



Geoceramic Researches S.r.l.

Via Bacchello, 9
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Laboratory for Experimental and Technological Ceramics and Brick Industries

TEST REPORT

TS N°: 301/16eng

DATE 10/11/2016

Spett.li
CERAMICHE ASCOT S.p.A.
Via Croce, 80
41050 SOLIGNANO MO

NORM DIN 51130 : 2014

Determination of anti-slippery characteristic
Work's zone with high risk of slippery
Procedure of test walking – inclined platform.

The test regard work's zone with high risk of slippery; the procedure it previews a slanted plan that it comes covered from the subject participants to the test, whose surface is paved with the material in object, preventively greased with having oil 10 viscosity SAE W 30. During the execution one determines if the material in examination can be suitable for puts down it in specific atmospheres of job. The medium degree of inclination correspondent to the feeling of insecurity of the operator who walks on the plan, defines the classification of the material in one of the five groups that serve like parameter in order to establish the effectiveness degree anti-slippery.

Samples arrived 09/11/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN720R ENTROPIA BEIGE RETT.

Test start 10/11/2016
Test finished 10/11/2016

Slide angle : 10,2°

Classification : R10

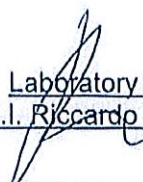
LEGEND:

Total of the medium values

from 6° to 10°
over 10° until 19°
over 19° until 27°
over 27° until 35°
over 35°

Group classification

R 9
R 10
R 11
R 12
R 13


Laboratory Head
P.I. Riccardo Frabetti



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TEST REPORT

TS N°: 292/16eng

DATE 04/11/2016

Spett.li
DOM CERAMICHE S.p.A.
S.S. 569, 167/a
41014 SOLIGNANO MO

UNI EN ISO 10545-3 : 2000

CERAMIC TILES DETERMINATION OF WATER ABSORPTION

Principle: dry tiles are impregnated with water and then suspended in water. The relationships of the dry, saturated, and suspended weights allow the calculation of the listed properties.

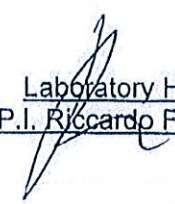
Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 27/10/2016
Test finished 27/10/2016

Instrumentation used : Boiling tank– Cod. GR AS/021
±0,2 grams balance – Cod. GR B/001

Sample n°	Water absorption %
1	0,07%
2	0,06%
3	0,07%
4	0,07%
5	0,05%
Average water absorption	0,07%


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UNI EN ISO 10545-13 : 2000

DETERMINATION OF CHEMICAL RESISTANCE

This norm defines a method of test for determining the chemical resistance of ceramic tiles at room temperature. The method is applicable to all types of ceramic tiles.

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

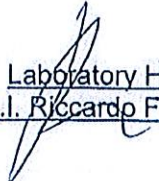
Test start 27/10/2016
Test finished 31/10/2016

Test solutions for chemical resistance: hydrochloric acid solution 3% (v/v) for 4 days.; citric acid solution (100 g/l) for one day; potassium hydroxide 30 g/l for 4 days; sodium hypochlorite solution (20 mg/l) for one day; ammonium chloride solution (100 g/l) for one day.

TEST SAMPLES : Every solution has been tried on n° 5 fragments of floor tile .

Classification

<i>Household chemicals :</i>	ammonium chloride	GA class
<i>Swimming pool salts :</i>	sodium hypochlorite	GA class
<i>Acids and alkalies</i>	citric acid	GLA class
	hydrochloric acid	GLA class
	potassium hydroxide	GLA class


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EN 101 : 1982

**DETERMINATION OF SCRATCH HARDNESS
MOHS SCALE**

This norm defines a method of test for determining the scratch hardness with Mohs scale.

Mineral's test

Mineral	Scratch Hardness Mohs	Mineral	Scratch Hardness Mohs
Talc	1	Feldspar	6
Gypsum	2	Quartz	7
Calcite	3	Topaz	8
Fluorite	4	Corundum	9
Apalite	5	Diamond	10

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 27/10/2016
Test finished 27/10/2016

**Scratch Hardness
Mohs**

Test tile n°:	1	7
	2	7
	3	7

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41050 SOLIGNANO MO

UNI EN ISO 10545-7 : 2000

CERAMIC TILES
DETERMINATION OF RESISTANCE TO SURFACE ABRASION
GLAZED TILES

Principle: determination of the abrasion resistance of the glaze of tiles by rotation of an abrasive load on the surface and the assessment of the wear by means of visual comparison of abraded test specimens and non-abraded tiles.

Samples arrived 09/11/2016 (sampling executed by Costumer)

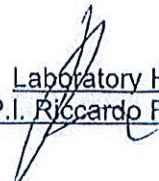
DESCRIPTION TILES : 75x75 cm
TYPE : DEN720R ENTROPIA BEIGE RETT.

Test start 10/11/2016
Test finished 10/11/2016

Instrumentation used : Surface abrasion apparatus – Cod. GR AS/005.

DETERMINATION OF RESISTANCE TO SURFACE ABRASION

Classification : **IV**
Note : (visual failure at 12.000 revolutions)


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UNI EN ISO 10545-12 : 2000

DETERMINATION OF FROST RESISTANCE

After impregnation with water the tiles are cycled between +5°C and -5°C. All sides of the tiles are exposed to freezing during a minimum of 100 freeze-thaw cycle.

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 27/10/2016
Test finished 04/11/2016

Instrumentation used: Apparatus for frost resistance – Cod. GR AS/016
Apparatus for determining porosity vacuum – Cod. GR AS/009
Scales ± 0.2 grams – Cod. GR B/006
Forced air dryer – Cod. GR E/002

Number of tiles tested:10
Used method of immersion:water absorption with vacuum
Number of tiles damaged after 100 cycles:.....nobody
Description of the defects damaged before the test: ...nobody
Type of damage:.....nobody
Water absorption before test:0,08%
Water absorption after test:.....0,19%

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LAB N° 1505

Laboratory for Experimental and Technological Ceramics and Brick Industries

TEST REPORT

TS N°: 292/16eng

DATE 04/11/2016

Spett.li
DOM CERAMICHE S.p.A.
S.S. 569, 167/a
41014 SOLIGNANO MO

UNI EN ISO 10545-4 : 2014

**CERAMIC TILES
DETERMINATION OF MODULUS OF RUPTURE AND BREAKING STRENGTH**

The present norm establishes a test method in order to determine the modulus of rupture (R) and the breaking strength (S) of all the floor tiles of ceramics for means of a cargo applied on three points, with the point centers them of cargo in contact with the surface of exercise of the floor tile.

The modulus of rupture, expressed in Newton to the square millimetre, is given gives:
The breaking strength, expressed in Newton, is given gives:

$$R = 3 \cdot F \cdot L / 2 \cdot b \cdot h^2$$
$$S = F \cdot L / b$$

where: F is the necessary cargo to the breach (in Newton); L is the distance between the seams of support (in millimeters); b it is the width of the floor tile (in millimetres); h it is the minimal thickness of the champion of test (in millimeters) measured after the long test the edge of the breach.

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 27/10/2016
Test finished 27/10/2016

Description equipment

- Crometro - Cod. GR AS/004
- vernier caliper up to 500 mm - Cod. GR AC/012
- feeler 0÷20 mm - Cod. AC/011
- diameter of the seam (d) : mm 20
- thickness of the rubber (t): 5
- distance between support and extremity camp. (l): 10

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41014 SOLIGNANO MO

UNI EN ISO 10545-4 : 2014

CERAMIC TILES
DETERMINATION OF MODULUS OF RUPTURE AND BREAKING STRENGTH

Samples arrived 26/10/2016 (sampling executed by Customer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 27/10/2016
Test finished 27/10/2016

- number of tile for the test..... 7
- distance between support and extremity sample (l): mm..... 10
- distance between the seams of support (l₂) mm..... 480

	mm	mm	mm	N	N	N/mm ²
Tile n°	l ₂	b	h	F	S	R
1	480	510,8	10,0	3030	2847	42,7
2	480	510,7	9,9	2922	2746	42,0
3	480	510,0	9,9	2955	2781	42,6
4	480	510,4	9,9	2854	2684	41,1
5	480	509,2	10,0	3015	2842	42,6
6	480	510,4	9,9	2857	2687	41,1
7	480	509,8	9,9	2922	2751	42,1
media	480	510,2	9,9	2936	2763	42,0

"TILES CUT AT 50x50 cm"

Average breaking load F..... 2936N
Breaking strength S 2763N

Average modulus of rupture R..... 42,0N/mm²

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UNI EN ISO 10545-14 : 2015

DETERMINATION OF RESISTANCE TO STAINS

Definition: the resistance to stains is determined maintaining to contact solutions blotting with the surface of exercise of the champions heads, for a sure period of time; the surface comes then cleaned up with systems of severity progressive, finally analyzed visually.

Samples arrived 26/10/2016 (sampling executed by Costumer)

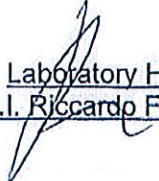
DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

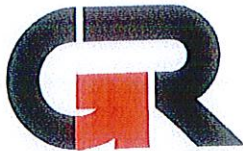
Test start 27/10/2016
Test finished 28/10/2016

Staining agents	Class
Stains having tracing action (pastes)	
Green staining agent in light oil	5
Stains having chemical/oxidizing action	
Iodine/alcohol solution, 13 g/l	5
Stains having filming action	
Olive oil	5

Classification:

Class 5 : stain removed with hot water;
Class 4 : stain removed with hand cleaning with abrasive sponge;
Class 3 : stain removed with mechanical cleaning with the strong cleaning agent;
Class 2 : stain removed with suitable solvent;
Class 1 : stain not removed.


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B.C.R.A. METHOD SLIPPERY

The test has been carried out using measuring instrument TORTUS® of the coefficient of dynamic friction between a sliding element and the surface of test.

Operating conditions:

- Speedo f advance (mm/s): 17 - Loaded junior clerk to sliding element (g): 200

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm

TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 28/10/2016

Test finished 28/10/2016

Covering material of sliding element	Superficial test of condition			Coefficient of friction (μ)	
Leather	Dry			0,38	
Hard rubber standard	Wet (water + bathing agent)			0,51	
Singles test of coefficient of friction					
with leather:	0,39	0,37	0,38	0,39	0,37
with hard rubber standard	0,50	0,52	0,49	0,50	0,54

REFERENCE VALUE

$\mu < 0.20$
 $0.20 < \mu > 0.40$
 $0.40 < \mu > 0.74$
 $\mu > 0.74$

(B.C.R.A. REP. CEC. 6/81)

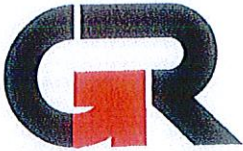
Danger slippery
Excessive slippery
Satisfaction friction
Excellent friction

Requirement (" Regulations of performance dell' art.1 of the law 9 January 1989, n.13" - Decree Ministerial 14/06/89, n° 236 Art. 8.2.2)

μ (coefficient of friction) :

- for leather sliding element to dry paving : > 0.40
- for hard rubber sliding element to wet paving : > 0.40

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BOT 3000

CERAMIC TILES
DETERMINATION OF DINAMIC COEFFICIENT OF FRICTION (DCOF)

All samples to be tested should be thoroughly cleaned prior to testing. Three samples should be placed in a row on an area not subject to fluctuations. Necessary to wet the path of the sensor with an aqueous solution of 0.05% SLS (Sodium-Lauryl Sulfate). Necessary to make a total of 4 dynamic measurements on the tiles. After scoring the first measurement rotate the BOT 3000 180 ° and run the second measurement. Subsequently rotate tiles of 90 ° and perform the following two measures according to the same methodology. Record all four measures and calculate the average. Repeat the procedure on two other pieces. For structured tiles, the three pieces tested shall be representative of the different structures. If there are more than three different structures, test each structure.

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 28/10/2016
Test finished 28/10/2016

DCOF – test conditions	value 1	value 2	value 3	value 4	Average value
Wet – sample n° 1	0,44	0,45	0,45	0,44	0,45
Wet – sample n° 2	0,45	0,44	0,45	0,45	0,45
Wet – sample n° 1	0,45	0,44	0,44	0,44	0,44

REFERENCE VALUES

The ANSI A137.1: 2012.Version 1 indicates as a limit value of 0.42 for indoor environments where conceivably there is the possibility of wear in wet conditions.

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NORM DIN 51097 : 1992

Determination of the property antislid of bathed zones on which it walks knots on foot

A person is left over and on foot withdraws knots on the covering to try whose inclination is increased of approximately 1° to the second; the rake in correspondence of which the person is not more in conditions than emergency, comes defined like sliding angle. The surface is bathed in continuous with one solution (1 g/l of bathing agent + water).

Samples arrived 26/10/2016 (sampling executed by Costumer)

DESCRIPTION TILES : 75x75 cm
TYPE : DEN710R ENTROPIA BIANCO RETT.

Test start 31/10/2016
Test finished 31/10/2016

Slide angle : 21,1°

Classification : B

LEGEND:

Total of the medium values

<12°
from 12° until 17,9°
from 18° until 23,9°
over 23,9°

Group classification

0
A
B
C

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