



Specifications For Manufactured Materials

Section: SPECIFICATIONS FOR DUST PALLATIVE

Subject: CALCIUM CHLORIDE/LIGNOSULPHONATE

1. SCOPE

1.1 This specification identifies the material requirements for the selection of chemicals to be used for deicing and/or stabilization and/or dust control for gravel roads, for Saskatchewan Highways and Transportation.

1.2 This specification covers the material requirements for the following chemicals:

Calcium Chloride
Lignosulphonate

1.2.1 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-449-84 Analysis of Calcium Chloride

Standard D-1293 Test Methods for pH of Water

Standard D-1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products

2.2 Canada Pulp and Paper Association

Standard Method H1-77: Determination of Solids Content of Pulp and Paper Mill Effluents.

3. MATERIALS

Materials shall conform to their respective requirements as listed below.

3.1 Liquid Calcium/Magnesium Chloride (brine)

3.1.1 Liquid Calcium/Magnesium Chloride shall possess the following quantities (by percent mass according to ASTM E449-84) of constituent chemicals:

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

* Calcium/Magnesium Chloride content may be made up of either CaCl₂ or a combination of both CaCl₂ and MgCl₂.

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

3.1.3 Liquid Calcium/Magnesium Chloride shall not be subject to freezing to negative forty-five (-45) degrees Celsius.

3.2 Flake Calcium Chloride

3.2.1 Flake Calcium Chloride shall possess the following minimum quantities (by percent mass according to ASTM E449-84) of constituent chemicals:

Calcium Chloride (CaCl ₂)	min.	77.0%
Total Alkali Chlorides (as NaCl)	max.	2.0%
Impurities (including MgCl ₂)	max.	0.5%
Other Impurities (not incl. Water)	max.	1.0%

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

Sieve Size	Percent Passing
Metric (U.S.)	Sieve
9.0 mm (3/8)	100%
5.0 mm (#4)	80-100%
630 um (#30)	0-5%

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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:

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

3.3.1.1 Product delivered in concentrations equal to or greater than 50% solids by weight shall receive any pay adjustment.

3.3.2 At time of application, Lignosulphate shall possess a minimum of 25% total dissolved solids when tested in accordance with Standard H1-77.

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 ratio of organic solids to total dissolved solids of 65% when tested in accordance with Standard H1-77.

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 safety data information, as required by the Workplace Hazardous Materials Information System.

3.4.3 Materials to be accepted by Saskatchewan Environment as not having any detrimental effect on the environment.

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4. MATERIALS SAMPLING AND TESTING

4.1 Supplier Testing

4.1.1 Chemical analysis of product to be supplied to Saskatchewan Highways and Transportation 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 Saskatchewan Highways and Transportation upon request.

4.1.3 Testing for compliance shall be performed by qualified personnel.

4.2 Saskatchewan Highways and Transportation 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

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. REJECTION

5.1 The Department 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 may be rejected if it is not a homogeneous solution.

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

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6. PRODUCT APPLICATION

6.1 Equipment

- 6.1.1 Spreader units for this application of liquid product shall be equipped with a pressurized spray bar capable of providing uniform application at a specified rate.
- 6.1.2 Spreader units shall be equipped with an amber rotary flashing light twenty (20) centimetres in diameter, visible from both the front and rear of the unit.

6.2 Application Rates

- 6.2.1 Liquid Calcium/Magnesium Chloride shall be applied at a rate of 1.0 to 1.1 litres/metre².
- 6.2.2 Lignosulphonate
 - 6.2.2.1 Lignosulphonate shall be applied at a rate of 2.0 to 2.2 litres/metre², in a single application unless otherwise permitted or specified by Department Engineer.
 - 6.2.2.2 Lignosulphonate shall be diluted with water or other approved cutback liquid to a concentration of no less than 25% solids mass for purpose of application.
- 6.2.3 Flake Calcium Chloride shall be applied at a rate of one tonne per 1480 to 1630 metre².

6.3 Application Conditions

- 6.3.1 Chemical shall not be applied during periods of rain, nor if rain is expected within 12 hours of application.
- 6.3.2 Chemical shall not be applied where the surface to be sprayed is in a saturated condition.
- 6.3.3 Chemical shall not be applied when air temperature is greater than twenty-seven (27) degrees Celsius.

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7. MEASUREMENT

7.1 Liquid Calcium Chloride and Lignosulphonate shall be measured in Litres.

7.2 Flake Calcium Chloride shall be measured by the equivalent flake tonnes (EFT).

7.2.1 Litres of liquid Calcium Chloride are to be converted to equivalent flake tonne in the following manner:

$$\text{EFT} = \frac{[\text{brine vol. (litres)}] \times [\text{brine wt. (kg/litre)}] \times [\text{CaCl}_2 \text{ in solution}\%]}{1000 \text{ kg/tonne} \times 77\%}$$

1 Equivalent Flake Tonne = 77% Calcium Chloride by weight.

8. TRANSPORTATION

8.1 Liquid Product

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

8.1.2 Each tank shall bear the official stamp of the Department of Weights and Measures showing the volume at each tanker marker.

8.2 Dry Product

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

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