

## Typical questions with regard to the application of ICE & DUST-AWAY

*ICE & DUST-AWAY* is a liquid solution of calcium magnesium acetate or CMA for short. The abbreviation is used in the text below.

### Impact on humans and animals

- Is it possible to document that CMA has no negative effects on humans and animals upon skin contact or by inhalation of relatively high vapour concentrations?  
The product is not classified as dangerous within the meaning of Directive 1999/45/EC and, therefore, is not subject to labelling. The test (acute oral mammal toxicity) showed no mortality at 2000 mg/kg. The inhalation of fumes is unlikely to occur, aerosols however should generally be avoided. If the product comes into contact with the skin, it should be washed with water.
- Are there rules of conduct for handling CMA in the event of prolonged contact with this substance? In such a case, are the occupational health and safety regulations taken into account, regulations describing how to deal with CMA upon prolonged contact (truck drivers, tractor drivers, personnel in charge of loading operations, etc.)?  
Please note the information provided on the Safety Data Sheet.
- Is CMA suited for areas where a contact with animals is to be expected?  
*ICE & DUST-AWAY* is suited for areas where dogs and cats move about as, contrary to road salt, the product does not dry out the paws of the animals.

### Impact on vegetation and groundwater

- Is it possible to document that CMA has no negative effects on soil and plant growth or, alternatively, that it is significantly less harmful than NaCl?  
A background document focusing on the eco-labelling for de-icers (“Baggrundsdocument for Svanemærkning af tømidler” at [www.ecolabel.dk](http://www.ecolabel.dk)) shows that CMA imposes significantly less strain on nature as opposed, for example, to salt. Due to the fact that the composition of the soil, the choice of the plants and the pH value vary from one location to another, the effects will be different too. Some foreign studies are also available – amongst other things “Icy Road Management Using CMA...”, New Zealand.
- Is there a risk of groundwater pollution by CMA?  
CMA is readily biodegradable. At a temperature of 20°C, more than 70% is decomposed within three days. But this process is slower at lower temperatures. When the product is decomposed, oxygen is consumed. If the groundwater level is high and the temperature is low, it is possible that acetate gets into the groundwater. Oxygen is also consumed when CMA reaches lakes and watercourses. At places with low water flow, the oxygen consumption may be important for fishes, seaweeds and

the like. Calcium and magnesium mix with the soil particles. When acetate is decomposed and  $\text{Ca}^{++}$  as well as  $\text{Mg}^{++}$  “change places” with, for example,  $\text{H}^+$ , the result can be a shift of the pH value in the soil. Several investigations were carried out abroad in order to clarify to what extent heavy metals can be released in this case.

## Corrosion

- Corrosion of asphalt and concrete?  
Own tests were carried out only on concrete and asphalt (test specimens were left in the CMA solution and/or in the water up to 240 hours). No difference was found between the test specimens that were left in the water and in the CMA solution.
- Corrosion of iron and metals?  
Force Technology has conducted corrosion tests on aluminium, steel and hot-dip galvanised iron according to ASTM F 483 and AMS 1435 A. CMA is within the acceptance criteria.

## Technology in connection with supply, storage and application of CMA

- Production speed, delivery speed?  
If made by tanker, delivery within one week.
- Requirements for tank systems (stirring, filter, cleaning)?  
It is of advantage to stir the product in order to avoid the formation of deposits in the tank. The tank should be cleaned with water after the season has ended.
- Cleaning of the equipment?  
Rinse nozzles with water when the vehicle is not driven for a week. At the end of the season, clean the whole equipment with water.
- Dosage under different road and weather conditions?  
See Dosage Instructions.

## Effect of calcium magnesium acetate

- Mode of action of CMA?  
CMA has a lower freezing point than water and, for this reason, it melts snow or ice (freezing point depression).
- Preventive action avoiding in advance that surfaces become slippery, on ice, on snow?  
If CMA is used preventively – which is the best thing – the product sticks to the road surface and continues to melt snow or ice, so that snow and ice can not freeze on the

road. If an ice layer has already formed, CMA improves the friction on the ice at first. When the product breaks up the ice layer by drilling holes down to the pavement, the ice-pavement interface will be weakened, the lower side of the ice will melt and the ice layer will crack. In case of snow, it is best to clear first the road and then to apply CMA onto the surface in order to use the melting effect not only for melting snow.

- Viscosity in relation to temperature?  
See Data Sheet.
- Layer formation when stored in tank systems?  
The product forms no layers (with regard to the concentration), but a small amount of sediment will occur if the storage is carried out without stirring or transferring the product.
- Impact on the wastewater treatment plant (where rainwater is currently discharged into the treatment plant)?  
In normal use, the product does not adversely affect the wastewater treatment plant. Acetic acid (acetate is a component of the acetic acid) is used as carbon source in wastewater treatment plants, because it is quickly transformed. Calcium and magnesium are present in tap water anyway (they render the water hard).

### Cost-effectiveness

- The price per tonne of CMA is higher than that of conventional road salt. Why is CMA, from an economical point of view, the better choice?  
Looking isolated at the purchase costs, ICE & DUST-AWAY is more expensive than conventional road salt. This is due to the fact that the raw materials for manufacturing CMA are more expensive than those for producing chlorides. But in a long term and socio-economic perspective, the overall economy is quite a different matter. Conventional road salt is based on chloride salts that are toxic to plants and can affect groundwater in a negative way. Furthermore, it is known that road salts are at least 5-10 times more corrosive than CMA as regards the formation of rust. De-icers containing chloride cause corrosion damage on many kinds of material when they are applied. The enormous costs for damage to health caused by dust particles in the air are also a factor. A study of the EU has shown that more than 300,000 citizens in Europe die every year due to air pollution.