



IPAL TEST REPORT NUMBER:

IPAL-0056-25

PAGE: 1 OF 4

TEST REQUESTED BY:

LALUR S.A. de C.V.

TEST METHOD:

ASTM C373-18 (2023): "Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products"

Informal Test Method Description: This test method covers procedures for determining water absorption, bulk density, apparent porosity, and apparent specific gravity of non-life fired glazed whiteware products, glazed or unglazed ceramic tiles, and glass tiles. The water absorption, reported here, is expressed as a percent, the relationship of the mass of water absorbed to the mass of the dry specimen.

This summary is provided for the reader's convenience and is not a complete description of the method. See ASTM C373 for all method details and information.

TEST SUBJECT MATERIAL:

Identified by client as: "Asleth - TC6060A0320"
Approximate Size as Received: 24" x 24"

TEST DATE:

2/4/2025

TEST PROCEDURE NOTES:

- Sample prep: Three (3) tiles were cut according to section 5.2 of ASTM C373.
- Samples were dried to a constant mass at a temperature of 150°C and cooled to room temperature in a desiccating unit.
- Samples were subjected to vacuum of 91 ± 5 kPa for 30 minutes. While maintaining the vacuum, water was added to the tank to fully submerge the specimens. The vacuum was then released and the pressure vessel was allowed to return to atmospheric pressure. Once at atmospheric pressure the test specimens were allowed to soak for 15 minutes.
- Saturated mass of the samples was measured after the 15 minute soak period.
- Water absorption is calculated by using the following formula: $(M - D)/D \times 100$ Where: D is the constant dry mass; M is the saturated mass

TEST RESULTS:

	Water Absorption (%)		Water Absorption (%)		Water Absorption (%)
Sample 1	0.1 %	Sample 6	0.1 %	Sample 11	0.0 %
Sample 2	0.1 %	Sample 7	0.2 %	Sample 12	0.0 %
Sample 3	0.2 %	Sample 8	0.2 %	Average	0.2 %
Sample 4	0.2 %	Sample 9	0.3 %		
Sample 5	0.1 %	Sample 10	0.3 %		

COMMENTS: None





IPAL TEST REPORT NUMBER:

IPAL-0901-24

PAGE: 1 OF 4

TEST REQUESTED BY:

LALUR S.A. de C.V.

TEST METHOD:

ASTM C373-18 (2023): "Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic tiles and Non-tile Fired Ceramic Whiteware Products"

Informal Test Method Description: This test method covers procedures for determining water absorption, bulk density, apparent porosity, and apparent specific gravity of non-tile fired unglazed whiteware products, glazed or unglazed ceramic tiles, and glass tiles. The water absorption, reported here, is expressed as a percent, the relationship of the mass of water absorbed to the mass of the dry specimen.

This summary is provided for the reader's convenience and is not a complete description of the method. See ASTM C373 for all method details and information.

TEST SUBJECT MATERIAL:

Identified by client as: "Lille"
Approximate Size as Received: 24"x24"

TEST DATE:

12/20/2024

TEST PROCEDURE NOTES:

- Sample prep: Three (3) tiles were cut according to section 5.2 of ASTM C373.
- Samples were dried to a constant mass at a temperature of 150°C and cooled to room temperature in a desiccating unit.
- Samples were subjected to account of 91 ± 5 kPa for 30 minutes. While maintaining the vacuum, water was added to the tank to fully submerge the specimens. The vacuum was then released and the pressure vessel was allowed to return to atmospheric pressure. Once at atmospheric pressure the test specimens were allowed to soak for 15 minutes.
- Saturated mass of the samples was measured after the 15 minute soak period.
- Water absorption is calculated by using the following formula: $(M - D)/D \times 100$ Where; D is the constant dry mass; M is the saturated mass

TEST RESULTS:

	Water Absorption (%)		Water Absorption (%)		Water Absorption (%)
Sample 1	0.8%	Sample 6	0.7%	Sample 11	0.3%
Sample 2	0.3%	Sample 7	1.5%	Sample 12	0.9%
Sample 3	0.7%	Sample 8	1.2%	Average	0.8%
Sample 4	0.7%	Sample 9	1.1%		
Sample 5	0.4%	Sample 10	1.0%		

COMMENTS: None





IPAL TEST REPORT NUMBER: IPAL-0723-24

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TEST REQUESTED BY: LALUR S.A. de C.V.

TEST METHOD: ASTM C648-20: "Standard Test Method for Breaking Strength of Ceramic Tile"

Informal Test Method Description: This test method covers the determination of the breaking strength of glazed ceramic wall tile, ceramic mosaic tile, quarry tile, and paver tile. The test method consists of supporting the tile on the ends of three cylindrical rods, or on three ball bearings arranged in an equilateral triangle, and applying force at a definite rate to the center of the tile, until the specimen breaks.

This summary is provided for the reader's convenience and is not a complete description of the method. See ASTM C648 for all method details and information.

TEST SUBJECT MATERIAL: Identified by client as: "Trento"
Approximate Size as Received: 24" x 24" x 0.36"

TEST DATE: 10/3/2024

TEST PROCEDURE NOTES:

- Sample prep: None
- Ten (10) glazed samples were tested
- Testing was performed on an Instron Universal Tester, model #3385-H
- A three-inch equilateral triangular support was used to hold the tiles during loading
- The tiles were loaded at a rate of 1000 pounds per minute

TEST RESULTS:

	Breaking Strength (lbf)		Breaking Strength (lbf)
Specimen 1	449 lbf	Specimen 6	495 lbf
Specimen 2	444 lbf	Specimen 7	489 lbf
Specimen 3	484 lbf	Specimen 8	499 lbf
Specimen 4	454 lbf	Specimen 9	480 lbf
Specimen 5	457 lbf	Specimen 10	514 lbf
		Average	477 lbf

COMMENTS: None





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TEST REQUESTED BY:

LALUR S.A. de C.V.

TEST METHOD:

ASTM C609-20: "Standard Test Method for Measurement of Light Reflectance Value and Small Color Differences Between Pieces of Ceramic Tile"

This test method covers the measurement of Light Reflectance Value (LRV) and visual small color difference between pieces of glazed or unglazed ceramic tile, using a spectrophotometer.

This summary is provided for the reader's convenience and is not a complete description of the method. See ASTM C609 for all method details and information.

TEST SUBJECT MATERIAL:

Identified by client as: **"Trento"**
Approximate Size as Received: 24" x 24"

TEST DATE:

10/3/2024

TEST PROCEDURE:

- Sample Prep: Samples were cleaned with alcohol per the method
- A X-Rite Ci6X Spectrophotometer was used to measure CIE values L*, a*, and b*, and tristimulus light reflectance value Y at a CIE illuminant of D65/10.
- The average of 13 readings from each of five (5) specimens was recorded.
- The color difference was calculated according to the formula given in ASTM C609 between two theoretical pieces of tile, one of which had the maximum value in each of the three columns and the other which had the minimum value in each column. The average light reflectance value (Y) was also reported.

TEST RESULTS:

	L*	a*	b*
Theoretical Max	87.16	-0.86	1.54
Theoretical Min	85.40	-0.96	1.41
Color Difference (AE ⁺)	1.77		

Average LRV (Y)	69.28
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COMMENT: None





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TEST REQUESTED BY:

LALUR S.A. de C.V.

TEST METHOD:

ASTM C485-24: "Standard Test Method for Measuring Warpage of Ceramic Tile"

Informal Test Method Description: This test method covers procedures for measuring diagonal and edge warpage of tile. This test method consists of measuring the deviation from flatness at the midpoint along the edge and in the center of the tile in reference to a standard metal plate.

This summary is provided for the reader's convenience and is not a complete description of the method. See ASTM C485 for all method details and information.

TEST SUBJECT MATERIAL:

Identified by client as: "Trento"

TEST DATE:

10/8/2024

TEST PROCEDURE NOTES:

- A sample size of n=10 tiles were measured for edge and diagonal warpage.
- The nominal facial dimension was **24.00 in x 24.00 in**
- The edge gage length was **23.63 in** and diagonal gage length was **33.42 in**

TEST RESULTS:

% Edge Warpage

	Tile 1	Tile 2	Tile 3	Tile 4	Tile 5	Tile 6	Tile 7	Tile 8	Tile 9	Tile 10
Side 1	-0.01%	0.00%	0.06%	-0.01%	0.05%	0.05%	0.07%	0.07%	0.07%	0.06%
Side 2	0.08%	0.07%	0.08%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Side 3	0.02%	0.03%	0.06%	-0.01%	0.04%	0.07%	0.04%	0.05%	0.06%	0.05%
Side 4	0.02%	0.06%	0.06%	0.07%	0.01%	0.03%	0.03%	-0.01%	0.00%	0.03%
								Range		
								-0.01%	0.08%	
								0.00 in.	0.02 in.	

% Diagonal Warpage

	Tile 1	Tile 2	Tile 3	Tile 4	Tile 5	Tile 6	Tile 7	Tile 8	Tile 9	Tile 10
Side 1	0.06%	0.05%	0.06%	0.07%	0.03%	0.07%	0.05%	0.02%	0.04%	0.04%
Side 2	0.09%	0.07%	0.04%	0.07%	0.03%	0.05%	0.05%	0.05%	0.06%	0.04%
Side 3	0.07%	0.05%	0.07%	0.08%	0.03%	0.07%	0.05%	0.02%	0.05%	0.05%
Side 4	0.09%	0.06%	0.04%	0.03%	0.05%	0.05%	0.06%	0.05%	0.06%	0.04%
								Range		
								0.02%	0.09%	
								0.01 in.	0.03 in.	

COMMENTS: None





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Sample 3	0.2 %	Sample 8	0.2 %	Average	0.2 %
Sample 4	0.2 %	Sample 9	0.3 %		
Sample 5	0.1 %	Sample 10	0.3 %		

COMMENTS: None

