



**MIGRATING CORROSION INHIBITORS**  
FROM GREY TO GREEN

03 03 20

Maintenance of  
Concrete Reinforcing

07 19 16

Water Repellents

# MCI®-2018/ MCI®-2018 V/O and Modifications

## DESCRIPTION

MCI®-2018/MCI-2018 V/O is a 100% silane water repellent containing time-proven Migrating Corrosion Inhibitors (MCI®). MCI®-2018 penetrates deep into concrete providing corrosion protection to reinforcing steel from carbonation, chlorides and other contaminants.

MCI®-2018 V/O is formulated for easier application on vertical and overhead surfaces. Modifications available to MCI®-2018 and MCI®-2018 V/O include incorporation of fugitive dye (MCI®-2018 FD, MCI®-2018 V/O FD), incorporation of a UV tracer (MCI®-2018 UV), as well as the ability to add permanent stains.

## PACKAGING & STORAGE

MCI®-2018/MCI®-2018 V/O and Modifications are available in 5 gallon (19 L) pails and 55 gallon (208 L) drums.

To ensure best product performance, store in original packaging, indoors, and out of direct sunlight at 40-100 °F (4-38 °C).

Shelf life: 2 years



## HOW IT WORKS

The silane component in MCI®-2018/MCI®-2018 V/O provides water repellency by chemically reacting with the cementitious substrate under proper application, decreasing the ingress of aggressive materials. The MCI® component penetrates deeper into the substrate, forming a protective, molecular barrier on embedded reinforcement to reduce the rate of corrosion at the bar.

## WHERE TO USE

- Commercial buildings
- Parking garages
- Bridge decks or bridge structures
- Tunnels
- Jetties/Piers and other marine structures
- Off-shore oil platforms
- Any other reinforced concrete structure

## ADVANTAGES

- Certified under EN 1504-2 (2+ system) for superficial protection of concrete
- USBR M-82 Protocol confirms corrosion rate reduction independent of chloride levels/ high chloride threshold
- Certified to meet ANSI/NSF Std. 61 for potable water applications
- Forms a monomolecular corrosion inhibiting layer on steel, inhibiting the electrochemical corrosion process between metal and chloride, oxygen, and moisture in concrete
- Treated substrates are hydrophobic and retain their original appearance
- Surfaces remain fully breathable and maintain their natural moisture-vapor transmission
- Blocks carbonation and chloride ion intrusion
- Extends the service life of structures
- Easy application by spray, roller, or squeegee

# MCI®-2018/ MCI®-2018 VO and Modifications

- Non-toxic, contains no nitrites, phosphates, or chromates
- No blushing, peeling, or yellowing
- Complies with Alberta DOT Standards for Type 1B and Type 1C sealers
- MCI®-2018 UFI: S830-20V9-X00H-TU0P

## PHYSICAL PROPERTIES

Appearance:

MCI®-2018 (and modifications)	Liquid (various colors)
pH	9-11(1% in water)
Density	7.3-7.7 lb/gal (0.87-0.92 kg/L)
VOC	3.1 lb/gal (350 g/L)
CARB VOC	50 g/L
Coverage Rate	125-175 ft <sup>2</sup> /gal (3-4.3 m <sup>2</sup> /L)
Density (both versions)	6.9-7.1 lb/gal (0.83-0.85 kg/L)

## COVERAGE

Application rates will vary depending on surface porosity and number of applications. Approximate coverage rate is 125-175 ft<sup>2</sup>/gal. (3-4.3 m<sup>2</sup>/L). Before applying it is recommended that preliminary tests be carried out to determine dosing.

## PERFORMANCE DATA

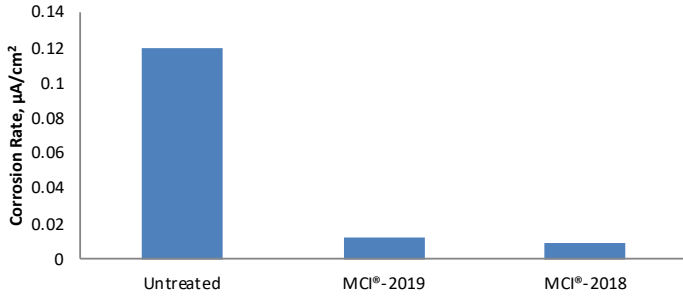
### EN 1504:2 PERFORMANCE TESTING TABLE

Essential Characteristics	Performance	Test Standard	Harmonized Technical Specification
Drying Test for Hydrophobic Impregnation	DRC (%)	UNE-EN 13579:2003	EN 1504-2:2005
	69.9		
Water Absorption and Resistance to Alkali for Hydrophobic Impregnation	AR (%)	UNE-EN ISO 7783:2012	
	6.3		
	AR <sub>ALK</sub> (%)		
	7.7		
Depth of Penetration	11.4 mm	EN 13579 + EN 14630	

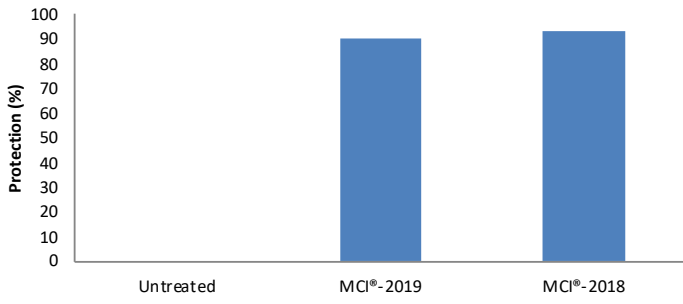
Performance Criteria	Test Method	Results
Concrete Sealer Testing	Alberta Transportation Specification B388	Meets Type 1B at 148.7 ft <sup>2</sup> /gal (274.1 ml/m <sup>2</sup> ) coverage rate. Meets Type 1C at 169.1 ft <sup>2</sup> /gal (240.7 ml/m <sup>2</sup> ) coverage rate
Reduction in Chloride Ion Content	NCHRP Series II	Single coat application of 125 ft <sup>2</sup> /gal (3.06 m <sup>2</sup> /L) showed 88% reduction in chloride ion content.

Accelerated Weathering Tests	NCHRP Series IV, Southern Exposure	Single coat application of 125 ft <sup>2</sup> /gal (3.06 m <sup>2</sup> /L) had zero discoloration and reduced chloride intrusion by 98%.
Resistance to Chloride Ion Penetration	AASHTO T259	Treated samples showed 82.6% reduction in chloride ion penetration compared to control. Depths from 0.5-1 inch (1.25-2.54 cm) contained negligible amounts of chloride ions.
Water Absorption of Concrete	ASTM C642	Single coat application of 125 ft <sup>2</sup> /gal (3.06 m <sup>2</sup> /L) showed a 74% reduction after 50 days compared to control.
Water Repellency	Federal Specification SS-W-110C	Single coat application of 125 ft <sup>2</sup> /gal (3.06 m <sup>2</sup> /L) resulted in 0.39% water absorption, exceeding the 1.0% maximum allowed in spec.
Scaling Resistance of Concrete Exposed to Deicing Chemicals	ASTM C672	Results show little to no change after more than 50 cycles of freeze-thaw with the use of deicing salts on treated concrete samples.
Potable Water	ANSI/NSF Standard 61	Certified by Underwriters Laboratories to meet NSF Standard 61 requirements at recommended coverage rates.
Corrosion Protection	USB R M-82 Protocol	MCI®-2018 reduced corrosion of severely corroded rebar. Treatment of MCI®-2018 done after 10,000 Coulombs of corrosion was reached, indicating treatment works independent of chlorides present or at a higher initial chloride content level.
Depth of MCI® Penetration	DART Analysis	Inhibitor in MCI®-2018 shown to penetrate up to 1-1/4 in (3 cm) in 5 weeks
Drying Test for Hydrophobic Impregnation	UNE-EN 13579:2003	69.9% (DRC)
Water Absorption and Resistance to Alkali for Hydrophobic Impregnation	UNE-EN ISO 7783:2012	6.3 % AR 7.7 % AR <sub>ALK</sub>
Depth of Penetration	EN 13579 + EN 14630	11.4 mm

### Corrosion Levels Based on Electrochemical Impedance Data



### Effective Corrosion Protection of MCI® Sealers



### APPLICATION

Surfaces should be free of standing water, dirt, dust, oils, grease, curing compounds, efflorescence, laitance, and other contaminants. MCI®-2018 may be applied to damp surfaces, although dry surfaces are preferred to achieve maximum penetration into the substrate.

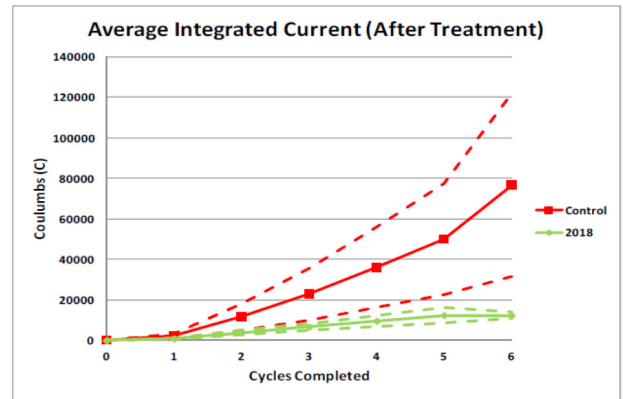
Application can be performed using airless sprayer, roller, or brush. Sprayers should be fitted with solvent hoses and gaskets. For best results, we recommend a two coat, wet on wet application technique, i.e. the surface is damp from first application but not glossy when the second coat (containing remaining recommended coverage rate) is applied. During application, precautions should be taken to protect the surrounding areas from overspray and runoff.

### CONSIDERATIONS

- Stir thoroughly before use
- Should be applied to sound, clean concrete that is free of oils, dirt, sealers, coatings, paints, membranes, or asphalt
- Should only be applied when temperatures are between 40-100 °F (5-37 °C)
- Should not be applied on extremely windy days when evaporation of the solvent would be too rapid
- Fresh concrete should be allowed to cure for 28 days before application. Allow repair material to fully cure before applying MCI®-2018
- If a coating will be used over MCI®-2018, a seven day waiting period is recommended before application of that coating. A compatibility test should be performed prior to application
- Allow 24 hours for curing if a membrane will be applied over MCI®-2018
- Should not be used on structures under hydrostatic pressure

### US BUREAU OF RECLAMATION M-82 PROTOCOL

MCI®-2018 was shown to decrease the rate of corrosion on severely corroded rebar in a concrete slab. This can be seen by the slope of the curves in the graph below. This test concluded when 80% of the control rebar cracked the surface of the cement. At this time, the concrete slabs treated with MCI®-2018 were still clean and structurally sound.



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