Project:
Corrosion inhibitor/shop primer

Product:
SurfaGuard® Metals

Key Benefits:
- Slows down rust formation
- Extends the lifetime of the metal till installation
- Application by dipping, brush or spraying
- Water-based (Low VOC)
- Cost-Effective

Applications:
- Reduces corrosion of ferrous (such as carbon steel, cast iron, galvanized steel and stainless steel) and non-ferrous surfaces (such as aluminum and zinc alloys)
- Corrosion inhibition of reinforcing steel bars
- Removes and passivates existing rust

Packaging:
1Kg, 5Kg, 12Kg, 35Kg Containers, 1200Kg IBC

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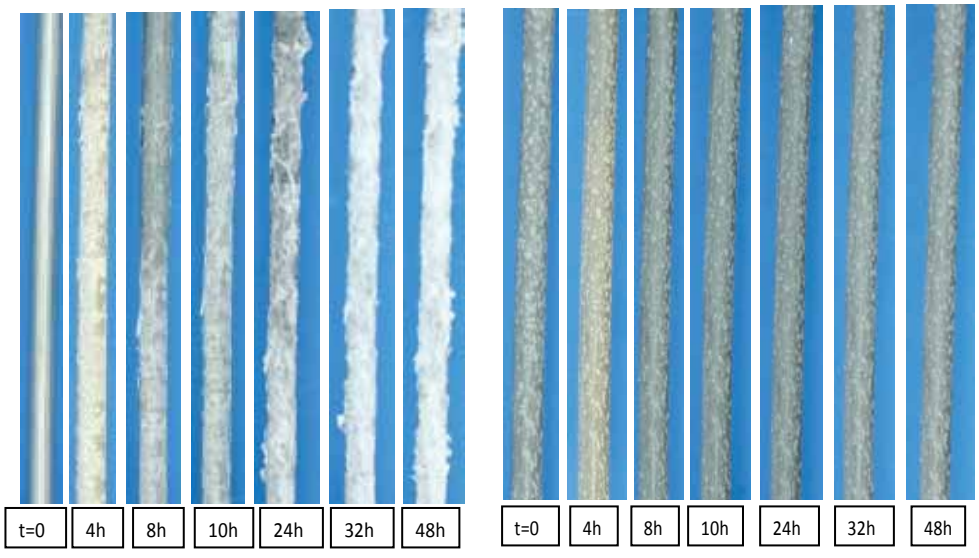
SurfaGuard® Metals

Corrosion inhibitor/shop primer for ferrous surfaces such as carbon steel, cast iron, galvanized (zinc plated) steel, stainless steel

SurfaGuard Metals is a water-based formulation that can be easily applied on metal surfaces to prevent corrosion. After application, double protection is achieved: The metal surface becomes passivated and a 3D nanoparticles network prevents corrosive agents to react with the metal. Thus, corrosion rate is decreased up to 10 times and the metallic gloss remains unchanged, even when exposed to a corrosive environment. SurfaGuard Metals can be applied easily by using a brush, a roller or dipping. SurfaGuard Metals modified surfaces can last longer and remain shiny!



Reference sample

SurfaGuard Metals treated sample

Photos from salt spray test in galvanised steel

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NanoPhos
Pioneering Nanotechnology

SurfaGuard Metals Description

SurfaGuard Metals is a water-based formulation which reacts with the metal surface (ferrous or non-ferrous) and inhibits the corrosion. The combination of nanoparticles and corrosion inhibitors results in the creation of an impermeable layer against humidity and oxygen. SurfaGuard Metals modifies chemically the metal surface to form a passive layer and the corrosive agents cannot contact with the metal surface. The application of SurfaGuald Metals in stainless steel helps to preserve its "gloss" and shiny appearance.

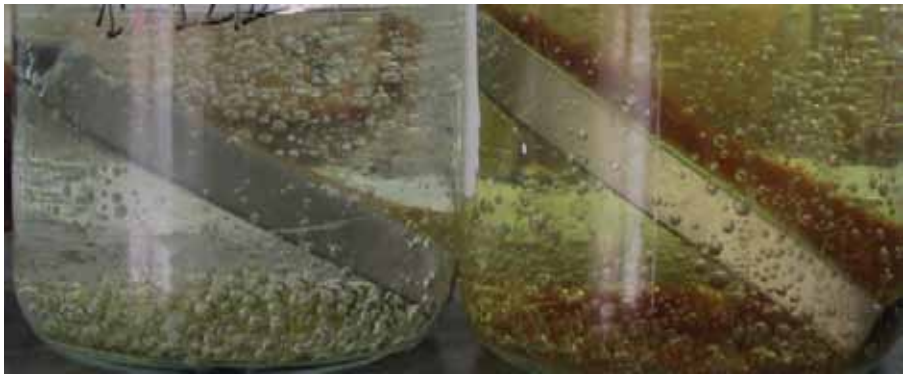
International Standards Testing

Immersion test: This test determines the time required for the appearance of corrosion spots on metal surface, when immersed in 3% sodium chloride solution. Reinforcing steel bars treated with SurfaGuard Metals withstands 280 hours of immersion without exhibiting corrosion signs.

Salt spray test (ASTM B 117-85): Evaluation of corrosion resistance of the SurfaGuard Metals treated galvanised steel panels is performed by subjecting them to an aqueous mist of 5% sodium chloride in a special chamber. The extent of corrosion spread along a scribe made on the panel, is a measure of the protective coating action or corrosion resistance. SurfaGuard Metals presented no signs of corrosion within 48 hours while the untreated corroded within 4 hours.

A.R.E. salt droplet test: This test evaluates the corrosion resistance of treated panels by determining the weight loss after five consecutive days exposure in humid conditions, inside a closed cabinet at room temperature. Seawater spraying promotes the strength of the corrosive environment. The loss in weight in SurfaGuard Metals treated panels is 0,18 g/m^2.

Electrochemical methods of testing: The corrosion resistance of the reinforcing steel bars was measured by means of Electrochemical Impedance Spectroscopy (EIS) in a 3,5%w/w sodium chloride solution. The calculated corrosion rate of the treated reinforcing steel bars is 0,043 mm/year.



Photos of SurfaGuard Metals treated and no treated stainless steel immersed in salt water with hydrogen peroxide

Application Note

Shake the container vigorously before use. The application surface has to be clean and dry. Clean the surface, prior to application, with an alkaline, acidic or neutral cleaner or solvent. Apply SurfaGuard Metals by a) immersing the metal for 3 - 10 minutes, or b) spraying for 1-3 minutes or c) brushing 2 coats using a brush or a roller. After removal of the application excess, curing takes place within 2 hours in ambient temperature.

Consumption: Estimated consumption rate 5-8 m^2/L, strongly dependant on the application method.

VOC (Volatile Organic Compounds): Maximun EU VOC content limit value (Directive 2004/42/CE) of the product in a ready to use condition (category A/i "One-pack performance coatings", Type WB): 140 g/L (2010). **Maximun VOC content of this product is 1g/L.**

Physical Properties

Water formulation with characteristic acidic odour. pH = 1.3±0.5. Density: 1.23±0.05 $g.cm^{-3}$ Viscosity (25^{o}C): 2cP.

Safety & Storage

Causes serious eye irritation. Causes skin irritation. Toxic to aquatic life with long lasting effects. Wash . . . thoroughly after handling. Avoid release to the environment. Wear protective gloves / protective clothing / eye protection / face protection. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice / attention. Avoid breathing dust / fume / gas / mist / vapours / spray. Use only outdoors or in a well-ventilated area.**Storage:** 18 months after the production date in closed package. Close the container cap firmly before storage.

What is Nanotechnology?

Nanotechnology refers to the scientific field, which deals with the research and creation of small matter particles, usually sized below 100 nm. One nanometer (nm) is one billionth of a meter (10^{-9} 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 and 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 2008 by Bill Gates as one of the most innovative companies and also received the 1st 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, Norway, Sweden, Denmark, Portugal, Spain, France, Italy, Greece, Cyprus, Egypt, Sudan, Saudi Arabia, Bahrain, UAE, Qatar, Oman, Iran, India, New Zealand, China, Japan, Mexico, Guatemala, Thailand, Malaysia and Singapore.

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NanoPhos SA has been approved by Lloyd's Register Quality Assurance to follow the EN ISO 9001:2000 Quality Management System and the environmental management system EN ISO 14001:2004 for the development, production and sales of chemical products for cleaning and protection of surfaces and nanotechnology products. Furthermore, it is certified for occupational health and safety management systems with OHSAS 18001:2007.

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