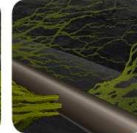


Technical Sales Bulletin

Performance Additives

Mitigates respirable silica dust generated by frac sand

Sentinel™ Dust Suppressant



In order to have a safer work environment, OSHA has implemented a new ruling that limits the permissible exposure limit (PEL) for respirable silica dust to 50 µg/m³ calculated as an 8-hour time weighted average.¹ This poses a new challenge for frac sand producers and users.

Hexion's Sentinel™ dust suppressant is an economical solution designed to reduce the amount of respirable silica to levels below the new OSHA and existing Canadian PELs. The unique chemical system traps fine dust particles and remains on the proppant during transportation and transfer.

The versatile application method allows users to apply the product at the sand mine, transload or at the frac location. Sentinel dust suppressant can provide safety and compliance from the sand mine to the wellhead.

Technical Applications

- Liquid dust control agent
- Can be applied at the sand mine, transload or on frac location
- Can be applied at temperatures from -30°F to 200°F
- Is effective on all mesh size sands, including 100 mesh

Technical Advantages and Benefits

- Capable of reducing respirable silica dust below 25 µg/m³ as an 8-hour TWA
- Sentinel dust suppressant mobile or stationary delivery system has a small footprint on location
- Unique chemistry is compatible with most frac fluids
- Will not decrease throughput at the sand mine
- Will not decrease sand offloading time when deployed at a transload or frac site
- Resistant to degradation during multiple proppant transfers

Sentinel Dust Suppressant Field Study



Uncoated 100 Mesh Sand
Average Respirable Silica: 1,470 µg/m³



Sentinel Dust Suppressant Treated 100 Mesh Sand
Average Respirable Silica: 16 µg/m³

Both the Sentinel dust suppressant treated 100 mesh sand and uncoated 100 mesh sand were transferred to an open bin by a mobile conveyor. A vertical fall of approximately 25 feet generated respirable dust levels above the new OSHA PEL for the uncoated 100 mesh sand. The 100 mesh sand treated by the Sentinel dust suppressant had all respirable dust measurements below the new OSHA PEL. Analyzed in accordance with OSHA 1910.1053 appendix A.

Product Delivery System



Sand Mine



Transload



Frac Site

Sentinel dust suppressant's innovative and compact delivery system provides the ultimate flexibility with application configurations available for the sand mine, transload or frac site. The high-speed treatment process keeps up with the industry's fastest loading times. The simple user interface allows for effortless transitions when switching between loading uncoated sand and Sentinel dust suppressant treated sand. The easy installation and trouble-free operation allow for a seamless integration into any frac sand supply chain.



Sentinel Dust Suppressant Applicator

The Sentinel dust suppressant application system is an all-in-one mobile or stationary unit. The application mechanism only requires compressed air and can be configured to fit virtually any vertical fall.

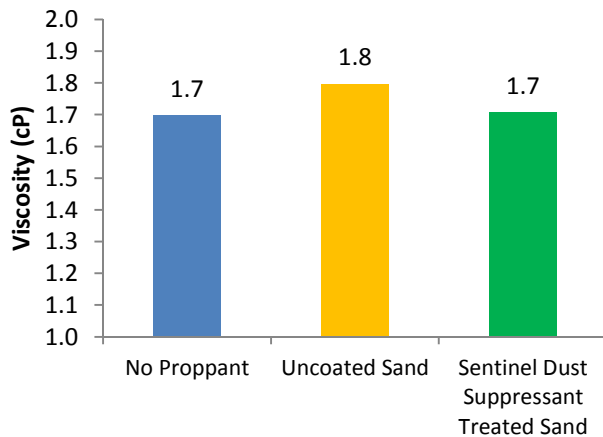
The versatile delivery system is specifically designed to coat the sand with a protective dust suppressant that not only traps small particles and dust, but also reduces the generation of respirable dust from the sand caused by attrition during proppant transportation and conveyance by pneumatic transfer.

Sentinel dust suppressant is composed of a single chemical that does not require any mixing systems or dilution. This allows the system to have a small footprint, which can be fully contained on a trailer that can be relocated as needed by the user.

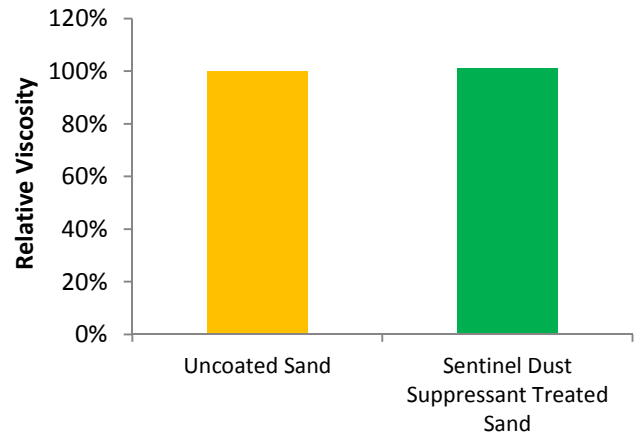
Frac Fluid Compatibility

Sentinel dust suppressant shows negligible effects on commonly used frac fluid components when compared to uncoated sand.

Effect on Friction Reducer
0.1% Friction Reducer



Effect on Gel Viscosity
20 lb XL Borate Fluid



Sentinel dust suppressant is compatible with most commonly used fracturing fluids, both water and oil-based systems. Testing with fluids prior to pumping is advised.

Physical Properties	
Physical Form	liquid
Color	brownish-yellow
Odor	slight
pH	8.0 - 8.5
Viscosity 68°F (20°C)	300 - 500 cP
Pour Point	-31°F [-35°C]
Flashpoint	>264°F [129°C]

Application and Storage	
Suitable Mesh Sizes	12/20, 16/30, 20/40, 30/50, 40/70, 100 Mesh
Recommended Storage Conditions	cool and dry
Shelf Life	1 year
Packaging	tote or bulk (tank truck or railcar)

Product Safety, Handling, and Storage

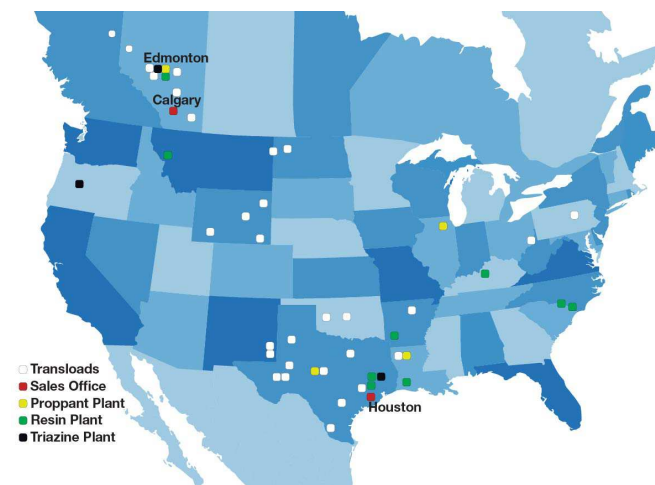
Always wear proper PPE, gloves and safety glasses, and wash hands and face after handling. Use only with adequate ventilation and wear an appropriate respirator if necessary. Keep product in the original container or an approved alternative made from compatible material. Do not reuse empty containers as they may contain hazardous residue.

Store in original container protected from direct sunlight in a dry, cool, and well-ventilated area away from strong oxidizers, food, and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Limitations

Customers must evaluate Hexion products and make their own determination as to the fitness of use in their particular applications.

North America Manufacturing and Distribution Network



Hexion continues to expand capacity and strategically locate transloads near the major shale plays in North America to meet the industry's increasing need for resin coated proppants.

References:

1. "OSHA's Final Rule to Protect Workers from Exposure to Respirable Crystalline Silica," <https://www.osha.gov/silica/>, March, 2016.



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