



LABORATORIO CERAMICO SEBASTIAN CARPI
COLEGIO OFICIAL DE INGENIEROS INDUSTRIALES DE CASTELLON

N.I.F: Q - 4670001 - I

AVENIDA DEL MAR, Nº 46 - 12003 CASTELLON
TEL: 964 208 583 - FAX: 964 202 594
www.laboratoriocarpi.com



TEST REPORT

PETITIONER: GRES DE LA MANCHA, S.L.

ADDRESS: Ctra. Consuegra, Km. 1,200

CITY: LOS YEBENES (Toledo)

TEST REPORT Nº: 51.278

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DATE OF TEST REPORT: 01/03/2012

DATE OF RECEIPT OF THE SAMPLE: 27/01/2012

DATE OF TESTS PERFORMANCE: 27/01 - 28/02/2012

NUMBER OF TILES SUPPLIED: 36

DESCRIPTION OF THE SAMPLE:

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

TEST PERFORMED:

- UNE-EN-ISO 10545-2 and ERRATUM: DETERMINATION OF DIMENSIONS AND SURFACE QUALITY.
- UNE-EN-ISO 10545-3 : DETERMINATION OF WATER ABSORPTION.
- UNE-EN-ISO 10545-4 : DETERMINATION OF MODULUS OF RUPTURE AND BREAKING STRENGTH.
- UNE-EN-ISO 10545-9 : DETERMINATION OF RESISTANCE TO THERMAL SHOCK.
- UNE-EN-ISO 10545-12 : DETERMINATION OF FROST RESISTANCE.

José A. Estibález Catalán
MANAGER

The samples and his description have been chosen by the petitioner.

The reported results relate only to the samples tested.

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The uncertaintys have been evaluated according to recommendations of document ISO/TAG5/WGE : June 95.



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DETERMINATION OF DIMENSIONS
*** MEASUREMENTS OF LENGTH AND WIDTH ***

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* Work size: **604 mm x 299 mm**

Individuals measurements (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
<u>L1</u>	605.0	603.7	602.7	603.3	605.2	603.8	603.7	602.2	604.5	603.6
<u>L2</u>	602.6	604.2	603.3	603.3	602.5	603.8	603.3	603.6	603.6	603.7
<u>L3</u>	298.9	299.1	299.0	298.6	298.6	298.1	298.4	298.6	298.5	299.1
<u>L4</u>	298.9	298.6	298.5	299.2	298.7	298.7	298.8	298.8	299.2	298.4

Average measurements (mm)

<u>Length</u>	603.8	604.0	603.0	603.3	603.9	603.8	603.5	602.9	604.1	603.7
<u>Width</u>	298.9	298.9	298.8	298.9	298.7	298.4	298.6	298.7	298.9	298.8

Deviations from the work size (%)

<u>D^{Lw}</u>	-0.03	0.00	-0.17	-0.12	-0.02	-0.03	-0.08	-0.18	0.02	-0.05
<u>D^{Aw}</u>	-0.03	-0.03	-0.07	-0.03	-0.10	-0.20	-0.13	-0.10	-0.03	-0.07

Deviations from the average size of the sample (%)

<u>D^{Lm}</u>	0.03	0.07	-0.10	-0.05	0.05	0.03	-0.02	-0.12	0.08	0.02
<u>D^{Am}</u>	0.03	0.03	0.00	0.03	-0.03	-0.13	-0.07	-0.03	0.03	0.00

* Average length of the sample: **603.6 mm**

* Average width of the sample: **298.8 mm**

* Maximum deviations of the average measurements form the work size: **0.02 % / -0.20 %**

* Maximum deviations of the average measurements from the average size of the sample:
0.08 % / -0.13 %

* Deviations uncertainty: **U= ± 0.03 % (k=2)**

Note: In calculating the deviations, the work size is assumed by the laboratory.



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DETERMINATION OF DIMENSIONS

*** MEASUREMENTS OF THICKNESS ***

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* Work size thickness: **12.4 mm**

Measurements of thickness (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
G1	12.4	12.4	12.4	12.4	12.3	12.4	12.4	12.3	12.4	12.4
G2	12.4	12.4	12.3	12.3	12.4	12.3	12.3	12.4	12.2	12.4
G3	12.4	12.4	12.2	12.4	12.3	12.5	12.4	12.4	12.3	12.4
G4	12.3	12.4	12.3	12.3	12.2	12.4	12.4	12.3	12.5	12.3
Average thickness (mm)	12.4	12.4	12.3	12.4	12.3	12.4	12.4	12.4	12.4	12.4
Deviation from the work size thickness (%)	0.00	0.00	-0.81	0.00	-0.81	0.00	0.00	0.00	0.00	0.00

* Average thickness of the sample: **12.4 mm**

* Maximum deviation of the thickness from the work size thickness: **-0.81 %**

* Deviations uncertainty: **U = ± 0.81 % (k=2)**

Note: In calculating the deviations, the work size thickness is assumed to be equal to average thickness.



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DETERMINATION OF DIMENSIONS

*** MEASUREMENTS OF STRAIGHTNESS OF SIDES ***

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* Work size: **604 mm x 299 mm**

Measurements of straightness (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
R1	-0.29	-0.24	0.03	-0.34	-0.15	-0.37	-0.39	-0.28	-0.47	-0.29
R2	-0.25	-0.44	-0.27	-0.08	-0.37	-0.24	-0.24	0.04	-0.16	-0.46
R3	-1.00	0.01	0.11	-0.51	-0.89	-0.20	-0.57	0.14	-0.79	-0.14
R4	0.58	-0.32	-0.42	-0.16	0.38	-0.07	0.39	-0.63	0.36	-0.41

* Maximum deviation from straightness, related to the work size: **0.10 % / -0.17 %**

* Deviations uncertainty: **U= ± 0.03 % (k=2)**



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DETERMINATION OF DIMENSIONS *** MEASUREMENTS OF RECTANGULARITY ***

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* Work size: **604 mm x 299 mm**

Measurements of rectangularity (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
<u>O1</u>	-1.95	0.28	1.36	0.09	-2.53	-0.33	0.15	2.98	-0.85	0.47
<u>O2</u>	2.90	0.03	0.58	-0.53	2.57	-0.96	0.45	-0.04	0.28	1.13
<u>O3</u>	0.96	-0.32	-0.72	0.23	1.31	0.49	0.09	-1.31	0.64	-0.50
<u>O4</u>	-1.41	0.30	-0.02	-0.05	-1.34	0.28	-0.30	-0.08	-0.38	-0.06

* Maximum deviation from rectangularity, related to the work size: **0.49 % / -0.47 %**

* Deviations uncertainty: **U= ± 0.03 % (k=2)**



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DETERMINATION OF DIMENSIONS
*** MEASUREMENTS OF SURFACE FLATNESS ***

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* Work size: **609 x 299 mm**

* Diagonal calculated from the work size: **674.0 mm**

Measurements of centre curvature (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
CC1	0.50	0.74	0.48	0.74	0.42	0.50	0.23	0.50	0.08	0.18
CC2	0.56	0.88	0.64	0.76	0.50	0.42	0.22	0.43	-0.01	0.34
CC3	0.42	0.33	0.17	0.51	0.53	0.53	0.15	0.37	0.20	0.34
CC4	0.41	0.37	0.26	0.52	0.50	0.56	0.21	0.38	0.23	0.38

Measurements of edge curvature (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
CL1	0.06	0.02	-0.24	-0.14	-0.15	0.04	0.01	-0.01	-0.04	-0.35
CL2	-0.16	-0.20	-0.07	0.00	0.01	-0.26	-0.29	-0.26	-0.28	-0.07
CL3	0.34	0.12	0.27	0.23	0.43	0.32	0.37	0.13	0.05	0.01
CL4	0.23	0.28	0.45	0.42	0.35	0.08	-0.01	0.50	0.20	0.17

Measurements of warpage (mm)

<u>Tile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
A1	0.02	0.69	0.27	0.28	-0.23	-0.10	-0.06	0.16	-0.48	-0.37
A2	0.04	0.86	0.68	0.29	-0.13	-0.37	-0.07	-0.08	-0.62	-0.13
A3	-0.21	-0.99	-0.84	-0.77	0.05	-0.02	-0.21	-0.24	0.16	0.01
A4	-0.34	-1.02	-0.65	-0.44	-0.04	0.03	-0.13	-0.10	0.38	-0.08

* Maximum centre curvature, related to the diagonal: **0.13 %**

* Maximum edge curvature, related to the work size: **0.08 / -0.12 %**

* Maximum warpage, related to the diagonal: **0.13 / -0.15 %**

* Deviations uncertainty: **U= ± 0.03 % (k=2)**

Note: In calculating the deviations, the work size is assumed by the laboratory.



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DETERMINATION OF SURFACE QUALITY

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 2 and Erratum:1998**)

* The number of tiles tested: **30 tiles.**

* The percentage of tiles without defects: **100 %**

* Observations: The tiles tested are free from visible defects.



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DETERMINATION OF WATER ABSORPTION

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 3:1997**)

* Water absorption for each tile (**Boiling method "E_b"**):

Tile	Water absorption (E_b) (%)
1	1.1
2	1.4
3	1.0
4	1.2
5	0.9

* Average water absorption of the sample: **1.1 %**

* Measurement uncertainty: **U = ± 0.2 % (k=2)**

* Average value uncertainty: **U = ± 0.3 % (k=2)**



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DETERMINATION OF MODULUS OF RUPTURE AND BREAKING STRENGTH

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 4:1997**)

* Parameters: L = 585 mm; l = 10 mm; t = 5 mm ; d = 20 mm

<u>Tile</u>	<u>Breaking load " F "</u> (N)	<u>Breaking strength " S "</u> (N)	<u>Modulus of rupture " R "</u> (N/mm ²)
1	1068.2	2096.3	25.5
2	1101.5	2159.5	25.8
3	1046.6	2053.3	25.0
4	1096.6	2152.0	25.7
5	1095.6	2149.4	26.2
6	1102.5	2162.1	26.3
7	1037.8	2036.6	24.8
Average	1078	2116	26

* Measurement uncertainty: **$U_F = 10.8 \text{ N}$** ; **$U_S = 21.0 \text{ N}$** ; **$U_R = 0.6 \text{ N/mm}^2$** (**k=2**)

* Average value uncertainty: **$U_F = 23 \text{ N}$** ; **$U_S = 46 \text{ N}$** ; **$U_R = 1 \text{ N/mm}^2$** (**k=2**)



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DETERMINATION OF RESISTANCE TO THERMAL SHOCK

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after Standard **UNE-EN-ISO 10545 Part 9:1997**)

- * Water absorption of the tiles: **Less than 10 %**
- * Type of test performed: **With immersion.**
- * Number of test specimens: **Five.**
- * Number of test specimens with visible defects: **Not - one.**
- * Observation: The tiles tested are free from visible defects.



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DETERMINATION OF FROST RESISTANCE

DESCRIPTION OF THE SAMPLE.-

Ceramic tiles, single extruded, 299 x 604 mm, glazed. Ref.:

-- **BASE 30 x 60** --

Code lab.: 28-1-12

RESULTS.- (Test performed after **UNE-EN-ISO 10545 Part 12:1997**)

* Number of tiles tested: **Ten.**

* Method used to impregnate the tiles: **Impregnation with water at pressure below of the atmospheric pressure.**

* The initial water content before the freeze-thaw test: **$E_1 = 0.7 \% \pm 0.1 \%$** (**k=2**)

* The final water content after the freeze-thaw test: **$E_2 = 3.0 \% \pm 0.2 \%$** (**k=2**)

* Number of damaged tiles after 100 cycles: **Not-one.**

* Description of defects after the freeze-thaw test: The tiles tested are free from visible defects.
