



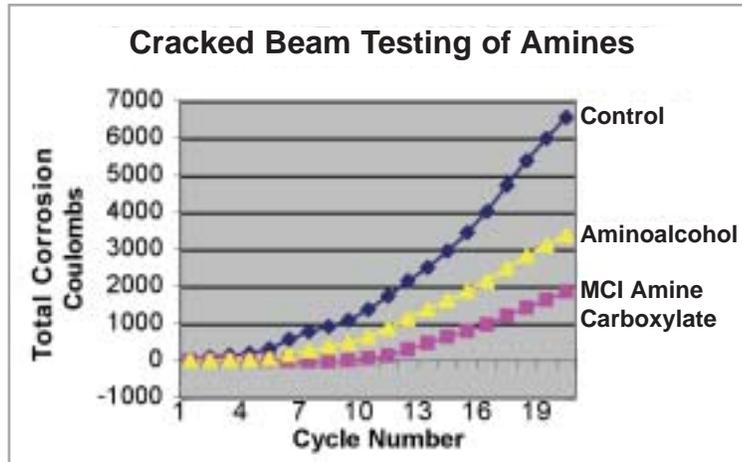
Competition Puts up a Fight

Fall brings changing leaves, cooler weather and competitive football games. Of course Jessi knows that the Packers are a much better football team than the Vikings, but it doesn't stop Cliff from trying to prove her wrong. Recently, Cortec's competition, SIKA, has changed their Ferrogard data sheets making them appear more similar to our MCI products. Since this is confusing to both our distributors and end users, we have some notes to aid you in deciphering these changes.

MCI 2020 vs. Ferrogard 903

1) Ferrogard 903 is based on Amino-alcohol technology (similar to our older, MCI 2000 series), while MCI 2020 is based on amine carboxylate technology (see diagram for corrosion protection comparison). MCI 2020 amine carboxylate technology is better than the amino-alcohol technology in terms of corrosion protection.

2) Amino-alcohols have partial + and partial - charges ($\partial+$ and $\partial-$) within each molecule that attracts them to the steel, but the overall charge on the molecule is zero, similar to what you have with water molecules. These partial charges



These free ions are attracted to the anodic and cathodic areas of the steel. Because they have an actual charge, their affinity for the steel is stronger than the affinity of partially charged pieces, which is why they are able to provide a better reduction in corro-

are attracted to both anodes and cathodes, which is how they can help reduce the amount of corrosion. MCI 2020 is a blend of organic inhibitors. Some of this blend has molecules with similar partial + and partial - charges. But, a majority of this blend consists of an amine carboxylate that reacts with the concrete as it migrates through.

sion rates than the amino-alcohol once they reach the steel.

What happens is that the amine carboxylate reacts, leaving an insoluble salt in the pore, effectively blocking some of the pores and making future ingress of chloride and other contaminants more tortuous. At the same time, the free N^+ and COO^- charged ions that are a result of this reaction, migrate towards the embedded reinforcement to provide protection.

3) Ferrogard 903 requires at least two coats, in many cases more. The total dosage rate is said to be 100 ft²/gallon (2.45 m²/liter). This has changed from past data which stated that the coverage rate was 100 ft²/gallon (2.45 m²/liter) per coat! MCI 2020 only requires one coat at 150 ft²/gallon (3.86 m²/liter) for most applications. In cases of dense concrete or vertical structures (when you aren't using MCI 2020 V/O), you would apply two coats of MCI 2020 at a rate of 300 ft²/gallon (7.72 m²/liter) for a total dosage rate of 150 ft²/gallon (3.86 m²/liter). In any case, we have a larger coverage rate, with fewer coats required,

Examples of Reports Showing the Migration of MCI Inhibitors in Concrete

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| Analysis of Diffusion Rate of Migrating Corrosion Inhibitor MCI 2000 in Concrete Using Radioactive Isotope Tagging Techniques | Alex Eydelnant, A.B. Ostrovski, PhD, and A.M. Demidov | 9/1/1993 | Institute of Construction Materials, Kurachatov Institute of Nuclear Physics; Moscow, Russia |
| Corrosion Protection of Steel Rebar in Concrete with Optimal Application of Migrating Corrosion Inhibitors, MCI 2022 | Behzad Bavarian, PhD, Lisa Reiner | 3/1/2003 | University of California-Northridge |
| MCI Modified Fairing Coat Site Evaluation | Paul Lambert | 10/1/2002 | Sheffield Hallam University |

Examples of Reports Showing Effectiveness of MCI Inhibitors in Concrete

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| Cracked-Beam Corrosion Tests of Concrete Treated With MCI 2000 and MCI 2020 Corrosion Inhibitors | Matthew Sherman, Paul Krauss | 1/1/1995 | Wiss, Janney, Elster Associates, Inc. |
| Report of Concrete Corrosion Inhibitor Effectiveness | Daniel Vruno, PE, Richard Stehly, PE | 1/1/1995 | American Engineering and Testing, Inc. |
| Long Term Corrosion Testing of MCI 2020 (November 1994-April 1999) | Dr. Masaru Nagayama, Mr. Kazuyuki Shimozawa | 4/1/1999 | General Building Research Corporation of Japan |



meaning a lower cost per square foot, and much less in labor costs for the contractors and end users.

4) The Ferrogard 903 data sheet states that you must protect glass, wood, brick, galvanized steel, and exposed aluminum during the application of the product. This is not required when you use MCI 2020, which would also lead to a savings in labor costs for the customer.

5) The Ferrogard 903 data sheet states that a minimum of one hour wait time between coats is needed; however, it also says that the concrete should be as dry as possible for best ingress of the product. Our data sheet says that one should wait several hours (7.5-8) between coats if you are applying two coats, however, this time frame can be shortened provided the concrete substrate is adsorbing the MCI 2020 and isn't saturated, allowing the product to pool and run down the surface. Also, remember that we rarely require two coats, so this normally isn't an issue. Of course the drier the concrete is, the faster the ingress of the material, but it isn't necessary to have extremely dry concrete when applying the MCI 2020 product.

6) MCI 2020 can be used under similar circumstances for chloride levels as the Ferrogard 903. (6 lbs/yd³ of chloride at the reinforcing steel, up to 10 lbs/yd³ when consulting with Cortec Technical Service for application information).

7) It is important to keep in mind that the migration rate of amino-alcohols and amine carboxylates depends on several factors, including the porosity of the concrete, temperature, and moisture conditions. In cases of poorer concrete, the MCI and Ferrogard products can migrate quickly, in the case of better quality concrete, migration rates take longer. Similarly to how quickly chlorides migrate in concrete...they go faster in poor quality concrete, and slower in bet-

ter quality concrete. The rate of migration of amino-alcohols and amine carboxylates is similar.

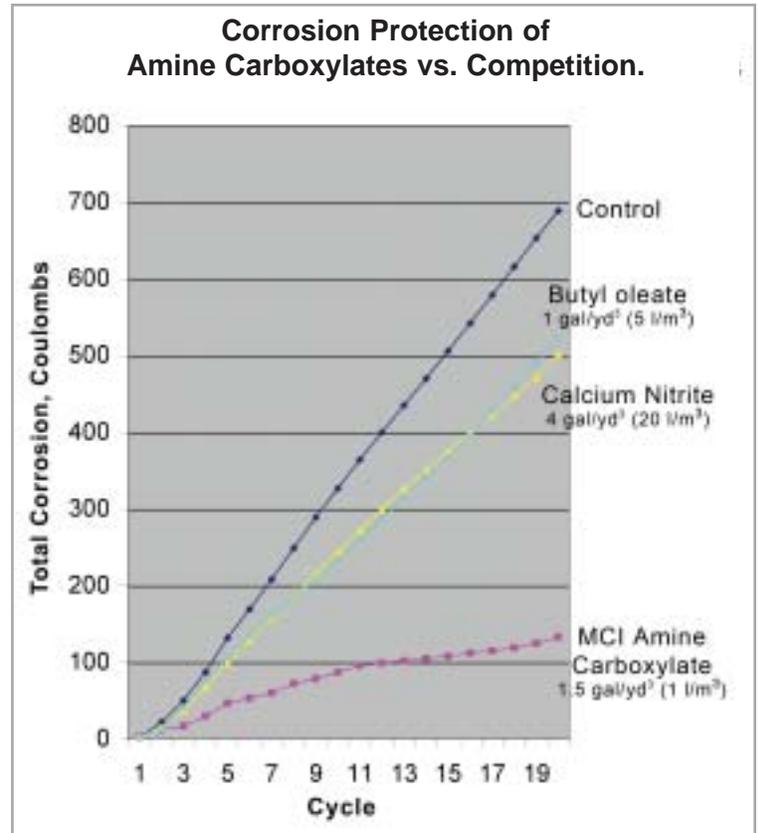
MCI 2005 NS vs. Ferrogard 901

1) Again, Ferrogard 901 is based on amino-alcohols, and MCI 2005 NS is based on Amine Carboxylates. Please see #1 and #2 under MCI 2020 vs. Ferrogard 903 for further explanation.

2) MCI 2005 NS is dosed at 1.5 pints per cubic yard. Ferrogard 901 is dosed at a rate of two to three gallons per cubic yard. MUCH HIGHER! This is why you always want to compare cost per cubic yard (or cubic meter) rather than cost per gallon. Adding the Ferrogard 903 also requires that the mix water added to the concrete be adjusted, whereas no adjustments are necessary with the MCI 2005 NS product.

3) See diagram Corrosion Protection of Amine Carboxylates vs. Competition.

4) Finally, if you wanted a direct competitor to the Ferrogard 901, you could revert to our MCI 2000 product. However, it also has advantages over the Ferrogard 901. MCI 2000 is only dosed at a rate of 1 pint per cubic yard versus two to three gallons per cubic yard, so again, compare cost based on dosage, not cost per gallon. There is also no need for adjustments to the mix water with the MCI 2000 as there is with the Ferrogard 901.



MCI 2020 in New Test

The Port Authority of New York and New Jersey has incorporated the MCI 2020 along with several competitor products into a test on a parking ramp at La Guardia Airport in New York. A total of five products will be tested and evaluated by the Port Authority for their effectiveness.

Surface preparation for the test areas included shot blasting of a 500 ft² (46 m²) test area for each product involved. MCI 2020 was applied to its test site in a one coat application at 150 ft²/gallon. The pictures shown are of MCI 2020's application to the test site, taken on Monday, November 24, 2003.

The post application testing will involve linear polarization and half cell analysis 1 month after the application, and every four months thereafter for the first year. During testing, ambient temperature, relative humidity, concrete temperature, and the amount of precipitation during



MCI 2020 has been included in a test on a parking ramp at La Guardia Airport in New York.

the preceding three days shall be recorded. The areas to be tested will be thoroughly wetted the day of testing. An evaluation will be made after one year to determine future testing. Surface frictional properties using an British Pendulum Tester (ASTM: E303) will also be performed after the migrating corrosion inhibitor has fully cured.