BUILDING TRUST

PRODUCT DATA SHEET

Sika® FerroGard®-903

Penetrating, bipolar corrosion inhibiting, impregnation coating for hardened concrete

DESCRIPTION

Sika® FerroGard®-903 is a surface applied bipolar corrosion inhibitor, designed for use as an impregnation of steel reinforced concrete. It is designed to penetrate the surface and then to diffuse in vapor or liquid form to the steel reinforcing bars embedded in the concrete. Protection with Sika® FerroGard®-903 both delays the start of corrosion and reduces the corrosion rate. Corrosion protection with Sika® FerroGard®-903 increases the service and maintenance life cycles by up to 15 years when used as part of a complete Sika® Concrete Repair and Protection System.

How it works

Sika® FerroGard®-903 is based on organic and inorganic inhibitors that protects both the anodic and cathodic parts of the corrosion cell. This dual action effect dramatically delays the initiation of corrosion and greatly reduces the overall corrosion activity. Sika® FerroGard®-903 penetrates the concrete and forms a protective monomolecular layer on the surface of the reinforcing steel. This barrier inhibits corrosion of the steel caused by the presence of chlorides as well as by carbonation of concrete.

USES

- For the corrosion protection of steel reinforced concrete, prestressed, precast, post tensioned or marine concrete structures above and below the ground
- As a corrosion control treatment for undamaged reinforced concrete where reinforcing steel is corroding, or is at risk from corrosion due to the effects of carbonated or chloride contaminated concrete
- Steel-reinforced concrete, bridges and highways exposed to corrosive environments (deicing salts, weathering)
- Sika® FerroGard®-903 is especially suitable for extending the service life of aesthetically valuable fair-faced concrete surfaces such as historic structures

CHARACTERISTICS / ADVANTAGES

- Suitable for method 11.3 (applying inhibitor to the concrete) for Principle 11 (anodic control), EN 1504-9
- Does not change the appearance of the concrete structure
- Does not alter the water vapour diffusion properties of concrete
- Long term protection and durability
- Can be applied to the surface of existing repairs and to surrounding areas to prevent the development of incipient anodes
- Protects both, cathodic (principle 9) and anodic (principle 11) zones of reinforcing steel
- Can be applied where other repair/prevention options are not viable
- Easily applied by either spray or roller to all existing reinforced concrete.
- Economic extension of the service life of reinforced concrete structures
- Penetration depth can be tested on site using the Sika “Qualitative Analysis Test”

APPROVALS / STANDARDS

- BRE, The use of surface applied Sika® FerroGard®-903 corrosion inhibitor to delay the onset of chloride induced corrosion in hardened concrete, BRE Client Report No. 224-346, 2005
- Mott MacDonald, Evaluation of Sika® FerroGard® 901 and 903 Corrosion Inhibitors, Ref. 26’063/001 Rev A, April 1996.
- SAMARIS (Sustainable and Advanced Materials for Road Infrastructure) - Final Report, Deliverables D17a, D17b, D21 & D25a, Copenhagen, 2006
- Mulheron, M., Nwaubani, S.O. , Corrosion Inhibitors for High Performance Reinforced Concrete Structures, University of Surrey, 1999
- C-Probe Systems Ltd., Performance of Corrosion Inhibitors in Practice, 2000
- Wolfseher & Partner, Materials Technological Investigation, Report No. 96.144.11 and Report No. 98.115.11.

PRODUCT INFORMATION

Chemical base	Amino alcohol and inorganic combination
Packaging	20 kg container
Shelf life	12 months from date of production
Storage conditions	Store properly in undamaged and unopened, original sealed packaging. Store in a cool environment.
Appearance / Colour	Colourless to Pale yellow liquid
Density	~ 1.14 kg/L (at +20 °C)
Viscosity	~ 25 Cps
pH-value	> 8

TECHNICAL INFORMATION

Penetration depth

Site surveys and experimental tests have shown that Sika® FerroGard®-903 can penetrate through concrete at a rate of a few millimetres per day and to a depth of approximately 25 to 40 mm in 1 to 2 months. This penetration rate can be faster or slower dependent on the porosity of the concrete. Sika® FerroGard®-903 penetrates through both liquid and vapour phase diffusion mechanisms.

Note: If after application of Sika® FerroGard®-903, the concrete surface is coated with protective coatings (cement based, acrylic or impregnation) or hydrophobic impregnation, the rate of diffusion of the inhibitor is reduced but not stopped as the mechanism of diffusion liaises then only on the vapour phase.

As concrete quality and permeability differ, it is recommended to perform some preliminary depth profile testing by the Sika “Qualitative Analysis” to assess the specific penetration rate.

SYSTEM INFORMATION

System structure

Sika® FerroGard®-903 is part of the Sika® Concrete Repair & Protection Systems:

Repair system	Sika MonoTop® or SikaTop® mortars
Reinforcement corrosion control	Sika® FerroGard®-903
Concrete protection	Sikagard® Coatings and or Sikagard® Hydrophobic Impregnations

APPLICATION INFORMATION

Consumption	Generally ~ 0.500 kg/m² For very dense concrete with low permeability, the rate of application of Sika® FerroGard®-903 can be reduced but must not be lower than 0.300 kg/m². To assess project requirements, consumption and depth of penetration shall be checked on site using the Sika “Qualitative Analysis” – refer to the relevant method statement.
Ambient air temperature	+5 °C min. / +40 °C max.
Substrate temperature	+5 °C min. / +40 °C max.

BASIS OF PRODUCT DATA

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

IMPORTANT CONSIDERATIONS

- Do not apply when rain or frost is expected, protect from rain for at least 6 hours at +20 °C.
- The following construction materials have to be protected from splashes of Sika® FerroGard®-903 during application:
  - Silicone rubber
  - Flexible PVC
  - Epoxy and PU based material
  - Aluminium, copper & galvanised steel
  - Timber
- If the product is applied next to natural stones, it may be necessary to protect them from splashes as some discoloration may occur.
- Visible concrete defects (spalling, cracks etc) must be repaired using conventional repair methods (removal of contaminated concrete, treatment of reinforcement, reprofilling etc.).
- Alternatively to the method described above, Sika® FerroGard®-903 can be applied after repair works (but not overlay) has been carried out (after hardening of the repair material) – freshly repaired area might not need to be treated with the inhibitor. If this is nevertheless done, lower diffusion is then expected at the zones that were repaired.
- Typical maximum chloride content at rebar level is 1 % by weight of cement of free chloride ions (corresponding to 1.7 % of sodium chloride). Above this limit, according to site conditions and level of corrosion activities, increased consumption of Sika® FerroGard®-903 can be considered. Trials and corrosion rate monitoring to confirm consumption and effectiveness shall be carried out.
- If chlorides are already present near the reinforcement bars, concentration of Sika® FerroGard®-903 at rebar level shall be minimum 100 ppm when measured by ionic chromatography to provide efficient protection. Detailed method available upon request.
- Do not apply in tidal zones or on substrates saturated with water.
- Dependent on substrate conditions, the application of Sika® FerroGard®-903 may lead to a slight darkening of the surface. Proceed with preliminary testing.
- Avoid application in direct sun and/or strong wind and/or rain.
- Do not apply to concrete in direct contact with drinking water.
- All surface treatments are to be carried out using cold potable water.

ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY / PRE-TREATMENT

The concrete shall be free from dust, loose material, surface contamination, existing renders, laitance, coatings, oil and other materials which reduce or prevent penetration.
If the substrate is to be over-coated, the surface profile shall be sufficient to provide the required adhesion.
De-laminated, weak, damaged and deteriorated concrete shall be repaired using Sika MonoTop®, SikaTop® or Sika® site batch mortars.
For fair-faced concrete or concrete to be further over-coated by coatings or hydrophobic impregnation, water blast the concrete surface with pressure (upto 18 MPa – 180 bars).
For concrete surface to be further over-coated by cementitious material, roughen the surface using suitable abrasive blast cleaning techniques or high pressure water-blasting (upto 60 MPa – 600 bars).
For optimum penetration the substrate shall be allowed to dry out prior to the application of Sika® FerroGard®-903.

APPLICATION

Sika® FerroGard®-903 is supplied ready for use and must not be diluted. Do not shake the material prior to use. Following transportation, some foam may appear in the pail - this does not affect the performance of the product.
Sika® FerroGard®-903 shall be applied to saturation by brush, roller, low pressure or airless spray equipment.
After the application of the last coat, as soon as the surface become mat, do a low pressure water cleaning (water hose).
The day after application, the treated surfaces shall be cleaned by pressure washing (~ 10 MPa – 100 bars) to remove any traces of soluble salts that may have deposit at the surface.
To improve penetration speed, concrete treated with Sika® FerroGard®-903 may be dampened once or twice for 1 - 3 days after application.

Number of coats:
This is dependent on the porosity and moisture content of the substrate and the weather conditions, normally 3 to 5 coats are necessary to achieve the required consumption.

Waiting time between coats:
This is dependent on the porosity of the concrete and the weather conditions, normally 30 minutes to a few hours to allow the surface to dry between coats. Allow the surface to dry out between coats to a matt damp appearance.

Overcoating with coatings:
Two days (or later) after the application of Sika® FerroGard®-903, the treated surfaces must be washed down once or twice with water and allowed to dry for

at least 3 days.
Then clean the surface thoroughly by water jet (100 - 150 bars) and allow drying for a further 3 days.
If the application is carried out as described above, no further treatment is required before overcoating with Sikagard® hydrophobic impregnations, Sikagard® breathable coatings or Sikafloor® products (Refer to appropriate Product Data Sheet for application details).
If non Sika coatings are to be applied, please contact the manufacturers technical department for confirmation of compatibility with Sika® FerroGard®-903 or undertake compatibility and adhesion site trials.

Overcoating with cementitious products:
Allow areas treated with Sika® FerroGard®-903 to dry for a couple of days.
Rinse treated surface with high-pressure water jet (~ 100 - 150 bars). As a bonding agent for cementitious repair systems, only SikaTop® Armatec-110 Epocem® is to be used (follow the information in the product data sheet).
When Sika® FerroGard®-903 is used within a patch repair or before a cementitious overlay, Sika repair or overlay system can be used. Standard preparation (pre-wetting) shall be applied. When using a smoothing coat/pore filler over surface treated with Sika® FerroGard®-903, products such as SikaTop®-122 HS, Sikagard®-720 EpoCem® IN, Sika MonoTop®-122 F, SikaTop®-Seal 107 IN, etc. can be used. Cementitious levelling mortars shall only be used if there is a well prepared open textured surface that is completely cleaned of residue.
If other Sika cement based products are to be used, site trials are recommended to confirm preparation and suitability.
If non Sika cement based products are to be used, please contact the manufacturer technical department for confirmation of compatibility with Sika® FerroGard®-903 or undertake compatibility and adhesion site trials.

CLEANING OF TOOLS

Use water to clean application equipment.

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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