

Appendix A: Cold Weather Tech Brief TB 1903328

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PRELIMINARY



TECHNICAL BRIEF

180 River Road • Rio Vista, CA 94571 • +1 707-374-6800 • US Toll Free 888-800-3691
www.lindsaytransportationsolutions.com

ABSORB-M™ Anti-Freeze Solutions

In regions where the water filled ABSORB-M™ elements could become frozen, proper antifreeze agents should be used. Care should be taken to ensure that proper antifreeze agents are used in accordance with local regulations, environmental concerns and ensuring that any post impact liquid on the road surface does not constitute an undue hazard to adjacent motorists.

The information outlined in this document is intended to provide a general guide to ABSORB-M™ users for choosing, calculating, and applying anti-freeze solutions. The actual method and implementation of an anti-freezing solution should be determined by state and local standards and in accordance with the specific manufacturers' instructions.

Possible Anti-Freeze compounds include:

- Calcium Chloride, CaCl₂
- Calcium Magnesium Acetate, CMA
- Magnesium Chloride, MgCl₂
- Sodium Chloride, NaCl
- Potassium Acetate, KAc

Considerations for choosing an Anti-Freeze should include environmental impact on local vegetation and waterways, corrosion of existing structures, and the effect on concrete or asphalt roadways. Transportation, installation, and handling of the material should also be considered. The examples listed above are products commonly used on highways as de-icing road and bridge conditioners and for dust control. Specific information pertaining to these products regarding said considerations should be readily available from the product supplier or manufacturer.

The correct mixture of Anti-Freeze and water is critical to insure proper ice protection and performance of the ABSORB-M™ crash cushion. The freezing capacity depends on the particular chemical and the solution concentrate by percent weight of the solution. Both too little and too much solution will result in diminished freezing capacity. The ideal solution concentration for maximum capacity is specific to the chemical chosen. It may be desirable to reduce the concentration for cost savings if the maximum capacity is not necessary.

Depending on the form the chemical is provided; such as a fluid, powder, or pellet; the actual amount of the desired chemical may not constitute 100 % of the material by weight. It is important to account for the actual weight of the deicing chemical when mixing the solution.

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A typical solution recommended by some customers is Calcium Chloride. The ideal solution for maximum capacity is 29% by weight Calcium Chloride providing a freezing temperature of -53°F (-47°C). This solution is commonly used as a road-deicing agent, thus satisfying particular environmental regulations. It is available as a fluid solution of definite concentration or pellets and flakes in various sized bags. If purchased in flake or pellet form, care must be taken in dissolving it in water. Also, the concentrate must be calculated from the actual Calcium Chloride content. For example, if the flake/pellet agent purchased has a Calcium Chloride content of 80% and a 29% solution by weight is desired, the quantity added must account for the impurity of the agent. These principles apply to many various anti-freezing chemicals. Refer to the manufacturer or supplier for how to calculate the quantity of agent to add to the ABSORB-M™ element based on the actual chemical and agent used, given the ABSORB-M™ Data shown below.

ABSORB-M™ Data

Fluid Capacity of (1) ABSORB-M™ Element: **250 Gallons** (947 Liters), **33.4 ft³** (.947 m³)
Weight of Water at 30° F (0° C): **62.4 lb/ft³** (999.6 kg/m³) ≈ **2086 lb** (947 kg) **H₂O/Element**

Anti-Freeze Chemical Companies

The following Companies are manufacturers of deicing chemicals. These are just a few examples. These companies or their local distributors should be able to supply further information and options for your application.

Dow Chemical Company
USA or Canada (800)-447-4369
Worldwide (989)-832-1466
www.dow.com
Contact for local Distributor, or find on Web Site

Cargill Salt
(888)-385-7258
Highway and Specialty Deicing Customer Service (800)-600-7258
www.cargillsalt.com
Contact for information and distribution

Cryotech Deicing Technology
Main Office and Plant – Iowa (800)-346-7237
www.cryotech.com
Contact for information, Branch Offices, and distribution

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