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Test Report N. GF/3.2023

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Test: Self-cleaning performance test via contact angle measurements on Active Surfaces White CS according to ISO 27448-1:2008

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

Milan, 04/09/2023

Date of receipt	17/07/2023
Analysis start date	19/07/2023
Analysis end date	26/07/2023
Material	Ceramic Materials
Product	Ceramic slabs in porcelain gres
Sample	**Active Surfaces White CS**
Test information	• Evaluation of self-cleaning properties in accordance with ISO 10678:2010 • Sample tested: 3.5x3.5 cm pieces cut from an original slab, intact and randomly selected from a production batch directly at the manufacturing facility • Pre-treatment: as specified by the standard • Light source: UV-A Jelosil 500 lamp with intensity of 2.0 mW/cm² • Exposure time: 80 hours • Initial concentration: 0.5 vol% oleic acid in n-heptane • Homogeneous layer of oleic acid applied to the surface, weighing 2.0 ± 0.2 mg (measured with high-precision analytical balance, Gibertini Elettronica) • Analytical method: contact angle measurement (Kruss instrument with high-resolution camera) • Dark test conducted for comparison • Reproducibility: the measurement was repeated

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	on 5 samples, randomly selected and cut from 5 different slabs

The contact angle data and the related calculations, as required by the standard, are reported in Table 1.

Tab.1

Calacatta Active™		n. 5 contact angle measures per time interval, in degree (°)					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 value of the contact angle measured at five randomly selected points on the surface
s = standard deviation
$\langle\bar{x}\rangle$ = mean of θ_n values measured over three successive time intervals

Conclusions

The **Active Surfaces White CS** sample qualifies as a self-cleaning material according to ISO 27448-1:2008. Based on the data collected, after only 28 hours of irradiation the contact angle decreased by **28.70°**, returning to the original value of the untreated material before the start of the test. This behavior demonstrates the photocatalytic degradation of oleic acid applied to the surface, confirming the photocatalytic activity of the Calacatta Active™ slab. The control sample (dark test) showed no change in contact angle between the beginning and end of the test.

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