

DMS - 6400**DE-ICER/ANTI-ICER (MAGNESIUM CHLORIDE/SODIUM CHLORIDE)****EFFECTIVE DATES: AUGUST 2004–MAY 2008.**

6400.1. Description. This Specification governs for the Quality Monitoring Program (QMP) for safe de-icer/anti-icer, pre-qualification requests and procedures, disqualification, sampling, re-qualification, quality control (QC), and material requirements.

6400.2. Units of Measurements. The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

6400.3. Material Producer List. The Materials and Pavements Section of the Construction Division (CST/M&P) maintains a material producer list (MPL) of all products conforming to the requirements of this program. Materials listed on the MPL, entitled "[De-Icer/Anti-Icer \(Magnesium Chloride/Sodium Chloride\)](#)" require no further testing, unless deemed necessary by the Project Engineer or CST/M&P. To obtain a place on this list, the product must be accepted into the QMP. Materials not on the list require project-specific testing.

6400.4. Pre-Qualification Procedure.

A. Pre-Qualification Request. Prospective producers or suppliers interested in submitting their product for evaluation should submit a written request to Texas Department of Transportation, Construction Division, Materials and Pavements Section (CP-51), 125 E. 11th Street, Austin, TX 78701-2483.

Include the following information with the request:

- Company name
- Physical and mailing addresses
- Type of material
- Contact person and telephone number
- A laboratory test report with test data showing compliance of the material with the requirements stated in this Specification

B. Pre-Qualification Sample. After receiving a request for QMP pre-qualification, CST/M&P will contact the producer and request a minimum of one sample (at least 1 gal.) for each de-icer being considered for pre-qualification.

C. Sampling and Testing. The Department will test in accordance with the requirements listed in Article 6400.5.

D. Evaluation. CST/M&P will notify prospective bidders and suppliers after completion of material evaluation.

- 1. Qualification.** If CST/M&P finds an adequate correlation between producer and CST/M&P test results, CST/M&P will pre-qualify the producer and place the producer on the MPL.

Once on the MPL, the producer must report any change in formulation or manufacturing process to CST/M&P. Any changes in the material require resubmission for pre-qualification.

- 2. Failure.** Producers not qualified under this Specification may not furnish materials for Department projects and must show evidence of correction of all deficiencies before reconsideration for qualification.

CST/M&P will reject the material if a correlation is not established or if the material does not meet the requirements.

Costs of sampling and testing are normally borne by the Department; however, the costs to sample and test materials failing to conform to the requirements of this Specification are borne by the Contractor or supplier. This cost will be assessed at the rate established by the Director of CST/M&P and in effect at the time of testing.

Amounts due the Department will be deducted from monthly or final estimates on contracts, from partial or final payments on direct purchases by the State, or directly billed to the producer.

- E. Quality Monitoring Requirements.** Materials in the QMP are pre-qualified every year. The pre-qualification period is from July 1 to June 30. During each pre-qualification period, the producer must provide one pre-qualification sample and monthly quality control (QC) testing reports.

- 1. Pre-Qualification Sample.** The producer must submit a sample of each pre-qualified material every pre-qualification period to CST/M&P for testing and, to allow sufficient time for testing, submit sample at least one month before the beginning of the pre-qualification period. Any material not submitted on time may be delayed in posting on the MPL.
- 2. Quality Control (QC) Testing Reports.** The Department requires that all producers in the QMP perform QC testing on their material. Testing is required for every material that is pre-qualified under the QMP.

Submit QC testing reports to CST/M&P twice per pre-qualification period. The report must reflect the test data from each batch of pre-qualified de-icer regardless of the destination of the material. The monthly report must contain the following information:

- Type of de-icer
- Date of manufacture
- Batch number
- QM test results

Producers should submit reports by the first business day of the months of October and January. If there was no pre-qualified material produced for a particular month, then the producer must submit a report stating there was no production of the material.

F. Periodic Evaluation. The Department reserves the right to conduct random sampling of pre-qualified materials for testing and to perform random audits of test reports. Department representatives may sample material from the manufacturing plant, the project site, and the warehouse.

CST/M&P reserves the right to test samples to verify compliance with this Specification and inspect and approve the QC testing laboratory to ensure that all criteria meets equipment and test procedures.

Producers should maintain a complete record of all test reports for the previous and current calendar year.

G. Disqualification. CST/M&P may disqualify and remove a product from the MPL if any of the following infractions occurs:

- Material tested by CST/M&P fails to meet the requirements stated in this Specification.
- Producer fails to properly submit complete QC testing reports or pre-qualification samples to CST/M&P.
- Producer fails to report changes in the formulation or production process of the material to CST/M&P.
- Producer fails to comply with this Specification.

If CST/M&P disqualifies a material, the producer will not be allowed to supply material to the Department for six months, or as determined by the Director of CST/M&P. After this period has expired, the producer must re-qualify to regain QMP status.

Disqualification will only apply to the de-icer type corresponding to the infraction.

H. Re-Qualification. If a producer desires to re-qualify after disqualification, the producer must first submit a request to CST/M&P and include the test report with data certifying that the de-icer meets the material requirements in this Specification. Once accepted, all procedures and requirements as stated in Article 6400.4 apply.

6400.5. Material Requirements.

A. Magnesium Chloride.

1. General Requirements. The magnesium chloride-based, corrosion-inhibiting material must be active at an ambient temperature of at least -15°C (5°F). If active at this temperature, the de-icer/anti-icer will melt ice on roadways and bridges.

Unless otherwise noted, the Department will allow appropriate industry-accepted methods of wet titration and instrumental testing.

2. Chemical Requirements.**Table 1**
Chemical Requirements

| Property | Requirement |
|---|---|
| Magnesium Chloride Concentration | 26 to 30% (Liquids) 18 to 21% (Solids) |
| Total phosphates, "Standard Methods for the Examination of Water and Waste Water," APHA-AWWA-WPCF ¹ | 25 ppm maximum |
| Cyanide | 0.20 ppm maximum |
| Chromium | 0.5 ppm maximum |
| Cadmium | 0.15 ppm maximum |
| Sulfate | 0.7 maximum |
| ¹ Except a 1% solution will be used. (To prepare a 1% solution, place 10 ml [0.34 fl. oz.] of sample into 500 ml [17 fl. oz.] distilled or DI water contained in a 1 L [1 qt.] volumetric flask to which 2.5 ml [0.08 fl. oz.] 1 + 1 sulfuric acid has been added. Swirl the contents and make up to 1000 ml [34 fl. oz.] with distilled water.) | |

3. Physical Requirements.**Table 2**
Physical Requirements

| Property | Requirement |
|--|------------------------------|
| pH, ASTM E 70-90 ² | 6-9 |
| Specific Gravity | 1.24 to 1.28 (Liquids) |
| Corrosive Property, Tex-624-J | 70% less corrosive than NaCl |
| Frictional Analysis, per PNS specification | 0.3 minimum |
| Settleable Solids and Solidification, Tex-625-J | 1% maximum |
| ² Except a dilution must be made of one part de-icer to four parts distilled/de-ionized water before reading. | |

B. Sodium Chloride (De-Icing Salt).

- 1. General Requirements.** The sodium chloride may be obtained from either natural deposits (rock salt), or produced artificially (evaporated, solar, or other salt). The material must be in a free-flowing, usable condition when received.

The material supplied must not have constituents that would cause residual waste to meet the definition of a hazardous waste, as found in [40 CFR 261](#).

2. Chemical Requirements.**Table 3**
Chemical Requirements

| Property | Requirement |
|---|--------------|
| Chlorides, as NaCl, (% by weight), ASTM D 632 ³ , Paragraph A1 | 94.5 minimum |
| Sulfate, % | 0.7 maximum |
| ³ Grind at least a 20-g portion of the reduced sample to pass a No. 50 (300 μ m) standard sieve. Use 2 ml (0.068 fl. oz.) potassium chromate instead of 3 ml (0.10 fl. oz.). | |

3. Physical Requirements.**Table 4**
Physical Requirements

| Property | Requirement |
|---|-------------|
| Particle size, ASTM C 136 ⁴ , (% by weight) retained on sieve size | |
| 0.265 in. (6.7 mm) | 20 maximum |
| No. 8 (2.36 mm) | 50-95 |
| No. 30 (600 μ m) | 90 minimum |
| ⁴ Sample must not be moistened, as directed ASTM C136, 4.1. | |

6400.6. Delivery and Equipment. The vendor is responsible for assuring delivery and complete transfer of the material through properly calibrated metered pumps for liquids or certified scales for solids and for all necessary equipment to transfer the material to existing storage facilities.

The product, including corrosion inhibitor, must be completed at the original manufacturing plant location. Post adding of corrosion inhibitors or any other ingredients and splash mixing is not allowed.

6400.7. Packaging and Labeling. Package material as stated in the invitation to bid. Packaging must protect material from moisture under normal storage conditions and must permit safe dispensing under a variety of storage and weather conditions.

A bill of lading with the following information must accompany each shipment:

- Product's name, supplier and manufacturer and destination
- Unit of measurement and number of units being delivered
- Total weight of delivery (certified scale ticket)
- Lot number of products being delivered (number must enable purchaser to track a delivered product back to its manufacture point, date of manufacture, and specific batch)
- Shipper information, including the name of the shipping company, tank, trailer, or rail car number, and point and date of origin

Upon delivery of a purchased shipment to the Department, include the following documentation:

- Current, clearly legible Material Safety Data Sheet (MSDS)
- Clear documentation of its percentage of concentration of magnesium chloride
- Application rate table that clearly states the manufacturer/vendor/supplier recommended rate for the various conditions of use at the place of delivery
- Shelf life of material
- Friction Analysis Report on all products (Any certified lab that is set up to run the test as a function of humidity and for the type of roadway [asphalt or concrete] specified may perform the test. Required information includes hard data, graphical analysis, and a write-up about the product, typically with comparison information.)
- Information on how low temperatures will affect storage of liquid material
- Clear documentation on proper storage
- Certification that any MgCl supplied meets test methods SHRP-H-205.2 for effectiveness (*Strategic Highway Research Program Handbook of De-icer Test Methods*)

6400.8. Measurement. Measure and deliver the de-icer/anti-icer to the designated locations as directed on the invitation to bid.

6400.9. Archived Versions. Archived versions are available.