MCI-2020 is a surface applied, migrating corrosion inhibitor designed to penetrate through cementitious materials including concrete, mortar, and limestone. MCI-2020 migrates in both liquid and vapor (gas) phases through the pore structure, forming a protective, molecular layer on embedded reinforcement. MCI-2020 provides corrosion protection against carbonation, chlorides, and other contaminants.

**Advantages**

- Protects against corrosion caused by carbonation, chlorides, and other aggressive contaminants
- Effectively reduces corrosion rates on metals with existing corrosion
- ANSI/NSF Standard 61 Approval for structures containing potable water
- Water based and non-flammable
- Does not etch, stain, discolor, or otherwise harm glass, metals, or automotive paint
- Does not contain calcium nitrite
- Does not contain wax
- Does not require removal of sound concrete
- Allows vapor diffusion (not a vapor barrier)
- Easily applied by spray, brush, or roller
- Minimal curing time, traffic may resume minutes after application if necessary (dry to touch)
- Migrates independent of orientation (horizontal, vertical, overhead)
- Migrates up to 3 inches in 30 days
- Proven performance in both lab and field testing

**How it works**

MCI-2020 is an organic corrosion inhibitor. It is considered ambidic (mixed) inhibitors which means they protect both anodic and cathodic areas within a corrosion cell. MCI-2020 contains a synergistic blend of amino-alcohols and salts of carboxylic acids which form a protective layer on embedded reinforcement delaying the onset of corrosion as well as reducing existing corrosion rates.

**Applications**

- Preventative maintenance of existing reinforced, precast, pre-stressed, post-tensioned, or marine concrete structures
- Bridges, highways, and industrial floors exposed to aggressive environments (carbonation, de-icing salts, chemical and atmospheric attack)
- Parking garages
- Concrete piers, dams, offshore platforms, piles, pillars, pipes, utility poles, and cooling towers
- Concrete potable water structures
- As a component of Nufins High Performance Repair System (HPRS)

**Coverage**

MCI-2020 is applied in a single coat at 3.68 m²/litre to horizontal surfaces. It is applied in two coats at 7.36 m²/litre to vertical and overhead surfaces.
**Technical Data**

### Table 1, Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Organic ambiidic corrosion inhibitors</td>
</tr>
<tr>
<td><strong>Appearance</strong></td>
<td>Clear to slightly hazy, amber liquid</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>9.0-9.5 (neat)</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>1.03-1.05 kg/litre</td>
</tr>
<tr>
<td><strong>Water Vapour Transmission</strong></td>
<td>1.72 perms</td>
</tr>
<tr>
<td><strong>Shelf Life</strong></td>
<td>24 Months, when unopened</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>0-60°C, protect from freezing</td>
</tr>
</tbody>
</table>

**Corrosion rate reduction - pre-existing chlorides**

MCI-2020 treated specimens decreased the amount of corrosion up by ½ to 1/6 that of the control samples. When applying MCI-2020 after cracks appeared, it worked very well in reducing corrosion rates in samples. Study used ASTM G109 sized beams cast with 3 rebar in a triangular array. Chloride solution was ponded on the surface for 2 weeks of a 4 week test cycle. Half-cell potentials and corrosion current readings were taken monthly.


**Corrosion rate reduction - crack performance**

MCI-2020 reduced corrosion current by 72% compared to the untreated sample, and also outperformed the amino-alcohol based surface treatment.

Penetration into concrete, film forming capability, chloride displacement.

XPS analysis demonstrated the presence of inhibitor on steel rebar surfaces at levels 85 nm below the unetched surfaces (MCI-2020 M) and 75 nm (MCI-2020). The XPS results showed similar diffusion rates for the MCI and the corrosive species. The MCI-2020/ MCI-2020 M inhibitors were able to provide a protective film on the rebar surface, whereas the untreated samples were subjected to localized corrosion attack. From the XPS depth profiling, chloride was detected at depths of 60 nm from the analysis surface on the bar and at a concentration of roughly 0.44 weight percent for the untreated samples and 0.14% for treated samples, confirming displacement of the chloride ions. (NOTE: 10 nm = 100 Å)


Surface Preparation
Surfaces should be dry, clean, and free of oil, grease, efflorescence, water repellents, coatings, membranes, and asphalt. Cleaning may be done by steam cleaning, water/sand blasting.

Application
Apply MCI-2020 by spray (conventional airless or hand pressure spray equipment), brush or roller in accordance with coverage rates listed above. If applying more than one coat, allow the surface to dry enough between applications so that the second coat penetrates into the surface within 15 minutes. When applying a water repellent, coating, repair mortar, or overlay over MCI-2020 the surface should be rinsed with water, pressure washed, or blast-cleaned to remove any residue unless prior adhesion testing has been performed. Consult product specifications for more detailed application instructions.

Considerations
- Substrate and ambient temperature should be above 2°C and below 50°C
- Do not apply if temperature is expected to fall below 0°C within 12 hours after application
- MCI-2020 will not penetrate water repellents, coatings, paints, membranes, or asphalt
- If structure will be submerged after application of MCI-2020, it is recommended to use a waterproofing coating over MCI-2020 prior to submersion
- Maximum chloride content at the depth of reinforcement in structures being treated with MCI-2020 is 3.5 kg/m³. For higher levels, consult Nufins technical department
- Do not apply if precipitation is expected within 8 hours after application

Packaging
MCI-2020 is supplied in 20 and 210 litre drums.

Storage
MCI-2020 should be stored at between 0 and 60°C, however it must be protected from frost, kept out of the reach of children and away from foodstuffs. All containers should be resealed after use.
Health & Safety

Product Safety Data Sheets (SDS) are available from Nufins. SDS sheets are provided to help customers satisfy their safe handling, use and disposal needs as well as assist with any conformance requirements made locally by health and safety regulations.

SDS are continually updated to provide the very latest information to our customers. We therefore recommend contacting our head office to obtain the most recent and accurate SDS before handling and using any product.

Disclaimer

The information contained herein is to the best of our knowledge true and accurate and is given in good faith but without warranty. The user will be deemed to have satisfied themselves independently as to the suitability of our products for their own particular purpose. In no event shall Nufins be liable for consequential or incidental damages.

Users must always refer to the most recent issue of the Technical Datasheets, copies of which will be supplied on request.

Technical Support

Through our technical department and laboratories we can offer a comprehensive service to specifiers and contractors. Technical contacts are available to provide further information and arrange demonstrations.