

DENSI-PROOF™ PLUS REO PROTECT™

SUMMARY INFORMATION & TECHNICAL DATA



THE NAME SAYS IT ALL

The most common and frequent forms of corrosion of Portland cement concrete's imbedded steel is caused by a flow of electric current, usually, but not necessarily, generated within the concrete itself. Electrical potential differences, can occur in various areas throughout a concrete containing imbedded metals for several diverse reasons such as variable moisture content, oxygen concentration, electrolyte concentration, or contact of dissimilar metals, etc. Inside reinforced concrete, prior to corroding, a corrosion cell may, be formed along imbedded steel through the formation of an anode where corrosion occurs and a cathode where no corrosion occurs. However, for corrosion cells to become active there has to be electrolyte present. Electrolyte can be any liquid which is capable of conducting electrical current, through ionic flow, such as rain water, etc. The electrolyte acts as a sink for steel's electrons, higher concentrations of ionized substances, in the electrolyte, such as chlorides from salt or calcium, causes the electrolyte to be more potent, or stronger, allowing even more electron flow from the steel, further accelerating corrosive activity rates.

Electrolyte activated corrosion cells subsequently produce pits in the corroding imbedded steel, however, the integrity loss, due to pitting / corrosion, is of much greater consequence in concrete Utilizing prestressing cables, than in concrete with reinforcing bars. A catastrophic failure may occur in stressed cables, as the cable's cross section becomes reduced or weakened sufficiently by corrosion, or embrittlement due to hydrogen evolution, caused by the corrosive processes. On the other hand, concrete surrounding the imbedded steel reinforcement bar is often cracked, as a result of corrosion's expansive forces long before the loss of steel's integrity becomes critical, from a load bearing standpoint. In such cases, repairs are often necessary due to concrete bond loss, cracks, or spalling, making corrosion, in either instance, very costly.

Now there is an effective alternative to helplessly allowing this corrosive destruction to run rampant. The alternative is in the form of a non-toxic, user and environmentally friendly solution, Protect Crete® Densi-Proof™ + Reo Protect™. Densi-Proof™ + Reo Protect™ is spray-applied to the concrete's surface as a remedial (apparent corrosion taking place) treatment or as a preventative treatment (no visible signs of corrosion as yet), where it readily deeply penetrates into the concrete being treated. As a remedial treatment, Densi-Proof™ + Reo Protect™ arrests or greatly retards, destructive corrosion activity, through subsequent removal of electrolyte, oxide (scale) de-aeration, and oxygen deprivation at the steel's surface. Also, as a side benefit, Densi-Proof™ + Reo Protect™ diminishes water soluble chloride content to varying degrees, depending on pore accessibility, permeability, chloride content, and etc. However, as a preventative, where imbedded steel is not yet corroding, Densi-Proof™ + Reo Protect™ works to prevent corrosive processes from commencing by neutralizing acids (if any) which are mainly responsible for pitting, oxygen deprivation, and conversion of steel's protective oxide coating from a two valence oxide to a three valence one. Following an application of Densi-Proof™ + Reo Protect™, Densi-Proof™ + Reo Protect™'s internally generated insoluble residue, subsequently left in Densi-Proof™ + Reo Protect™'s reticulation route, while penetrating, permanently deprives treated areas of their main ingredient for corrosion, which is electrolyte.

Section 1 Description

Densi-Proof™ + Reo Protect™, a water-clear, odorless, non-petroleum, colloidal liquid which is environmentally neutral, contains zero VOC / VOS, and is user friendly.

Section 2 Basic Use

Densi-Proof™ + Reo Protect™ penetrates / permeates Portland cement concrete very readily when applied to its surface penetrating to extraordinary depths, depending on concrete's permeability factor and etc. Densi-Proof™ + Reo Protect™ effectively attacks existent conditions that can create and/or promote corrosion activity, if any, arresting / preventing, or at the very least significantly retarding rust producing reactions. In order for corrosion to exist, the observed facts are, water (H₂O) and molecular oxygen (O₂) are essential ingredients; The presence of the H (aqueous hydrogen) ion speeds up reactions; plus the presence of some metals retard or hinder corrosion while other type of metals accelerate it. Theories about why corrosion occurs vary however, the most promising mechanism suggested

is a many-step process in which the following sequence of events occur: (1) The steel (iron) acts as an anode (electrode at which oxidation occurs) to give up two electrons (particles which carry one unit of electrical charge) leaving two protons in the iron without their electron counterparts creating Fe²⁺ (ferrous) ion; (2) The errant electrons are picked up by an H⁺ ion to form transient neutral H (hydrogen) atoms; (3) The H atoms are immediately oxidized by O₂ to form H₂O; (4) The Fe²⁺ ion is oxidized by O₂ in the presence of H₂O to form rust. Rust is not a simple compound, as its name implies, but seems to be an indefinite hydrate of Fe₂O₃. Acids catalyse rust formation because they provide an H⁺ ion to electrons from the iron, causing it to dissolve faster. Oxygen gas is necessary to oxidize Fe²⁺ to Fe₂O₃, which would be non-corrosive without the presence of an electrolyte. The presence of water (electrolyte) facilitates migration of Fe²⁺ from the reaction site, and reduction of Fe²⁺ concentration permits rusting (corroding) to resume / exist. Subsequently, one of the easiest ways to prevent rusting (corrosion) of the iron is to shut out the O₂ / H₂O supply.

Densi-Proof™ + Reo Protect™ performs its objectives by doing this, plus neutralization of acids where applicable, end by de-aeration of corrosion product (rust) where applicable, and along with permanent conversion of steel's oxide coating to Fe₃O₄, with removal of electrolyte presence, whether steel has begun to corrode or not. In addition, as a preventive, in installations not yet experiencing corrosion problems, Densi-Proof™ + Reo Protect™ has ability to reduce the chloride ion content, present in concrete's accessible porosity. Furthermore, internally generated Densi-Proof™ + Reo Protect™ precipitate which is permanently deposited in Densi-Proof™ + Reo Protect™'s paths of reticulation, while penetrating concrete to its embedded steel, permanently deprives the treated concrete of corrosion's very necessary ingredient, electrolyte. Densi-Proof™ + Reo Protect™ will not alter concrete's surface appearance or physical characteristics, nor does it impair surface traction or bonding quality, Concrete only needs to be closed while treating, and can be reopened immediately afterward.

Limitations: Densi-Proof™ + Reo Protect™ contacting glass should be rinsed off without being allowed to dry, since glass can become etched.

Densi-Proof™ + Reo Protect™ may dull the shine on shiny aluminium, however, its integrity is otherwise unaffected.

Do not apply Densi-Proof™ + Reo Protect™ to frozen concrete or when ambient temperature is at 1°C and expected to drop shortly.

When applying paint, adhesives or other coatings, wait at least 24 hours after sealing with Densi-Proof™ + Reo Protect™, then vacuum or flush surface with water and allow to dry before coating.

Section 3 Installation Suggestions

Apply using medium to high-pressure airless spray unit, with fan spray tip of .019". Apply Densi-Proof™ + Reo Protect™ to point of saturation twice, in back-to-back applications. Apply first coat north/south direction - second coat east/west. Each coat should be at the rate of 4.5m² per litre. To estimate volume of Densi-Proof™ + Reo Protect™ needed, prior to job commencement, use 2.25m² per litre, for estimation purposes, however, actual Densi-Proof™ + Reo Protect™ volume used may vary, depending on concrete's permeability factor, etc. Damp or wet concrete may be treated by removing all water puddles, if any.

Densi-Proof™ + Reo Protect™ application should begin at lowest point in elevation. For example, walls or steep slopes should be applied from bottom up, overlapping spray patterns approximately 50%. Only normal, or usual maintenance is required following Densi-Proof™ + Reo Protect™ application.

Section 4 Precautions

1. Any coatings that may restrict access to the concrete's interior must be chemically or mechanically removed for Densi-Proof™ + Reo Protect™ to penetrate.
2. Protect areas not intended for coverage.
3. Do Not allow to Densi-Proof™ + Reo Protect™ puddle or build up.

4. Densi-Proof™ + Reo Protect™ may etch glass or dull shiny aluminium and can be difficult to remove from other surfaces once it dries.
5. Do not apply on frozen substrate or when temperature is near freezing.
6. Densi-Proof™ + Reo Protect™'s spray mist is not hazardous to breathe. However, we do recommend the use of a face mask during application. Refer to MSDS.
7. For more information read Material Safety Data Sheet or contact your customer representative.

Section 5 Technical Data

Physical: Liquid

Colour: Clear

Odour: None

pH: ±12

Flammability: None

Hazardous Vapours: None

Clean-up Solvent: Water

U.V. Resistance: Excellent

Surface Bond Quality: Excellent

Chloride Screen ability: Excellent

VOC/VOS Compliant: YES

Section 6 Some Advantages

1. Stops or Greatly Retards Existing Corrosion
2. Prevents or Greatly Retards Any Future Corrosion
3. Significantly Densifies Concrete
4. Internally Waterproofs Concrete
5. Makes Concrete More Durable
6. Greatly Diminishes Permeability
7. Enhances Surface Traction Quality
8. Greater Surface Bondability
9. Provides Internal Humidity Stability
10. Restricts Vapour Transmission
11. Preserves Concrete's Integrity
12. Eliminates Internal Water Migration
13. Resists Freeze-Thaw Damage
14. Easier Snow / Ice Removal
15. Improves Thermal Resistance (R-Factor)
16. Adds Surface Abrasion Resistance
17. Decreases Dusting Potential
18. Increases Acid / Chemical Resistance
19. Lowers Chemical Reaction Potential

Ensure you contact your nearest PROTECT CRETE® office for full technical bulletins and latest application procedures.