

Protectosil® CIT Corrosion Inhibitor

FAQ # 1

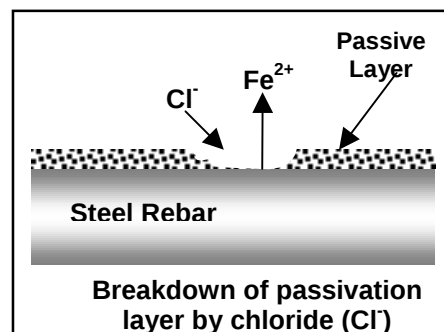
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FAQ #1: How Does Protectosil CIT Work?

Protectosil CIT is a surface applied corrosion inhibitor used to mitigate corrosion of steel reinforced concrete. Extensive laboratory and field testing have shown the Protectosil CIT to be very effective in reducing corrosion.

1st Some Background on the Corrosion Problem

Corrosion of steel in concrete can proceed once the protective passive film is broken down. In new concrete this naturally occurring film, actually a type of iron oxide, helps keep the corrosion rate of steel to an insignificant level. Unfortunately, the passive film can be breached by chloride ions or by a reduction in the concrete's normally high pH (typically via carbonation).



Because the passive film is thin, only nanometers or even just a few molecules thick, the exact depassivation mechanism is not fully known. Corrosion of the steel occurs spontaneously once the passive film is breached. The corrosion will continue in the classic electrochemical half-cell process until the steel is repassivated or the thermodynamic condition of the steel reinforced concrete changes.

Chemical Bonding is the Key

Protectosil CIT's small molecules penetrate deeply into the concrete and chemically react with siliceous and ferrous materials. It makes the concrete matrix hydrophobic as well as improves and strengthens the passivating layer on the steel surface.



Similar to how chloride ions depassivate steel, the exact reaction mechanism of CIT is not known. Based on our best knowledge the Protectosil CIT works in a threefold process.

First, *like a coating*, CIT reduces corrosion by limiting the amount of water and chlorides that get into the concrete in the future. This feature eliminates corrosion "spiking" seen in unprotected concrete. The CIT reduces the need for secondary waterproofing, saving cost, and has the added benefit of being a "breathable" system.

Second, *unlike* what occurs with a coating, CIT changes the concrete itself. CIT makes the concrete much more resistant to ionic flow and, in doing so, interrupts the electrolytic current. This makes the concrete less of an ideal conductive medium for corrosion.

Third, Protectosil CIT works on the steel level at the anode and cathode sites of the corrosion cell. The passive film can be stabilized by chemical reaction of CIT with the OH⁻ functions of the oxidized steel. This allows the passive layer -- Fe(OH)₂ -- to reform and/or strengthen.