



# Specifications For Manufactured Materials

Section: SOIL STABILIZATION & DUST  
CONTROL CHEMICALS

Subject: CHLORIDES & LIGNOSULPHONATE

## 1. SCOPE

- 1.1 This specification identifies the material requirements for the selection of chemicals to be used stabilization and/or dust control for gravel roads, for the Ministry of Highways and Infrastructure.
- 1.2 This specification covers the material requirements for the following chemicals:  
Calcium Chloride  
Magnesium Chloride  
Lignosulphonate
- 1.3 The chemicals may be in liquid or solid form for purposes of transportation and compliance testing.

## 2. REFERENCES

- 2.1 American Society for Testing and Materials (ASTM)  
Standard E-449-08      Analysis of Calcium Chloride  
Standard D-1293      Test Methods for pH of Water  
Standard D-1429      Specific Gravity of Water and Brine  
Standard D-1475      Test Method for Density of Liquid Coatings, Inks  
And Related Products
- 2.2 Canada Pulp and Paper Association  
Standard Method H.1-93      Determination of Solids Content of Pulp and Paper  
Mill Effluents.
- 2.3 Environment Canada “Best Practices for the Use and Storage of Chloride-Based Dust Suppressants”, February 2007

## 3. MATERIALS

Materials shall conform to their respective requirements as listed below.

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3.1 Liquid Calcium Chloride or liquid Magnesium Chloride

3.1.2 Liquid Calcium Chloride and Magnesium Chloride shall possess the following quantities (by percent mass according to ASTM E449-08) of constituent chemicals.

Calcium Chloride or Magnesium Chloride min. 35.0%  
Total Alkali Chlorides (as NaCl) max. 2.0%  
Impurities (including MgCl<sub>2</sub>) max. 5.0%  
Other Impurities (excluding water) max. 1.0%

3.1.2 Liquid Calcium Chloride or Magnesium Chloride shall have a minimum specific gravity of 1.30 when tested in accordance with ASTM Standard D-1475.

3.2 Flake Calcium Chloride

3.2.1. Flake Calcium Chloride shall possess the following minimum quantities (by percent mass according to ASTM E449-08) of constituent chemicals):

3.2.2. Flake Calcium Chloride shall have the following range of gradations based on dry weight as determined by Canadian Metric Sieve analysis:

Sieve Size Metric	Percent Passing Sieve
9.0 mm	100%
5.0 mm	80 - 100%
630 mm	0 - 5%

3.3. Lignosulphonate

3.3.1. Lignosulphonate delivered in a concentration possessing a minimum of 50% solids by weight. Concentrations possessing a lower percentage of solids shall be pay adjusted such that payment is for volume at a concentration of 50% solids by weight according to the formula:

$$\text{Payment} = [\text{price/litre}] \times [\text{volume}] \times \frac{\% \text{ solids}}{50\%}$$

3.3.2 At time of application, lignosulphonate shall possess a minimum of 25% total dissolved solids when tested in accordance with Standard H.1-93.

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- 3.3.3 Lignosulphonate must have a minimum specific gravity of 1.125 when tested in solution and a minimum specific gravity of 1.25 when tested in concentrate, in accordance with ASTM Standard D-1475.
- 3.3.4. Lignosulphonate shall have a pH in the range of 3.5 to 6.5 when tested in accordance with ASTM Standard D-1293 (solution diluted to 25% TDS @ 20 degrees Celsius).
- 3.3.5. Lignosulphonate solution shall have minimum ration of organic solids to total dissolved solids of 65% when tested in accordance with Standard H.1-93.

**3.4. General**

- 3.4.1. Product shall be a processed material that is manufactured at a consistent and controlled strength of concentration.
- 3.4.2 The supplier shall provide a complete set of documentation including the liquid product name, manufacturer, the name and concentrations of the chemical components, and clearly legible Material Safety Data Sheet.
- 3.4.3 The Environment Canada Best Practices for the Use and Storage of Chloride-Based Dust Suppressant shall be followed for handling and storage of chloride based materials.

**4.0 MATERIAL SAMPLING AND TESTING**

**4.1. Supplier Testing**

- 4.1.1 Chemical analysis of product to be supplied to Ministry at time of tender submission.
  - 4.1.1.1 Percent solids by weight shall be supplied for lignosulphonate.
- 4.1.2 Proof of testing of product, for compliance with this specification, and results of such testing, to be supplied to the Ministry upon request.
- 4.1.3 Testing for compliance shall be performed by qualified personnel.

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CONTROL CHEMICALS****Subject: ALL ACCEPTABLE SOLUTIONS****4.2 Ministry Highways and Infrastructure Testing**

4.2.1 Sampling, for purposes of compliance and concentration testing, shall be done at the supplier's tanks or at any time prior to application of the product.

4.2.2 Sampling for testing by the Ministry shall be performed in a method specified by the ministry.

4.2.3 Testing for compliance and concentration shall be performed by Ministry personnel or other qualified personnel as selected by Ministry.

**4.3 General**

4.3.1. Testing for compliance and concentration shall be performed in accordance with referenced Standards, or in the absence of specific references, with accepted standard practice.

**5.0 REJECTION**

5.1. The Ministry may reject any load(s) at time of delivery under the conditions listed below. The supplier will dispose of any load so rejected and will not be paid for the material, delivery or disposal.

5.1.1 Product may be rejected if it fails to conform to any of the applicable requirements of this Specification.

5.1.2 Solid product may be rejected if it has become caked or sticky in shipment.

5.1.3 Liquid chemical may be rejected if it is not a homogenous solution.

5.2. Rejected chemical must be returned to supplier for proper disposal.

**6.0 MEASUREMENT**

6.1. Liquid calcium chloride and lignosulphonate shall be measured in litres.

6.2. Flake calcium chloride shall be measured by the equivalent flake tonnes (EFT).

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6.2.1. Litres of liquid calcium chloride are to be converted to equivalent flake tonne in the following manner:

$$\text{EFT} = \frac{\text{Litres} \times \text{kg/litres} \times \% \text{ Concentration}}{1000 \text{ kg/tonne} \quad 77\%}$$

EFT = equivalent flake tones (77% anhydrous product by weight)

Litres = volume measurement at delivery

Kg/litre = specific gravity of solution as determined by lab analysis supplied with the tender.

% Concentration = Percent by weight of anhydrous product in the solution as determined by representative lab analysis.

Example: EFT conversion for supply of MgCl

For litres = 16, 000 L of MgCl (from tank measurement)

Kg/litre = 1.320 (specific gravity from lab analysis)

% Concentration = 30% (from lab analysis)

$$\text{EFT} = \frac{16,000 \times 1.320}{1000} \times \frac{30}{77} \times \frac{110.99}{95.22} = 9.59$$

Molecular Weight of MgCl is 95.220 g/mole

Molecular Weight of CaCl is 110.990 g/mole

**7.0 TRANSPORTATION**

7.1. Liquid Product

7.1.1. Product shall be transported in calibrated tanker(s) in compliance with applicable Canada Transport regulations.

7.1.2. Each tank shall bear the official stamp of the Ministry of Highways and Infrastructure of Weights and Measures showing the volume at each tank marker.

7.2. Dry Product

7.2.1. Product shall be transported in closed or covered vehicles in compliance with applicable Transport Canada regulations.

7.2.2. Product shall be transported in calibrated hopper trailers or be weighed on approved scales. The Ministry reserves the right to weigh any or all loads.