



MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

03 30 00	Cast in Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete

MCI[®]-2005 AL

DESCRIPTION

MCI[®]-2005 AL is a normal set, water-based, organic, corrosion inhibiting admixture for protection of metallic reinforcement in concrete structures. MCI[®]-2005 AL is designed for use when freezing temperatures or very high temperatures are expected during transit or storage, as well as for applications where the presence of sodium should be minimized.

When incorporated into concrete, MCI[®]-2005 AL forms a protective, monomolecular layer on embedded metals that inhibits corrosion. In new construction, this is quantified by an increase in critical chloride threshold and subsequent reduction in corrosion rates when corrosion does initiate. When used with repair mortars and grouts, MCI[®]-2005 AL not only protects rebar within the patch, it is able to migrate into undisturbed concrete adjacent to the repair, to protect reinforcement already in place.

PACKAGING & STORAGE

Available in 5 gallon (19 Liter) pails, 55 gallon (208 Liter) drums, and 275 gallon (1040 Liter) totes. Store away from direct sunlight and at ambient temperatures – above 32°F (0°C) and up to 131°F (55°C). When properly stored, MCI[®]-2005 AL has a shelf life of 24 months.



HOW IT WORKS

MCI[®]-2005 AL is an organic corrosion inhibitor. It is considered ambiodic (mixed), meaning it protects both anodic and cathodic areas within a corrosion cell. MCI[®]-2005 AL contains a blend of amine salts of carboxylic acids and other inorganic inhibitors, which form a protective layer on embedded reinforcement delaying the onset of corrosion as well as reducing existing corrosion rates.

MCI[®]-2005 AL is effective at enhancing the durability and extending the service life of concrete structures exposed to corrosive environments (carbonation, chlorides, and atmospheric attack).

WHERE TO USE

- Reinforced concrete including precast, pre-stressed, and post-tensioned structures
- Corrosive environments including exposure to deicing salts, saline groundwater, airborne chlorides, and carbonation
- Marine and coastal structures, highways and bridges, parking decks, balconies, pools, concrete tanks, pilings, substructures, piers, pillars, pipes, and utility poles

ADVANTAGES

- Biobased (20%)
- Earns credit towards LEED certification
- Lower toxicity and environmental impact than traditional corrosion inhibiting admixtures such as calcium nitrite
- Low dosage rate with minimal effect on concrete properties (i.e. workability, strength development, air entrainment, etc.)
- Single dosage rate which is independent of expected exposure to chlorides
- Ability to migrate through porous substrates (concrete, masonry, limestone, etc.) by capillary action, vapor diffusion and ionic attraction
- Meets all requirements of ASTM C1582
- MCI[®]-2005 AL can be reconstituted by mixing well after exposure to freezing temperatures.
- Complies with CSA S413, Section C1.2, for corrosion inhibiting

MCI®-2005 AL

PHYSICAL PROPERTIES

Appearance	Colorless to amber liquid
pH	8.5-9.5 (1% solution)
Non-volatile Content	35-40%
Density	9.2-9.5 lb/gal (1.10-1.14 kg/L)

DOSAGE

Add MCI®-2005 AL to concrete mix at the rate of 1.5 pts/yd³ (1L/m³).

APPLICATION

MCI®-2005 AL is best added with the mix water into ready mix concrete at the plant. Alternatively, it can be dosed into the ready mix truck using portable dosing equipment. Concrete should be mixed thoroughly before placement.

STANDARD TEST RESULTS

Slump	ASTM C143	Neutral
Air Content	ASTM C231	Neutral
Density	ASTM C138	Neutral
Set Time	ASTM C403	Neutral
Flexural Strength	ASTM C78	Improved
Corrosion Properties	ASTM C1582 ASTM G109	Meets Requirements
Biobased Content	ASTM D6866	20%
Workability	N/A	No adverse effects when used with pozzolans or other high performance concrete admixtures

ASTM C1582 PHYSICAL PROPERTY RESULTS

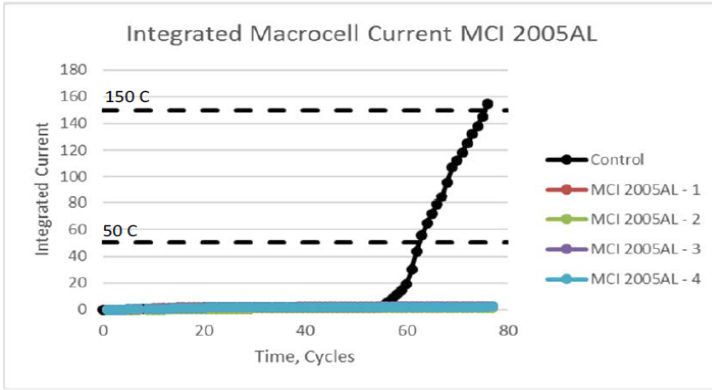
Setting Time					
	Control	MCI®-2005 AL	Relative to Control	ASTM C1582 Requirement	Result
Initial Set (Minutes)	300	344	+44	+/- 210 Min of Control	Meets Requirement
Final Set (Minutes)	396	438	+42	+/- 210 Min of Control	Meets Requirement
Compressive Strength					
3 Day (psi)	3270	3390	104%	Min 80% of Control	Meets Requirement
7 Day (psi)	4037	4253	105%	Min 80% of Control	Meets Requirement
28 Day (psi)	5080	5240	103%	Min 80% of Control	Meets Requirement
6 Month (psi)	5943	6457	109%	Min 80% of Control	Meets Requirement
1 Year (psi)	6453	6823	106%	Min 80% of Control	Meets Requirement
Flexural Strength					
3 Day (psi)	596	612	103%	Min 80% of Control	Meets Requirement
7 Day (psi)	647	692	107%	Min 80% of Control	Meets Requirement
28 Day (psi)	758	781	103%	Min 80% of Control	Meets Requirement
Shrinkage					
Length Change (%)	-0.022	-0.023	0.001	Max 0.010 Over Control	Meets Requirement
Durability					
Freeze/Thaw Durability	98.9	98.1	99.2%	RDF 80%	Meets Requirement

ASTM C1582 CORROSION PROPERTIES - ASTM G109 RESULTS

	Control	MCI®-2005 AL	Relative to Control	ASTM C1582 Requirement	RESULTS
Average Integrated Current, C	155	2	n/a	≤ 50C When Control is 150 C	Meets Requirement
Average Area Corroded, in ²	8.93	0.03	0%	≤ 1/3 of Control	Meets Requirement
Critical Chloride Content*, ppm	2861	3289	115%	≥ Critical Control	Meets Requirement

The results from the inhibitor tests were compared to 13 control runs on the same steel heat, and using the same cement in lab database. The comparison shows that MCI®-2005 AL reduces the corrosion current (1/R_c) by a factor of ten so it meets the ASTM C1582 requirement of being 1/8 the value (49.3µS/cm²) of the control specimens without inhibitor.

ASTM C1582 RESULTS



CONSIDERATIONS

Concrete properties are always best determined in a trial using the actual mix components. Cortec recommends a trial batch anytime you are using MCI®-2005 AL with new mix components.

Consult with Cortec's Technical Support Department for further guidance if necessary.

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