

## Questions & Answers

### What is CMA?

Cryotech CMA® is solid calcium magnesium acetate, a low-corrosion, environmentally safe deicer. It is used on roads, bridges, parking garages, and corporate campuses, or wherever corrosion, concrete damage, or the environment are of concern. CMA can also be liquefied in the field for anti-icing applications.

### How is CMA made?

CMA is a simple combination of dolomitic lime and acetic acid (a principal component of vinegar). CMA is produced Cryotech's plant in Fort Madison, Iowa.

### Why was CMA developed?

There has long been a concern for damage to the environment and to structures like bridges and parking garages cause by the use of chloride deicers. In the 1970's, the Federal Highway Administration (FHWA) identified calcium magnesium acetate as the only low-corrosion chemical alternative to road salt that also protected the environment. Years of research and field applications have proven CMA is no more corrosive than tap water and does not harm vegetation or receiving waters.

### How does CMA work?

CMA, like road salt, works best above 20°F (-7°C), and is used at about the same rates as salt. Applied early in the storm, CMA prevents the formation of snow pack and the bonding of ice to the pavement surface. CMA interferes with the ability of snow and ice particles to adhere to each other or to the pavement, and therefore, the loose residue can be easily removed by broom or plow.

A key to successful use of CMA is a thorough understanding of the deicer's performance characteristics. Trained and experienced operators quickly adapt their applications and plowing techniques to take advantage of CMA's unique properties.

### How can CMA be used?

- CMA can be used straight for direct application.
- CMA can be prewet with Cryotech CF7® Liquid Commercial Deicer (potassium acetate-based) to enhance its performance.
- CMA can be mixed with sand for direct application at various concentrations or to prevent the sand pile from freezing.
- CMA can be mixed with salt to reduce the corrosive nature of salt and reduce the volume of salt applied.
- CMA can be liquefied for use as a prewetting agent or for direct anti-icing applications

### How long does CMA last?

CMA tends to remain on the pavement surface longer than ordinary deicers, working longer to prevent bonding. This residual action reduces application frequency and makes snow removal easier.

The refreeze temperature of CMA solutions rises slower than dilution than sodium chloride, calcium chloride, or magnesium chloride. This feature makes it well suited for anti-icing treatments, especially for use in the pretreatment of bridge decks in anticipation of frosting, or localized icing conditions.

### Does CMA require any special handling or equipment?

No, CMA is applied with the same equipment as other deicers. Furthermore, CMA can be stored indefinitely when kept dry.

### Does CMA affect health?

CMA is essentially non-toxic. A series of oral inhalation, eye, and skin tests conducted in accordance with the U.S. Environmental Protection Agency (EPA) guidelines classify CMA as no more harmful to handle than common table salt.

### Does CMA affect the environment?

When absorbed into the soil, CMA's calcium and magnesium components benefit the soil structure, just as limiting a garden improves permeability. The acetate portion of CMA biodegrades naturally.

### Does CMA cause corrosion on roads, bridges, parking garages, etc.?

No significant corrosion of steel, aluminum, or concrete has been found in repeated tests with CMA sponsored by the FHWA, state Departments of Transportation, and private researchers.

### Does CMA act as a corrosion inhibitor?

Laboratory studies have shown that CMA, when mixed with sodium chloride at a minimum 20% by weight, inhibits salt's naturally corrosive properties. Additionally, CMA reduces active corrosion when applied on chloride-contaminated structures, extending their useful life.

### Does CMA reduce corrosion more than inhibited chloride products?

Yes, CMA is essentially non-corrosive. FHWA studies conclude that no inhibited deicers compare with CMA in minimizing corrosion to steel imbedded in concrete.

### Is CMA safe for concrete?

CMA does not chemically attack concrete, nor does it increase spalling cause by the freeze/thaw cycle of water. A study by the UK Department of Transportation concludes: "With the exception of CMA, all of the deicing chemicals tested resulted in a greater deterioration of the concrete than water alone...CMA was the only chemical on weak structural concrete which satisfied the criterion for scaling damage."

## Frequently Asked Questions

### How much does CMA cost?

The purchase price of CMA is more than salt. However, independent studies have concluded the life-cycle costs of salt can be as high as \$3000 per ton (\$3.30/kg) when considering corrosion damage and environmental impact.

### Is there government awareness of CMA?

Yes, the U.S. Federal Government allows for matching federal funds. In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA) providing states with 80% reimbursement for use of CMA on bridges, overpasses, and approaches. In 1998, the TEA-21 Act (Transportation Equity Act for the 21st Century) reaffirmed this reimbursement. Again in 2005, the federal government showed continued support by passing the SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy of Users). The FHWA has funded research to find inexpensive methods to produce CMA from biofermentation processes.

Additionally, California, Massachusetts, Michigan, Nevada, New York, New Hampshire, and Vermont have all passed legislation concerning environmentally friendly deicers like CMA.

### Is Cryotech ISO certified?

In 2002, Cryotech's Fort Madison, IA plant achieved ISO 9001:2000 certification for its quality process systems, having been previously registered to ISO 9000:1994. ISO is an internationally recognized quality model. It provides assurance to customers that the products they receive are produced and shipped under rigorous international quality standards. In 2005, Cryotech also became an ISO 14001:2004 certified company, which is primarily concerned with what the company is doing to minimize the environmental effects of its activities. Every year Cryotech is audited by an independent registrar to ensure it is continually improving its processes and maintaining the ISO standards. Cryotech is the first manufacturer in North America in its industry to receive certification to these two standards.

### Who are some of the users?

#### A small sampling:

##### Cities

Arlington Heights, IL  
Bellevue, WA  
Columbus, OH  
East Lansing, MI  
Essexville, MI  
Oak Lawn, IL

##### State DOT's

TN, TX, WA, WV  
Pennsylvania Turnpike

##### Commercial

Blue Cross Blue Shield  
Cox Health Systems  
Kentucky, University of  
Lewis Gale Hospital

Midwest Snowfighters, LLC  
Morristown Parking Authority  
Park Square Revival  
St. Mary's Hospital

## References

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- Vitaliano, D.F.**, An Economic Assessment of the Social Costs of Highway Salting and the Efficiency of Substituting New Deicing Material, Rensselaer Polytechnic Inst., Economics Dept., Troy, NY, 1991

### For corrosion:

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- McCrum, R.L.**, Corrosion and Alternate Deicers, Materials and Technology Division, MI DOT, in proceedings of: Chemical Deicers and the Environment, Michigan State University, 1992

### For concrete:

- Hancock, D.A.**, "Assessment of De-Icing Chemicals for Scaling Resistance to Various Grades of Concrete", 1995

### For environment:

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- Goldman, C.R.**, Environmental Effect of CMA on Natural Phytoplankton Populations in Ten Sierra Nevada and Klamath Mountain Lakes, in proceedings of: The Environmental Impact of Highway Deicing, UC-Davis, 1989
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