ROAD & TREATED SALT SPECIFICATIONS
for
Road Salt and Treated Salt – Types 1 & 2 (Statewide)

IFB #23449

Table of Contents

SECTION 1: ROAD SALT (LOT I) 3
1.1 Detailed Specifications – Road Salt (Rock & Solar), Type A 3
1.1.1 Chemical Composition 3
1.1.2 Size Grading – Rock Salt 3
1.1.3 Size Grading – Solar Salt 3
1.1.4 Moisture Content (crushed Rock Salt) 4
1.1.6 Inhibitor Treatment 4
1.1.7 Sampling 4
1.1.8 Price Deductions 5
SECTION 2: TREATED SALT (LOT II – TYPE 1 and LOT III - TYPE 2) 6
2.1 Certification 6
2.2 Product Suitability and Liability 6
2.3 Dye/Color 6
2.4 Toxic Substances – Material Safety Data Sheets 6
2.5 Detailed Specifications - Treated Salt 8
2.5.1 SECTION A: Sodium Chloride Type "A" Crushed Rock Salt Specifications 8
2.5.2 SECTION B: Corrosion Inhibited Liquid Magnesium/Calcium Chloride Product (with or without Organic Based Performance Enhancer, OBPE) 9
2.5.3 SECTION C: Mixing the Sodium Chloride and Corrosion Inhibited Liquid Magnesium/Calcium Chloride 11
2.5.4 SECTION D: Final Product: Rock Salt treated with Corrosion Inhibited Liquid Magnesium/Calcium Chloride 12

SECTION 1: ROAD SALT (LOT I)

1.1 Detailed Specifications – Road Salt (Rock & Solar), Type A

It is the intent of this specification to describe sodium chloride (ASTM D632 Type 1, Grade 1 or the latest revision thereof) crushed Rock Salt and/or Solar Salt, to be used for snow and ice control.

Delivery of both Rock Salt and Solar Salt will be allowed to be provided in the following counties ONLY: ***Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, & Westchester.***

1.1.1 Chemical Composition

Shall be not less than 95% sodium chloride. Percent of sodium chloride shall be determined in accordance with ASTM D632 or the latest revision thereof.

1.1.2 Size Grading – Rock Salt

The salt, when tested in accordance with ASTM D632 (*) or the latest revision thereof, shall conform to the following requirements for particle size distribution:

Sieve Size	Percent Passing (**)
1/2” - (12.5 MM)	100
3/8” - (9.5 MM)	95 - 100
No. 4 - (4.75 MM)	20 - 90
No. 8 - (2.36 MM)	10 - 60
No. 30 - (600 MICRONS)	0 – 15

* -A drying temperature of 110°C ± 5°C may be used.

**-Tolerance of 5 percentage points on the maximum value of the range for each sieve except 1/2" (12.5 mm) and 3/8" (9.5 mm) sizes, on which no tolerance will be allowed.

1.1.3 Size Grading – Solar Salt

The Solar Salt, when tested in accordance with ASTM D632 (*) or the latest revision thereof shall conform to the following size for particle size distribution:

Sieve Size	Percent Passing (**)
3/4" - (19.05 MM)	100
1/2" - (12.5 MM)	99 - 100
3/8” - (9.5 MM)	95 - 100
1/4" - (6.35 MM)	65 - 90
No. 4 - (4.75 MM)	20 - 80
No. 8 - (2.36 MM)	10 - 30
No. 30 - (600 MICRONS)	0 - 15

* -A drying temperature of 110°C ± 5°C may be used.

**-Tolerance of 5 percentage points on the maximum value of the range for each sieve except 1/2" (12.5 mm) and 3/8" (9.5 mm) sizes, on which no tolerance will be allowed.

1.1.4 Moisture Content (crushed Rock Salt)

Moisture content upon delivery **shall not exceed 1-1/2%** (*) when determined as follows:

$$\% \text{ Moisture} = \frac{(W_1 - W_2)}{(W_1)} \times 100$$

W_1 = initial weight of sample

W_2 = weight of sample after drying to a constant weight at 110°±5°C.

* Procedure shall be in accordance with ANSI/AWWA B200-03, Moisture Determination or the latest revision thereof. A tolerance of 0.5% will be allowed before a deduction is assessed.

1.1.5 Moisture Content (Solar Salt)

Moisture content upon delivery **shall not exceed 2.5% (*)** when determined as follows:

$$\% \text{ Moisture} = \frac{(W_1 - W_2)}{(W_1)} \times 100$$

W_1 = initial weight of sample

W_2 = weight of sample after drying to a constant weight at 110°±5°C.

* Procedure shall be in accordance with ANSI/AWWA B200-03, Moisture Determination or the latest revision thereof. A tolerance of 0.5% will be allowed before a deduction is assessed.

1.1.6 Inhibitor Treatment

Salt shall be treated with an anticaking conditioner. The quantity of inhibitor used shall be in the range of 0.1 to 0.2 lbs/ton. **Potential contractors shall supply with their bid a description of the inhibitor treatment used, quantity of inhibitor used per ton of salt, method of determining the presence of the treatment and information relative to the solubility and photodecomposition of the treating agent.** Potential harm to the ecology caused by inhibitor treatment may be cause for rejection of a bid.

Salt delivered in a lumpy condition which requires reprocessing in order to make it usable shall be cause for rejection of the entire delivery, with a replacement delivery to be made at no additional charge to the Authorized User.

If, because of emergency conditions, it is necessary to accept and reprocess the Salt for use, all costs will be charged to the contractor.

1.1.7 Sampling

Sampling shall be done in accordance with current ASTM D632 or the latest revision thereof. OGS, or any of its authorized representatives, reserves the right to take samples from the contractor's stockpile or transfer point or from shipments at the point of destination.

The right is also reserved to consider truckloads of salt delivered by the contractor to any one delivery location on a single day to be a single delivery. Price deductions imposed because of deviation from specifications may be imposed on the total day's delivery.

1.1.8 Price Deductions

No price deduction is to be assessed unless the proper analysis and test procedures are followed.

If the contractor consistently delivers salt found to be above 2% moisture content for Rock Salt or 2.5% moisture content for Solar Salt or consistently not conforming to the gradation requirements, the contract shall be subject to cancellation.

Moisture – Rock Salt

If, after delivery the moisture content is found to be above 2.0%, a price deduction for moisture content will be made from the delivered bid price based on the following formula:

Reduced price per ton = delivered contract price per ton x (1.02 - 2X)

where X = moisture content of the sample (expressed as the decimal equivalent of the percentage of the original sample weight to the nearest 1%).

Moisture – Solar Salt

If, after delivery the moisture content is found to be above 2.5%, a price deduction for moisture content will be made from the delivered bid price base based on the following formula:

Reduced price per ton = delivered contract price per ton x (1.03 - 2X)

where X = moisture content of the sample (expressed as the decimal equivalent of the percentage of the original sample weight to the nearest 1%).

Solar Salt with a moisture content higher than 3% may be rejected.

Gradation (Particle Size Distribution)

If, after delivery, the gradation of the Salt is found to be out of tolerance a deduction from the price shall be made based on the following formula:

Reduced price per ton = delivered contract price x (1.00 - X)

where X = the decimal equivalent of the total % out of gradation less the tolerance. The % out of tolerance for each sieve shall be to the nearest 1%. The total of the individual sieve tolerance deviations shall be used as X.

Contamination

If the end user accepts contaminated salt as defined in Section 1.1.6 – *Inhibitor Treatment* for operational reasons, a 10% price deduction may be placed on the contractor by the end user after consultation with the contractor and OGS Procurement Services.

AUTHORIZED USERS WILL SUBMIT TO OGS SUPPORTING DOCUMENTATION FOR DELIVERY PRICE DEDUCTION. OGS PROCUREMENT SERVICES WILL REVIEW AND WILL HAVE FINAL APPROVAL AS TO DELIVERY DEDUCTION APPLIED IN REGARD TO CONTAMINATION.

Calculations

Calculations performed relative to this specification shall be made using the rounding off method of "ASTM Recommended Practice E-29 for Designating Significant Places in Specified Limiting Values".

SECTION 2: TREATED SALT (LOT II – TYPE 1 and LOT III - TYPE 2)

2.1 Certification

Deviation from any of the specifications may result in the rejection of the entire delivery load or loads (if from the same source) at the discretion of the Authorized User. All costs associated with rejected deliveries shall be borne by the contractor.

The supplier of any product delivered and/or applied that is found to be contaminated with non-specified products and/or is cause for environmental concerns which may necessitate yard, storage facility, or roadside cleanup measures shall be responsible for all clean up expenses without limitation.

2.2 Product Suitability and Liability

Deviation from specifications may result in rejection of any delivery. All costs associated with rejected deliveries will be the responsibility of the contractor.

Should a product be found to be contaminated (after application) with non-specified elements and become cause for environmental concerns that necessitate clean-up of yards, storage facilities, or roadsides, etc., the contractor shall be responsible for any and all expenses incurred.

2.3 Dye/Color

Product may be dyed a characteristic color that will allow ready visual identification of the product or any material treated with the product. Any dye used shall remain in solution without precipitation or leaching during all normal use and storage conditions. Dye utilized shall be non-toxic, non-staining, and environmentally benign.

Contractors will advise OGS Procurement Services as to the color the final product will be when applied to end user's treated salt.

2.4 Toxic Substances – Material Safety Data Sheets

Each contractor furnishing a toxic substance (as defined by Section 875 of the State Labor Law) to an ordering Authorized User shall provide that Authorized User with not less than two copies of a material safety data sheet. This sheet shall include for each such substance the information outlined in Section 876 of the State Labor Law.

Example MgCl Chart

FREEZING POINT OF
MAGNESIUM CHLORIDE BRINE
EXAMPLE OF A 25% PRODUCT SUBMITTED

% By Weight	Specific Gravity	Freezing Point Celsius	Freezing Point Fahrenheit
5	1.013	-2.11	26.4
6	1.051	-3.09	25.0
7	1.060	-4.72	23.5
8	1.069	-5.67	21.8
9	1.070	-6.67	20.0
10	1.086	-7.83	17.9
11	1.096	-9.05	15.7
12	1.105	-10.5	13.1
13	1.114	-12.1	10.3
14	1.123	-13.7	7.3
15	1.132	-15.9	4.0
16	1.142	-17.6	0.4
17	1.151	-19.7	-3.5
18	1.161	-22.1	-7.7
19	1.170	-25.6	-12.2
20	1.180	-27.4	-17.2
21	1.190	-30.5	-23.0
22	1.200	-32.8	-27.0
23	1.210	-28.9	-20.0
24	1.220	-25.6	-14.0
**25	**1.230	**-23.3	**-10.0
26	1.241	-21.1	-6.0
27	1.251	-19.4	-3.0
28	1.262	-18.3	-1.0
29	1.273	-17.2	1.0
30	1.283	-16.7	3.0

****25% EXAMPLE**. YOUR INFORMATION MUST MATCH YOUR PRODUCT**

2.5 Detailed Specifications - Treated Salt

(Granular Sodium Chloride Treated with Corrosion Inhibited Liquid Magnesium/Calcium Chloride, Type 1 and Type 2)

It is the intent of this specification to describe a mixture of Sodium Chloride Type "A" crushed Rock Salt treated with corrosion inhibited liquid magnesium/calcium chloride product. The treatment is intended to enhance the performance of the product over untreated salt by reducing corrosiveness, improving low temperature performance, reducing bounce and scatter, preventing clumping, salt pile freezing and enhancing flowability. The treated salt is intended to be used to facilitate snow and ice prevention and removal on New York State roads and bridges. The end product treated salt will be categorized as either Type 1 (containing corrosion inhibited liquid magnesium/calcium chloride), or Type 2 (containing corrosion inhibited liquid magnesium/calcium chloride and an organic based performance enhancer [OBPE]). The defining characteristics of Type 1 and Type 2 treatment can be found summarized in the table found **on page 10 of this document.**

The finished product shall be composed of two primary constituents:

- Crushed Rock Salt as described and specified in **Section A** below
- A corrosion inhibited liquid magnesium/calcium chloride product described and specified in **Section B** below.

The two components shall be mixed to produce a finished product as described in **Section C**.

The final product shall meet all the requirements described in **Section D**, also below.

A separate Vendor Certified Product Data Sheet **MUST** be submitted for **EACH** of the two components being utilized by the vendor to produce the final product.

2.5.1 SECTION A: Sodium Chloride Type "A" Crushed Rock Salt Specifications

The crushed Rock Salt used in the preparation of the final product shall meet the following requirements.

- **Contamination**
  Upon inspection, the material shall be uniform in appearance, free flowing and free from visual evidence of foreign matter including but not limited to dirt, stone, chips, trash or any other material that could reasonably be expected to interfere with the use, handling or storage of the salt.
- **Chemical Composition**
  Shall be not less than 95% Sodium Chloride. Percent of Sodium Chloride shall be determined in accordance with current ASTM-D-632 or the latest revision thereof.
- **Size Grading**
  The salt, when tested in accordance with ASTM D632 (*) or the latest revision thereof, shall conform to the following requirements for particle size distribution:

Sieve Size	Percent Passing (**)
1/2" - (12.5 MM)	100
3/8" - (9.5 MM)	95 - 100
No. 4 - (4.75 MM)	20 - 90
No. 8 - (2.36 MM)	10 - 60
No. 30 - (600 Microns)	0 - 15

* -A drying temperature of 110°C ± 5°C should be used.

**-Tolerance of 5 percentage points on the maximum value of the range for each sieve except 1/2" (12.5 mm) and 3/8" (9.5 mm) sizes, on which no tolerance will be allowed.

- **Moisture Content**
  Moisture content upon delivery shall not exceed 1-1/2% (*) when determined as follows:

  $$\% \text{ Moisture} = \frac{(W_1 - W_2)}{(W_1)} \times 100$$

  W_1 = initial weight of sample

  W_2 = weight of sample after drying to a constant weight at 110°±5°C.

  * Procedure shall be in accordance with ANSI/AWWA B200-03, Moisture Determination or the latest revision thereof. A tolerance of 0.5% will be allowed before a deduction is assessed.

- **Sampling**
  Sampling shall be done in accordance with ASTM-D632 or the latest revision thereof. The Office of General Services, or any of its authorized representatives, reserves the right to take samples from the contractor's stockpile or transfer point or from shipments at the point of destination.

  The right is also reserved to consider truckloads of treated salt delivered by the contractor to any one delivery location on a single day to be a single delivery. Penalties imposed because of deviation from specifications may be imposed on the total day's delivery.

2.5.2 SECTION B: Corrosion Inhibited Liquid Magnesium/Calcium Chloride Product (with or without Organic Based Performance Enhancer, OBPE)

Material used for this component of the finished product shall be a blend of Liquid Magnesium/Calcium Chloride and an Organic Based Performance Enhancer (OBPE) component intended, amongst other things, to inhibit the corrosiveness of the product. The offered product shall meet all of the requirements for EITHER Type 1 or Type 2. Bidder shall identify on the Attachment 11 – Bidder Certified Product Data Sheet which type product is being offered. Product of either type must comply with the General Chemical Requirements section shown below.

GENERAL CHEMICAL REQUIREMENTS:

This section applies only to products offered that **do not** have a Beneficial Use Determination (BUD) from New York State Department of Environmental Conservation, however, **ALL PRODUCTS OFFERED MUST CONTAIN 250 PPM OR LESS PHOSPHORUS, CALCULATED ON AN UNDILUTED BASIS, WITH OR WITHOUT BENEFICIAL USE DETERMINATION.**

Any product that contains constituents in excess of the following established total concentration limits may not be accepted. Results are stated as Parts Per Million (ppm). If product exceeds any of the following constituents then the bidder shall identify the exception(s) and explain any mitigating circumstances. The State reserves the right to evaluate these exceptions and make a determination of product eligibility based on the best interests of the State.

Arsenic	5.00 ppm
Barium	75.00 ppm
Cadmium	0.20 ppm
Chromium	0.50 ppm
Copper	4.00 ppm
Cyanide	0.20 ppm

Lead	1.00 ppm
Mercury	0.05 ppm
Phosphorus	250.00 ppm
Selenium	5.00 ppm
Zinc	10.00 ppm

OTHER REQUIREMENTS:

PARAMETER	REQUIREMENT	
	LOT II - TYPE 1	**LOT III - TYPE 2**
Divalent Chloride Concentration (MgCl2+CaCl2) (w/v)	25% Min.	22% Min.
Magnesium Chloride Concentration (w/v)	19% Min.	13 < 25%
pH	6.0 - 9.0	3.2 - 7.5
Eutectic (Freezing) Point	-20 Deg. F or Lower	-20 Deg. F or Lower
Total Solids (w/w After 1 Hr. @ 105^{0}C)	No Requirement	35% Min.
Organic Based Performance Enhancer (OBPE)	No Requirement	8% Min
Corrosivity	A 3% solution of the product shall have a corrosion value at least 70% less than that of a 3% solution of Sodium Chloride when tested by NACE Standard TM-01-69 as modified by the Clear Roads Qualified Products List: https://clearroads.org/qualified-product-list/.	
Settleable Solids	Shall contain not greater than 1.0% (v/v) total settleable solids after being stored at 0 deg. F for 168 hours. If any solids are observed, 99% of those solids must pass through a #10 sieve.	Shall contain not greater than 4.0% (v/v) total settleable solids after being stored at 0 deg. F for 168 hours. If any solids are observed, 99% of those solids must pass through a #10 sieve.
Freezing Point Table	Contractor shall supply a table showing the Freezing Point vs Specific Gravity for varying dilutions of product in water, starting at 5% and continuing up to and including the percentage needed to reach the eutectic (freezing) point.	
Chemical Analysis	Contractor shall supply a certified analysis conducted within the last year from an independent laboratory* showing compliance with all the above listed requirements **INCLUDING** those listed in the GENERAL CHEMICAL REQUIREMENT section above. Exceptions to the requirements must be stated and the State reserves the right to reject the product.	
BOD5 (Biological Oxygen Demand)	No Requirement	Contractor shall provide BOD5 expressed in mg/l

Sampling to be done in accordance with ASTM D345 or the latest revision thereof.

Product shall be tested using generally accepted industry standard analytical procedures as appropriate.

*Independent laboratory is defined as a 3rd party laboratory that is certified to perform the required analyses by the USEPA and/or NYS Department of Health Environmental Laboratory Approval Program (ELAP).

2.5.3 SECTION C: Mixing the Sodium Chloride and Corrosion Inhibited Liquid Magnesium/Calcium Chloride

The materials described in Section A and Section B above shall be mixed as described in this section to produce the finished product. Mixing procedures shall comply with all requirements described in this section.

- The Office of General Services, or any of its authorized representatives, reserves the right to take samples from the contractor's stockpile or transfer point before the salt is mixed with the Corrosion Inhibited Liquid Magnesium/Calcium Chloride. Both salt and liquid samples may be taken.
- The contractor will thoroughly mix a minimum of 8 gallons of Corrosion Inhibited Liquid Magnesium/Calcium Chloride per ton of salt.
- The contractor will ensure a consistent thorough mix (e.g. spray system, pugmill, conveyor) so that there is maximum coverage of the liquid on the salt crystals (loader mixing and stockpile injection methods are not acceptable) and will specify the mix method in the bid.
- Trucks must be weighed on certified scale with printout after loading the final product (salt and liquid mixture) and prior to delivery destination. The weight ticket shall include the net weight of the final product and the stockpile source. The certification must bear the Weighmaster's signature. **Handwritten weights are not acceptable.**
- All shipments of finished product shall be accompanied by a ticket indicating the amount of Corrosion Inhibited Liquid Magnesium/Calcium Chloride mixed in the finished product. This amount will be indicated on the ticket by Gallons. The number of gallons shall be recorded by a printing device or handwritten.
- The finished product shall be shipped via bulk delivery. Trucks delivering the mixture shall have the entire cargo area completely covered by a waterproof tarpaulin or similar sheeting material. Torn or ripped covers may be cause for rejection of the shipment.
- The State reserves the right to, at any time inspect the operation to take salt and liquid samples, to ensure that the proper amount of liquid is being applied and that the mix method is appropriate.

2.5.4 SECTION D: Final Product: Rock Salt treated with Corrosion Inhibited Liquid Magnesium/Calcium Chloride

The Treated Salt shall meet the following requirements:

- **Contamination**
  Upon inspection of delivered salt, the material shall be uniform in appearance, free flowing and free from visual evidence of foreign matter including but not limited to dirt, stone, chips, trash or any other material that could reasonably be expected to interfere with the use, handling or storage of the salt.

- **Flowability**
  Properly stored product (covered or inside storage) shall be uniform and free flowing in a manner consistent with its intended use and shall show no objectionable clumping or caking.

- **Leaching**
  Properly stored product (covered or inside storage) shall show no indication of objectionable leaching or separation of components to the extent that such condition produces adverse effects in the handling or usage of the product or routine maintenance of the storage facility.

- **Chemical Composition**
  Shall be not less than 91.2% Sodium Chloride. Percent of Sodium Chloride shall be determined as follows: Apparent total % Sodium Chloride content shall be determined in accordance with current ASTM D632 or the latest revision thereof. Magnesium and Calcium content shall be determined in accordance with ASTM E-534 or the latest revision thereof and computed as % Magnesium Chloride and % Calcium Chloride respectively. The% Sodium Chloride shall then be computed as follows:

  % Sodium Chloride = % Apparent Sodium Chloride - (% Magnesium Chloride + % Calcium Chloride)

- **Size Grading**
  The salt, when tested in accordance with ASTM D632 (*) or the latest revision thereof, shall conform to the following requirements for particle size distribution:

Sieve Size	Percent Passing (**)
1/2" - (12.5 MM)	100
3/8" - (9.5 MM)	95 - 100
No. 4 - (4.75 MM)	20 - 90
No. 8 - (2.36 MM)	10 - 60
No. 30 - (600 Microns)	0 - 15

* -A drying temperature of 110°C ± 5°C should be used.
**-Tolerance of 5 percentage points on the maximum value of the range for each sieve except 1/2" (12.5 mm) and 3/8" (9.5 mm) sizes, on which no tolerance will be allowed.

- **Moisture Content**
  Moisture content shall not exceed 4.8% when determined as follows:

  $$\% \text{ Moisture} = \frac{(W_1 - W_2)}{(W_1)} \times 100$$

  W_1 = initial weight of sample

  W_2 = weight of sample after drying to a constant weight at 110°±5°C.

  NOTE: Procedure shall be in accordance with ANSI/AWWA B200-03, Moisture Determination, or the latest revision thereof. A tolerance of 0.5% will be allowed before a deduction is assessed.

- **Sampling**
  Sampling shall be done in accordance with ASTM D632 or the latest revision thereof. The Office of General Services, or any of its authorized representatives, reserves the right to take samples from the contractor's stockpile or transfer point or from shipments at the point of destination.

  The right is also reserved to consider truckloads of treated salt delivered by the contractor to any one delivery location on a single day to be a single delivery. Penalties imposed because of deviation from specifications may be imposed on the total day's delivery.

- **Acceptance**
  The treated salt may be rejected if it fails to conform to any of the requirements of this specification.
- **Non-complying Product – Price Deductions**
  A non-complying product - price deduction is not to be assessed unless the proper analysis and test procedures are followed. If the contractor consistently delivers treated salt found to be above 5.3% moisture content or consistently not conforming to the gradation requirements, the contract shall be subject to cancellation either in whole or in parts.
  - **Non-complying Product – Price Deduction – Moisture**
    If the moisture content of the treated salt is found to be above 5.3%, a deduction for moisture content will be made from the delivered bid price based on the following formula:

    Reduced Price/Ton = Delivered Contract Price/Ton x (1.053 - 2x)

    where: X = Moisture content of the sample (expressed as the decimal equivalent of the percentage of the original sample weight to the nearest 1%)
  - **Non-complying Product – Price Deduction – Gradation (Particle Size Distribution)**
    If, after delivery, the gradation of the treated salt is found to be out of tolerance, a deduction from the price shall be made based on the following formula:

    Reduced Price/Ton = Delivered Contract Price x (1.00 - Y)

    where: Y = the decimal equivalent of the total % out of gradation. The % out of tolerance for each sieve shall be to the nearest 1%. The total of the individual sieve tolerance deviations shall be used as Y.
  - **Non-complying Product – Price Deduction – Contamination**
    If the end user accepts contaminated salt as defined in Section D for operational reasons, a 10% non- complying price deduction may be placed on the contractor by the end user after consultation with the contractor and OGS.
- **Calculations**
  Calculations performed relative to this specification shall be made using the rounding off method of "ASTM Recommended Practice E-29 for Designating Significant Places in Specified Limiting Values".