

# **Guidelines For Anti-icing Table of Contents**

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**Guidelines For Anti-icing**

# INTRODUCTION

The Mn/DOT Anti-icing Committee has formulated this booklet to assist with the introduction of anti-icing to the arsenal of winter storm fighting tools. The committee is made up of various employees and management involved with the use and implementation of anti-icing practices throughout the State of Minnesota. The information contained herein is intended as a basic guideline only. This in no way constitutes a specific numbered process or procedure for the use of anti-icing material, chemicals, or equipment. The successful use of anti-icing is a learning process of which knowledge through experience is gained. The use of anti-icing can be a very beneficial tool when used in conjunction with other best practices and methods for snow and ice control.

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## **MN/DOT ANTI-ICING GUIDELINES**

### **A. DEFINITIONS:**

Anti-Icing: The application of liquid chemicals\* to prevent the formation of frost or the bonding of snow or ice to pavement. Initial applications can be made either as a pre-treatment in advance of a storm event, or as an early storm period treatment.

Black Ice: Popular term for a very thin coating of clear ice which forms on a pavement or bridge deck surface.

Working Temperature: Range of pavement temperatures at which chemical will effectively melt ice.

\*In rare instances solids may be used.

### **B. WHEN TO APPLY:**

1. Application Schedule: Regularly scheduled applications twice per week on bridge decks and critical areas or on black ice and routes prior to events.
2. Residual effect can remain for up to five days after application if the precipitation does not dilute the initial application. Refreezing of the surface can occur when precipitation or moisture in the air dilutes the chemical on the surface.
3. Magnesium Chloride: pavement temperature –10 degrees F to + 30 degrees F.
4. May be used at lower temperatures with high traffic volume roads.

5. Application - preferred times are during off peak ADT hours.
6. Other chemicals may be applied at different pavement temperature (see Appendix A.)

**C. APPLICATION RATES:**

	<u>Mag</u>	<u>Brine</u>
1. Regularly Scheduled Applications	15 to 20 Gal/LM	20-35 Gal/LM
2. Prior to Frost or Black Ice Event	15 to 20 Gal/LM	20-35 Gal/LM
3. Prior to Light or Moderate Snow*	15 to 20 Gal/LM	20-50 Gal/LM
*Used as bond breaking agent		

**D. WHEN NOT TO ANTI-ICE:**

1. Prior to predicted rain.
2. During heavy snow (1 inch/hour events). Heavy snows will cause the rapid dilution of chemicals and require frequent reapplication of liquid. During this time a snow fighter may need to switch to de-icing methods (may include liquids) for their area.
3. Under blowing or drifting snow conditions.
4. After the bond between in the snow and the pavement has occurred.

**E. PRECAUTIONS:**

1. Use caution especially with higher rates

2. Refreezing of bridge deck or pavement surfaces can occur if the applied chemical is significantly diluted or pavement temperature decreases. Need to know the lowest working temperature of applied chemical to determine minimum freezing point depression (See Appendix A.).
3. Pavement slipperiness with the use of liquid magnesium chloride and calcium chloride is possible after application under certain temperature and humidity condition. (Example: temperature above 30 F and humidity level greater than 40%).
4. When blowing and drifting snow conditions exist. Anti-icing chemicals on a dry pavement or bridge deck may cause blowing snow to stick and create slippery conditions.
5. Corrosion inhibitors that reduce material corrosion to 70% less than sodium chloride are to be used with liquid magnesium and calcium chloride.
6. Buildup of oils and rubber residues on pavement surfaces and bridge decks may become slippery after the application of liquid anti-icing chemicals. If no significant precipitation has occurred within seven days, assure that these conditions do not exist prior to application.

## **F. BENEFITS OF ANTI-ICING:**

1. Accident Reduction.
2. More rapid bare lane regain times.
3. Reduce de-icing material, labor, and de-icer residue.
4. Reduce winter clean-up work and costs.
5. Reduce accumulation of sand in drainage structures and beneath guardrails.

## **G. NOZZLE RECOMMENDATIONS:**

1. Eight holes minimum
2. Solid Stream
3. Bar height 12-14 inches

## H. QUESTION AND ANSWER

Q: Does MgCL need to dry to be effective?

A: No, It is still effective when wet.

## REFERENCES

Pacific Northwest Snowfighters

AASHTO "Guide for snow and ice control", 1999

FHWA "Manual of Practice for an Effective Anti-icing Program" Publication No. FHWA-RD-95-202, June 1996

A Guide for Selecting Anti-icing Chemicals Version 1.0 by Wilfrid A. Nixon and Anissa D. Williams, University of Iowa, IIHR Technical Report No. 420, October, 2001

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## CHEMICAL AND VENDOR TABLE

Alternative  
Chemicals  
2003-2004

Approved  
= A

Vendor/

Under

Cost

Districts

Testing=T

Manufacturer

Contract

**Sodium Chloride Products**

Salt Brine	A	Mn/DOT	No	\$.10 per gal	
LCS 1000	T	Envirotech	Yes	\$.59 per gal	6B-3B-Metro
LCS 5000	T	Envirotech	Yes	\$1.35 / gal	6B-3B-Metro

**Magnesium Chloride Products**

Caliber M1000	T	Envirotech	Yes	\$.73- &1.50 /gal	1A - Metro
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Caliber  
M2000

T

Envirotech

Yes

\$.825-  
\$1.65/gal

1A -  
Metro

Meltdown Zero with Shield LSW	A	Envirotech	Yes	\$.43- \$1.42/gal	All but 4
Univar with Anderson Additive	T	Erickson Truax, Inc	Yes	\$.43- \$.52/gal	1
Magnesium Chloride Pellets	T	Envirotech	Yes	\$444- \$783/ton	6A, flakes also

**Calcium  
Chloride  
Products**

Excel Calcium Chloride (pellets)	A	Scotwood Industries	Yes	\$7.99/ton	1A - 6A - 7W
Anderson's Calcium	T	US Environment	Yes	\$.734- \$.815/gal	7E

**Acetate  
Products**

Cryotech CF7 (Potassium Acetate)	A	Cryotech Deicing Tech	Yes	\$2.64/gal	4 , Metro, 6A
Cryotech CF7 (Potassium Acetate)	A	V & Associates	Yes	\$3.36- \$3.92/gal totes	6A

For questions concerning chemical contracts call: Robert Vasek 651-297-5113

