GUIDE FOR PREPARING LIQUID CMA25

Liquid CMA is gaining popularity as an alternative deicer to be used for anti-icing and prewetting of sand or other primary deicers. Users have chosen to prepare their own solutions of liquid CMA because of operational logistics related to storage or to save on freight costs. Pelletized CMA is available from various distribution points. The following information is a guide to preparing solutions of liquid CMA25™ in the field.

**What is CMA?**

CMA is calcium magnesium acetate manufactured by combining acetic acid (similar to vinegar) with high-magnesium lime. CMA was identified by the Federal Highway Administration (FHWA) in the late 1970’s as an alternative to salt for deicing highways and bridges. It has an extremely low corrosion rate, low toxicity for vegetation and animals, and biodegrades very quickly in nature. As part of the Strategic Highway Research Program (SHRP H-208B), the FHWA sponsored extensive tests to confirm the benefits of liquid CMA along with our CF7 (potassium acetate based liquid) as anti-icing chemicals to prevent the bond of ice and snow to pavement surfaces. CMA is ideally suited for roadways, bridge decks, and elevated roadways.

Information on the anti-icing advantages of CMA and CF7 (KAc) over other chloride deicers is published in the FHWA “Manual of Practice For an Effective Anti-icing Program” (Pub. FHWA-RD-95-202) June 1996. It states: “The refreeze temperature of both CMA and KAc solutions rises slower with dilution than do the refreeze temperatures of either NaCl, CaCl or MgCl. This feature makes them well suited for being used in a liquid form during anti-icing treatments. This is especially true for their use in a liquid form for the pretreatment of bridge decks in anticipation of frosting, or localized icing conditions”.

**Recommended Concentration**

A 25% CMA solution is recommended, prepared by mixing CMA at a rate of three pounds per gallon of fresh water (0.36 kg/l). At higher concentrations, some CMA may not dissolve, and the liquid tends to be more viscous (thicker) at cold temperatures. At a 25% concentration, liquid CMA has a gel point of 8°F (-13°C), a eutectic point of 4°F (-16°C), and a specific gravity in the range of 1.13-1.15 which is easily checked with a specific gravity meter. For freeze point storage concerns, various amounts of CF7 (KAc) can be added to CMA25 to lower the gel point of the fluid. (see chart next page). As a general rule, using potable water for liquid CMA addresses most concerns about water quality.

**Mixing Procedures**

CMA goes into solution quickly if vigorously agitated. Standard packaging for Cryotech CMA is 1000 Kg (2205 pounds) or 25 Kg bags (55.1 pounds) on 1000 Kg pallets. Each metric ton (1000 Kg) of CMA will require 740 gallons (2800 l) of water for a 25% solution producing about 875 gallons (3300 l) of finished product. **You must first fill your tank with the 740 gallons of water, start the agitation process, and then add the metric ton of pelleted CMA.** Some heat will be generated during the dissolving process.

For economical installations, a flat bottomed 2000 gallon polyethylene mixing tank fitted with strategically placed high volume nozzles for maximum agitation and recirculation has been very successful. The return leg should be submerged to minimize mixing air into the solution. Too much air can cause foaming and premature biodegradation. Some users report that a small amount of anti-foaming agent or biodegradable detergent improves mixing and minimizes foaming. For large volume operations it is best to mix small batches and transfer to larger storage tanks so product can be distributed to sprayers without waiting for a batch to be completed. Normally it takes 45-50 minutes to make a batch of CMA25.
**Insoluble Material**

CMA contains 1% to 3%, by weight, material that will not dissolve in water. This results from impurities in the lime used to make CMA. These particles are in the range of 1 to 100 microns, and most will settle within 24 hours after agitation is stopped. These particles are easily suspended by further agitation, and are not prone to caking. Agitation just before filling the sprayer is recommended. Most users do not filter or decant the fluid except to remove oversize contaminants when filling sprayers from the storage tank. If a clear liquid is desired, particles can be removed by decanting clear liquid and filtering to the desired particle size and clarity. The particles removed from the solution are not hazardous and may be discarded or used for localized deicing. Some users have recommended spreading the residue on sand piles to keep from freezing. When loading the sprayer unit, use a screen slightly smaller than the nozzle opening. This will prevent particles from plugging the sprayer nozzle.

**Shelf Life**

One of CMA’s environmental advantages is that it biodegrades very quickly, even at temperatures near freezing. As a solid, CMA has a shelf life of years if protected from direct precipitation. However, liquid CMA may prematurely biodegrade unless stored in closed containers. Biodegradation is initiated by common bacteria found in soils and the presence of oxygen. Agitation once a week for a short duration dramatically reduces premature biodegradation. Small quantities of commercially available biocides may be added to the solution to prevent premature biodegradation without affecting the ability of the product to biodegrade when used in the field.

**Clean-up**

Liquid CMA tends to become tacky as it dries. Mixing and dispensing equipment should be rinsed with water often to remove residual CMA that may interfere with equipment operation or maintenance. We recommend equipment be thoroughly cleaned before being placed in storage at the end of the season.

*For further assistance, please call our office at 508-520-3900*

*For freeze protection, you can add CF7® to liquid CMA – the result is a product we call CMAK™.*