

Bellaterra : On November 3, 2014
 Report number : 14/9117 - 1705
 Petitioner's reference : **GRECO GRES INTERNACIONAL S.L.**
 NIF: B45428406
 Avda. Castilla - La Mancha, 1
 45240-Alameda de la Sagra (TOLEDO)

TEST REPORT

Register number: 14/1705

MATERIAL RECEIVED:

On September 23, 2014, have been received in Applus a sample of UNGLAZED CERAMIC TILES, extruded, of dimensions 800 x 405 x 19,5 mm., cream color and with the following reference according to the petitioner:

FRONTEK 405 x 800 x 19,5 mm.
 Model: Artico 1A - C5 / Group: UNE-EN 14411- AI

TESTS REQUESTED:

- Determination of dimensions and surface quality.
 UNE-EN ISO 10545-2:1998 and UNE-EN ISO 10545-2:1998 Erratum. (*)
- Determination of water absorption, apparent porosity, apparent relative density and bulk density.
 UNE-EN ISO 10545-3:1997.
- Determination of modulus of rupture and breaking strength. UNE-EN ISO 10545-4:2012.
- Determination of chemical resistance. UNE-EN ISO 10545-13:1998.
- Determination of resistance to thermal shock. UNE-EN ISO 10545-9:2013.
- Determination of impact resistance by measurement of coefficient of restitution.
 UNE-EN ISO 10545-5:1998. (*)
- Determination of resistance to deep abrasion. UNE-EN ISO 10545-6:2012.
- Determination of linear thermal expansion. UNE-EN ISO 10545-8:1997 and UNE-EN ISO 10545-8:1997 Erratum 2008
- Determination of frost resistance. UNE-EN ISO 10545-12:1997.
- Determination of moisture expansion. UNE-EN ISO 10545-10:1997.
- Determination of initial adherence pursuant to Section 8.2. (UNE-EN 1348:2008) *
- Determination of dry apparent density and dry absolute density. UNE EN 772-13:2001. (*)

(*) Test not included in the scope of the ENAC Certification.

DATE AT WHICH THE TESTS WERE CONDUCTED:

from 29/09/2014 to 30/10/2014.

RESULTS:

See attached pages.

Firmado digitalmente por Juan Martinez Egea

Responsible for Construction Mat.
 LGAI Technological Center S. A.

Firmado digitalmente por Miguel Maria Ayala Morán

Chief Technician
 LGAI Technological Center S. A.

The results specified in the present document pertain exclusively to the material collected on site by personnel from Applus, and tested in accordance with the instructions shown. The expanded measurement uncertainty has been expressed as the typical measurement uncertainty multiplied by a coverage factor k=2 which, for a normal distribution, corresponds to a probability of approximately 95%.

Responsible Statement by APPLUS-LGAI Technological Center, S.A., Registration Nº L0600161, of R.D.410/2010, D.257/2003 and Law 25/2009.

Queries: <http://www.gencat.cat> or http://www.codigotecnico.org/web/galerias/archivos/RG_LECCE_rev_0-2_julio-2010.xl

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 The present document is a translation of the report Nº 14/9117-1705 In case of dispute, the valid is the spanish version
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GRECO GRES INTERNACIONAL S.L.		FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

RESULTS:

Dimensional Characteristics (UNE-EN ISO 10.545-2/98 and Erratum/98) *

Length measurements in mm										
Tile (N°)	Length 1	Length 2	Average Length	Deviation in relation to average measurement %	Deviation in relation to manuf. measurement %	Width 1	Width 2	Average Width	Deviation in relation to average measurement %	Deviation in relation to manuf. measurement %
1	800,0	800,0	800,0	0,00	0,00	404,5	404,2	404,4	-0,02	-0,15
2	800,0	799,5	799,8	-0,03	-0,03	404,3	404,3	404,3	-0,05	-0,17
3	799,5	800,0	799,8	-0,03	-0,03	404,5	404,4	404,5	0,00	-0,12
4	800,0	800,0	800,0	0,00	0,00	404,5	404,5	404,5	0,00	-0,12
5	800,0	800,0	800,0	0,00	0,00	404,7	404,1	404,4	-0,02	-0,15
6	800,0	800,0	800,0	0,00	0,00	404,9	404,5	404,7	0,05	-0,07
7	800,0	800,0	800,0	0,00	0,00	404,5	404,3	404,4	-0,02	-0,15
8	800,0	800,0	800,0	0,00	0,00	404,7	404,6	404,7	0,05	-0,07
9	800,0	800,0	800,0	0,00	0,00	404,8	404,2	404,5	0,00	-0,12
10	800,0	800,0	800,0	0,00	0,00	404,5	404,9	404,7	0,05	-0,07
Average measurement			800,0	Average measurement			404,5			

Length - Maximum deviation from the average measurement of each tile (%)	
In relation to the average measurement of 10 tiles	+ 0,00 / -0,03
In relation to manufacturing size	+ 0,00 / -0,03

Width - Maximum deviation from the average measurement of each tile (%)	
In relation to the average measurement of 10 tiles	+ 0,05 / -0,05
In relation to manufacturing size	+ 0,00 / -0,17

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation of the average size of each tile in relation to the average size of 10 test tubes will be $\pm 1.5\%$, and $\pm 2.0\%$ in relation to the manufacturing size, up to $\pm 4\text{mm}$.

Thickness measurements in mm							
Tile (N°)	Measurement 1	Measurement 2	Measurement 3	Measurement 4	Thickness average	Deviation in relation to average measurement (%)	Deviation in relation to manuf. measurement (%)
1	19,2	19,3	18,9	18,9	19,1	0,00	-2,05
2	18,5	18,9	19,1	19,2	18,9	-1,05	-3,08
3	19,1	19,1	19,2	18,8	19,1	0,00	-2,05
4	19,0	19,3	19,3	19,0	19,2	0,52	-1,54
5	18,9	19,3	19,3	19,2	19,2	0,52	-1,54
6	19,5	18,7	18,9	19,1	19,1	0,00	-2,05
7	19,4	19,0	19,0	19,3	19,2	0,52	-1,54
8	19,0	19,0	19,1	19,2	19,1	0,00	-2,05
9	18,8	19,0	19,5	19,1	19,1	0,00	-2,05
10	18,9	19,2	19,0	19,1	19,1	0,00	-2,05
Average thickness					19,1		

Maximum deviation from the average measurement of each tile (%)	
In relation to the average measurement of 10 tiles	+ 0,52 / -1,05
In relation to manufacturing size	+ 0,00 / -3,08

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation of the average thickness of each tile in relation to the manufacturing tile will be $\pm 10\%$.

* Test outside the ENAC accreditation scope.

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GRECO GRES INTERNACIONAL S.L.		FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Straightness of the sides in mm

Tile N°	Long side		Short side		
	Measurement 1	Measurement 2	Measurement 3	Measurement 4	
1	0,1	0,0	-0,1	0,1	$\Delta = \text{Side deviation} / L = \text{Side length}$ % MAXIMUM DEVIATION $\Delta / L \times 100$ Maximum deviation LONG SIDE (%) Average size: + 0,03 / -0,00 Manufacturing size: + 0,03 / -0,00 Maximum deviation SHORT SIDE (%) Average size: + 0,01 / -0,00 Manufacturing size: + 0,01 / -0,00
2	-0,1	0,0	-0,1	0,1	
3	0,0	-0,1	0,2	0,1	
4	0,1	0,1	0,0	-0,1	
5	0,1	0,1	0,0	-0,1	
6	0,1	-0,1	-0,1	0,1	
7	0,0	-0,1	-0,1	0,0	
8	0,1	0,1	-0,1	0,0	
9	0,1	-0,1	-0,1	0,0	
10	0,0	0,0	0,1	0,1	

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation in relation to the manufacturing size will be $\pm 0.6\%$.

Orthogonality in mm

Tile N°	Longitudinal		Transverse		
	Measurement 1	Measurement 2	Measurement 3	Measurement 4	
1	0,7	1,3	0,4	0,5	$\Delta = \text{Angle deviation} / L = \text{Side length}$ % MAXIMUM DEVIATION $\Delta / L \times 100$ Maximum deviation LOGITUDINAL (%) Average size: + 0,17 / -0,00 Manufacturing size: + 0,17 / -0,00 Maximum deviation TRANSVERSE (%) Average size: + 0,21 / -0,00 Manufacturing size: + 0,21 / -0,00
2	0,5	0,5	0,2	0,9	
3	0,9	1,2	0,3	0,6	
4	0,8	1,3	0,4	0,6	
5	0,7	1,4	0,3	0,7	
6	0,6	0,9	0,3	0,6	
7	0,6	0,9	0,4	0,6	
8	0,8	1,2	0,3	0,6	
9	0,7	1,2	0,2	0,5	
10	0,8	1,4	0,3	0,7	

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation in relation to the manufacturing size will be $\pm 1.0\%$.

Central curvature measurements in mm

Tile N°	Measurement 1	Measurement 2	Measurement 3	Measurement 4	
1	0,1	0,0	0,0	0,2	% MAXIMUM DEVIATION $\Delta / L \times 100$ $\Delta = \text{Deviation from the centre}$ $L = \text{Diagonal length}$ Maximum deviation (%) Average size: + 0,03 / -0,00 Manufacturing size: + 0,03 / -0,00
2	0,1	0,0	0,0	0,2	
3	0,2	0,0	0,0	0,3	
4	0,2	0,0	0,1	0,3	
5	0,3	0,0	0,2	0,2	
6	0,3	0,0	0,3	0,2	
7	0,1	0,0	0,2	0,2	
8	0,2	0,0	0,3	0,3	
9	0,2	0,0	0,2	0,3	
10	0,2	0,0	0,2	0,2	

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation of the diagonal calculated in relation to the manufacturing size will be $\pm 1.5\%$.

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GRECO GRES INTERNACIONAL S.L.		FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Measurements of side curvature in mm				
Tile N°	Longitudinal		Transverse	
	Measurement 1	Measurement 2	Measurement 3	Measurement 4
1	0,2	0,3	0,0	0,0
2	0,1	0,3	-0,1	0,0
3	0,2	0,2	0,0	0,0
4	0,2	0,1	0,0	0,0
5	0,4	0,3	0,0	0,0
6	0,4	0,4	0,0	0,0
7	0,3	0,3	0,0	0,0
8	0,2	0,3	0,0	0,0
9	0,1	0,2	0,0	-0,1
10	0,2	0,2	-0,1	0,0

&= Deviation to the side / L = Side length
% MAXIMUM DEVIATION
& / L x 100

Maximum deviation LOGITUDINAL (%)
Average size: + 0,04 / -0,00
Manufacturing size: + 0,04 / -0,00

Maximum deviation TRANSVERSE (%)
Average size: + 0,01 / -0,00
Manufacturing size: + 0,01 / -0,01

Pursuant to Standard EN 14411:2012 annex L , the maximum acceptable deviation in relation to the manufacturing size will be $\pm 1.5\%$.

Warp measurements in mm				
Tile N°	Measurement 1	Measurement 2	Measurement 3	Measurement 4
1	0,2	0,7	0,4	0,4
2	0,5	0,5	0,3	0,3
3	0,3	0,4	0,4	0,6
4	0,4	0,5	0,4	0,5
5	0,5	0,6	0,7	0,6
6	0,5	0,4	0,3	0,4
7	0,4	0,4	0,4	0,5
8	0,4	0,3	0,4	0,6
9	0,4	0,5	0,5	0,4
10	0,4	0,5	0,4	0,4

% MAXIMUM DEVIATION
& / L x 100

&= Deviation at the
4° vertex
L = Length of the diagonal

Maximum deviation (%)
Average size: + 0,08 / -0,00
Manufacturing size: + 0,08 / -0,00

Pursuant to Standard EN 14411:2012 annex L, the maximum acceptable deviation of the diagonal calculated in relation to the manufacturing size will be $\pm 1.5\%$.

Surface Aspect (UNE-EN ISO 10.545-2/98 and Erratum/98) *

30 tiles have been placed on the floor, forming 9.7m², observing them perpendicularity to the surface from a distance of 1 m under a light of uniform intensity of 300 lux, with the following results:

100% fault free

Pursuant to Standard EN 14411:2012 annex L, at least 95% of the tiles should be free of visible flaws that may impair the appearance of a larger surface of the tiles.

* Test not included in the scope of the ENAC Certification.

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GRECO GRES INTERNACIONAL S.L.	FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Water Absorption (UNE-EN ISO 10545-3:1997)

Test tube	Dry mass (g)	Saturated mass (g)	Absorption (%)
1	9693,5	9718,0	0,3
2	9660,5	9682,4	0,2
3	9734,3	9761,2	0,3
4	9669,6	9725,1	0,3
5	9770,5	9793,5	0,2
Mean value:			0,3

Uncertainty: $\pm 0,2\%$

(*) Depending on the water absorption ($E \leq 0,5\%$), the ceramic tiles are classified like GROUP Ia, UNE-EN 14411:2012, annexe L.

According to UNE-EN 14411:2012 annex L (Group Ia), the average absorption will be $E \leq 0,5\%$, and no individual value will be $> 0,6\%$.

The interpretation checked with (*) is outside the scope of ENAC's accreditation.

Water Absorption. Vacuum Impregnation Method. (UNE-EN ISO 10545-3:1997)

Test tube	Weights (g)			Water Absorption (%)	Outer Volume (cm ³)	Apparent porosity (%)	Apparent Relative Density	Apparent density (g/cm ³)
	Dry	saturated	submerged saturated					
1	9772,1	9849,2	5675,8	0,79	4173,3	1,85	2,39	2,34
2	9871,6	9963,2	5745,8	0,93	4217,3	2,17	2,39	2,34
3	9805,1	9894,4	5717,5	0,91	4176,9	2,14	2,40	2,35
4	9819,9	9918,1	5732,1	1,00	4186,0	2,35	2,40	2,35
5	9763,4	9866,5	5702,1	1,06	4164,4	2,48	2,40	2,40
Mean values:				0,94	4183,6	2,20	2,40	2,34

Uncertainty: $\pm 0,2\%$ --- $\pm 0,4\%$ $\pm 0,2\text{g/cm}^3$ $\pm 0,01\text{g/cm}^3$

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GRECO GRES INTERNACIONAL S.L.	FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Bending Resistance (UNE-EN ISO 10545-4:2012)

Test tube	Distance Between axis (mm)	Width (mm)	Thickness (mm)	Breaking Force (N)	Breaking Force (N)	Resistance bending (N/mm ²)
1	780	405	18,6	3404	6656	28,4
2	780	405	18,7	3583	6901	29,6
3	780	405	18,5	3636	7003	30,7
4	780	405	18,8	3158	6082	25,8
5	780	405	18,4	3189	6142	27,2
6	780	405	18,8	3337	6427	27,3
7	780	405	18,6	3404	6556	28,4
Mean values:				3387	6524	28,2
Uncertainty:				±3,5%	±3,5%	±5,6%

Diameter of the supports: 20 mm

Thickness of the rubber of the supports: 5 mm

Distance between the support points and the end of the tile: 10 mm

According to UNE-EN 14411:2012, annexe L (Group A1a), the average breaking strength will be ≥ 1300 N. Modulus of rupture minimum ≥ 28 N/mm², and modulus of rupture individual minimum ≥ 21 N/mm²

Linear Thermal Dilation (UNE-EN ISO 10545-8:1997 and UNE-EN ISO 10545-8:1997 Erratum 2008)

The results of thermal dilation were as follows:

Lengthwise	$5,7 \times 10^{-6} / ^\circ\text{C}$
Crosswise	$5,8 \times 10^{-6} / ^\circ\text{C}$

% Uncertainty of the test result: ±3,7%

According to UNE-EN 14411:2012, annexe L (Group A1a), this requirement is not obligatory.

Thermal Shock (UNE-EN ISO 10545-9:1997)

Absorption	$\leq 10\%$
Type of Test	with immersion
Test tube	Results
1	No damage observed
2	No damage observed
3	No damage observed
4	No damage observed
5	No damage observed

According to UNE-EN 14411:2012, annexe L (Group A1a), this requirement is not obligatory.

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GRECO GRES INTERNACIONAL S.L.	FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Chemical Resistance (UNE-EN ISO 10545-13:1998)

50 x 50 mm test tubes were cut in such way that one of their sides was not cut; 5 test tubes of different tiles were used for each test solution.

Household cleaning product test classification:

Test solution	Classification	Remarks
Ammonium Chloride 100 g/l	UA	No visible effects.

Pool Salts Test Classification:

Test solution	Classification	Remarks
Sodium Hypochlorite 20 mg/l	UA	No visible effects.

According to UNE-EN 14411:2012 annexe L (Group Ala), minimum value GB (glazed tiles) or UB (unglazed tiles).

Classification of the alkaline compounds and bases test:

Weak concentrations:

Test solution	Classification	Remarks
3% Hydrochloric Acid (v/v)	ULA	No visible effects.
Citric Acid 100 g/l	ULA	No visible effects.
Potassium Hydroxide 30 g/l	ULA	No visible effects.

According to UNE-EN 14411:2012 annexe L (Group Ala), the class will be indicated by the manufacturer.

Strong concentrations:

Test solution	Classification	Remarks
18% Hydrochloric Acid (v/v)	UHA	No visible effects.
5% Lactic Acid (v/v)	UHA	No visible effects.
Potassium Hydroxide 100 g/l	UHA	No visible effects.

According to UNE-EN 14411:2012 annexe L (Group Ala), this requirement is not obligatory, though with the informative character it indicates in the annexe P the following thing: "Ceramic tiles are normally resistant to common chemicals. The test for high concentrations of acids and alkalis listed is intended for ceramic tiles which are to be used in potentially corrosive conditions".

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GRECO GRES INTERNACIONAL S.L.		FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Impact Resistance. Restitution Coefficient. (UNE-EN ISO 10545-5:1998) *

Test tube (N°)	Bounce height of the Ø19 mm ball, further to being dropped from a height of 1 m above the visible surface, in cm	Defects found after the impact with the ball	Restitution Coefficient. (e)
1	73,5	The impact is marked	0,857
2	73,0	The impact is marked	0,854
3	75,5	The impact is marked	0,869
4	76,0	The impact is marked	0,872
5	75,0	The impact is marked	0,866
Mean Value:			0,864

According to UNE-EN 14411:2012, annexe L (Group A1a), this requirement is not obligatory, though with informative character it indicates in the annexe N the following thing: "This test is intended only for testing tiles that are used in areas where the impact resistance is considered to be of particular importance. The normal requirement for light duty installations is a coefficient of restitution of 0.55. For heavier duty applications a higher figure would be required".

* Test outside the ENAC accreditation scope.

Deep Abrasion Resistance (UNE-EN ISO 10545-6:2012)

Test tube	Vertical (mm)	Horizontal (mm)	Vertical (mm ³)	Horizontal (mm ³)
1	27,0	27,5	165	174
2	27,5	27,0	174	165
3	26,5	27,0	156	165
4	27,0	27,0	165	165
5	27,0	27,0	165	165
Mean value:			166	

Uncertainty (interval 26,5 - 27,5 mm.): ± 9 mm ³

According to UNE-EN 14411:2012, annexe L(Group A1a), the maximum value will be of 275 mm³.

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GRECO GRES INTERNACIONAL S.L.		FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Frost Resistance (UNE-EN ISO 10545-12:1997)

Further to drying and subsequent water saturation, 10 tiles underwent the test listed in Standard UNE-EN ISO 10545-12: 1997, including freezing and thawing cycles, within a forced air chamber, in which the tile temperature was decreased to -5 °C and maintained for 15 minutes. The tiles were subsequently submerged in water until the temperature exceeded +5 °C and were subsequently maintained at this temperature for 15 minutes.

Further to completing 100 cycles with this procedure, the following results were obtained by naked-eye inspection:

Test tube (N°)	Initial absorption (%)	Final absorption (%)	Visible defects following the test
1	1,0	1,1	Without visible effects
2	1,0	1,1	Without visible effects
3	1,1	1,2	Without visible effects
4	1,0	1,0	Without visible effects
5	1,0	1,1	Without visible effects
6	1,1	1,1	Without visible effects
7	1,0	1,1	Without visible effects
8	1,0	1,0	Without visible effects
9	1,0	1,1	Without visible effects
10	1,0	1,1	Without visible effects
Number of tiles with defects following the 100 cycles			0

According to UNE-EN 14411: 2012, annexe L (Group A1a), this characteristic will be required.

Moisture Expansion (UNE-EN ISO 10545-10:1997)

Test tube (N°)	Moisture expansion (mm/m)
1	0,092
2	0,097
3	0,071
4	0,072
5	0,097
Mean value:	0,086

Uncertainty: ± 0.02 mm/m

According to UNE-EN 14411: 2012, annexe L (Group A1a), this requirement is not obligatory, though with informative character it indicates in the annexe P the following thing: "The majority of glazed and unglazed tiles have negligible moisture expansion which does not contribute to tiling problems when tiles are correctly fixed (installed). However, with unsatisfactory fixing practises or in certain climatic conditions, moisture expansion in excess of 0,06% (0,6 mm/m) may be contribute to problems.

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GRECO GRES INTERNACIONAL S.L.	FRONTEK 405 x 800 x 19,5 mm. Model: Artico 1A-C5 / Group: UNE EN 14411-AI

Determination of dry apparent density and dry absolute density. (UNE-EN 772-13:2001) *

The number of parts tested was 10 whole pieces, without any apparent defect.

Tile nº	Dry apparent density (kg/m ³)	Dry absolute density (kg/m ³)
1	1612	2333
2	1603	2335
3	1583	2334
4	1584	2336
5	1588	2335
6	1558	2333
7	1593	2331
8	1581	2342
9	1582	2335
10	1606	2333
Average sizes:	1589	2335

* Test not included in the scope of the ENAC Certification.

PHOTOGRAPH OF THE TILE:



Service Quality Guarantee

Applus+ guarantees that this task has been carried out in compliance with the requirements of our Quality and Sustainability System, and furthermore, that the contractual terms and legal regulations have been complied with.

In the framework of our improvement programme, we would appreciate any comments you may deem appropriate. These should be addressed to the manager who signs this document, or to the Quality Director of Applus+, at the following address: satisfaccion.cliente@appluscorp.com

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GRECO GRES INTERNACIONAL S.L.		

Date at which tests were conducted: from 29/09/2014 to 30/10/2014.

CERAMIC TILE 400x400x9,5 mm Model: VENATTO / Group: AI / Surface type: Unglazed			
TEST CONDUCTED		RESULT	Uncertainty
Size and Surface Appearance *			PRESCRIPTION PURSUANT TO UNE-EN 14411:2007, Annex
LENGTH	UNE-EN ISO 10545-2:1998 and UNE-EN ISO 10545-2:1998 Erratum	800,0	±1,5 %
% Maximum deviation of the average measurement of each tile in relation to the mean size of 10 tiles		+0,00 / -0,03	
% Maximum deviation of the average measurement of each tile in relation to the manufacturing size		+0,00 / -0,03	±2.0 % (max ± 4mm)
THICKNESS		404,5	
% Maximum deviation of the average thickness of each tile in relation to the manufacturing size		+0,05 / -0,05	
STRAIGHTNESS OF THE SIDES		+0,00 / -0,17	±10%
% Max. dev. in relation to the manufacturing size		19,5	
ORTHOGONALITY		+0,00 / -3,08	±0,6 %
% Max. dev. in relation to the manufacturing size		+0,03 / -0,00	
SURFACE FLATNESS (in relation to manuf. size)		+0,21 / -0,00	±1,0%
CENTRAL CURVATURE % maximum deviation	+0,03 / -0,00		
SIDE CURVATURE % maximum deviation	+0,04 / -0,00	±1,5 %	
WARPING % maximum deviation	+0,08 / -0,00	±1,5 %	
SURFACE APPEARANCE		100% defect-free	≥95% defect-free
Physical Properties			
Water Absorption	Maximum individual value (%)	0,3	±0,2 %
	Mean Value (%)	0,3	±0,2 %
	Apparent porosity (%)	2,20	±0,4 %
UNE-EN ISO 10545-3:1997	Apparent Relative Density	2,40	±0,2g/cm ³
	Apparent density (g/cm ³)	2,34	±0,01g/cm ³
Bending strength	Rupture strength (N)	6529	±3,5 %
	Min. individual value (N/mm ²)	25,8	±5,6 %
UNE-EN ISO 10545-4:2012	Mean value (N/mm ²)	28,2	±5,6 %
Deep abrasion resistance	UNE-EN ISO 10545-6:2012	166 mm ³	±9 mm ³
Linear thermal expansion	UNE-EN ISO 10545-8 and UNE-EN ISO 10545-8 ERRATUM 2008	5,7 - 5,8 x 10 ⁻⁶ /°C	1,1 x 10 ⁻⁶ /°C
Thermal shock	UNE-EN ISO 10545-9:1997	No defects	---
Frost resistance	UNE-EN ISO 10545-12:1997	No defects	---
Moisture expansion	UNE-EN ISO 10545-10:1997	0,086 mm/m	±0,02 mm/m
Dry apparent density / Absolute density	UNE-EN 772-13:2001	1589 / 2335	---
Resistance to impact *	UNE-EN ISO 10545-5:1998	e: 0,864	---
Chemical Properties			
Resistance to household cleaning products (Ammonium Chloride 100 g/l)	UNE-EN ISO 10545-13:1998	UA	UB Minimum
Resistance to salts for pools (Sodium Hypochlorite 20 mg/l)		UA	UB Minimum
Resistance to acids and bases, weak concentration (hydrochloric acid 3%, citric ac. 100 g/l, potassium hyd 30 g/l)		ULA / ULA / ULA	as specified by the manufa
Resistance to acids and bases, strong concentration (hydrochloric acid 18%, lactic ac. 100 g/l, potassium hyd. 30 g/l)		UHA / UHA / UHA	---

Results contained herein pertain exclusively to the material received and tested pursuant to specified standards. This is page Nº 11 of 11 of the mentioned report, which summarises the results contained herein.

(*) Test not included in the scope of the ENAC Certification.

Firmado digitalmente por Juan Martínez Egea

Responsible for Construction Mat.
LGAI Technological Center S. A.

Firmado digitalmente por Miguel María Ayala Morán

Chief Technician
LGAI Technological Center S. A.