



HEXIQON LABORATORY PVT. LTD.
Plot No. 8, Shayona Estate Part-2,
Bh. Silver Oak Engineering Collage,
Nr. AUDA Water Tank, Gota,
Ahmedabad-382481 Gujarat, INDIA.
Email : hexiqonlab@gmail.com
Mb.: +91 8487878021, +91 9879444222
CIN : U86905GJ2023PTC140980

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

TEST REPORT OF TILE

Name of Agency : GRENIC TILES PVT. LTD.
Address : 8-A NATIONAL HIGHWAY, NR. IYOTA CERAMIC AT. BHAYATI JAMBUDIYA,
TAL. WANKANER, DIST. MORBI, GUJARAT, INDIA
Sample Name : Pressed Ceramic Tiles (Ceramic Glazed Wall Tiles)
Make : GRENIC TILES
Sample Code : Not Mentioned
Sample Received on : 26-06-2024 Date of Start of Testing : 26-06-2024
Analysis End On : 08-07-2024

SAMPLE DETAILS

Type : Dry Pressed Ceramic Tiles water absorption (Ev > 10.0 %)
Group : BIII (Annexure-L)
Nominal Size (N) : 600 x 300 x 10.0 mm (Rectified)
Work Size : 600 x 300 mm
Nature of Surface : Glazed (GL)
Quantity of sample : 40 Pieces
Date of Manufacturing : 01-06-2024
Design : TANGER GRIGIO
Indication of First Quality : Provided (Premium)
Country of Origin : INDIA
Any Other Information : Declared Thickness 10.0 mm
Total Weight of Box : Provided (14.0 kg Approx per box)
Specification : ISO: 13006 Third Edition 2018-09 (Ceramic tiles- Definitions, Classification, Characteristics and marking)
Reference Standards : ISO: 10545 (Part - 2, 3, 4, 5, 8, 9, 10, 11, 13, 14, 15, 16) with Latest Edition.



Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

(a) Dimensions

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

| | | | | | | |
|---------------------------|-----------------------|----|-----|---|------|----|
| a) Description of tiles : | Pressed Ceramic Tiles | | | | | |
| b) Number of Specimen: | 7 Whole Tiles | | | | | |
| c) Nominal Size: | 600 | x | 300 | x | 10.0 | mm |
| d) Work Size: | 600 | x | 300 | x | 10.0 | mm |
| e) Thickness: | 10.0 | mm | | | | |
| f) Instruments Used: | Vernier Caliper | | | | | |

Average Size Lengthwise

Number of Specimens

| Parameters | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|-------------------|--------|--------|------------------------------|--------|--------|--------|
| Individual Size (mm) side 1 Lengthwise | 599.82 | 599.72 | 599.74 | 599.80 | 599.82 | 599.84 | 599.76 |
| Individual Size (mm) side 2 Lengthwise | 599.88 | 599.76 | 599.86 | 599.84 | 599.88 | 599.74 | 599.78 |
| Average Size of each Specimen(mm) Both Sides Lengthwise | 599.85 | 599.74 | 599.80 | 599.82 | 599.85 | 599.79 | 599.77 |
| Average Size of 7 specimens (mm) Lengthwise | 599.803 mm | | | | | | |
| Deviation of the average size of each specimen from the work size (mm) Lengthwise | -0.150 | -0.260 | -0.200 | -0.180 | -0.150 | -0.210 | -0.230 |
| Deviation of the average size for the average of 7 specimens (mm) lengthwise | -0.197 mm | | | Required Value: ± 1.0 mm | | | |
| Deviation of the average size of each specimen from the work size (%) Lengthwise | -0.025 | -0.043 | -0.033 | -0.030 | -0.025 | -0.035 | -0.038 |
| % Deviation of the average size from the average of 7 Specimens Lengthwise | -0.033 % | | | Required Value: ± 0.3 % | | | |
| Deviation of the average size of each specimen from the average of 7 specimen (mm) Lengthwise | 0.047 | -0.063 | -0.003 | 0.017 | 0.047 | -0.013 | -0.033 |
| Deviation of the average size of each specimen from average of 7 specimens (%) Lengthwise | 0.008 | -0.010 | 0.000 | 0.003 | 0.008 | -0.002 | -0.005 |

Remark: Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

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

| | | | | | | |
|---------------------------|-----------------------|----|-----|---|------|----|
| a) Description of tiles : | Pressed Ceramic Tiles | | | | | |
| b) Number of Specimen: | 7 Whole Tiles | | | | | |
| c) Nominal Size: | 600 | x | 300 | x | 10.0 | mm |
| d) Work Size: | 600 | x | 300 | x | 10.0 | mm |
| e) Thickness: | 10.0 | mm | | | | |
| f) Instruments Used: | Vernier Caliper | | | | | |

Average Size Widthwise

| Parameters | Number of Specimens | | | | | | |
|--|---------------------|--------|--------|------------------------------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Individual Size (mm) side 1 Widthwise | 299.84 | 299.82 | 299.78 | 299.80 | 299.76 | 299.88 | 299.68 |
| Individual Size (mm) side 2 Widthwise | 299.96 | 299.88 | 299.92 | 299.90 | 299.82 | 299.90 | 299.76 |
| Average Size of each Specimen(mm) Both Sides Widthwise | 299.90 | 299.85 | 299.85 | 299.85 | 299.79 | 299.89 | 299.72 |
| Average Size of 7 specimens (mm) Widthwise | 299.836 mm | | | | | | |
| Deviation of the average size of each specimen from the work size (mm) Widthwise | -0.100 | -0.150 | -0.150 | -0.150 | -0.210 | -0.110 | -0.280 |
| Deviation of the average size for the average of 7 specimens (mm) Widthwise | -0.164 mm | | | Required Value: ± 1.0 mm | | | |
| Deviation of the average size of each specimen from the work size (%) Widthwise | -0.033 | -0.050 | -0.050 | -0.050 | -0.070 | -0.037 | -0.093 |
| % Deviation of the average size from the average of 7 Specimens Widthwise | -0.055 % | | | Required Value: ± 0.3 % | | | |
| Deviation of the average size of each specimen from the average of 7 specimen (mm) Widthwise | 0.064 | 0.014 | 0.014 | 0.014 | -0.046 | 0.054 | -0.116 |
| Deviation of the average size of each specimen from average of 7 specimens (%) Widthwise | 0.021 | 0.005 | 0.005 | 0.005 | -0.015 | 0.018 | -0.039 |

Remark: Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

(iii) Measurements of Thickness

- a) Description of tiles : Pressed Ceramic Tiles
b) Number of Specimen: 7 Whole Tiles
c) Nominal Size: 600 x 300 x 10.0 mm
d) Work Size: 600 x 300 x 10.0 mm
e) Thickness: 10.0 mm
f) Instruments Used: Micrometer

| Thickness Parameters | Number of Specimens | | | | | | |
|---------------------------|---------------------|--------|--------|--------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Thickness (mm) Position 1 | 10.06 | 10.01 | 10.14 | 10.17 | 9.95 | 10.09 | 9.94 |
| Thickness (mm) Position 2 | 10.04 | 10.20 | 10.14 | 9.94 | 10.22 | 9.92 | 10.11 |
| Thickness (mm) Position 3 | 10.19 | 9.92 | 9.94 | 9.91 | 10.07 | 10.06 | 10.09 |
| Thickness (mm) Position 4 | 10.18 | 10.00 | 10.06 | 10.21 | 10.20 | 10.00 | 9.93 |
| Average Thickness (mm) | 10.118 | 10.033 | 10.070 | 10.058 | 10.110 | 10.018 | 10.018 |

Average Thickness of 7 specimens (mm) all positions **10.060 mm**

| | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|
| Deviation of the average thickness of each tile from the work size thickness(mm) | 0.118 | 0.033 | 0.070 | 0.058 | 0.110 | 0.018 | 0.017 |
|--|-------|-------|-------|-------|-------|-------|-------|

Deviation of the average thickness from the average of 7 specimens (mm) **0.060 mm** Required Value: ± 0.5 mm

| | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|
| Deviation of the average thickness of each specimen from the work size (%) | 1.175 | 0.325 | 0.700 | 0.575 | 1.100 | 0.175 | 0.175 |
|--|-------|-------|-------|-------|-------|-------|-------|

% Deviation of the average thickness from the average of 7 Specimens **0.604 %** Required Value: ± 10.0 %

Remark: Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

(iv) Measurements of Straightness of Sides

Straightness of Sides

Number of Specimens

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|----------|------|-------|------|-------|-------|-------|
| (a) Lengthwise | | | | | | | |
| Straightness of sides (mm) side 1 | -0.12 | 0.09 | -0.04 | 0.04 | 0.09 | -0.11 | -0.04 |
| Straightness of sides (mm) side 2 | -0.14 | 0.04 | -0.11 | 0.06 | -0.11 | 0.03 | -0.14 |
| Maximum deviation of Straightness of both sides (mm) | 0.09 mm | | | | | | |
| | -0.14 mm | | | | | | |
| Maximum deviation from straightness related to the corresponding work size (%) | 0.015 % | | | | | | |
| | -0.023 % | | | | | | |
| (b) Widthwise | | | | | | | |
| Straightness of sides (mm) side 1 | -0.21 | 0.04 | -0.06 | 0.01 | 0.02 | 0.07 | 0.07 |
| Straightness of sides (mm) side 2 | -0.06 | 0.11 | 0.05 | 0.11 | -0.03 | 0.11 | 0.05 |
| Maximum deviation of Straightness of both sides (mm) | 0.11 mm | | | | | | |
| | -0.21 mm | | | | | | |
| Maximum deviation from straightness related to the corresponding work size (%) | 0.037 % | | | | | | |
| | -0.070 % | | | | | | |

Required Value: ± 0.8 mm

Required Value: ± 0.3 %

Required Value: ± 0.8 mm

Required Value: ± 0.3 %

Remark: Conforms

(v) Measurements of Rectangularity

Rectangularity of Sides

Number of Specimens

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|----------|-------|-------|-------|-------|------|-------|
| (a) Lengthwise | | | | | | | |
| Rectangularity (mm) side 1 | -0.28 | -0.16 | -0.19 | -0.25 | -0.25 | 0.03 | 0.15 |
| Rectangularity (mm) side 1 | 0.09 | -0.11 | -0.01 | -0.16 | -0.02 | 0.10 | -0.08 |
| Maximum deviation of Rectangularity of both sides (mm) | 0.15 mm | | | | | | |
| | -0.28 mm | | | | | | |
| Maximum deviation from Rectangularity related to the corresponding work size (%) | 0.025 % | | | | | | |
| | -0.047 % | | | | | | |
| (b) Widthwise | | | | | | | |
| Rectangularity (mm) side 1 | 0.05 | 0.11 | 0.07 | -0.12 | 0.09 | 0.06 | -0.13 |
| Rectangularity (mm) side 2 | -0.11 | 0.05 | 0.11 | 0.08 | 0.10 | 0.02 | 0.18 |
| Maximum deviation of Rectangularity of both sides (mm) | 0.18 mm | | | | | | |
| | -0.13 mm | | | | | | |
| Maximum deviation from Rectangularity related to the corresponding work size (%) | 0.060 % | | | | | | |
| | -0.043 % | | | | | | |

Required Value: ± 1.5 mm

Required Value: ± 0.3 %

Required Value: ± 1.5 mm

Required Value: ± 0.3 %

Remark: Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality **Reference Standard : ISO: 10545 (Part - 2) - 2018**

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

A. Centre Curvature:

| | Number of Specimens | | | | | | |
|--|---|---|---|---|---|---|---|
| Centre Curvature | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Centre curvature (mm) Diagonal 1 | Not Applicable: As the sample has lots of variation on its surface due to the design hence, centre curvature is not applicable | | | | | | |
| Centre curvature (mm) Diagonal 2 | | | | | | | |
| Maximum centre curvature related to the diagonal work size (mm) | Required Value: ± 1.8 mm | | | | | | |
| Maximum centre curvature related to the diagonal calculated from work size (%) | Required Value: ± 0.4 % | | | | | | |

B. Edge Curvature of Length

| (a) Lengthwise | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
| Edge curvature(mm) side 1 | Not Applicable: As the sample has lots of variation on its surface due to the design hence, Edge curvature is not applicable | | | | | | |
| Edge curvature(mm) side 2 | | | | | | | |
| Maximum edge curvature related to the corresponding work size (mm) | Required Value: ± 1.8 mm | | | | | | |
| Maximum edge curvature related to the corresponding work size (%) | Required Value: ± 0.4 % | | | | | | |

C. Edge Curvature of Width

| (b) Widthwise | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
| Edge curvature(mm) side 1 | Not Applicable: As the sample has lots of variation on its surface due to the design hence, Edge curvature is not applicable | | | | | | |
| Edge curvature(mm) side 2 | | | | | | | |
| Maximum edge curvature related to the corresponding work size (mm) | Required Value: ± 1.8 mm | | | | | | |
| Maximum edge curvature related to the corresponding work size (%) | Required Value: ± 0.4 % | | | | | | |

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

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

D. Warpage

(a) Lengthwise

Warpage (mm) side 1

Warpage (mm) side 2

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

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

1 2 3 4 5 6 7

Not Applicable: As the sample has lots of variation on its surface
due to the design hence, Warpage is not applicable

Required Value: ± 1.8 mm

Required Value: ± 0.4 %

E. Warpage

(b) Widthwise

Warpage (mm) side 1

Warpage (mm) side 2

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

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

1 2 3 4 5 6 7

Not Applicable: As the sample has lots of variation on its surface
due to the design hence, Warpage is not applicable

Required Value: ± 1.8 mm

Required Value: ± 0.4 %



Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

A. Determination of Dimensions and Surface Quality

Reference Standard : ISO: 10545 (Part - 2) - 2018

(vii) Measurements of Surface Quality

- a) Description of tiles : Pressed Ceramic Tiles
b) Number of Specimen: 20 Whole Tiles
c) Nominal Size: 600 x 300 x 10.0 mm
d) Work Size: 600 x 300 x 10.0 mm
e) Thickness: 10.0 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

Remark: Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

B. Physical Property

(i) Water Absorption

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

Sample Size: 200x200x10.0 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 | 686.57 | 785.21 | 14.3671 |
| 2 | 691.30 | 787.92 | 13.9766 |
| 3 | 698.15 | 793.47 | 13.6532 |
| 4 | 682.89 | 775.19 | 13.5161 |
| 5 | 694.72 | 798.47 | 14.9341 |

Average Water Absorption of the all specimens tested in %

14.089 %

Required Value > 10.0 %

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

13.516 %

Required Value Individual Min. 9.0 %

Remark: Conforms

(ii) Modulus of Rupture

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

| 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 | 412.0 | 580 | 300 | 9.12 | 14.36 |
| 2 | 434.5 | 580 | 300 | 9.14 | 15.08 |
| 3 | 429.0 | 580 | 300 | 9.17 | 14.80 |
| 4 | 420.0 | 580 | 300 | 9.11 | 14.68 |
| 5 | 415.0 | 580 | 300 | 9.16 | 14.34 |
| 6 | 410.5 | 580 | 300 | 9.09 | 14.41 |
| 7 | 437.0 | 580 | 300 | 9.14 | 15.17 |

Average Breaking Load, N

422.57 Newton

Average Modulus of Rupture, N/mm²

14.69 N/mm²

Required Value: Min 12 N/mm²

Individual Minimum Modulus of Rupture, N/mm²

14.34 N/mm²

(Thickness ≥ 7.5 mm),

Remark: Conforms

Min 15 N/mm² for Thickness < 7.5mm

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

(iii) Breaking Strength

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

| 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_{l_2}/b |
|-----------------|--------------------------|--|-----------------------------------|--|
| 1 | 412.0 | 580 | 300 | 796.53 |
| 2 | 434.5 | 580 | 300 | 840.03 |
| 3 | 429.0 | 580 | 300 | 829.40 |
| 4 | 420.0 | 580 | 300 | 812.00 |
| 5 | 415.0 | 580 | 300 | 802.33 |
| 6 | 410.5 | 580 | 300 | 793.63 |
| 7 | 437.0 | 580 | 300 | 844.87 |

Average Breaking Load, N

422.57 Newton

Required Value: Min 600 Newton for

Average Breaking Strength, N

816.97 Newton

(Thickness ≥ 7.5 mm),

Remark : Conforms

Min. 200 Newton for Thic. < 7.5 mm

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

Reference Standard : ISO: 10545 (Part - 5) - 1996

| Specimen Number | Dropping height of the ball (h1) mm | Indentation or Cracking | Coefficient of restitution of Specimen |
|-----------------|-------------------------------------|----------------------------|--|
| 1 | 1000 | No Indentation or Cracking | 0.623 |
| 2 | 1000 | No Indentation or Cracking | 0.616 |
| 3 | 1000 | No Indentation or Cracking | 0.624 |
| 4 | 1000 | No Indentation or Cracking | 0.618 |
| 5 | 1000 | No Indentation or Cracking | 0.628 |

Average Coefficient of Restitution of the all specimens tested

0.622

Required Value : Min 0.55 **Conforms**

Any indentation or Cracking in the Test Specimen

No Indentation or Cracking Observed in all the test specimen tested

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

(vi) Determination of Linear Thermal Expansion

Reference Standard : ISO: 10545 (Part - 8) - 2014

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 1 | 25.32 | 27.2 | 0.009 | NA | 4.88×10^{-6} |
| b. Coefficient of linear thermal expansion, ambient to 100°C, Specimen 2 | 25.24 | 26.4 | 0.009 | NA | 4.84×10^{-6} |
| Average Coefficient of linear thermal expansion, ambient to 100°C | | | 4.86×10^{-6} | NA | |

(vii) Determination of Resistance to Thermal Shock

Reference Standard : ISO: 10545 (Part - 9) - 2013

i) Water Absorption Coefficient: 14.089 %

| 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) | Cracks (Naked eye) | Crazing (Naked eye) | Dryspot (Naked eye) | Using Methylene Blue Staining (Naked eye) | | |
| 1 | Satisfac. | Satisfac. | Satisfac. | Satisfac. | No Def. | No Def. | No Def. | No Def. | No Def. | No Def. |
| 2 | Satisfac. | Satisfac. | Satisfac. | Satisfac. | No Def. | No Def. | No Def. | No Def. | No Def. | No Def. |
| 3 | Satisfac. | Satisfac. | Satisfac. | Satisfac. | No Def. | No Def. | No Def. | No Def. | No Def. | No Def. |
| 4 | Satisfac. | Satisfac. | Satisfac. | Satisfac. | No Def. | No Def. | No Def. | No Def. | No Def. | No Def. |
| 5 | Satisfac. | Satisfac. | Satisfac. | Satisfac. | No Def. | No Def. | No Def. | No Def. | No Def. | No Def. |

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

Remark : Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

(viii) Determination of Moisture Expansion

Reference Standard : ISO: 10545 (Part - 10) - 2021

| 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 | 100.325 | 100.325 | 100.330 | 100.327 | 0.01994 |
| 2 | 100.278 | 100.278 | 100.283 | 100.280 | 0.01994 |
| 3 | 100.311 | 100.311 | 100.316 | 100.313 | 0.01994 |
| 4 | 100.149 | 100.149 | 100.153 | 100.151 | 0.01997 |
| 5 | 100.294 | 100.294 | 100.299 | 100.296 | 0.01994 |
| Average Moisture Expansion (mm/m) | | | | | 0.01995 |
| Maximum Value of Moisture Expansion (mm/m) | | | 0.01997 | Required Value | Max. 0.6 mm/m |

Remark : Conforms

(ix) Determination of Craze Resistance for glazed tiles

Reference Standard : ISO: 10545 (Part - 11) - 1994

| 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.

Remark : Conforms

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

(xi) Determination of Small Colour Differences

Reference Standard : ISO: 10545 (Part - 16) - 2010

| Observation No. | 1 | 2 | 3 | 4 | 5 |
|---|------|-----|-------------------|-----|-----|
| Observation Value ΔE | 0.5 | 0.3 | 0.5 | 0.3 | 0.4 |
| Average Value of colour Difference ΔE | 0.40 | | Req. value < 0.75 | | |

C. Chemical Property

(i) Determination of Chemical Resistance

Reference Standard : ISO: 10545 (Part - 13) - 2016

a. House hold chemical Resistance:

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|-------------------------------------|-----------------|-----------------------------|----------|
| 1 | Ammonium Chloride solution 100 gm/L | Min. class B(V) | Class-A(V) No visual change | Conforms |
| 2 | | Min. class B(V) | Class-A(V) No visual change | |
| 3 | | Min. class B(V) | Class-A(V) No visual change | |

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 | Conforms |
| 2 | | Min. class B(V) | Class-A(V) No visual change | |
| 3 | | Min. class B(V) | Class-A(V) No visual change | |

c. Low Concentration (L):

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|--|---------------------|-------------------------------|----------|
| 1 | i) Hydrochloric Acid solution 3% (v/v) | As per Manufacturer | Class-LA(V) No visual change | Conforms |
| 2 | | | Class-LA(V) No visual change | |
| 3 | | | Class-LA(V) No visual change | |
| 1 | ii) Citric acid Solution 100 gm/l | As per Manufacturer | Class- LA(V) No visual change | Conforms |
| 2 | | | Class- LA(V) No visual change | |
| 3 | | | Class- LA(V) No visual change | |
| 1 | iii) Potassium Hydroxide Solution 30gm/l | As per Manufacturer | Class- LA(V) No visual change | Conforms |
| 2 | | | Class- LA(V) No visual change | |
| 3 | | | Class- LA(V) No visual change | |

d. High Concentration (H):

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|---|---------------------|-------------------------------|----------|
| 1 | i) Hydrochloric Acid Solution 18% (v/v) | As per Manufacturer | Class-HA(V) No visual change | Conforms |
| 2 | | | Class-HA(V) No visual change | |
| 3 | | | Class-HA(V) No visual change | |
| 1 | ii) Lactic Acid Solution 5% (v/v) | As per Manufacturer | Class- HA(V) No visual change | Conforms |
| 2 | | | Class- HA(V) No visual change | |
| 3 | | | Class- HA(V) No visual change | |

*Note : "(V)" stands for normal classification

Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|---|---------------------|-------------------------------|----------|
| 1 | iii) Potassium Hydroxide Solution 100gm/l | As per Manufacturer | Class- HA(V) No visual change | Conforms |
| 2 | | | Class- HA(V) No visual change | |
| 3 | | | Class- HA(V) No visual change | |

*Note : "(V)" stands for normal classification

(ii) Determination of Resistance to stains

Reference Standard : ISO: 10545 (Part - 14) - 2015

a. Stain Leaving Trace:

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|--|--------------|--------------|----------|
| 1 | Green Staining Agent in light oil (Cr2O3 in light oil), for all tiles except green colored tiles | Min Class 3 | Class 5 | Conforms |
| 2 | | Min Class 3 | Class 5 | |
| 3 | | Min Class 3 | Class 5 | |
| 4 | | Min Class 3 | Class 5 | |
| 5 | | Min Class 3 | Class 5 | |

b. Stain having chemical/oxidizing action:

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|------------------------------------|--------------|--------------|----------|
| 1 | Iodine, 13gm/l solution in alcohol | Min Class 3 | Class 5 | Conforms |
| 2 | | Min Class 3 | Class 5 | |
| 3 | | Min Class 3 | Class 5 | |
| 4 | | Min Class 3 | Class 5 | |
| 5 | | Min Class 3 | Class 5 | |

c. Stain Forming a film:

| Specimen Number | Characteristic/ Test | Requirements | Test Results | Remark |
|-----------------|----------------------|--------------|--------------|----------|
| 1 | Olive oil | Min Class 3 | Class 5 | Conforms |
| 2 | | Min Class 3 | Class 5 | |
| 3 | | Min Class 3 | Class 5 | |
| 4 | | Min Class 3 | Class 5 | |
| 5 | | Min Class 3 | Class 5 | |



Test Report

Test Report No.: HL/MT/240626013

ULR No.:TC1171224000001616F

Issued To: GRENIC TILES PVT. LTD.

Issue Date: 08-07-2024

C. Chemical Property

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

Reference Standard : ISO: 10545 (Part - 15) - 2021

Lead Release (mg/l & mg/dm²)

| Specimen Number | Characteristic/ Test Parameter | Requirements | Test Results | Remark |
|-----------------|---|------------------------|--------------------------------------|----------|
| 1 | Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ² | 0.8 mg/dm ² | Not Detected (Detection Limit 0.005) | Conforms |
| 2 | Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ² | 0.8 mg/dm ² | Not Detected (Detection Limit 0.005) | |
| 3 | Mass of lead Extracted per unit of Surface $\rho_A(\text{Pb})$, mg/dm ² | 0.8 mg/dm ² | Not Detected (Detection Limit 0.005) | |

Cadmium Release (mg/l & mg/dm²)

| Specimen Number | Characteristic/ Test Parameter | Requirements | Test Results | Remark |
|-----------------|--|-------------------------|--------------------------------------|----------|
| 1 | Mass of cadmium extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ² | 0.07 mg/dm ² | Not Detected (Detection Limit 0.005) | Conforms |
| 2 | Mass of cadmium extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ² | 0.07 mg/dm ² | Not Detected (Detection Limit 0.005) | |
| 3 | Mass of cadmium extracted per unit of Surface $\rho_A(\text{Cd})$, mg/dm ² | 0.07 mg/dm ² | Not Detected (Detection Limit 0.005) | |

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

Opinion and Interpretation: Not Applicable

Reviewed By

For, Hexiqon Laboratory Pvt. Ltd.




Karan 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 Director of Laboratory.
2. This test report is ONLY FOR THE SAMPLE TESTED.

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