

## Mn/DOT ALTERNATIVE CHEMICAL DEICER SPECIFICATIONS

### A. Product General Specifications

Only Mn/DOT Approved Alternative Chemicals shall be permitted for use. The prescreening process and requirements for winter chemicals can be found at:

<http://www.dot.state.mn.us/maint/research/chemical/Winter%20Chemical%20Certification.pdf>

### B. Liquid Corrosion Inhibitor / Salt Brine Additive Specification

Active ingredient in the product offered will be tested by Evaporation Method according to Test Method on file with the Mn/DOT Chemical Laboratory. Test results shall be within 5.0% of the concentration listed on the manufacturer's product data sheet.

The resulting salt brine, when treated according to manufacturer's recommendation, shall be at least 70% less corrosive than Sodium Chloride. The corrosion tests will use the National Association of Corrosion Engineers (NACE) Standard TM-01-69 (1995 rev.) modified to use 30mL of a 3% chemical product solution per square inch of coupon surface area.

### C. Liquid Corrosion Inhibited Sodium Chloride Solution Specification

Active ingredient in the product offered will be tested by Silver Nitrate Titration according to Test Method on file with Mn/DOT Chemical Laboratory. Test result for sodium chloride content shall be within 2.0% of the concentration listed on the manufacturer's product data sheet.

The product offered shall be at least 70% less corrosive than Sodium Chloride. The corrosion tests will use the National Association of Corrosion Engineers (NACE) Standard TM-01-69 (1995 rev.) modified to use 30mL of a 3% chemical product solution per square inch of coupon surface area.

### D. Liquid Corrosion Inhibited Magnesium Chloride - Rock Salt Pre-Treating Solution Specification

The product offered will contain corrosion control inhibitor in quantities not less than those indicated by the responder. The finished deicing product, including corrosion inhibitors, must be completely formulated at the original manufacturing plant location. **Post adding of corrosion inhibitors or any other ingredients, other than anti-foaming agents, is unacceptable after the product has left the original manufacturing plant.**

The responder **must submit test data** that indicates the percent concentration of Magnesium Chloride in the deicer solution is a minimum of 24.0%. The test method to determine magnesium chloride is Mn/DOT EDTA Titration Method. Test method is on file with Mn/DOT Chemical Laboratory.

The product offered will not contain greater than 1% (v/v) insoluble solids and will have 99% of the solids passing through a No. 10 Sieve after being stored at 0°F (-17.8 °C) +/- 2°F (1 °C) for 168 hours (seven days).

The product shall have a minimum storage life of one year without degradation or addition of stabilizers or inhibitors

#### **E. Liquid Corrosion Inhibited Potassium Acetate Solution Specification**

The product offered will contain corrosion control inhibitor in quantities not less than those indicated by the responder. The finished deicing product, including corrosion inhibitors, must be completely formulated at the original manufacturing plant location. **Post adding of corrosion inhibitors or any other ingredients, other than anti-foaming agents, is unacceptable after the product has left the original manufacturing plant.**

The responder **must submit test data** that indicates that the percent concentration of Potassium Acetate in the deicer solution is 48.0-52.0%. The test method used to determine the percent potassium acetate shall be by Evaporation Method. Test method is on file with the Mn/DOT Chemical Laboratory.

The product offered will not contain greater than 1% (v/v) insoluble solids and will have 99% of the solids passing through a No. 10 Sieve after being stored at 0°F (-17.8 °C)+/- 2°F (1°C ) for 168 hours (seven days).

The product shall have a minimum storage life of one year without degradation or addition of stabilizers or inhibitors.

#### **F. Solid Corrosion Inhibited Sodium Acetate Pellet Specification**

The product offered will contain corrosion control inhibitor in quantities not less than those indicated by the responder. The finished deicing product, including corrosion inhibitors, must be completely formulated at the original manufacturing plant location. **Post adding of corrosion inhibitors or any other ingredients is unacceptable after the product has left the original manufacturing plant.**

The responder **must submit test data** that indicates that the percent concentration of Sodium Acetate in the deicer is a minimum of 95%. The test method used to determine the percent sodium acetate shall be by difference from the Insoluble Material. Test method is on file with Mn/DOT Chemical Laboratory.

The product shall have a minimum storage life of one year without degradation or addition of stabilizers or inhibitors.

#### **G. Liquid Corrosion Inhibited Magnesium Chloride Solution Specification**

The product offered will contain corrosion control inhibitor in quantities not less than those indicated by the responder. The finished deicing product, including corrosion inhibitors, must be completely formulated at the original manufacturing plant location. **Post adding of corrosion inhibitors or any other ingredients, other than anti-foaming agents, is unacceptable after the product has left the original manufacturing plant.**

The responder **must submit test data** that indicates the percent concentration of Magnesium Chloride in the deicer solution is 26.0 – 30.0%. The test method to determine magnesium chloride is Mn/DOT EDTA Titration Method. Test method is on file with Mn/DOT Chemical Laboratory.

The product offered will not contain greater than 1% (v/v) insoluble solids and will have 99% of the solids passing through a No. 10 Sieve after being stored at -0°F (-17.8 °C) +/- 2°F (1°C) for 168 hours (seven days).

The product shall have a minimum storage life of one year without degradation or addition of stabilizers or inhibitors.

#### **H. Liquid Corrosion Inhibited Calcium Chloride Solution Specification**

The product offered will contain corrosion control inhibitor in quantities not less than those indicated by the responder. The finished deicing product, including corrosion inhibitors, must be completely formulated at the original manufacturing plant location. **Post adding of corrosion inhibitors or any other ingredients, other than anti-foaming agents, is unacceptable after the product has left the original manufacturing plant.**

The responder **must submit test data** that indicates the percent concentration of Calcium Chloride in the deicer solution is 30.0 – 34.0%. The test method to determine calcium chloride is Mn/DOT EDTA Titration Method. Test method is on file with Mn/DOT Chemical Laboratory.

The product offered will not contain greater than 1% (v/v) insoluble solids and will have 99% of the solids passing through a No. 10 Sieve after being stored at -20°F (-29°C) +/- 2°F (1°C) for 168 hours (seven days).

The product shall have a minimum storage life of one year without degradation or addition of stabilizers or inhibitors.