TREATED SALT MGS-18-01A

1.0 SCOPE. This specification covers sodium chloride, obtained from natural deposits (rock salt) or produced by man (evaporated, solar, other) treated with an approved corrosion inhibited product for use as a de-icer for maintenance purposes.

2.0 MATERIAL.

2.1 Chemical Composition. The minimum percent sodium chloride (NaCl) shall be as follows for the material ordered, when tested in accordance with MoDOT Test Method T32 included in Annex A of this specification.

Name	Minimum % NaCl
92% Sodium Chloride	92

Treated Salt will contain an approved corrosion inhibited Liquid Magnesium Chloride from the approved list of the Pacific Northwest Snowfighters Qualified Product List (PNS QPL). This product shall be listed on the certification of each lot of material.

2.2 Agricultural Processing Residue. The magnesium chloride based product will also contain an agricultural processing residue that will decrease corrosiveness of the overall compound as well as prevent leaching of the treating solution. Agriculture Processing Residue Products (APRP) is the concentrated liquid residues from the processing of grains and other agricultural products. They are derived from the processing of agricultural raw materials, primarily corn and beets. The liquid residues are typically combined with chloride solutions and/or rock salt and the resulting mixture is applied to road surfaces and bridge decks for the purpose of anti-icing or de-icing.

2.3 Application Rate of Corrosion Inhibited Liquid Magnesium Chloride. The application rate shall be one (1) ton of salt mixed with seven (7) gallons, plus or minus (+/-) one-half (1/2) gallon of PNS QPL approved corrosion inhibited liquid magnesium chloride.

2.4 Gradation. The gradation shall conform to the following requirements:

Sieve Size	Percent Passing (by weight)
1/2 inch	100
3/8 inch	95 - 100
No. 4	15 - 95
No. 8	5 - 65
No. 30	0 - 15

2.5 Condition. The treated sodium chloride shall arrive at the delivery point in a free-flowing and usable condition.

2.6 Moisture. The moisture content at the delivery point shall not exceed 2.0 percent based on dry weight.

2.7 Foreign Material. Treated salt shall be relatively free from any foreign material at the delivery point. Residue from truck beds such as coke, grain, or other materials not germane to sodium chloride will be cause for rejection. Any oversize foreign material will result in immediate rejection.

3.0 PACKAGING.

3.1 The treated salt shall be delivered in bulk lots.

3.2 The supplier shall furnish the truck driver a copy of the bill of lading, manifest, or truck ticket to be delivered to the Missouri Department of Transportation personnel prior to unloading, showing the following information regarding the shipment:

(a) Consignee.

(b) Destination.

(c) Type of Material (including the percent Sodium Chloride and inhibiter used).

(d) Purchase Order Number.

(d) Truck number and weights of truck before and after loading.

(f) Date loaded.

(g) Name and Location of the Source.

(h) A Certification Statement.

3.2.1 The certification statement shall be signed by an authorized representative of the Supplier and substantially as follows:

"This certifies that the Treated Salt in this shipment complies with Missouri Department of Transportation specifications and the weights shown hereon were obtained on scales approved by and/or certified by the State of Missouri and are correct within the specified scale requirements."

3.2.2 The requirements for platform scales for weighing Bulk Treated Salt are shown in Annex B of this specification.

4.0 ACCEPTANCE.

4.1 A lot shall consist of that quantity of material ordered for delivery to one location at one time. It shall be sampled and tested prior to intermixing with material on hand.

4.2 Acceptance of the material will be based on satisfactory compliance with this specification as determined by samples and inspection deemed necessary by the engineer at the delivery site.

4.3 If samples fail to meet the material requirements on the basis of an initial sample, two additional samples shall be taken from the lot and tested. Both of the additional samples must meet the requirements, or the lot will be rejected.

4.4 The department will not accept loads which exceed the legal limits. Overweight loads that are emptied before rejection will have the tonnage in excess of the legal weight deducted from the invoice.

4.5 In addition to other requirements, 92% Sodium Chloride material shall be specifically delivered to a location designated by receiving personnel, and any contamination with existing lower percentage sodium chloride salt as a result of delivery will be cause for rejection or payment at the lower sodium chloride content salt rate, at the department's option.

ANNEX A

TEST METHOD MODOT T32
DETERMINATION OF PURITY OF SODIUM CHLORIDE

1.0 SCOPE. This method describes a procedure for determining the percent sodium chloride in commercial grades of sodium chloride.

2.0 REAGENTS AND APPARATUS.

2.1 Millivolt meter equipped with a combination chloride electrode.

2.2 Nitric Acid (HNO_3), chloride free, 1.42 specific gravity.

2.3 Sodium Chloride (NaCl), Reagent Grade, dried at 105-110C for 1 hour prior to use.

2.4 Silver Nitrate ($AgNO_3$), Reagent Grade.

2.5 A source of chloride-free distilled or deionized water.

3.0 PREPARATION OF STANDARD SOLUTIONS.

3.1 Standard Sodium Chloride Solution (0.0100N). Weigh 0.5844 g dried NaCl, dissolve in distilled water and dilute to 1L.

3.2 Standard Silver Nitrate Solution (0.01N). Weigh 1.699 g $AgNO_3$, dissolve in distilled water and dilute to 1L. Standardize to the nearest 0.0001 N against 0.0100 N NaCl.

4.0 PROCEDURE.

4.1 Using a suitable sample splitting technique, divide the salt, as received, to obtain a representative sample of about 75 g. Grind the entire 75 g sample to pass a No. 50 mesh sieve, dry at least 3 hours at 105-110C and cool to room temperature in a desiccator. Weigh the sample to the nearest 0.1 mg and transfer to a 1000-mL beaker. Add approximately 500 mL of distilled water and 20 mL of HNO_3. Heat near boiling 1 hour, occasionally stirring and crushing any insoluble matter against the bottom of the beaker with the flattened end of a stirring rod. Cool to room temperature, quantitatively transfer to a 1000-mL volumetric flask and dilute to volume with distilled water. Transfer a 10-mL aliquot to a 1000-mL volumetric flask and dilute to volume with distilled water.

4.2 Transfer a 10-mL aliquot to a 250-mL beaker, adding 90 mL of distilled water and 1 mL of HNO_3. Determine the chloride concentration by potentiometric titration with the standard silver nitrate solution.

5.0 CALCULATION AND REPORT.

5.1 Report percent sodium chloride to the nearest 0.1% as follows:

$$\% \text{ Sodium Chloride (NaCl)} = \frac{A \times C \times 584.5 \times 100}{D}$$

Where:

A = Milliliters of $AgNO_3$ solution to titrate sample

C = Normality of $AgNO_3$ solution

D = Grams of sample

ANNEX B

SPECIFICATIONS FOR PLATFORM SCALES FOR WEIGHING BULK TREATED SALT

1.0 Equipment for weighing of bulk Treated Salt shall consist of accurate and reliable platform scales approved by the Missouri Department of Transportation.

2.0 Calibration shall be to within an accuracy of 0.4 percent of the load applied, regardless of the location of the load on the platform. The value of the smallest unit of graduation on a scale shall be not greater than 20 pounds. Sensitivity requirements of scales not equipped with balance indicators shall be twice the value of the minimum graduated interval on the weigh beam, or 0.2 percent of the nominal capacity of the scale, whichever is less. For scales equipped with balance indictors, the sensitivity requirement shall be the value of the minimum graduated interval on the weigh beam.

3.0 When equipment to be weighed is of such length that all axles cannot be weighed simultaneously, a level area of portland cement concrete or asphaltic concrete pavement shall be provided permitting those axles not on the scale platform to be on the pavement during the weighing operation. the approach shall be the same width as the platform and of sufficient length to insure the level positioning of vehicles during weight determinations. The weighing shall be performed with all brakes released. When equipment to be weighed is equipped with an air bag suspension unit on any axle, the equipment including semi-trailers or pup trailers shall be weighed on platform scales of sufficient size to weigh all axles of the combination simultaneously.

4.0 Scales shall have been calibrated within the six month period immediately prior to any material being delivered or any time the Missouri Department of Transportation's representative has cause to question the accuracy of the scale. A scale acceptance shall be based on one of the following:

(a) A valid certification or seal of approval by the Division of Weights and Measures of the Missouri Department of Agricultural will be acceptable.

(b) A valid certification or seal of approval by a State of Missouri duly appointed "sealer of weights and measures" in cities or counties of seventy-five thousand population or more will be acceptable.

(c) Certification of calibration from a commercial scale service company showing that the scale meets the requirements of these specifications. The Supplier shall furnish the certification of calibration to the Missouri Highway and Transportation Department's representative.

4.1 Regardless of the form of acceptance, the calibration shall be within the accuracy requirements specified herein and the scales shall meet all requirements of these specifications.

4.2 Verification of a platform scale may be required of a hauling unit on another recently calibrated and certified scale.

4.3 All cost incurred in obtaining a certification of calibration or verification shall be borne by the Supplier.