BASF
The Chemical Company

RHEOCRETE® CNI

Corrosion-inhibiting admixture for steel reinforced concrete

Description
RHEOCRETE® CNI is a calcium nitrite based corrosion-inhibiting admixture for steel reinforced concrete. RHEOCRETE® CNI admixture contains a minimum of 30% active ingredients by mass and meets ASTM C 494 interim requirements for Type C, Accelerating Admixtures.

Benefits
RHEOCRETE® CNI admixture is a corrosion inhibitor that provides basic corrosion protection for steel reinforced concrete structures.

- Provides effective corrosion protection against chlorides in concrete.
- Extends the service life of reinforced concrete structures.

Packaging and availability
RHEOCRETE® CNI admixture is available in 210 litre drums, and by bulk delivery.

Mechanism
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 repassivating 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 repassivate the reinforcing steel and re-establish the barrier between the steel and chlorides that initiate corrosion.

Applications
RHEOCRETE® CNI admixture will effectively inhibit corrosion in all types of steel reinforced concrete including precast / prestressed and post-tensioned applications. RHEOCRETE® CNI admixture is recommended for use in parking garages, bridge decks, marine structures, slabs, floors, and other reinforced concrete applications requiring corrosion protection against chlorides from deicing salts or marine exposure. RHEOCRETE® CNI admixture will also inhibit the potentially corrosive effects of chloride-bearing concrete-making ingredients.

Compatibility
RHEOCRETE® CNI admixture may be used with Portland cements and mineral admixtures approved under ASTM, AASHTO, or CRD specifications. It is compatible with other chemical admixtures, including water reducers, superplasticizers, retarders and air entrainers. Chemical admixtures should be added separately to the concrete to ensure desired results.

Concrete setting time
Concrete setting times may be accelerated with the use of RHEOCRETE® CNI admixture. If desired, a retarding or hydration control

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admixture may be added to the concrete mixture to offset the acceleration effects of RHEOCRETE® CNI admixture. Please contact your local BASF representative for additional information on set-balancing admixtures for concrete.

Dosage

RHEOCRETE® CNI is recommended for use at a rate of 5.0 to 30.0 L/m³ of concrete, depending upon the severity of the corrosion environment and the anticipated chloride loading of the structure.

RHEOCRETE® CNI may be used to offset the potentially corrosive effects of chloride-bearing concrete-making 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 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 local BASF representative for additional information regarding dosage rates of RHEOCRETE® CNI for your application.

Table 1 *

RHEOCRETE® CNI Dosage L/m³	Chloride Protection Limit, kg/m³	
	With Chloride-Bearing Materials	All Other Applications
5.0	1.2	---
10.0	2.4	3.6
15.0	3.6	5.9
20.0	4.8	7.7
25.0	6.0	8.9
30.0	7.2	9.5

BASF recommends that steel reinforced concrete structures that will be exposed to chlorides in service should be designed in accordance with ACI 318, ACI 357, CSA, AASHTO or other applicable codes.

Chemical composition

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

The water content of RHEOCRETE® CNI admixture is approximately 7.3 pounds per gallon. This water contributes to the consistency of the concrete mixture and the hydration of the cementitious materials. The water contributed by RHEOCRETE® CNI should be used in the calculation of the water-to cementitious material ratio of the concrete.

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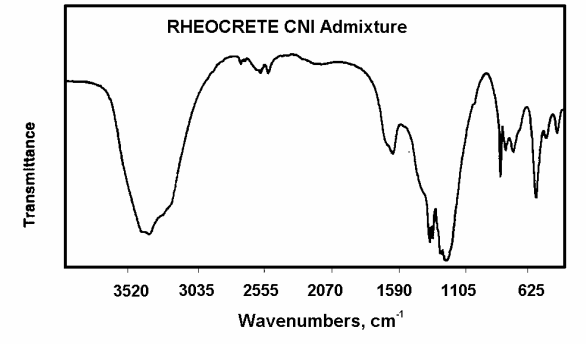
Non-chloride

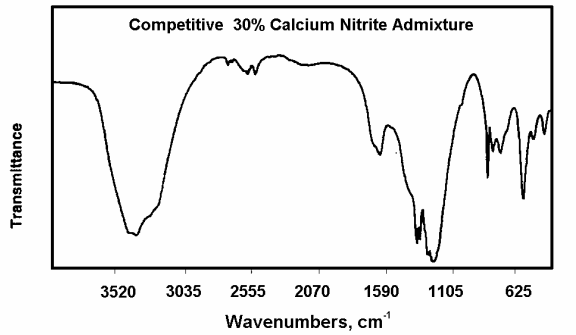
RHEOCRETE® CNI admixture will not initiate or promote corrosion of reinforcing steel embedded in concrete, prestressed concrete or concrete placed on galvanized steel floor and roof systems. Neither calcium chloride nor any chloride-based ingredients are used in the manufacture of RHEOCRETE® CNI.

Temperature precaution

RHEOCRETE® CNI admixture can be stored at temperatures between –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.**

FOURIER TRANSFORM INFRARED (FT-IR) SPECTRAL COMPARISION





Note

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local BASF representative.

BASF reserves the right to have the true cause of any difficulty determined by accepted test methods.

Quality and care

All BASF Products are manufactured under a management system independently certified to conform to the requirements of the quality, environmental and occupational health and safety standards of ISO 9001 and BASF ESHQ recommendations.

Saudi BASF – 12/2007

* Properties listed are only for guidance and are not a guarantee of performance

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