

# DCI<sup>®</sup>S

Corrosion Inhibitor

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## Product Description

DCI<sup>®</sup>S corrosion inhibitor is a liquid added to concrete during the batching process. It chemically inhibits the corrosive action of chlorides on reinforcing steel and pre-stressing tendons in concrete. It also promotes strength development at all ages.

DCI<sup>®</sup>S is recommended to protect all steel reinforcement, posttensioned and pre-stressed concrete that will come in contact with chlorides from de-icing salts or the marine environment.

- Piers & coastal structures
- Sea defenses
- Foundations in saline ground water
- Structures close to the coast
- Parking structures
- Bridge decks/abutments

It may also be used to protect concrete where chloride is already present in the mix constituents, or on the rebar surface.

## Corrosion Mechanism

Corrosion occurs in the presence of oxygen, moisture and an electrolyte. As chlorides attach the reinforcing steel, the salt intensifies the electrolyte properties of the concrete, degrading the normal passivating layer, thereby creating a corrosion cell. As the reaction proceeds, rust is formed. It migrates away from the bar, leaving more iron to be corroded. This process continues and two situations develop:

1. The reinforcement reduces in effective thickness, resulting in flexural failure of the structural member.
2. Iron, as it oxides, expands to four times its original volume. This expansion results in physical disruption of the concrete, evident as cracking, straining, crazing and spalling. The process accelerates.

## Corrosion Inhibitor

DCI<sup>®</sup>S corrosion inhibitor is a patented system based on Calcium Nitrite which interacts with the embedded steel in concrete to prevent salt attack. By chemically reacting with the embedded steel the passivating layer is maintained unbroken when chlorides penetrate the concrete cover zone. Corrosion initiation is significantly delayed, and the rate of corrosion, after eventual initiation, is controlled at a slower rate.

When added to concrete in sufficient quantity, as determined by the anticipated chloride ion content of the concrete over the design life of the structure, DCI<sup>®</sup>S maintains an active corrosion controlling system within the concrete matrix.

## Typical Properties

Appearance	light brown liquid
Specific Gravity	1.27–1.30 at 20 °C
Calcium Nitrite	Minimum 30%
Freezing Point	-15 °C

## Compatibility with Cements

DCI<sup>®</sup>S can be used with all types of Portland Cements, including cement replacement materials.

## Compatibility with other Admixtures

DCI<sup>®</sup>S is compatible with other liquid admixtures, providing they are added separately to the mix.

It is already formulated with a retarding component to offset the acceleration in set normal with Calcium Nitrite.

A moderate increase in dosage rate of air entraining agent may be required to attain the normal specified level of air.

## Method of Use

DCI<sup>®</sup>S is supplied ready for use. It should be added to concrete preferably at the same time as the mix water. It should not be added directly to the cement.

Mix water adjustment is essential to account for the water in DCI<sup>®</sup>S and maintain the desired w/c ratio. The mix water added at the batch plant must therefore be reduced to compensate for the addition of the corrosion inhibitor. The adjustment factor is 0.84 litres of water per litre of DCI<sup>®</sup>S.

## Addition Rates

Range: 10 litres– 30 litres per cubic metre of concrete

The project specification will indicate the addition rate, which is pre-determined on the basis of projected chloride ion ingress over the life of the structure.

The performance of DCI<sup>®</sup>S is best assessed after preliminary tests on site using the actual mix constituents under consideration to determine the effect on concrete properties.

## Effects of Overdosing

Overdosing of DCI<sup>®</sup>S will normally produce an increase in workability, and in certain circumstances this could be accompanied by a reduction in setting time. Provided overdosed concrete is properly cured, ultimate strength will generally be no lower than that of normal concrete.

## Dispensing

It is preferable that liquid admixtures for concrete should be introduced into a mixer by means of automatic dispensing equipment. Such equipment is available and can be supplied on request.

## Health and Safety

For further information see the DCI<sup>®</sup>S SDS (Safety Data Sheet) or consult GCP Applied Technologies.

## Packaging

DCI<sup>®</sup>S is available in 210 litre, non-returnable drums.

Alternatively, 1000 litre IBCs or bulk deliveries can be arranged.

## Storage

DCI<sup>®</sup>S should be stored in original containers or suitable closed tanks, preferably out of direct sunlight and protected from extremes of temperature.

### **Storage Life in Manufacturer's Drums & IBCs:**

12 months from the date of manufacture

### **Storage Life in Bulk Storage:**

12 months from the date of manufacture

## Technical Service

The Technical Service Department of GCP is available to assist you in the correct and best use of our products. These resources and advice are at your disposal entirely without obligation. Please contact:

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