



## NEW 3M™ Dust Suppressant LSP-1000C

### Introduction

Dust generated from coal mining, storage and transportation is an ongoing problem that can pose a serious threat to worker health and efficiency. It can also be a safety hazard and a potential source of tension with surrounding communities. Managing dust, however, has become an increasingly-costly challenge – one that can have an adverse effect on operational efficiency.

Water is commonly used as a dust suppressant because of its perceived low cost – even though water must be continually re-applied in order to be effective. But in many areas today, water is becoming increasingly scarce. And the rising cost of fuel, labor and equipment needed to transport water to remote areas could mean that water is no longer your most cost-effective option.

Now there is a practical, durable alternative to water and other agents used to suppress dust. New 3M™ Dust Suppressant LSP-1000C is a water-soluble formulation of wetting, penetrating and agglomerating agents, used to reduce or eliminate dust emissions from coal, ore and mineral stockpiles during transportation and storage.

Once applied to a material's surface using conventional spray equipment, the LSP-1000C solution dries to form a thin, flexible and continuous film that can effectively suppress dust for extended periods. In fact, both laboratory and field tests have shown that the product provides more complete and longer-lasting dust control than water or many conventional dust suppression products.

### Advantages

- **Helps reduce costs** – Unlike water, which must be frequently re-applied to maintain dust control, LSP-1000C suppressant typically requires only a single application. This can result in potentially significant savings on fuel and labor costs.
- **Durable** – LSP-1000C suppressant has proven its ability to control dust over long, jarring rail hauls of 800+ miles, without re-application.
- **Wide operating temperature range** – Can be applied down to 32°F (0°C) and in excess of 100°F (38°C) without appreciable effect on durability, performance or application properties. It is also not affected by humidity.
- **Non-corrosive** – Does not contribute to corrosion of railcars or equipment
- **Global sales and tech support**



3M™ Dust Suppressant LSP-1000C forms a thin, tough, flexible film that is durable enough to survive railcar vibration, wind and rain.

## Application

3M™ Dust Suppressant LSP-1000C can be applied using readily-available, off-the-shelf components used in fluid spraying systems, such as tanks, pumps, piping, nozzles and proportioners. Nominal application rate is from 0.5 to 5% diluted in water. For coal transportation or stockpiles, the recommended dilution is 1 to 5% in water.

LSP-1000C suppressant dries tack-free in 30 minutes, at which time 80% performance is achieved. If rain occurs after 30 minutes, there will be no detrimental effect on performance. Product dries to full cure in 60 minutes. It is recommended that the coal be above 32°F (0°C) before applying LSP-1000C suppressant.

## Typical Physical Properties

(Data not for specification purposes)

Appearance	Viscous liquid, milky white
Density	1.00-1.05 g/ml
Solids (%)	40-42
Viscosity (cP)	3000-5000
Boiling point	203°F (95°C)
Freeze point	30°F (-1°C)
Flash point (Test Method B)	182°F (83°C)
pH (1% in water)	5-7
Vapor Pressure	21 mmHg @ 68°F
Solubility in Water	100% @ 77°F
Percent volatile	30-60
VOC	70 g/L (less water)
Surface Tension (0.2% in H2O at 23°C)	39 dyne/cm

## Performance Testing

### Strength of LSP-1000C Cured Film on Coal Surface

Test (Simpson Weathering Phase 1)	Result
Static Cure Strength, Crush	Pass
Static Strength, Penetration	Pass
Static Strength, Shear	Pass

### Effect of Weather on LSP-1000C Performance on Coal

Test (Simpson Weathering, Phase 1)	Result	Comments
Freeze Stress	Pass	Good dust suppression and LSP-1000C integrity after freeze/thaw cycle of 2 hrs @ -18°C
Run-Off/Erosion and Rain Simulation	Pass	
Wind Tunnel	Pass	Designed to test LSP-1000C stability at various wind speeds, orientations to railcar/profile
Solar Stress	Pass	Field test for LSP-1000C in static outdoor applications indicates minimum 6 months durability to UV exposure.

### Weight of Coal Lost Over Time

The following laboratory-scale test is designed to simulate the effect of wind blowing over a stockpile of coal, to determine the amount of coal (by weight) lost to dust emission.

The coal used is from the Powder River Basin coal mine. The coal sample is ground and sized by passing a 0.07 inch screen, with the oversize particles discarded.

The prepared coal sample was placed on trays 20mm in depth. The surface area of each tray is approximately 200 cm<sup>2</sup>. Application of LSP-1000C suppressant was approximately 1.5 liters per square meter.

After the suppressant was sprayed on the coal samples, the trays were placed in an oven of 40°C for one hour to cure. They were then left at room temperature (25°C) overnight before testing.

An air gun was used to simulate wind of approximately 10 mph blowing over the coal sample surface. The coal sample weight loss was measured at each air gun blow cycle, which lasted for one minute. A total of 10 cycles were recorded for the treated coal samples.

Minutes	1	2	3	4	5	6	7	8	9	10
Untreated Sample	25g	46g	64g	—	—	—	—	—	—	—
Sample Treated with 6% LSP-1000C solution	0g	0g	0g	0g	0g	0g	0g	0g	0g	0g

Virtually identical results were obtained when the same test was run after placing the sample trays in a freeze chamber at -28°C for about 3 hours and then allowed to thaw at room temperature for 3 hours, indicating that the product offers excellent freeze/thaw stability.

Additional tests have shown no relationship between the moisture content of coal and the effectiveness of LSP-1000C suppressant. None of the contaminants commonly found in coal have been found to affect the 3M product's performance.

## Regulatory Summary

3M™ Dust Suppressant LSP-1000C contains low levels of volatile organic compounds (VOCs). The product is based upon stable polymers with minimal environmental impact. The components of LSP-1000C suppressant are in compliance with the chemical notification requirements of TSCA.

## Storage

Keep container in well-ventilated area. Store away from heat. Store out of direct sunlight.

LSP-1000C concentrate is subject to form a “skin” when exposed to dry and hot air. Keep container closed tightly when not in use. The shelf life of LSP-1000C concentrate is two years from date of manufacture under normal storage conditions. The product is stable after limited freezing and thawing. Repeated freezing and thawing should be avoided, and may affect stability.

## Product Safety and Handling

Before using this product, read the product label and Material Safety Data Sheet (MSDS) and follow all precautions and directions for use.

To dispose of unused product, incinerate in an industrial or commercial facility in the presence of a combustible material. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

For additional health, safety and environmental information, see product MSDS or call 1-800-364-3577 or (651) 737-6501.

## Packaging

LSP-1000C is available in 20 kg pails, 200 kg drums and 1,000 kg totes. Alternative packaging may be available. Contact 3M for additional information about packaging.

Example of a non-enclosed spray header structure, for use in warm climates



**Important Notice:** The information in this publication is based on tests that we believe are reliable. Your results may vary due to differences in test types and conditions. You must evaluate and determine whether the product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all express and implied warranties (including the implied warranties of merchantability and fitness for a particular purpose): Except where prohibited by law, 3M's only obligation and your only remedy, is replacement or, at 3M's option, refund of the original purchase price of product that is shown to have been defective when you received it. In no case will 3M be liable for any direct, indirect, special, incidental, or consequential damages (including, without limitation, lost profits, goodwill, and business opportunity) based on breach of warranty, condition or contract, negligence, strict tort, or any other legal or equitable theory.



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