

**Attachment C**  
**CORROSION INHIBITOR FOR SODIUM CHLORIDE BRINE**  
**(CLEAR ROADS PRODUCT CATEGORY A3)**

**2. General Specifications**

This section provides the product specifications. Products that contain any constituent in excess of the following established total concentration limits (as tested in accordance with the listed test methodology from Section 3) will not be acceptable.

Liquid products shall be tested as received. Solid salts are to be diluted to a 25% (W/V) concentration and then tested as if the material was a liquid sample. Report only the values determined from the 25% solution for all the parameters as compared to the specification limits. Do not back calculate the concentration of the parameters to the dry weight of the material.

All liquid deicers must successfully complete the National Association of Corrosion Engineers (NACE) Standard TM0169-95, as modified by Clear Roads, and found to have a Corrosion Value of at least 70% less than that of Sodium Chloride (salt).

Section 2.1 contains Table 1, which lists the general specification limits, which are applicable to all products on the QPL. Section 2.2 contains Table 2, which lists the informational requirements for the liquid products and solids products to be used as liquids for application purposes. Section 2.3 provides category-specific specifications.

**2.1 Specified Limits**

**Table 1. Specification and Method of Determination**

Test	Specified Limits	Method Name
Corrosion Rate (corrosion inhibited products only)	varies <sup>1</sup>	Test Method 5
Phosphorus	≤ 2500. ppm	Test Method 7
Cyanide <sup>2</sup>	≤ 0.20 ppm	Test Method 8
Arsenic	≤ 5.0 ppm	Test Method 9
Barium	≤ 100.0 ppm	Test Method 9
Cadmium	≤ 0.20 ppm	Test Method 9
Chromium	≤ 1.0 ppm	Test Method 9
Copper	≤ 1.0 ppm	Test Method 9

<sup>1</sup> All liquids and liquids intended to be applied as solids must be at least 70% less corrosive than sodium chloride and have a corrosion effectiveness rate of 30% or less. For corrosion inhibited solids, refer to the product category specifications.

<sup>2</sup> Salt for highway use is usually treated with either Ferric Ferrocyanide, also known as Prussian Blue, or Sodium Ferrocyanide, also known as Yellow Prussiate of Soda (YPS), to prevent the salt from caking. The amount of Prussian Blue added is 70 to 165 parts per million (ppm), equivalent to 0.33 to 1.14 pounds per ton of salt. YPS is added in the amount of 50 to 250 ppm, equivalent to 0.1 to 0.5 pounds per ton of salt. YPS is also used as an anti-caking agent in table salt, and has approval of the U.S. Food and Drug Administration. Based on exhaustive testing no evidence of toxicity was demonstrated. If used, the presence of these products will not be assessed towards the total cyanide concentration when testing this product. However, the total cyanide concentration of the original material must meet specifications.

Vendor may bid this product with or without the anti-caking agent. Vendors must note on the Sample Checklist if the sample does contain anti-caking agent or not, and if so, what type. If the Vendor chooses not to add the anti-caking agent it does not prevent the vendor from assuring that the delivered product is in a free-flowing state.

Test	Specified Limits	Method Name
Lead	≤ 1.0 ppm	Test Method 9
Selenium	≤ 5.0 ppm	Test Method 9
Zinc	≤ 10.00 ppm	Test Method 9
Mercury	≤ 0.05 ppm	Test Method 10
pH	varies	Test Method 4

The analytical results shall reflect testing to the specified limit or below. For example, the specified limit for Cadmium is 0.20 ppm; therefore, the supplied analytical results need to reflect testing to that limit or below. A submitted value of less than 1.00 ppm is not acceptable.

## 2.2 Informational Requirements

For all liquid products and solid products intended to be used as liquid for application purposes.

**Table 2. Information and Method of Determination**

Test	Specified Limits	Method Name
Toxicity	Sample measurement as determined by an Independent Laboratory	Test Method 15
Ammonia – Nitrogen	Sample measurement as determined by an Independent Laboratory	Test Method 16
Total Kjeldahl Nitrogen	Sample measurement as determined by an Independent Laboratory	Test Method 17
NO <sub>3</sub> - & NO <sub>2</sub> - as Nitrogen	Sample measurement as determined by an Independent Laboratory	Test Method 18
Bio. Oxygen Demand	Sample measurement as determined by an Independent Laboratory	Test Method 19
Chem. Oxygen Demand	Sample measurement as determined by an Independent Laboratory	Test Method 20
Frictional Analysis	Sample measurement as determined by an Independent Laboratory	Test Method 21
Specific Gravity <sup>3</sup>	N/A	Test Method 2

## 2.3 Chemical Product and Inhibitor Product Categories

### A. Chemical Product Category 1 – Corrosion Inhibited Liquid Magnesium Chloride

#### (1) The product must meet the following requirements:

- a. General Specifications in Tables 1 and 2.

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<sup>3</sup> Specific gravity chart with correlating weight percentage and freeze point information presented in 1% increments beginning with a five percent solution. The chart must contain information up to, including, and exceeding, by 5% (or the solubility limits of your product) the concentration being submitted for evaluations.