



**Description**

Lithium Acetate / Potassium Acetate 45% Aqueous Solution

**Typical Properties**

|                      |                                       |
|----------------------|---------------------------------------|
| Density @25°C (77°F) | 1.248 g/cm <sup>3</sup> (10.4 lb/gal) |
| Appearance           | Clear to slightly tan clear solution  |
| pH at 25°C           | 10.8 -11.4                            |
| Flash Point          | Nonflammable                          |

**What is ASR ?**

Alkali-silica reactivity (ASR) is a chemical reaction that occurs between the reactive silica in aggregates used to make concrete and the alkalis (sodium or potassium) present in the concrete mix or from external sources. The reaction causes the formation of a gel that absorbs water and swells, exerting stresses that can lead to cracking, popouts and premature deterioration of the concrete. The deterioration weakens the matrix so the concrete can be further damaged by traffic loading, vibrations and environmental stresses such as freeze-thaw cycles or steel corrosion.

Recent studies by the Innovative Pavement Research Foundation (IPRF) under Federal Aviation Administration (FAA) funding indicated that onset of ASR in ASR susceptible airfield pavements could be accelerated by the use of potassium acetate anti-icers / deicers. It is theorized that at least a portion of the deleterious effect is due to these deicers providing an external source of potassium alkali. Details can be obtained from the IPRF website at <http://www.iprf.org>

Studies are continuing to further evaluate the problem. FMC drew from its experience in control of ASR in concrete based on its Lifetime® lithium technologies to modify the potassium acetate deicers to develop a new deicer, LithMelt, that in laboratory tests has been shown to be effective in preventing the onset of ASR.



Fig. 1 – ASR Affected airport pavement

**Product Description**

LithMelt™ anti-icing / deicing liquid is a specially formulated material comprising potassium acetate modified with lithium acetate to prevent the deleterious effects of standard potassium acetate on ASR. The technology was derived from research conducted under the Strategic Highway Research Project (SHRP) which demonstrated that ASR could be controlled by the use of lithium salts in fresh concrete (See SHRP C-343). These tests showed control of ASR

**Air Treatment Construction Energy Fine Chemicals Glass & Ceramics Greases & Lubricants Polymers Pool Water Treatment**

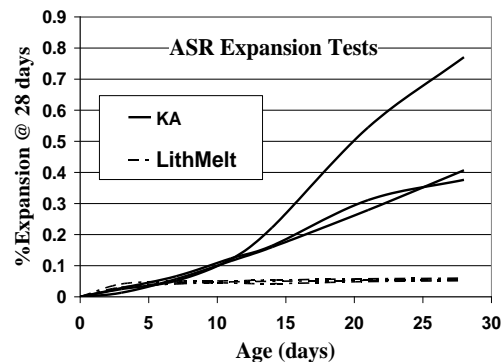
|                |  |   |   |  |  |  |
|----------------|--|---|---|--|--|--|
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|----------------|--|---|---|--|--|--|



expansion was obtained when a sufficient amount of lithium ion was supplied in the mix. Testing also showed that if ASR affected concrete is treated with sufficient lithium, then ASR expansion can be significantly reduced.

FMC built on these findings to develop LithMelt as an environmentally safe anti-icer / deicer whereby the lithium in the material counteracts the negative effects of potassium acetate for ASR, while maintaining the deicing properties of potassium acetate.

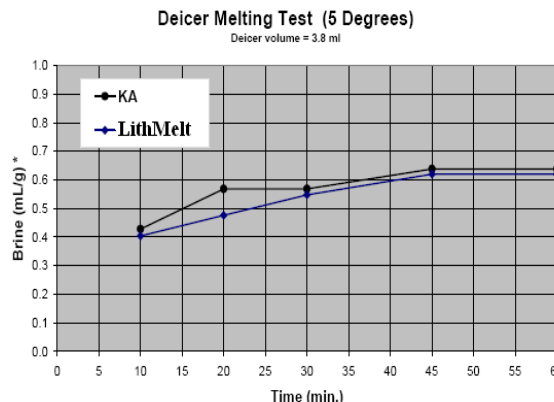
Significant testing was conducted on LithMelt to show that it does not promote ASR in concrete as other alternative deicers do.



LithMelt is not designed to treat already existing ASR in concrete, but it will prevent its acceleration. For pavement that has already shown effects of ASR due to other deicer use, it is recommended that the owner consider treatment of the pavement with Renew® concrete treatment, followed by the use of LithMelt during the snow season, followed by a second treatment with Renew at the end of the season. Contact FMC for details.

## Effectiveness

LithMelt has been tested at a reputable independent laboratory to test effectiveness vs. standard 50% potassium acetate deicers (KA). Ice melting was determined using SHRP H-205.2, "Test method For Ice Melting of Liquid Deicing Chemicals". Test Results showed that LithMelt is equivalent to KA at all temperatures.



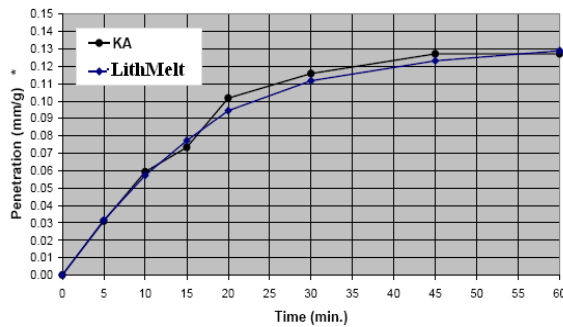
Ice penetration was tested according to SHRP H 205.4, "Test Method for Ice Penetration of Liquid Deicing Chemicals." Results are given as depth of penetration vs. time at three different temperatures (see graphs below). LithMelt performed similarly to KA.

Ice undercutting was tested according to SHRP H-205.6, "Test Method for Ice Undercutting by Liquid Deicing Chemicals." Results are reported as area of ice undercut per milligram of deicer used. LithMelt performed the same as KA.

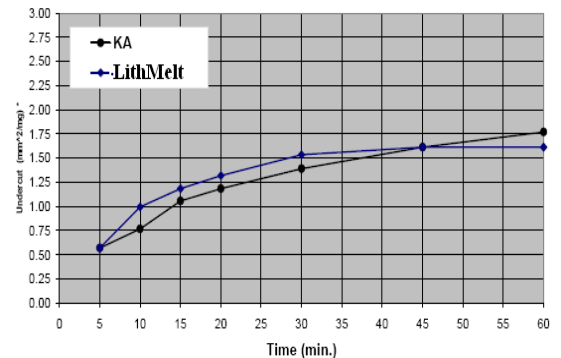


All test methods can be found in the Strategic Highway Research Program publication "Handbook of Test Methods for Evaluating Chemical Deicers" by the National Research Council designated SHRP-H-332.

Deicer Penetration Test (15 Degrees)

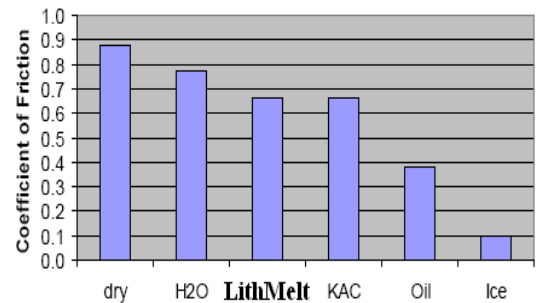


Deicer Undercutting Test (15 Degrees)



Friction tests were performed using an Apparatus designed to measure kinetic friction of a rubber block over a substrate (pavement) sample. The output friction numbers in this test were designed to give results for friction comparable to those given by a SAAB friction tester. Each chemical was applied at rates of 0 and 20 gallons per 1000 ft<sup>2</sup>. For Purposes of comparison at the 20 gal level a wet film is formed. Test results showed that LithMelt is equivalent to potassium acetate.

Lab Friction - Sliding Block Deicer Tests



LithMelt meets all AMS 1435 specifications. Like similar potassium acetate deicers, LithMelt does not contain urea or glycols, is biodegradable and has low toxicity towards fish, mammals and vegetation

**Usage**

LithMelt applications rates are the same as 50% potassium acetate deicers. Use 0.5 gals/1,000 ft<sup>2</sup> for anti-icing, and 1-3 gallons/1,000 ft<sup>2</sup> depending on thickness of ice. Plow fresh snow and ice to prevent product dilution and reapply as necessary. LithMelt can be applied using existing equipment.

Note: Patent Pending

## Toxicity / Safety Data

Colorless solution with slight vinegar-like odor. This product is mildly irritating to the skin and may be irritating to the eyes, respiratory tract and mucous membranes.

*COMPLETE INFORMATION ON TOXICITY AND SAFETY IS CONTAINED IN THE FMC MATERIAL SAFETY DATA SHEET (MSDS) AVAILABLE FOR THIS PRODUCT.*

## Handling/Storage

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use with adequate ventilation. Wear safety glasses or goggles and rubber gloves. Wash thoroughly after handling. Keep away from strong acids. Keep container closed.

## Shipping Containers

LithMelt deicer is shipped in bulk in tank trucks, 4,500 gal (17,000 L) maximum load per tank truck. Smaller containers available upon request.

## Shipping Limitations

Shipments of LithMelt are not classified as hazardous in transport. Shipments by post, parcel (e.g. UPS), air, water, rail, or road are acceptable within each carrier's weight limits and packaging requirements.

For shipments within Europe labeling for supply requirements are:

|             |                                |
|-------------|--------------------------------|
| Xn          | Harmful                        |
| R&S phrases | see Material Safety Data Sheet |

Responsible Care initiative dictates that all shipments of lithium chemicals must be transported in a DOT-approved vehicle in a responsible manner (i.e., no flat bed trucks).

