

Description

Rheocrete CNI calcium nitrite based corrosion-inhibiting admixture is used for reinforced concrete. Rheocrete CNI admixture contains a minimum of 30% active ingredients by mass and meets ASTM C 494/C 494M requirements for Type C, accelerating admixtures.

Applications

Recommended for use in:

- All types of steel reinforced concrete, including precast/prestressed and post-tensioned applications
- Parking garages, bridge decks, marine structures, slabs, floors and other reinforced concrete applications requiring corrosion protection against chlorides from de-icing salts or marine exposure
- 4x4™ Concrete

RHEOCRETE® CNI

Corrosion-Inhibiting Admixture

Features

- Effective corrosion protection against chlorides in concrete

Benefits

- Extended service life of reinforced concrete structures
- Set acceleration, which may be desirable in cold weather applications

Performance Characteristics

In the alkaline environment of concrete, a natural passive ferric oxide layer forms on the surface of embedded reinforcing steel and protects the steel from corrosion. This passive oxide layer may break down in the presence of chlorides and moisture resulting in corrosion of the steel.

Rheocrete CNI admixture delays corrosion by re-passivating defects on the steel surface. These defects are ferrous oxide ions that are susceptible to chloride attack. When chloride ions attack the ferrous ions, they combine to create a ferrous chloride complex (rust) and initiate pitting corrosion on the reinforcing steel. If untreated, chloride ions continue to attack newly exposed ferrous ions and form additional expansive corrosion products leading to staining, cracking and spalling of the concrete.

Nitrite ions contained in Rheocrete CNI admixture are effective in preventing ferrous chloride complex formation by reacting with defective ferrous oxide ions prior to chloride attack and reforming the passive layer. Nitrite ions surround the defective ferrous oxide ion and convert it to a more stable ferric ion species less susceptible to corrosion. This oxidation reaction serves to re-passivate the reinforcing steel and re-establish the barrier between the steel and chlorides that initiate corrosion.

Concrete Setting Time: Concrete setting times may be accelerated with the use of Rheocrete CNI admixture. In most applications a retarding or hydration control admixture must be added to the concrete mixture to offset the acceleration effects of Rheocrete CNI admixture. Please contact your local BASF Construction Chemicals representative for additional information on the proper choice of retarding admixture for concrete to be treated with Rheocrete CNI admixture.

Guidelines for Use

Dosage: Rheocrete CNI admixture is recommended for use within a dosage range of 1.0-6.0 gal/yd³ (5.0-30.0 L/m³) of concrete, depending upon the severity of the corrosion environment and the anticipated chloride loading of the structure.

The dosage of Rheocrete CNI admixture for a given application may be selected from the table or computed by using the following expression:

$$\text{Dosage (gal/yd}^3\text{)} = 0.441 \times \frac{\text{Anticipated Chloride Loading (lb/yd}^3\text{)}}{\text{Chloride-to-Nitrite Ratio}}$$

$$\text{Dosage (L/m}^3\text{)} = 3.69 \times \frac{\text{Anticipated Chloride Loading (kg/m}^3\text{)}}{\text{Chloride-to-Nitrite Ratio}}$$

Product Data: RHEOCRETE® CNI

Rheocrete CNI admixture may be used to offset the potentially corrosive effects of chloride-bearing concrete ingredients and in applications where the initial chloride ion content of the concrete may exceed code requirements or other specified chloride limits.

Chloride protection limits for Rheocrete CNI admixture are as given in the dosage table. The limits for applications involving the use of chloride-bearing materials are based on a critical chloride-to-nitrite ratio of 0.90 in accordance with the recommendations of the Federal Highway Administration (FHWA). These limits may also be used in very severe corrosion environments for enhanced protection, if desired. The chloride protection limits given for all other applications, such as parking structures and bridges, are based on critical chloride-to-nitrite ratios that range from 1.20 to 1.50. Please contact your BASF Construction Chemicals representative for additional information regarding the dosage of Rheocrete CNI admixture for your application.

Chloride Protection Limit, lb/yd³ (kg/m³)

Rheocrete CNI Dosage gal/yd ³ (L/m ³)	With Chloride- Bearing Materials	All Other Applications
1.0 (5.0)	2.1 (1.2)	–
2.0 (10.0)	4.1 (2.4)	6.0 (3.6)
3.0 (15.0)	6.1 (3.6)	9.9 (5.9)
4.0 (20.0)	8.1 (4.8)	13.0 (7.7)
5.0 (25.0)	10.1 (6.0)	15.0 (8.9)
6.0 (30.0)	12.1 (7.2)	16.0 (9.5)

BASF Construction Chemicals recommends that steel reinforced concrete structures that will be exposed to chlorides in service should be designed in accordance with ACI 318 / 318R (318M / 318RM), ACI 357R, CSA, AASHTO or other applicable codes.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: Rheocrete CNI admixture is a corrosion-inhibiting admixture and will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: Rheocrete CNI admixture may be used in combination with any BASF Construction Chemicals admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: Rheocrete CNI admixture can be stored at temperatures between 10 and 100 °F (-12 to 38 °C). If Rheocrete CNI admixture freezes, it can be fully reconstituted by thawing and mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: Rheocrete CNI admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your BASF Construction Chemicals representative regarding suitability for use and dosage recommendations if the shelf life of Rheocrete CNI admixture has been exceeded.

Packaging

Rheocrete CNI admixture is available in 55 gal (208 L) drums, 275 gal (1040 L) totes, and by bulk delivery.

Chemical Composition

Rheocrete CNI admixture contains a minimum of 30% calcium nitrite by mass as an active ingredient. Rheocrete CNI admixture is identical in composition and mechanism to other commercially available 30% calcium nitrite corrosion-inhibiting admixtures; and at equal dosages, provides similar performance and corrosion protection.

The water content of Rheocrete CNI admixture is approximately 7.3 lb/gal (0.88 kg/L). This water contributes to the consistency of the concrete mixture and the hydration of the cementitious materials. The water contributed by Rheocrete CNI admixture should be used in the calculation of the water-to-cementitious material ratio of the concrete.

Related Documents

Material Safety Data Sheets: Rheocrete CNI admixture.

Additional Information

For additional information on Rheocrete CNI admixture or its use in developing a concrete mixture with special performance characteristics, contact your BASF Construction Chemicals representative.

The Admixture Systems business of BASF Construction Chemicals is a leading provider of innovative additives for specialty concrete used in the ready mix, precast, manufactured concrete products, underground construction and paving markets throughout the NAFTA region. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.

BASF Construction Chemicals, LLC
Admixture Systems

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