KingMix® 500CN

State-of-The-Art Migratory Corrosion Inhibiting Admixture

DESCRIPTION

KingMix 500CN is a state-of-the-art migratory corrosion inhibiting admixture formulated to inhibit the corrosion of steel reinforcement in concrete. **KingMix 500CN** provides two levels of corrosion protection, inhibiting and waterproofing making it the most effective corrosion inhibiting admixture available in the world.

ADVANTAGES

KingMix 500CN extends the service life of reinforced concrete by slowing the ingress of chlorides and moisture into the concrete and by forming a strong, durable protective film on the reinforcing steel for a second level of corrosion protection. This dual mechanism system makes **KingMix 500CN** effective with all cement factors, as well as in cracked concrete where the elements that cause corrosion have direct access to the reinforcing steel.

PACKAGING

KingMix 500CN is available in 200 litre drums and bulk if required.

STANDARDS

ASTM G109, ASTM C1582, and ASTM C494

HOW IT WORKS

KingMix 500CN functions by inhibiting corrosion at its most critical points.
KingMix 500CN lines the pores of the concrete matrix thus waterproofing and slowing the rate at which chlorides and moisture enter the concrete and denying the corrosion process of its two most important components.
KingMix 500CN provides additional protection by migrating and adsorbing onto the reinforcing steel to form a corrosion resistant protective film. This protective film dramatically slows the corrosion process by preventing chlorides from reacting with the reinforcing steel, and by depriving the corrosion process of moisture and oxygen, thus slowing the rate of corrosion once it begins.

PLASTIC PROPERTIES

The plastic properties of concrete are not significantly affected by the use of **KingMix 500CN**

SLUMP AND TEMPERATURE DEVELOPMENT

KingMix 500CN has no effect on slump or the temperature development profile of concrete.

CONCRETE-STEEL BOND STRENGTH

Concrete to steel bond strength is not affected by **KingMix 500CN.**

CORROSION INHIBITING SYSTEMS

In order to control corrosion in steel reinforced concrete, the ACI Building Code (ACI 318) requires certain design considerations, such as limiting the water-cementitious materials ratio; providing adequate concrete cover over reinforcing steel; and limiting the initial chloride ion content of the concrete. Additionally, construction practices should be such that a dense, void-free concrete is obtained.

In addition to the elements of good concrete practice required by the ACI Building Code, KingKrete Inc. recommends a corrosion inhibiting system that inhibits corrosion at multiple levels for maximum protection.

The basis for this system can be established through the use of **KingMix 500CN** which restricts the ingress of chlorides and moisture and slows the rate of corrosion by forming a protective film on the reinforcing steel. Additional protection can be attained through the use of high-range water-reducing admixtures to provide adequate place ability and consolidation at low water-cement ratios and/or the use of silica fume admixtures to reduce concrete permeability.

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PHYSCIAL PROPERTIES TEST RESULTS ASTM C1582

SETTING TIME					
	Control Specimen	KingMix 500CN	Difference	Requirements	Remarks
Initial (Minutes)	305	340	25	+/- 210 Minutes	Passed
Final (Minutes)	410	474	64	+/- 210 Minutes	Passed

COMPRESSIVE STRENGTH					
	Control Specimen	KingMix 500CN	Difference	Requirements	Remarks
1 Day (MPa)	23.5	26.4	112%	Min 80%	Passed
3 Days (MPa)	29.1	31.7	109%	Min 80%	Passed
7 Days (MPa)	36.7	39.5	108%	Min 80%	Passed
28 Days (MPa)	43.4	48.2	111%	Min 80%	Passed
180 Days (MPa)	46.2	49.8	108%	Min 80%	Passed
365 Days (MPa)	47.1	50.9	108%	Min 80%	Passed

FLEXURAL STRENGTH					
	Control Specimen	KingMix 500CN	Difference	Requirements	Remarks
1 Day (MPa)	4.5	4.6	103%	Min 80%	Passed
3 Days (MPa)	4.6	4.8	104%	Min 80%	Passed
7 Days (MPa)	4.7	5.1	108%	Min 80%	Passed
28 Days (MPa)	5.4	6.0	111%	Min 80%	Passed

DURABILITY					
	Control Specimen	KingMix 500CN	Difference	Requirements	Remarks
Freeze/ Thaw	99.2	99.0	99.9	RDF 80%	Passed

SHRINKAGE					
	Control Specimen	KingMix 500CN	Difference	Requirements	Remarks
Length Change	-0.023	-0.022	0.001	Max 0.01	Passed

CORROSION PROPERTIES TEST RESULTS – ASTM C1582

ASTM G180 – DOSAGE KINGMIX 500CN 0.6 LITERS vs CONTROL SPECIMEN								
	Potential mV(SSC)	Rp (Ohms)	Log (1/Rp)	Area (cm^2)	Mean 1/Rp ($\mu S/cm^2$)	SD 1/Rp ($\mu S/cm^2$)	Log 1/Rp	Log SD
500CN-A	-545.2	8125	1.42	5.11	36.72	19.98	1.33	0.25
500CN-B	-525.3	5262	1.63	5.12				
500CN-C	-489.9	18001	1.15	5.11				
500CN-D	-495.2	9669	1.35	5.09				
500CN-E	-510.7	22565	0.95	5.11				
500CN-F	-455.2	3905	1.40	5.09				
Average of 15 Control Specimen	-525.7				385.21	205.95	2.45	0.38

The above testing result shows that KingMix 500CN reduces the corrosion current (1/Rp) by a factor of twelve so it meets the ASTM C1582 requirement of being 1/8 the value (49.3μS/cm2) of the control specimens without inhibitor

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DOSAGE

KingMix 500CN is recommended for use at a dosage rate of 0.6 litre / m³ of concrete for all applications and corrosion environments.
KingMix 500CN dosed at 0.6 litre / m³ is formulated to provide optimum corrosion protection of reinforced concrete structures in severe corrosive environments, and therefore provides excellent corrosive protection in less severe corrosion environments as well.
KingMix 500CN is formulated for use at a single dosage in order to eliminate the confusion and uncertainties related to determining the severity of the corrosive environment and predicting the chloride exposure of the structure.

DIRECTIONS FOR USE

KingMix 500CN may be added with concrete batch water. It should not be mixed with any other admixtures prior to being introduced into the concrete mixer. The use of this admixture does not require changes in normal batching procedures.

WATCHPOINTS

Trials must be carried out to ensure mix design meets specified performance criteria.

TEMPERATUE PRECAUTION

Store at ambient temperatures above 1°C but not exceeding 58°C. Precautions should be taken to protect **KingMix 500CN** from freezing. If product freezes, thaw and reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

NON-CHLORIDE

KingMix 500CN 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 **KingMix 500CN** corrosion inhibiting admixture.

SAFETY PRECAUTIONS

KingMix 500CN is not a fire or health hazard. Spillages should be washed down immediately with cold water. For further information refer to the material safety data sheet.

NOTE

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local KingKrete Inc. representative.
KingKrete Inc. reserves the right to have the true cause of any difficulty determined by accepted test methods.

QUALITY AND CARE

All products originating from KingKrete manufacturing facilities are manufactured under a management system independently certified to conform to the requirements of the quality, environmental and occupational health & safety standards ISO 9001, ISO 14001 and OHSAS 18001.

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