



*presents the surface technology  
of the twentyfirst century*

**TITAN**  
**Shield®**

*Photocatalytic*  
**Titanium dioxide TiO<sub>2</sub>**

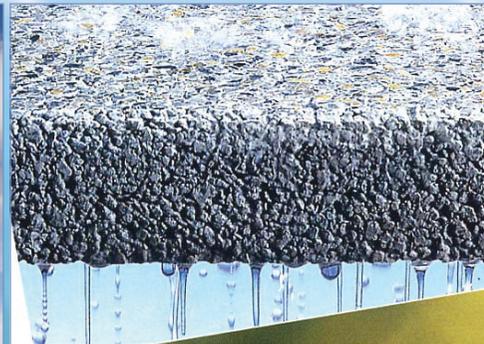
TiO<sub>2</sub>  
Titan  
Shield

*Surfaces which are coated with*

**TITAN**  
**Shield**<sup>®</sup>

*,clean themselves. They are also antibacterial  
.fungicidal and can even clean our air  
?Hard to believe*

***...Look and see***



dirt

nitrogen oxides

self cleaning

respirable

NOx

fungicidal

TITAN  
Shield

antibacterial

antiviral

NOx

environmental poisons



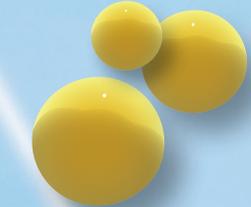


## *Operating mode*

*Our TitanShield products are based on the mechanism of photocatalysis. Active Titanium dioxide (TiO<sub>2</sub>) reacts with light. Practically all pollutants are converted through this reaction to harmless components like water, gypsum or .salts*



SO<sub>x</sub>  
Schwefeloxid



NO<sub>x</sub> Stickoxide  
NO<sub>2</sub> (Stickstoffdioxid)  
NO (Stickstoffmonoxid)



Ozon



Russ  
Feinstaub

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CaSO  
Calcium Sulfat



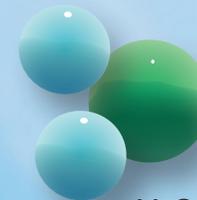
Ca(NO<sub>3</sub>)<sub>2</sub>  
Calcium Nitrat



CaCO<sub>3</sub>  
Calcium Carbonat



H<sub>2</sub>O  
Wasser



A photograph of a garden path with a large rock and a zipper overlay. The zipper is on the right side, partially unzipped, revealing the path and a rock. The zipper pull has the text 'TiO2 Titan Shield' on it.

*High technology from the Land of the rising sun*

*The basis technology of our products comes from Japan. The use of active titanium dioxide solves in Japan, and many other countries, a lot of .environmental problems*

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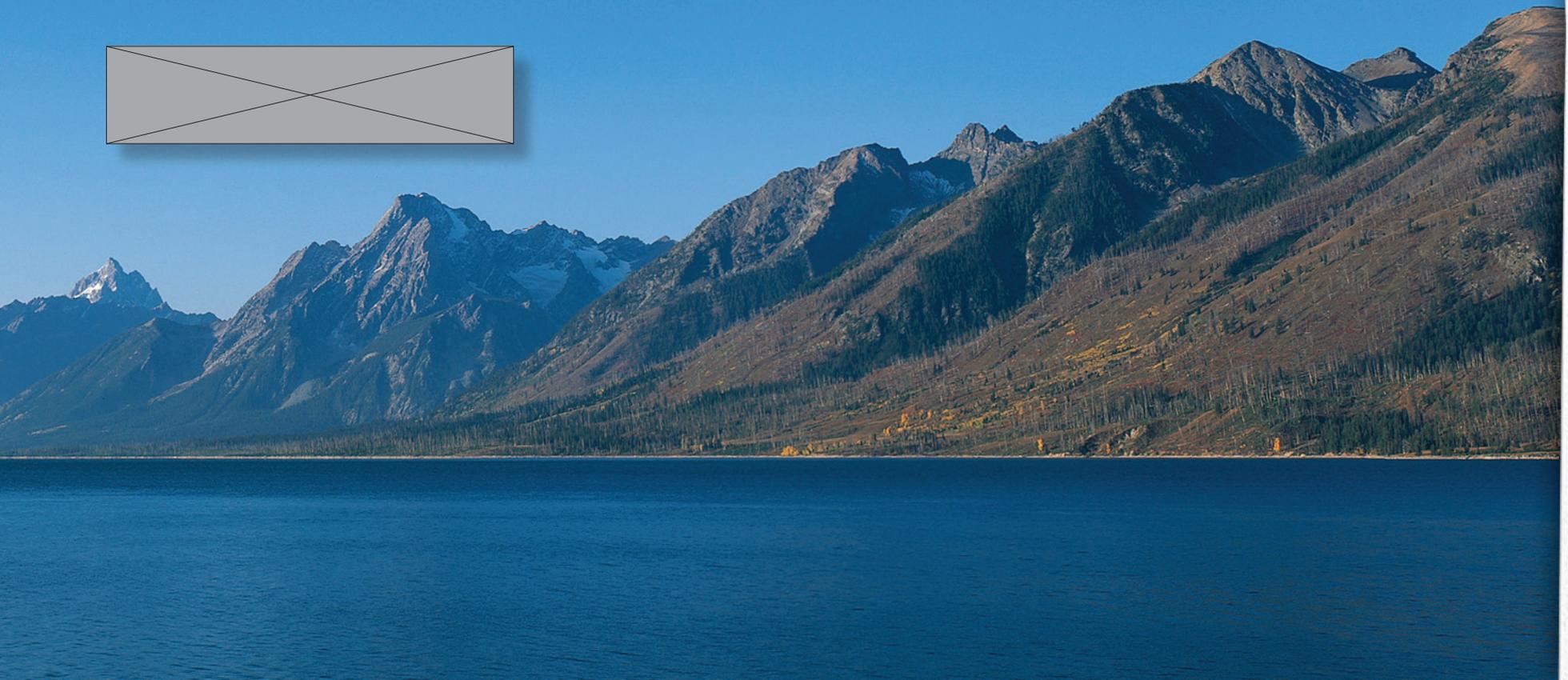
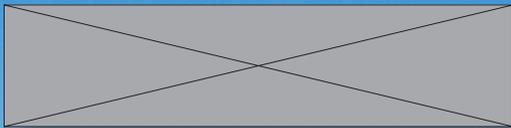
*Self cleaning facades, antibacterial coatings, active air filters and large-scale coated inner city centres*  
*The Reduction of NOx, SOx and respirable dust in Japanese metropolises like Kobe and Tokio is no exception, but the ...rule*





*A study of the University of Tokio  
.confirms the effective air cleaning  
A titanium dioxide coated area*

*of 1000 m<sup>2</sup>  
can during 12 light hours  
clean 250,000 m<sup>3</sup> air  
.from environment pollutants*



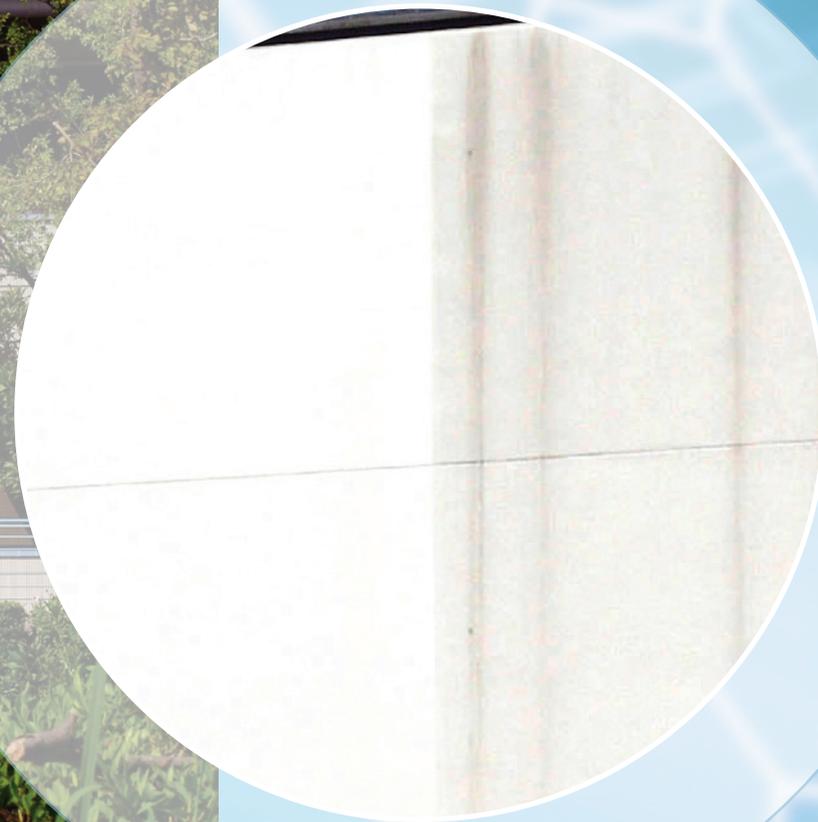
# TITAN Shield®

*.The coating of all surfaces is really simple  
The material is applied with modern low pressure  
paint technics after suitable cleaning. The aque-  
ous solution is patented, certified, solvent-free  
.and absolute eco-friendly*



## *Self cleaning surfaces*

*TitanShield coated surfaces clean themselves. This house facade is half coated with titanium dioxide. The difference is visible already after a few months*



*The self cleaning effect of the TitanShield coating is highly effective on glass facades, glass roofs and solar panels. Dirt particles are actively decomposed and residues are washed ...off by the rain*

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TiO<sub>2</sub>  
Titan  
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## *Hydrophilic surfaces*

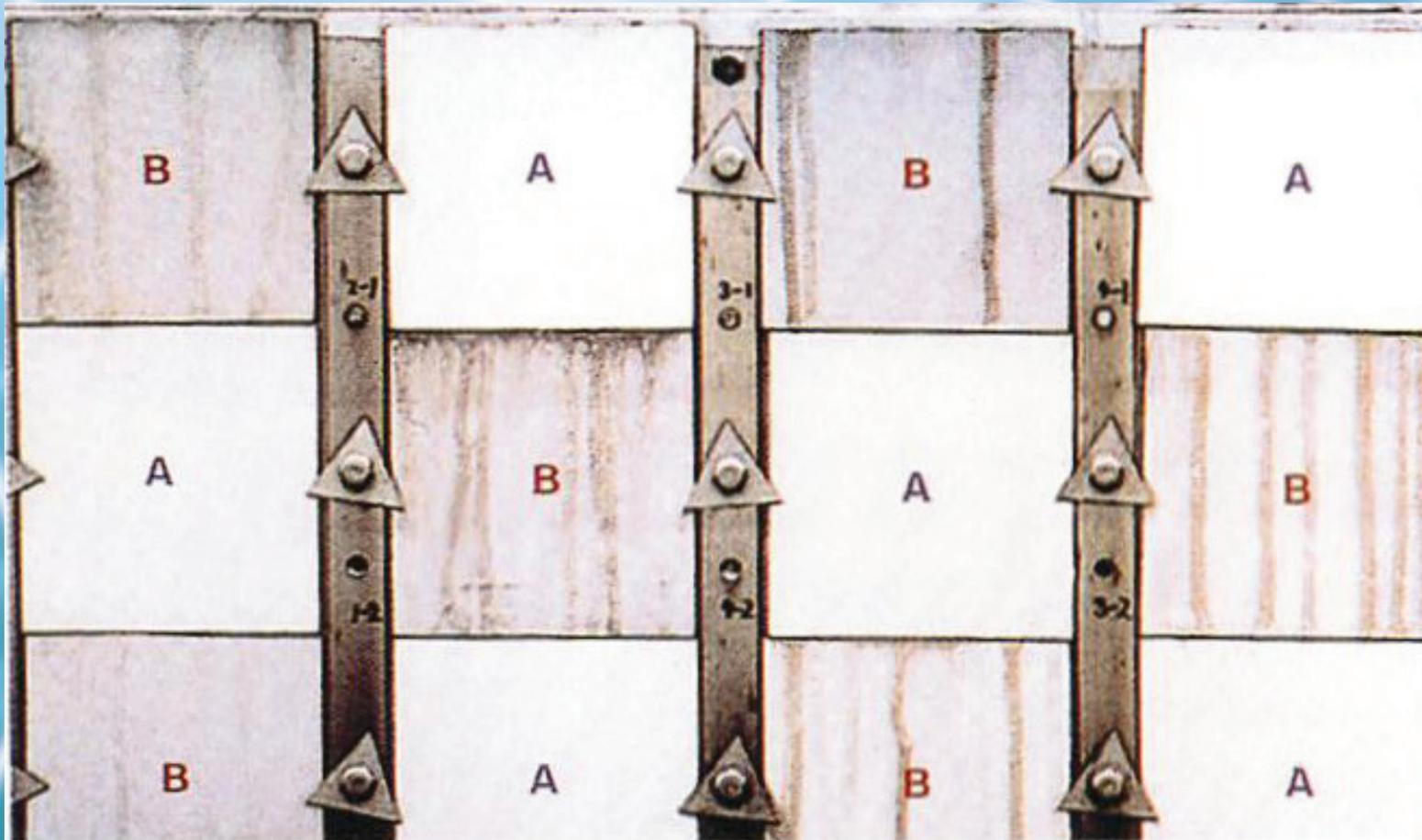
*TiO<sub>2</sub>-coated surfaces are superhydrophilic. This improves the self cleaning effect as well as the view in rain*

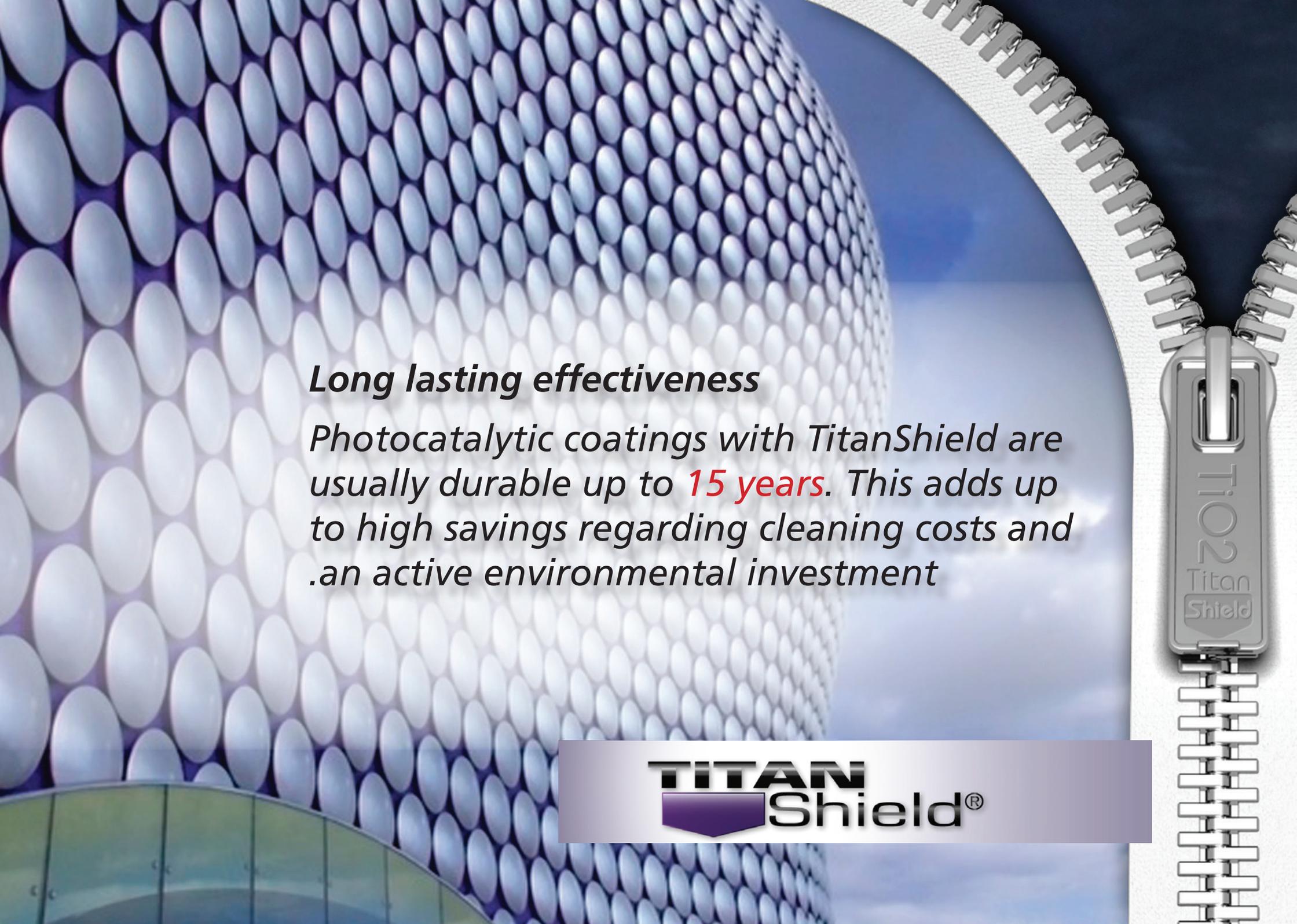


TiO<sub>2</sub>  
Titan  
Shield

## *Experimental setup*

*Coated (A) and uncoated (B) ceramic facade elements are exposed to usual inner city contamination by air pollution, nitrogen oxide and dirt*





***Long lasting effectiveness***

*Photocatalytic coatings with TitanShield are usually durable up to **15 years**. This adds up to high savings regarding cleaning costs and .an active environmental investment*

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***Antibacterial coatings***

*TitanShield coatings in hospitals and hygiene areas distinguish for their antibacterial and antiviral properties*

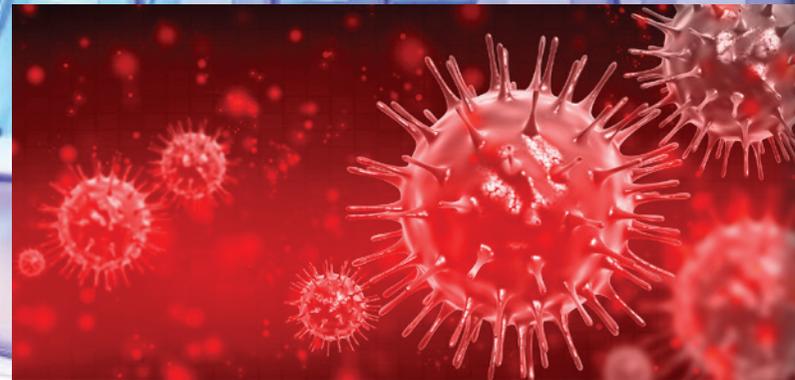
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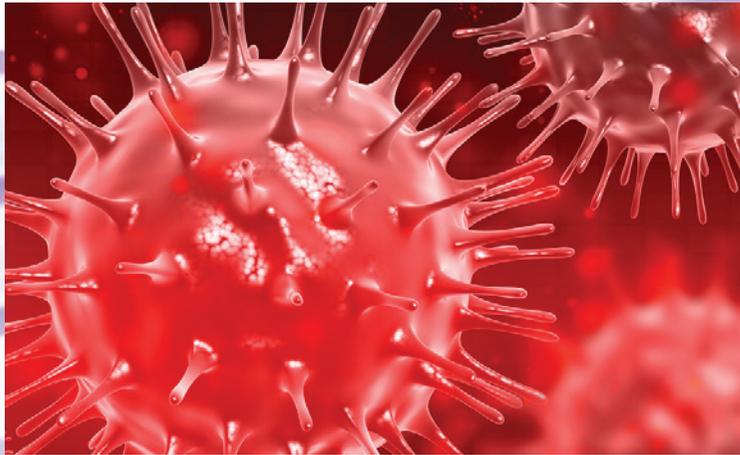


## *Versatile applications*

*In catering and canteen kitchens the coating  
with TitanShield offers many advantages  
Surfaces become antibacterial, fungicidal and  
dirt repellent. A special modification of our prod-  
uct is active even at a light intensity of 1000 Lux*

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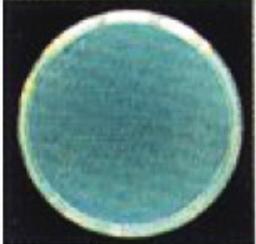
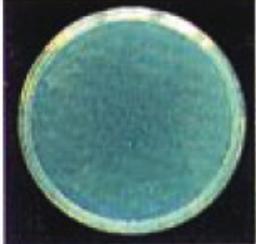
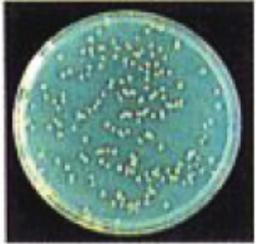


*The application of TitanShield in swimming pools saunas or on tanning beds is highly effective because of the antibacterial and germ-killing properties*

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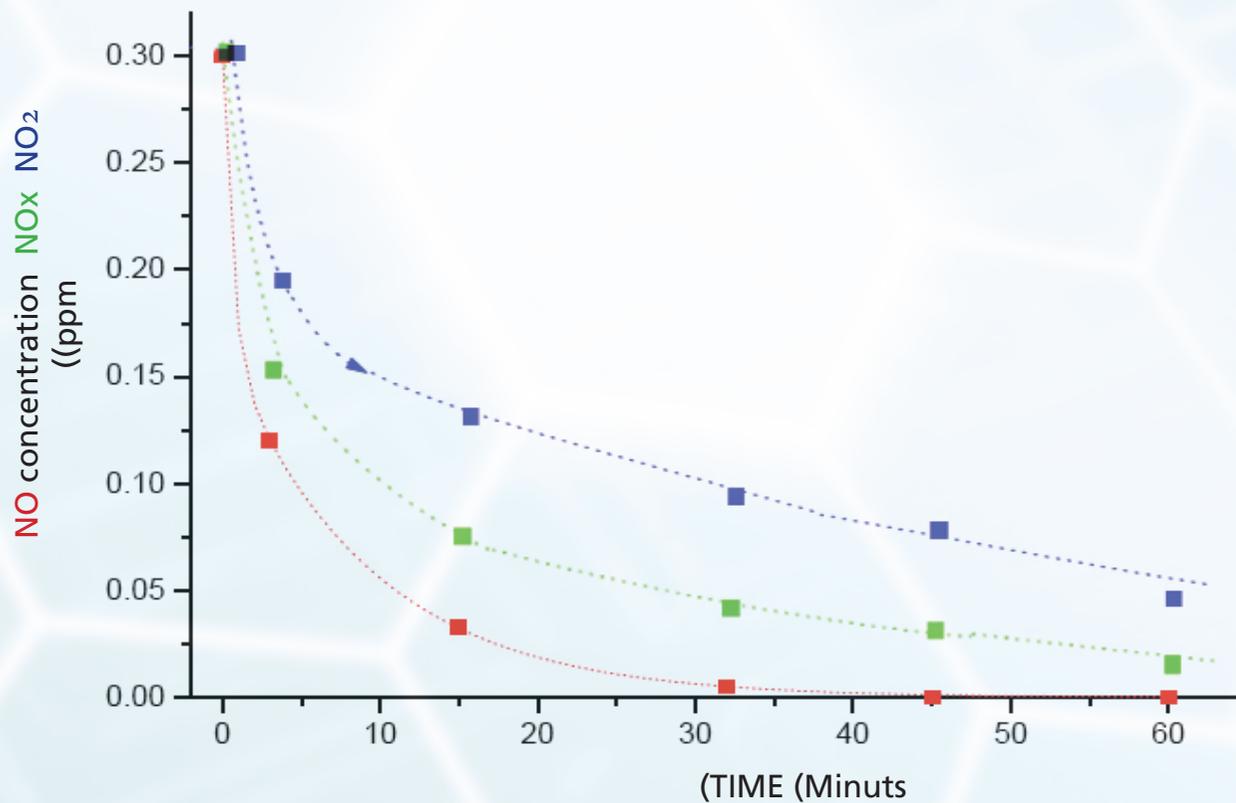
# Evidence of effectivity of a TitanShield coated surface regarding different bacteria cultures

	Uncoated tile	Photocatalytic coated tile (antibacterial)
	Illumination with (hour 1) Lux 1000	Illumination with (hour 1) Lux 1000
<i>E.Coli</i>		
<i>Methicillin Resistenz Staph. aureus (MRSA)</i>		
<i>Pseudomonas aeruginosa</i>		



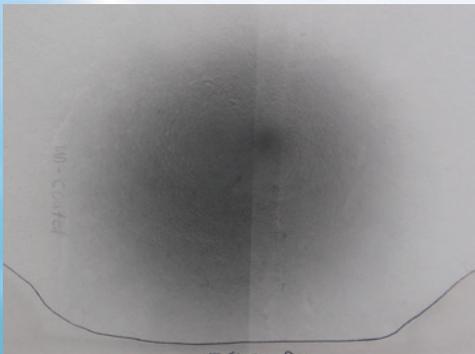
## Degradation of air pollutants within 60 minutes over a TitanShield coated surface

(NO<sub>x</sub> (nitrogen oxide  
(NO<sub>2</sub> (nitrogen dioxide  
(NO (nitrogen monoxide

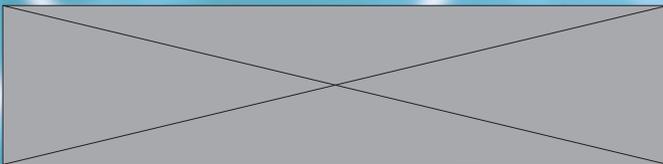
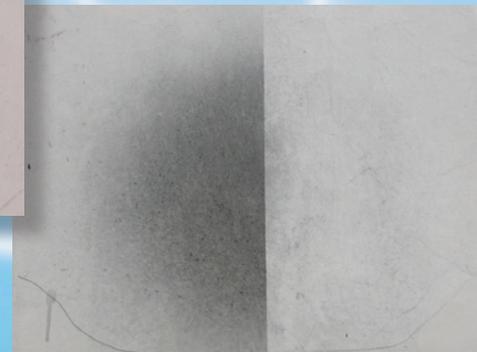




*Example of self cleaning properties:  
the surface is on one half coated with  
TitanShield, the other part covered  
(with soot pollution (respirable dust*



*Fotos after 1-30-60 days*





*This picture shows a wall that exhibits contaminations and weathering due to emissions and weather effects. The .marked area was prepared for the test*



*At first the area was thoroughly cleaned and one half coated with*



*Three months later it is perceived clearly that the uncoated cleaned side shows new contamination while the coated side .is as clean as on the day it was cleaned*



*European Experience*

*.In 2002, 7000 square meters of road surface in Milan, Italy, were covered with a catalytic Coating •*

*Residents reported that it was noticeably easier to breathe -with the concentration of nitrogen oxides at –  
. % street level cut by up to 60*

*More recently, Westminster borough of London cooperated with Mitsubishi Materials Corporation to pave •  
roads with TiO<sub>2</sub>*

*(containing paving stone (NOXER-*

*Under an intensity of UV light of 12 W/m<sup>2</sup>, an 80% NO<sub>x</sub> removal rate was achieved in the lab test (1 ppm –  
NO<sub>x</sub> ; the UV intensity of direct sunlight in*

*.(summer is 20-30 W/m<sup>2</sup>, compared to 1 W/m<sup>2</sup> on a cloudy winter day*

*(Euro PICADA (Photocatalytic Innovative Coverings Applications for De-pollution Assessment •*

*The 6-countries, 3.4 million Euro PICADA project is testing photocatalytic concrete streets and walls in urban –*

*.areas*

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***.Thanks a lot for your attention***

*Further information on TitanShield are found on our website at  
<http://www.titanshield.com>*

*Naturally, we are willingly available for questions and presentations*



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Keep our planet healthy...  
... we have nowhere else to go