



Protectosil® Corrosion Control



Protectosil®

The global brand for building protection.

Corrosion Control with Protectosil®

Long life and low maintenance costs for steel-reinforced concrete structures

Whether in buildings, bridges, or parking garages, steel-reinforced concrete structures represent a major portion of private and public investments. This makes it all the more important to prevent corrosion of the rebars, which could undermine the mechanical stability of the structure. To prevent corrosion, you must stop water and chloride ions from penetrating into the building material.

Protectosil® CIT is a special silane-based corrosion inhibitor system from Evonik. Protectosil® CIT molecules penetrate deep into the structure and bind chemi-

cally to the building material. But one more feature rounds out its special ability to reduce corrosion: Protectosil® CIT interrupts the electrolytic current that ultimately leads to corrosion.

This scientifically proven corrosion control makes Protectosil® CIT the product of choice for repairing structures that have already been affected by corrosion. In new reinforced concrete structures, Protectosil® CIT can, of course, considerably prolong the life of the structure and improve its resistance to corrosion, right from the start.



Protectosil® CIT Suppresses the Corrosion Mechanism

Damage to reinforced concrete structures often begins when water and chloride ions penetrate into the material of the structure. Particularly under harsh weather or environmental conditions, penetrating water can trigger damage by de-icing salt or salt-wedging. Through hydrogen bonding, water is relatively firmly bound in the pore spaces of concrete, acting as the transport medium for chloride ions. If these ions reach the steel reinforcement, corrosion sets in.

Protectosil® CIT counteracts both these mechanisms:

- The special composition of Protectosil® CIT interrupts the electrolytic current, reducing corrosion and rust formation.
- Protectosil® CIT provides particularly deep-acting protection against penetrating water and effectively prevents chloride ions from reaching the rebars.



Protectosil® DRY CIT Offers Perfect Corrosion Protection.

Even in cases where the concrete cover is very thin.

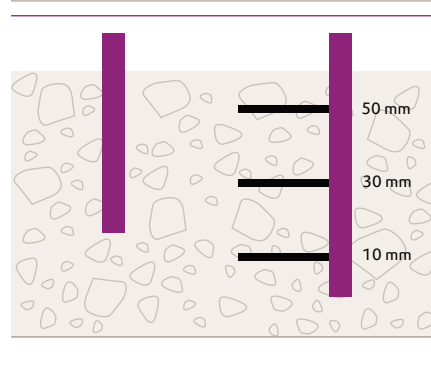
External test at SGK
(Swiss Society for Corrosion Protection)

Test cycles (wet / dry cycles)

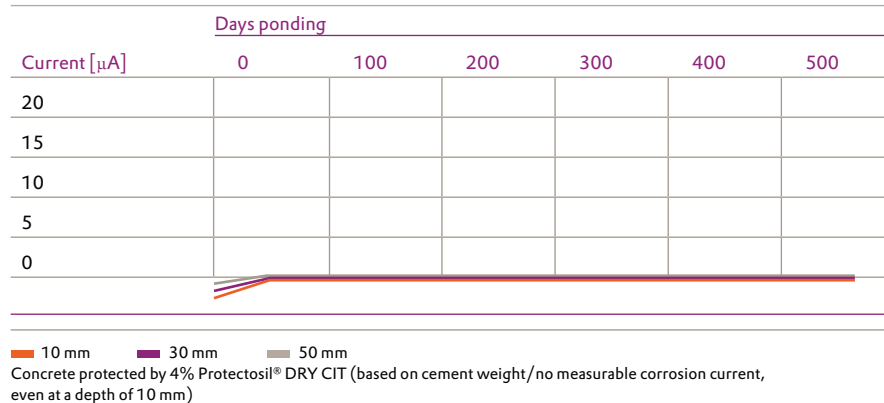
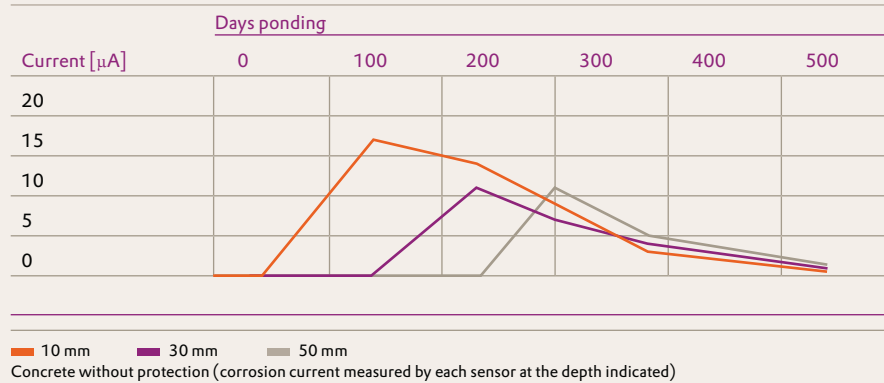
- 5 days dry at 35°C and
- 2 days ponding in NaCl Solution.
- overall period of testing: 520 days.

520 days of testing are equivalent to at least 35 years outside weathering.

Test specimen (cross-section)



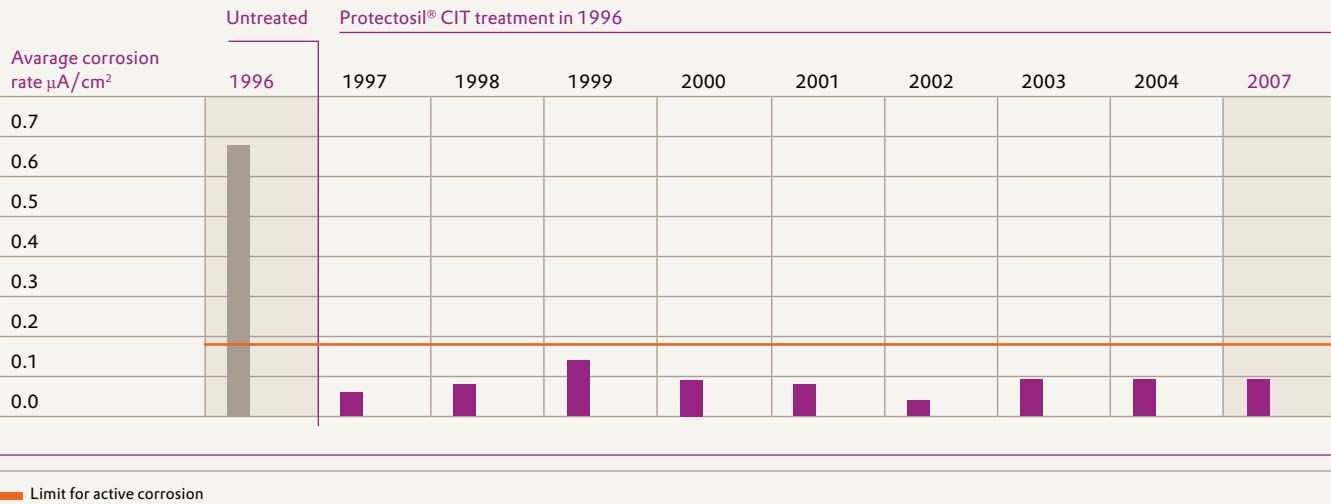
■ Electrodes ■ Sensors ■ Concrete



In the graphs above, the ponding time of the test specimens is plotted against the current measured between the electrodes. The onset of corrosion is characterized by an observable rise in

current on the sensors. With 4 w% Protectosil DRY CIT, perfect corrosion protection is observed, even when the concrete cover is only 10 mm thick.

Protectosil® CIT effectively halted corrosion in a parking garage for over 11 years!



Case Study: Monroe County Parking Garage

Conditions in parking garages are conducive to corrosion. In 1996, corrosion current measurements were carried out for a parking garage in Monroe County, Pennsylvania. The results indicated a high probability of damage, so Protectosil® CIT was used during the renovations performed in the same year. Annual tests carried out since 1996 prove that even in a building already considerably affected by corrosion, one-time application of Protectosil® CIT can strongly inhibit further corrosion.



Mass Modification with Protectosil® DRY CIT

Protectosil® DRY CIT is a free-flowing powder

Protectosil® DRY CIT is the first solid mass modifier for corrosion protection for concrete. As a free-flowing powder, it is easily dispersible in concrete mixtures and does not influence the color and the surface appearance of concrete. It is innocuous according to the German Chemicals Law (ChemG) and reduces the uptake of water significantly. Furthermore, Protectosil® DRY CIT modified mortars show excellent wetting properties during processing.

This scientifically proven corrosion control makes Protectosil® DRY CIT the product of choice for repairing structures that have already been affected by corrosion. In new reinforced concrete structures, Protectosil® DRY CIT can, of course, considerably prolong the life of the structure and improve its resistance to corrosion, right from the start.

Protectosil® DRY CIT improves the quality of various products

Manufacturers of precast concrete parts: Use as corrosion inhibitor for structural concrete as replacement for calcium nitrite or amino-based admixtures.

Cement manufacturers: Use as additive for ready-to-use cement products, for anti-corrosion and hydrophobic properties (reduction of water uptake).

Manufacturers of repair mortar: 25 kg bags of dry concrete with a latex polymer added (ready-to-use formulation, only addition of water and mixing is necessary, high-end segment of market, especially in case of fast-curing products). Integral additive for concrete blocks (for facades), substitution for currently used stearates.



Performance

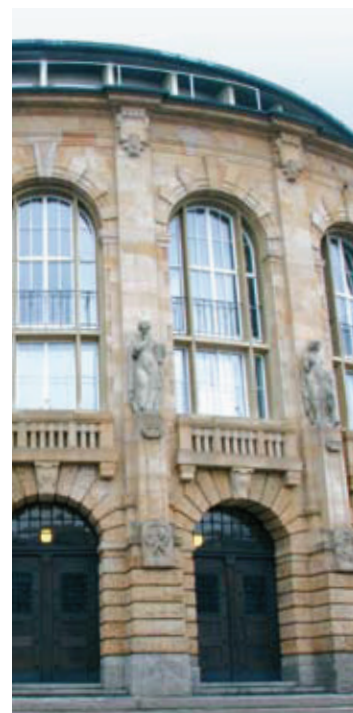
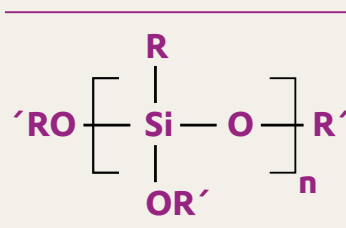
- Extremely good storage stability of Protectosil® DRY CIT
- The additive is easy to process and requires no special after-treatment
- The additive is highly temperature stable
- Treated concrete shows no significant loss in compressive strength after 90 days of curing
- Concrete corrosion testing at the Swiss Society for Corrosion was successful over 520 days (35 years of outside weathering)

Protectosil® DRY CIT offers excellent long-time protection of concrete against corrosion.

Chemistry

Reactive organofunctional silane molecules:

- react with cement and siliceous material in concrete
- react with oxide layer of iron and strengthen the passivation layer
- form a water vapor-permeable barrier against water-soluble harmful substances



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