

VITCON 9001 RCI

Bipolar Roving / Migratory
Corrosion Inhibitor Admixture
For Reinforced Concrete

Corrosion in Reinforced Concrete Structures

Aggressive Influences on Reinforced Concrete

In reinforced concrete the steel is normally protected against corrosion by the passivating alkalinity of the cement matrix. Due to the ingress of aggressive environmental influences the steel can corrode. Three conditions must exist for reinforcing steel to corrode:

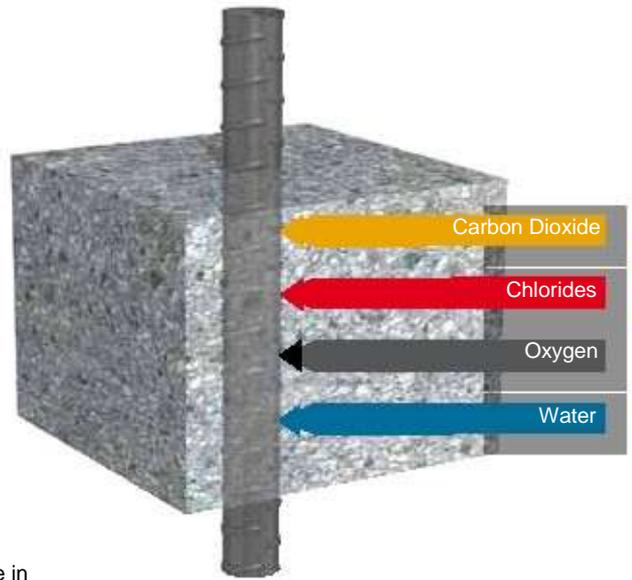
1. The passivation of the steel must have been destroyed by chlorides or by carbonation
2. The presence of moisture as an electrolyte
3. The presence of oxygen

Carbonation

Carbon dioxide ingress causes carbonation of the cement matrix progressively reducing the passivating alkaline protection of the steel reinforcement to a level where corrosion can occur.

Chloride attack

Chloride ions from deicing salts or marine exposure are carried into the concrete in solution in water. At the steel surface, even in alkaline concrete, they attack and break down the passivating layer and then accelerate the steel corrosion process.



The Effect of the Aggressive Influences

Chlorides/Carbonation

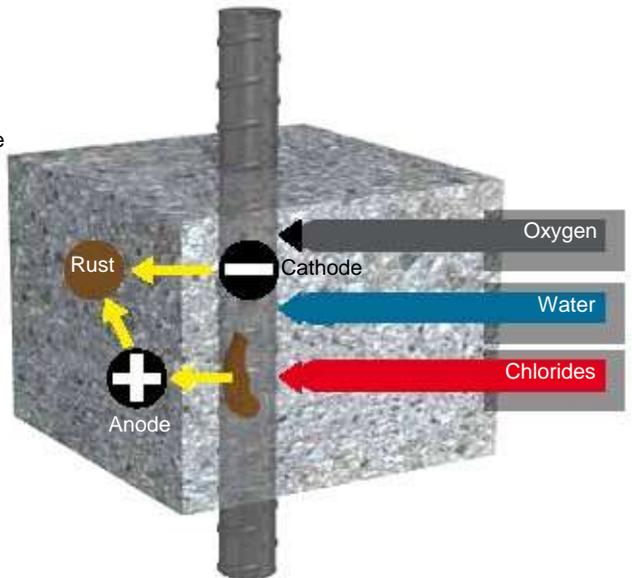
As soon as sufficient chloride ions (from deicing salts or marine exposure) or the carbonation front have reached the steel surface, the passive layer is destroyed and corrosion accelerates.

Contact with water (moisture)

The original neutral iron will receive a negative charge as the positively loaded ions have the tendency to dissolve. The water film around the metal turns positive.

Contact with oxygen

The oxygen takes on the negative charge of the iron ions which have gone into solution. The result is iron hydroxide, the first stage of rust.



Corrosion Management with VITCON 9001 RCI

DESCRIPTION

VITCON 9001 RCI is a unique blend of non toxic, bipolar roving / corrosion inhibiting concrete admixture, designed for protecting the reinforcement bars in concrete against chloride attack.

VITCON 9001 RCI is a multifunctional inhibitor which controls the cathodic and anodic reactions. This dual action effect significantly retards both the onset and the rate of corrosion and increases the time to future maintenance. VITCON 9001 RCI is normally applied as part of a corrosion strategy.

It is compatible all component of the Polygon concrete repair and protection systems.



Performance and Durability

VITCON 9001 RCI penetrates the concrete and forms an adsorbed protective film on the surface of the steel reinforcement.

The protective adsorbed film of VITCON 9001 RCI reduces the rate of corrosion in carbonated and chloride contaminated concrete.

The Performance of VITCON 9001 RCI

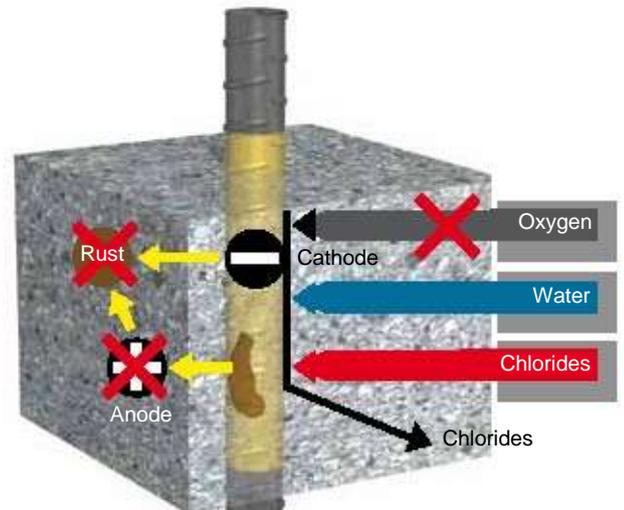
Protective layer

VITCON 9001 RCI forms an adsorbed protective film on the reinforcement.

The process of forming this protective film takes place even in carbonated concrete and even with the presence of chlorides in the concrete.

Delay of the corrosion process

The dissolution of the iron in contact with water will be reduced thanks to this passivating protective film. This film is also a barrier to the reduction of oxygen which will be prevented.



APPLICATION METHODOLOGY

Add VITCON 9001 RCI to the dosing water or added with it in to the concrete mixture.

It should not come into contact with dry cement. It may also be added to the concrete in the transit mixture at the point of discharge.

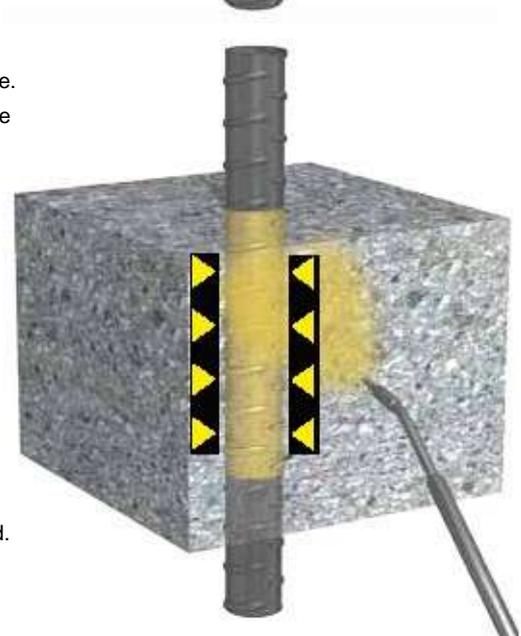
VITCON 9001 RCI is compatible with other admixture, however each admixture should be added to the mix separately.

When VITCON 9001 RCI is used with an air entraining agent then the dosage rate of air entraining agent should be reduced. VITCON 9001 RCI may react with the air entraining agent increasing its air producing efficiency.

Compatible with all types of Portland cement including sulphate resistance cement and not compatible with high alumina cement.

DOSAGE

Generally 0.5 – 3 % by weight of cement. It is advisable to carry out a trial to establish the exact & optimal dosage rate depending upon set retardation required.



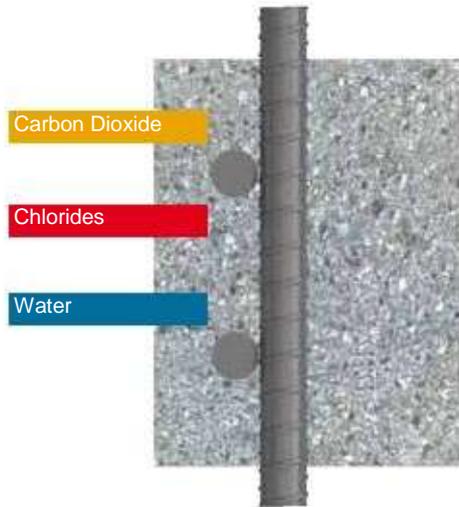
Existing Conditions and Aggressive Influences on the Structure

New Construction

New building/new concrete e.g. high quality architectural concrete without protective coating.

The steel reinforcement is protected by the passivating alkalinity of the cement matrix, pH 12.0 to 13.5.

With the ingress of aggressive environmental influences, steel reinforcement can corrode. The concrete will be carbonated or passivation broken down by penetrating chlorides.



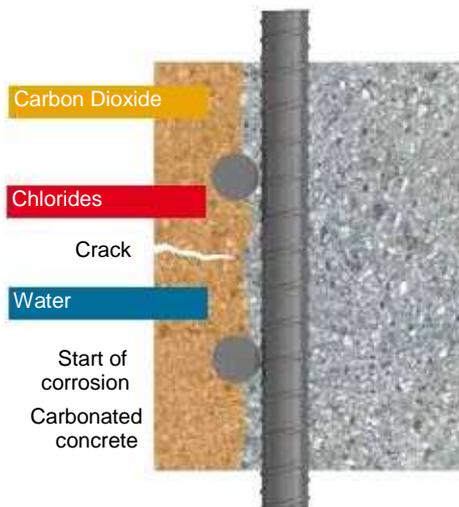
Objectives and Requirements

- Increasing service life of structure
- Preservation of architectural aspects
- Preserving protection to reinforcement

Well Advanced Corrosion Risk but no Visible Corrosion Damage

Concrete façade or civil engineering structure without protective coating.

- Steel reinforcement in a carbonated environment
- Perhaps light corrosion already exists
- No visible corrosion damage

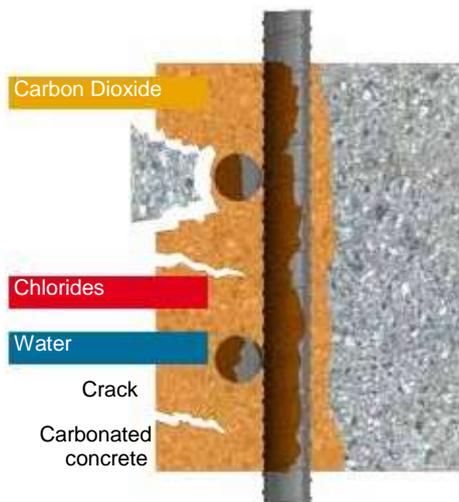


- Prevention maintenance
- Protection against possible concrete damage
- Long term protection against further environmental influences (carbonation, deicing salt)

Visible Corrosion Damage. Concrete Repair Necessary

Concrete surface (façade or civil engineering structure) without coating but with visible corrosion damage.

e.g. spalling concrete, cracks, etc., concrete repair is necessary.



- Active maintenance
- Structurally sound carbonated/chloride contaminated concrete remains
- Re-passivation of steel
- Protection against the development of latent damage
- Prevent the possibility of incipient anode corrosion
- Long term protection against further environmental influences

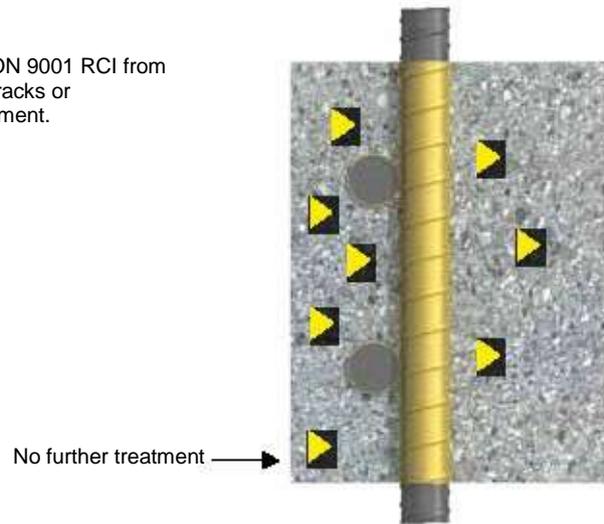
Reinforcement Protection Principles Using VITCON 9001 RCI

Principles Based on Remediation Techniques According to EN 1504-9

Corrosion protection will be increased by VITCON 9001 RCI from the beginning, even to concrete surfaces with cracks or inadequate concrete to cover over the reinforcement.

Principles:

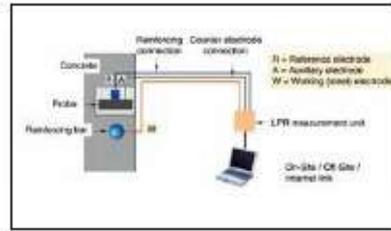
- Cathodic control
- Anodic control



VITCON 9001 RCI Examples of Uses



The Polygon Qualitative Colour Test Kit for Penetration Depth testing



Corrosion Rate Maintenance Monitoring System
Courtesy of C-Probe Technologies

Typical Usage of VITCON 9001 RCI

- Used for concrete in contact with chlorides from a marine environment
- All reinforced concrete structures in coastal / saline environment, Multi storied building and Industrial structures
- Effective in parking structures
- Marine structures
- Bridges, Flyovers, Wet basins, Docks
- Deicing salt
- Water retaining structures
- Sewage plants, Swimming pool
- Chemical plants
- Precast elements, Railway sleepers
- Ferrocement composite
- As on admixture to repair mortars and micro concrete
- Chimneys, Cooling towers, Power plant
- Infrastructure projects, Refineries, Metro

Advantage

- Corrosion protection for embedded reinforcing steel, especially from chloride attack
- Extends the service life of structures in a deicing salt and marine environment

Health and Safety

- VITCON 9001 RCI is non toxic, non flammable and non hazardous material
- Any splashes on the skin should be washed immediately with water.
- Splashes on the eyes should be washed immediately with water and seek medical advice.
- Use goggles, mask, nose cover and hand gloves during application.
- Clean hand with warm soap water after application.

Packing

VITCON 9001 RCI is supplied in 250 kg HDPE drums. Packaging size may vary subject to local regulations and requirements.

Storage

Must be stored in original packing at ambient temperature, dry place under shed. The containers must be protected from direct sunlight. The best use before end date of each batch appears on the product label.

Shelf Life

If stored in tightly closed original containers under the above conditions, it has a shelf life of 12 months. Periodical remixing can extend the shelf life further.