Project:
Water-proofing of porous clay based surfaces

Industry:
Building & Construction, Roof tile, Pottery and Cotto tile manufacturing

Product:
SurfaPore R

Key Benefits:
- Most Effective & Nano Based
- High Breathability
- Not Film Forming, Invisible
- Long Lasting & UV Resistant
- Easy Application on Surface or by dipping
- Water based
- Environmentally friendly
- Cost Effective

Applications:
- Roof tiles water repellent
- Prevents frost threat
- Prevents mould growth
- Prevents efflorescence and white spot development
- Protects pottery
- Protects absorptive cotto tiles

Packaging:
1L, 4L, 30L Containers, 1000L IBCs

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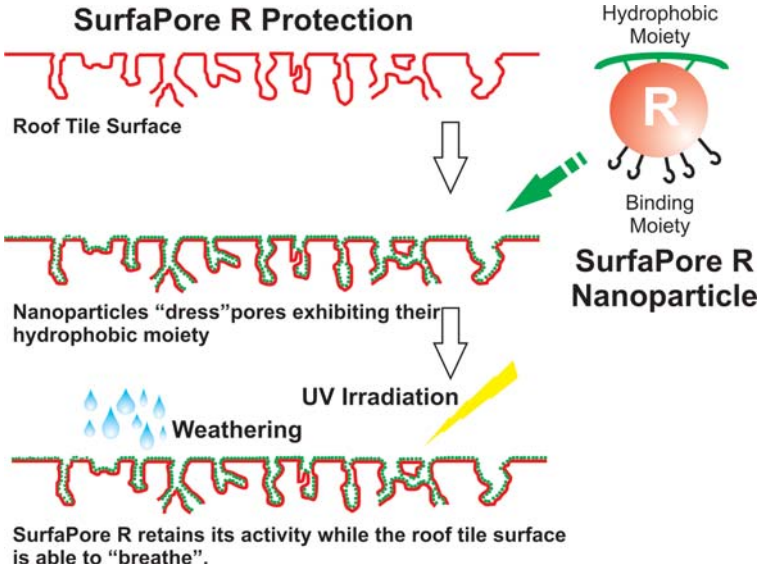
SurfaPore® R

Nanotechnology for any clay based surface such as roof tiles, cotto and pottery.

SurfaPore R protects your clay surfaces from water penetration. Roof tiles and pottery are effectively protected from deterioration and from the unsighly "greening" of mould growth. SurfaPore R preserves the aesthetics of your clay surfaces while protecting them against water and ageing. SurfaPore R was designed to exactly "fit" the unique nature, structural and surface properties of clay based materials. After applying SurfaPore R, your clay surfaces repel water and can remain dry even after rain. By excluding water, you will protect your roof tops and favourite clay based surfaces from "greening" and cracking, due to frost!



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NanoPhos
Pioneering Nanotechnology

SurfaPore R Description

SurfaPore R is a water based emulsion, composed of nanoparticles possessing three molecular regions: (a)The core nano-sized region, suitably engineered to fit the pores of a clay-based surface, (b) The hydrophobic moiety, attached on top of the core nanosized region, responsible for the creation of a continuous hydrophobic layer, and (c) The binding moiety, responsible for anchoring the nanoparticle directly onto the clay surface.

Most traditional sealers are based on "plastic polymers" or small silicon based molecules (most often corrosive Potassium Methyl Siliconate, PMS) that react with atmospheric carbon dioxide to create a water barrier. Even though their action might initially appear effective, they detrimentally diminish the useful life time of clay based products by restricting their breathing ability or by creating efflorescence white spots. The use of such traditional sealers affects the three most important advantages of clay products: (a) their compatibility with modern construction requirements for breathable materials, (b) their endurance, and (c) their aesthetic perfection.

NanoPhos introduces a new approach against covering clay surfaces with polymerizing additives. SurfaPore R coats the pores, the capillaries and the "free" surface with hydrophobic nanoparticles, protecting your favourite roof tiles while allowing them to breathe. The action of SurfaPore R nanoparticles is simple in conception, but extraordinary in use. Clay based materials expose their hydroxyl terminated surface to the deteriorating effects of weathering, UV radiation and water. Upon application of SurfaPore R, nanoparticles identify the hydroxyl groups and anchor on them. Anchoring is completed in 24 hours after application revealing the hydrophobic moiety of the nanoparticles. So, instead of suffocating your clay surface, we coat it with a hydrophobic dress!

International Standards Testing

Water Absorption: Results are based on laboratory testing of roof tiles samples provided by three independent roof tiles manufacturers: A, B & C. Water absorption is calculated after 24h of immersion in a water bath and expressed as %w/w: Manufacturer A, Without SurfaPore R: 13,66% With SurfaPore R: 0,53%. Manufacturer B, Without SurfaPore R: 5,26% With SurfaPore R: 0,54%. Manufacturer C, Without SurfaPore R: 7,79% With SurfaPore R: 0,84%. **Stability under Ultra Violet (UV) Irradiation:** Test samples were tested in a QUV chamber to evaluate direct sunlight stability and effectiveness. At least 10 samples were tested. Each treated sample was left to dry for 24h. Comparison was performed with the UK solvent based water repellent market leader. Contact angle is indicative for effective water beading and water exclusion:

	SurfaPore™ R	Competitive Silane/Siloxane
0 hours in QUV	137°	140°
500 hours in QUV	103°	87°
1000 hours in QUV	97°	56°
1500 hours in QUV	105°	38°

ISO EN 1015-18 Capillary Coefficient Determination: Capillary Coefficient C (g/(dm2.min1/2)) determination values are reciprocal to the water absorption ability. C values below 0.11 are considered effective water protection. Values below 0,07 have been achieved by surface application. **Water Vapour Permeability Loss:** Water Vapor Permeability was determined as the rate of water vapors "travelling" through a 2cm thick clay, roof tile sample. Vapor Permeability Loss: 4,94% (surface application).

Application Note

Surface Application: The application surface should be dry and clean. Apply SurfaPore R by brush, roller or spraying. No dilution is required. On very absorptive surfaces re-apply within 3 hours. **Dipping:** Dip the clay based object in SurfaPore R for 30 seconds. In any case (surface application or dipping) test results on a small area before full scale application. Maximum water repellency is achieved 24 hours post application. **Consumption:** Estimated consumption rate 9-11 m²/L, strongly dependant on the properties of the surface applied.

Physical Properties

Milky White, Water Emulsion with slight odour and pH = 7,1.
Boiling & Flash Point: >100°C
Auto Ignition Point: >100°C
Density: 1,01 g.cm^{-3} Viscosity: 15 mPa.s
SurfaPore R is not considered an oxidant.

Safety & Storage

SurfaPore R contains no dangerous ingredients and it is water based. VOC Content: 20g/L (EU limit (2010): 40g/L). Not hazardous according to Council Directive 1999/45/EC and its subsequent amendments. Request, read and comprehend the MSDS. Avoid freezing. Expiration Date: Two years 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^{-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! Nano-sized 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. 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, Greece, Cyprus, Poland, Saudi Arabia and Australia.

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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 for the development, production and sales of chemical products for cleaning and protection of surfaces and nanotechnology products.

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