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TILE COUNCIL OF NORTH AMERICA LABORATORY ANNOUNCES RESULTS OF RESEARCH PROGRAM WITH PHOTOCATALYTIC TILES FROM STONEPEAK CERAMICS, PART OF THE GRANITIFIANDRE GROUP

Tile Council of North America (TCNA), in collaboration with StonePeak Ceramics and Centro Ceramico Bologna, recently completed a research program with photocatalytic tiles produced through an innovative technology developed by StonePeak Ceramics.

According to Dr. Jennifer Ariss, a research scientist at TCNA, the effects of titanium dioxide as a photocatalyst are well-established in the scientific literature. "Generally its use can provide a meaningful reduction in organic and inorganic pollutants, self-cleaning properties through a reduction in water surface tension, and important anti-microbial and anti-fungal properties." She further added, "Photocatalysis is a simple chemical reaction, requiring only light and water to be activated."

TCNA's Product Performance Testing Laboratory, in cooperation with Centro Ceramico Bologna, conducted research on three fronts: Reduction of nitrogen oxides (a major component of urban air pollution); reduction of organic pollutants as measured by the indigo carmine test; and inhibition of bacterial growth. Tiles treated with a micrometric titanium dioxide layer developed by StonePeak Ceramics were tested along with control samples provided by StonePeak Ceramics and TCNA.

Using a closed chamber study according to a recognized protocol, a 70% reduction of nitrogen oxides was observed. In evaluations of antimicrobial properties using the photocatalytic StonePeak Ceramics tiles, up to a 60% reduction of *E. coli* bacteria was observed compared to traditional porcelain surfaces. A 30% reduction on average of organic pollutants was observed in indigo carmine testing.

While titanium dioxide photocatalytic technology is employed in many industries, the methods of its application are often nanotechnology-based, which can pose considerable environmental and health hazards in the manufacturing process. According to Centro Ceramico Bologna, the novel technology of StonePeak Ceramics using a micrometric application minimizes problems associated with previous application techniques for photocatalytic materials and increases the effect of the surface layer.

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“Our lab is very pleased to present promising results from our testing of this new technology invented by StonePeak Ceramics. The potential benefits of photocatalytic tile products include improved air quality, cleanability and sanitation,” commented TCNA Executive Director, Eric Astrachan.

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TCNA TEST REPORT: GranitiFiandre Antimicrobial Phase IA

TEST REQUESTED BY: GranitiFiandre Group
Attn: Mr. Graziano Verdi
GranitiFiandre Sp. A.
Via Radici Nord, 112
32014 Castellarano
RE, Italy

TEST SUBJECT MATERIALS:

Phase IA: Antibacterial Evaluations

Porcelain photocatalytic tiles. Supplied by GranitiFiandre.

Porcelain photocatalytic tiles without photocatalytic layer (ceramic control). Supplied by GranitiFiandre.

Vinyl composite tiles. Supplied by TCNA.

Oak hardwood flooring. Supplied by TCNA.

Generic carpet. Supplied by TCNA.

TEST DATE: August 13-September 9, 2009.

TECHNICAL REPORT:

TEST CONDITIONS:

All tests were irradiated with a black light blue lamp (peak wavelength of 351 nm) at an intensity of $0.25 \pm 0.1 \text{ mW/cm}^2$.

All tests assessing effects of photocatalytic activity on bacteria were irradiated with above specification for 8 hours.

All testing was completed at ambient temperatures ($25 \pm 3^\circ\text{C}$).

In all tests, enumeration methods were amended for use with PetriFilm diagnostic plates (3M Industries).

MATERIALS AND METHODS

Phase IA. Effects of Photocatalytic Activity on Bacteria

Objective A:

Assess effects of photocatalytic activity of product provided by client on three bacterial species using ISO 27447 (modified for multiple surface comparisons), "Test method for antibacterial activity of semi-conducting photocatalytic materials," across five comparative surfaces through established scientific testing procedures.

Methodology:

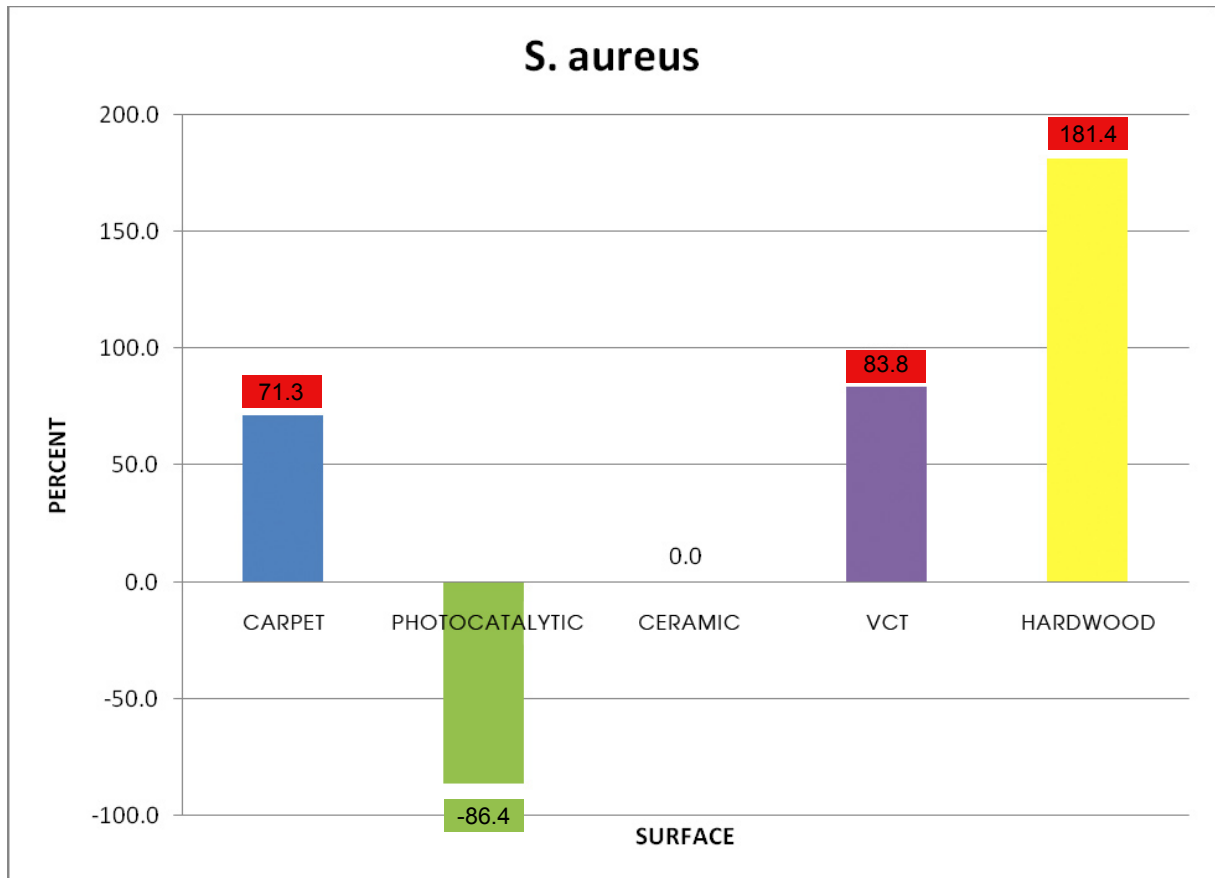
The five test surfaces (including Client's photocatalytic tile) were inoculated by *Staphylococcus aureus*, *Escherichia coli*, and *Klebsiella pneumoniae*. Changes in quantity of viable bacteria were compared to initial bacterial counts after 8 hours of contact with test surfaces. Alternate test surfaces used were 1) vinyl composite tile, 2) carpet, 3) non-photocatalytic ceramic tile, and 4) oak hardwood solid plank flooring.

RESULTS

Phase IA. **Effects of Photocatalytic Activity on Bacteria** - Staphylococcus aureus

SURFACE	Percent change*
CARPET	71.3
PHOTOCATALYTIC	-86.4
CERAMIC	0.0
VCT	83.8
HARDWOOD	181.4

Notes: Results are presented in the format of percent change in recoverable bacteria compared to initial inoculum concentration.



Phase IA. **Effects of Photocatalytic Activity on Bacteria** - *Klebsiella pneumoniae*

SURFACE	Percent change*
CARPET	63.2
PHOTOCATALYTIC	-70.8
CERAMIC	0.0
VCT	164.5
HARDWOOD	129.1

Notes: Results are presented in the format of percent change in recoverable bacteria compared to initial inoculum concentration.

