Offset the Potential Corrosive Effect of Chlorides in a Concrete Mix Using DCI®

DCI® Corrosion Inhibitor may be used to offset the corrosive effects of chloride ions found in steel reinforced concrete. Chloride ions in the form of salts may combine with oxygen and moisture in concrete and corrode the embedded steel. Chloride ions are present at varying levels in almost all aggregate and water sources; consequently, all concrete contains some chloride ions. The American Concrete Institute has established levels of acceptable chloride ions in concrete based upon service conditions.

ACI 318
Building Code Requirements for Structural Concrete

Type of Member	Maximum Water-Soluble Chloride Ion (Cl-) in Concrete
% by weight of cement	
Prestressed concrete	0.06
Reinforced concrete exposed to chloride in service	0.15
Reinforced concrete that will be dry or protected from moisture in service	1.00
Other reinforced concrete construction	0.30

The table below contains the recommendation of ACI 318 "Building Code Requirements for Structural Concrete."

In some cases, the aggregates and mix water contribute levels of chloride ions to the concrete that exceed ACI limits. In these instances DCI Corrosion Inhibitor may be added to the concrete mix to counteract the detrimental effects of the chloride ions. The use of DCI may be far less expensive to the concrete producer than finding alternate sources of materials. Technically, the producer may still be in violation of ACI maximum chloride limits, but DCI will counteract the potential corrosive effects of these unwanted chlorides so the producer and specifying engineer may allow its usage.

In order to determine how much DCI to use, the concrete must be tested for water-soluble chloride ion content. After the chloride content is measured, the DCI dosage rate may be taken from the table below.

DCI Dosage Recommendations

Water Soluble Chloride Ion Content (lbs/yd³)	DCI Dosage (gal/yd³)
0.00–0.50	0.50
0.51–0.75	0.75
0.76–1.00	1.00
1.01–1.25	1.25
1.26–1.50	1.50
1.51–1.75	1.75
1.76–2.00	2.00

Example: A prestressed concrete producer using a 705 lb cement factor mix tests for chloride content and finds that the mix contains 0.85 lb of chloride ions per cubic yard, or 0.12% by weight of cement. The chloride content percentage exceeds the ACI limit and the producer and the design engineer agree to use DCI to protect the embedded steel from corrosion. Locating 0.85 lb of chlorides per cubic yard on the table, 1.0 gallon of DCI per cubic yard is recommended.

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