

## Project:

Self-Cleaning and continuous protection of glass surfaces

## Industry:

Glass Manufacturing and Cleaning  
Direct Application without heat treatment process

## Product:

Water Based nanotechnology emulsion

## Key Benefits:

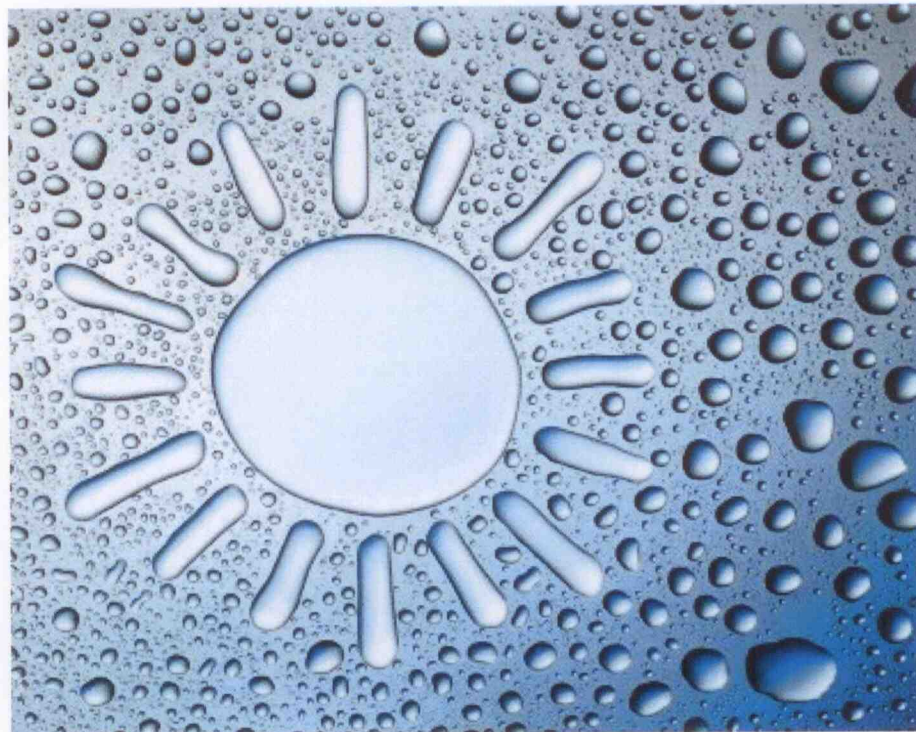
- Self Cleaning
- Antifogging
- Self Sterilizing
- Superhydrophilic
- Decomposes Odours
- Air purification
- Continuous Action
- Environmentally friendly cleaning technology

## Applications:

- Self-Cleaning of windows and mirrors
- Protection from organic stains
- Environmental Restoration
- Decomposes Pollutants
- Bacterial and Fungi Growth Inhibition
- Exhaust Gas Break-Down

## Packaging:

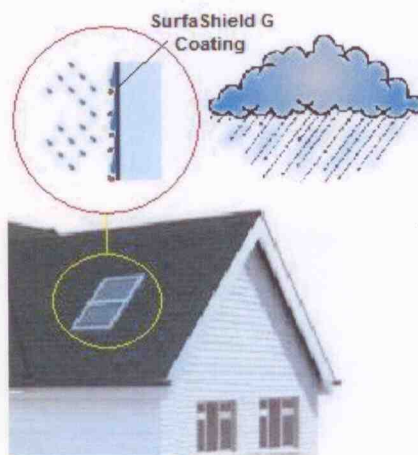
10L, 30L, 200L Barrels, 1000L IBCs



## SurfaShield® G

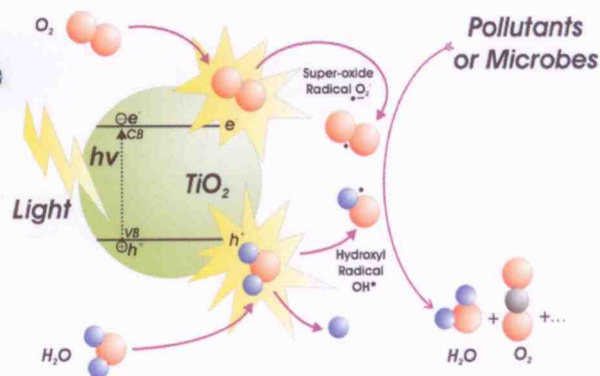
### Active Self-Cleaning Nanotechnology for the Protection of Glass Surfaces

SurfaShield G is a nanotechnology based emulsion especially designed for glass surfaces, without the need of energy consuming heat treatment steps. The nanoparticles are chemically bonded on the surface to assure abrasion resistance. SurfaShield treated glass becomes superhydrophilic and antifogging even without the aid of light. By harnessing the surrounding light (natural or artificial), modified glass surfaces become self-cleaning: They decompose organic material and deactivate any living microorganism. SurfaShield coated surfaces can efficiently eliminate organic stains, bacteria, fungi, gaseous pollutants, even odours. SurfaShield G modified surfaces are safer, without the use of hazardous chemicals or disinfectants. SurfaShield G is an active nano-shield on your favorite glass for a hassle free living environment.



SurfaShield coated glass. Surrounding light activates the SurfaShield nanoparticles.

SurfaShield® is a registered trademark of NanoPhos SA,  
PO Box 519,  
Science & Technology Park of Lavrio  
Lavrio 19500, Greece



Activation mechanism of a SurfaShield G nanoparticle. Producing cleaning and sterilizing scavenging radicals are decomposing pollutants or microbes.

**NanoPhos**  
Pioneering

### What is the nature of the SurfaShield G coating?

SurfaShield is a water based formulation consisted of a unique mix of inorganic oxides with titanium dioxide being the main component. The final coating creates a purely inorganic nanostucture that bonds on the surface of existing materials without thermal treatment. SurfaShield is a combination of material functionality and industrial applicability. The material demand comes from both large-scale (hospitals, outside coverings for multi-storey buildings, etc.) and private constructions (bathrooms, kitchens, etc.).

### How SurfaShield G is applied on glass surfaces?

An HVLP (High Volume Low Pressure) spraying deposition method has been chosen to combine both application simplicity and an ideal uniform functional coating. SurfaShield G is transparent, chemically inert and perfectly adheres on glass surfaces by chemically anchoring on the existing surface. Estimated consumption rate: 30-38 m<sup>2</sup>/L.

### How does it work?

SurfaShield G makes the glass surfaces superhydrophilic and antifogging. When the nanoparticles absorb the energy of the available surrounding light (natural or artificial) the surfaces act as self-cleaning and self-sterilizing. Through a series of physical phenomena justified from the nano-character of the SurfaShield coating, the energy is transferred to water and oxygen molecules, abundant in the environment. Both water and oxygen molecules are transformed to reactive, short-living radicals (hydroxyl and oxygen radicals respectively) that "attack" bacteria or organic stains within a range of 50 µm from the surface.

### What is the benefit for the treated surfaces?

SurfaShield promotes the transformation of energy in favor of cleanness and quality of life. It is never consumed or altered. The coating decomposes organic substances protecting the glass surfaces from stains and colorization by air pollutants. The most important advantage is the bacterial and fungal protection of your favourite glass surfaces! With the increased presence of microbial health hazards and other pollutants, the need to work and live in a clean environment is becoming more important than ever. SurfaShield also works as an air purifier as it decomposes harmful organic substances such as volatile organic compounds (VOC) and car exhaust fumes and nitrogen oxides (NOx). As a result your surfaces become safer, without the use of dangerous chemicals, and are preserved like new.

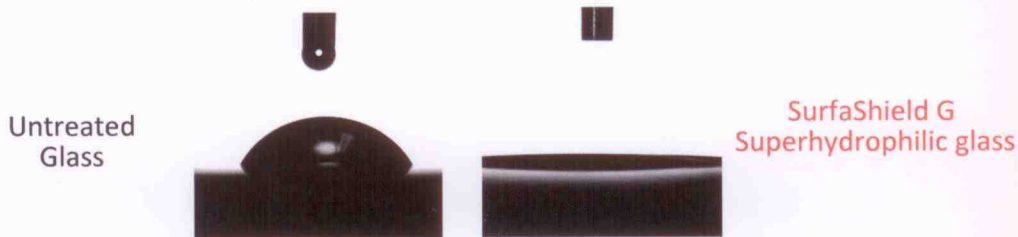
### SurfaShield G Tests

**Antibacterial test :** 88,6% bacteria colonies reduction within 4 hours

**Antifungal test :** 81,3% fungi colonies reduction within 4 hours

**Contact angle:** <5° (superhydrophilic)

**Photocatalytic Activity (Methyl Orange Test) Rate:** 1.5 x 10<sup>-5</sup> min<sup>-1</sup>



#### Application Note

The application surface should be dry and clean. Prior to application clean the surface with water or a solvent using a cloth. Apply SurfaShield G by HVLP spraying at a consumption rate of 30-38 m<sup>2</sup>/L. No dilution is required.

#### Physical Properties

Milky white, Water Suspension with slight odour and pH = 9-9,5.  
Boiling & Flash Point: 41°C  
Density: 0,98 g·cm<sup>-3</sup> Viscosity: 1,5 cP  
SurfaShield G is not considered an oxidant.

#### Safety & Storage

SurfaShield G contains no dangerous ingredients and it is water based. VOC Content: 136 g/L (EU limit (2010): 140g/L). Not hazardous according to Council Directive 1999/45/EC and its subsequent amendments. Request, read and comprehend the MSDS. Avoid freezing. Expiration Date: 18 months after the production date.



### What is Nanotechnology?

Nanotechnology refers to the scientific field, which deals with very small structures, usually sized below 100 nm. One nanometer (nm) is one billionth of a meter (10<sup>-9</sup> m) - it is so small that if earth were one meter in diameter, then one nanometer would have been the size of an apple! Nanosized materials reveal unique properties when compared to ordinary, bulk materials or even molecules.

### NanoPhos at a Glance...

At NanoPhos, we take advantage of the unique properties of nanotechnology and invent clever materials that solve every day problems. By harnessing nanotechnology, we seek to create a more comfortable, safe and trouble-free living environment. We transfer innovations out of our lab into the hands of consumers. Our vision is clear: "Tune the nanoworld to serve the macroworld" - in simple terms we make nanoparticles solve common problems. NanoPhos was recognized in January of 2008 by Bill Gates as one of the most innovative companies and also received the 1<sup>st</sup> prize for innovation at the prestigious 100% Detail Show in London. NanoPhos is a rapidly growing company that is actively expanding its distribution network. Currently, the company is present in the UK, Ireland, Norway, Sweden, Finland, Denmark, Portugal, Italy, Greece, Cyprus, Japan, K. of Saudi Arabia, K. of Bahrain, China, New Zealand, Australia and Mexico.

[www.NanoPhos.com](http://www.NanoPhos.com)