Project:
Corrosion protection

Industry:
Construction & Maritime

Product:
SurfaGuard® Metals

Applications:
- Protects ferrous metals (such as carbon steel, cast iron, galvanized steel and stainless steel), aluminum and zinc alloys
- Corrosion protection of reinforcing steel bars
- Passivates existing rust
- Prevents fretting corrosion

Key Benefits:
- Inhibits corrosion and rust formation even in extreme environments (e.g. marine, high temperature)
- Extends the lifetime of the metal
- Enhances adhesion with other coatings and cement
- Application by dipping, brushing or spraying
- No need for heat treatment
- Water-based (Low VOC)
- Cost-Effective

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

SurfaGuard® Metals

Corrosion protection and metal surface pretreatment for increasing paint adhesion. Applicable on carbon steel, cast iron, galvanized (zinc plated) steel, stainless steel and aluminum alloys

SurfaGuard Metals is a water-based, nanotechnology formulation that prevents corrosion and can be easily applied on metal surfaces. SurfaGuard Metals provides double protection: The metal surface becomes passivated and a 3D nanoparticles network prevents corrosive agents from reacting with the metal. Thus, the corrosion rate is decreased up to 10 times and preserves gloss on shiny metallic surfaces. Further, superficial layers of rust are passivated creating a shell against corrosion. At the same time, SurfaGuard Metals prepares the metallic surface for paint application as the adhesion of a polymer coating is enhanced.

Passes 250 hours of Salt Spray Test

The treated surfaces with SurfaGuard® Metals (side up) does not show rust

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What is the nature of SurfaGuard Metals?

SurfaGuard Metals is a water-based, nanotechnology emulsion which reacts with the metal surface and protects it from corrosion. The combination of nanoparticles and corrosion inhibitors results in the creation of an impermeable layer against humidity and oxygen.

How does it work?

SurfaGuard Metals chemically modifies the metal surface to form a passive layer and creates a 3D protective network of nanoparticles that "blocks" the transfer of oxygen and water from reaching the metal. As a result, the metal surface remains passivated and a barrier is created against corrosive agents.

How is SurfaGuard Metals applied on metal surfaces?

Before the application of SurfaGuard Metals the substrate has to be clean, free of contaminants such as oils, greases, waxes and corrosion by-products. The metal can be immersed in SurfaGuard Metals emulsion for 3-10 minutes. Alternatively, it can be applied by spraying 2 coats or 2 coats by brush or roller. After removal of the application excess, curing takes place within 2 hours in ambient temperature.

What is the benefit for treated surfaces?

SurfaGuard Metals creates a protective surface preventing humidity and oxygen to come in contact with the metal. The structure created on the molecular level of the surface increases the adhesion of polymer coatings. Therefore, metal paints will remain on the metal surface unaffected for a longer period of time. The application of SurfaGuard Metals on 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 the metal surface, when immersed in 3% sodium chloride solution. Reinforcing steel bars treated with SurfaGuard Metals withstand 280 hours without exhibiting corrosion. **Salt spray test:** Evaluation of corrosion resistance of SurfaGuard Metals treated panels is performed by subjecting them to a salt mist of 5% sodium chloride. The extent of corrosion spread along a scribe made on the panel, rated after ASTM B 117-85 specifications, is a measure of the protective coating action or corrosion resistance. SurfaGuard Metals passes 250 hours of testing. **Humidity test - ASTM D 224:** The SurfaGuard Metals treated panels is subjected to high humidity conditions (90-95% relative humidity) at elevated temperatures (42-48 ^{O}C). This test method evaluates the treatment cohesion against corrosive factors. SurfaGuard Metals treated panel remain unaffected, even after exposure for 1000 hours. **A.R.E. salt droplet test:** This test evaluates the corrosion resistance of the treated panels by determining the loss in weight after five consecutive days of exposure in humid condition, inside a closed cabinet at room temperature. Seawater spraying promotes the strength of the corrosion 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 sodium chloride solution which constitutes the most corrosive environment for metals and the chosen salt concentration is 3.5%w/w. The calculated corrosion rate of the treated reinforcing steel bars is 0.043 mm/year.

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 12g/L.

Application Note

Surface Application: Shake or stir the container before use. The application surface has to be clean and dry. Prior to application clean the surface with a cleaner or solvent. Apply SurfaGuard Metals by: a) immersing the metal for 3 - 10 minutes, or b) spraying 2 coats generously, or c) applying 2 coats by brush or roller. Remove excess of the material after application and let the material to dry and cure (up to 2 hours at ambient temperature).

Consumption: Estimated consumption rate 5-8 m²/L, strongly dependant on the application method.

Storage: 24 months after the production date in closed package. Close the stopper after the use.

Physical Properties

Water suspension with characteristic odour. pH = 1.2-1.4. Density: 1.23 g•cm^{-3} Viscosity (25^{O}C): 2cP.

Safety

C Corrosive N Dangerous to the environment

Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Keep locked up and out of the reach of children. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protection clothing, gloves and eye/face protection. In case of accident or if you feel unwell (show the label where possible). This materials and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheet.

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^{-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 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 1st prize for innovation at the prestigious 100% Detail Show in London. SurfaShield technology, received the prestigious GAIA award at the 2010 International Building and Construction Show BIG5 in Dubai for its environmentally friendly and innovative profile.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.

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NanoPhos SA has been approved by Lloyd's Register Quality Assurance to follow the EN ISO 9001:2008 Quality Management System and EN ISO 14001:2004 Environmental Management System for the production and sales of chemical products for cleaning and protection of surfaces and nanotechnology products.

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