Test Procedure for

DETERMINING SODIUM CHLORIDE IN DEICING SALT

TxDOT Designation: Tex-623-J

Effective Date: August 1999

1. SCOPE

1.1 Use this method to determine the percent sodium chloride found in rock salt used for deicing roads and bridges.

1.2 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.

2. APPARATUS

2.1 *Oven,* capable of maintaining a temperature of 100°C (212°F).

2.2 *Balance,* Class G1 in accordance with Tex-901-K.

2.3 *Magnetic stirrer.*

2.4 *Desiccator.*

2.5 *Volumetric flask,* 250 mL (8.5 fl. oz.)

2.6 *Beaker,* 250 mL (8.5 fl. oz.)

2.7 *Buret,* 50 mL (1.7 fl. oz.)

2.8 *Graduated cylinder,* 50 mL (1.7 fl. oz.)

2.9 *Standard U.S. sieves,* meeting the requirements of Tex-907-K, in the following sizes:

- 7.1 mm (9/32 in.)
- 2.36 mm (No. 8)
- 600 µm (No. 30).

2.10 *Pipette.*

3. SOLUTIONS

3.1 *Deionized or distilled water.*

3.2 *Silver nitrate solution,* 0.1 N, standardized against a sodium chloride solution of known concentration.

3.3 *Potassium chromate indicator solution,* 50 g of potassium chromate (K_2CrO_4) dissolved in 100 mL (3 fl. oz.) of water.

4. PROCEDURE

4.1 Dry 15 g rock salt in a 100°C (212°F) oven for 1 hour.

4.2 Cool to 25 ± 1°C (77 ± 2°F) in a desiccator.

4.3 Weigh 5 ± 0.05 g of dried sample.

4.4 Transfer to a 250-mL (8.5-fl. oz.) volumetric flask, and add deionized water to volume.

4.5 Add a stirring bar and stir for 1 hour or until dissolved.

4.6 Pipette 10 mL (0.35 fl. oz.) of the salt solution in a 250-mL (8.5 fl. oz.) beaker.

4.7 Add 50 mL (1.7 fl. oz.) of deionized water.

4.8 Add 11 drops of indicator solution, and slowly titrate with 0.1 N silver nitrate solution, stirring the liquid constantly, until obtaining the first permanent color deviation from the pure yellow of the suspension (orange red).

4.9 Calculate percent sodium chloride as described under Section 5.

4.10 Weigh a 500 ± 50-g sample. Shake salt over the 7.1-mm (9/32-in.), 2.36-mm (No. 8), and 600-µm (No. 30) sieves.

4.11 Report total percent NaCl, and percent retained in each sieve.

5. CALCULATIONS

5.1 Calculate percent sodium chloride:

$$\%\ NaCl = \frac{(mL\ of\ \ AgNO_3)(5.8453)(N\ \ AgNO_3)(25\ mL)}{Sample\ Weight\ (g)}$$