



UNIVERSITÀ DEGLI STUDI DI MILANO

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Test Report N. GF/4.2015

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Test: self-cleaning test performed by means of contact angle measurement on **Calacatta Active™ 300x150 cm** in accordance with ISO 27448:2008.

ISO 27448-1:2008 "Fine ceramics (advanced ceramics, advanced technical ceramics – test method for self-cleaning performance of semiconducting photocatalytic materials"

Milano 24/09/2015

Date of receipt	10/09/2015
Analysis start date	21/09/2015
Analysis end date	24/09/2015
Material	Ceramic Materials
Product	Ceramic slabs in porcelain gres
Sample	Calacatta Active 300x150 cm
Test information	<ul style="list-style-type: none">• Test to assess and quantify the self-cleaning property in accordance with ISO 10678:2010.• Tested sample: collected and cut in a 3.5x3.5 cm sample from an original slab, intact in all its parts, randomly chosen from a production batch.• Pre-treatment methods: in accordance with ISO 27448-1:2008.• Light source: UV-A Jelosil 500, intensity 3.0 mW/cm².• Exposure time: 6 h.• Initial concentration: solution 0.5 vol.% of oleic acid in n-heptane.• Homogeneous layer of oleic acid resulted to be 2.0±0.2 mg (Gibertini Elettronica precision balance).



	<ul style="list-style-type: none"> Analytical method: contact angle instrument equipped with high-resolution TV camera (Kruss). Dark tests for comparison. Reproducibility: the measurement was repeated on no. 5 samples, cut and randomly chosen from # 5 different slabs.
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Both experimental contact angle data and the relative mathematical elaborations, in accordance with ISO 27448-1:2010, are reported in Table1.

Tab.1

Calacatta Active™		5 (five) contact angle measurements at each time (°)					θ_n	s	\bar{x}	s/\bar{x}
		1	2	3	4	5	(°)	(°)	(°)	(%)
UV irradiation time (h)	0	58,6	63,5	47,7	39,7	42,7	50,44	-	-	-
	2	58,0	60,8	51,3	39,4	35,5	49,00	-	-	-
	4	40,6	51,4	53,6	32,6	55,0	46,64	1,92	48,69	3,94
	6	39,4	37,9	56,4	53,0	45,6	46,46	1,42	47,37	2,99
	24	32,0	29,2	27,5	23,9	28,6	28,24	10,57	40,45	26,14
	28	17,3	25,5	20,8	21,0	24,1	21,74	12,81	32,15	39,86
	48	23,1	29,4	20,4	15,7	21,7	22,06	3,66	24,01	15,26
	72	17,2	17,9	31,2	20,8	29,0	23,22	0,78	22,34	3,48
	74	20,9	43,4	32,5	32,6	29,9	31,86	5,36	25,71	20,83
	76	35,6	35,7	37,1	22,0	30,9	32,26	5,11	29,11	17,55

θ_n = mean of the contact angle value measured on 5 (five) measurements made on 5 points chosen randomly on the surface of the material

s = standard deviation

\bar{x} = mean of the values of θ_n obtained at three consecutive time

A summary of the obtained data is shown in Table 2:

Tab.2

Sample	UV	Original slab contact angle	Contact angle t_0	Contact angle t_{48}	Contact angle t_{76}
Calacatta Active™	Yes	28.8°	50.44°	21.74°	32.26°
Calacatta Active™	No (dark)	28.8°	50.90°	50.86°	53.50°



Conclusions

Calacatta Active™ 300x150 cm is a material with **self-cleaning properties in accordance with ISO 27448-1:2008**.

With regard to the data obtained during the test, after **only 28 hours**, the value of the contact angle drops of 28,70 degrees, to return then to the value, which originally had the material before the test. This fact proves that the oleic acid, applied onto its surface, had undergone photodegradation due to the photocatalytic efficiency of the Calacatta Active™ slabs. The control (dark test) sample shows a contact value, which remains unchanged from the start to the end of the test.

Il Responsabile Scientifico
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