEO of Laboratory.
2. This test report is ONLY FOR THE SAMPLE TESTED.

.....End of Report.....