Soil-Sement®

Dust and Erosion Control Agent

Environmental Data

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MIDWEST INDUSTRIAL SUPPLY, INC.

Working to Make a Difference

Soil Sement® Environmental Perspective

Midwest Industrial Supply, Inc. is committed to providing comprehensive and relevant environmental information about our products. Working with various testing laboratories and regulatory organizations enables us to provide unbiased environmental and toxicity data that we use to develop the best dust control and stabilization programs for our customers.

Choosing the right product for an application is more than picking the product with good or sufficient dust control efficiency. It means evaluating the application and understanding all the needs of the customer including environmentally sensitive areas, regulatory constraints, aesthetics, customer preferences, operational or process concerns, and climate. Understanding the environmental and toxicity data and relating it to typical applications and site-specific needs is an important aspect of what Midwest does when working with our customers.

The conclusion of the information presented herein is that all testing shows Soil Sement®, when applied properly, will not negatively impact soil quality or water quality in terms of toxicity. Generic risk assessment will not replace a conscientious site-specific evaluation, but the data used in this perspective is a necessary component for all risk assessments

The US EPA Environmental Technology Verification (ETV) Program protocol for Dust Suppression Products evaluated bulk constituents as well as aquatic toxicity on Soil Sement®. The purpose of the program was to accumulate environmental data, however, the US EPA protocol did not allow for commentary on the environmental data.

The US EPA does however have regulatory guidelines that enable us to assess the potential impact of Soil Sement® on the environment. The test results used for this Environmental Impact Perspective can be found in Appendix A and B of the US EPA ETV report on Soil Sement® or on the Midwest Website.

1. Tri-State Laboratories, Chemical Analysis, July 2002
2. ABC Laboratories, Various Species Toxicity, September 2002
3. EnviroScience Inc., Rainbow Trout, Chronic Toxicity, June 2005

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Chemically, Soil Sement® is a polymer emulsion blend. The selected acrylic and vinyl acetate monomers are polymerized and emulsified. The selected polymer emulsions are formulated to achieve the desired end product properties. Soil Sement® is diluted upon application to achieve desired penetration properties specific to each site and application need.

Application rates vary with soil type and properties and the desired end result of the project. Soil Sement® is typically applied topically to the surface of the road with specially designed applicator trucks. Some applications require or specify incorporation of Soil Sement® into the soil to a depth of several inches. These types of Good Construction Practices (GCP®) applications are not typical; all calculations are based on topical rather than GCP® application techniques. Typical application rates for dust control range from 0.15 gal/yd^2 to 0.30 gal/yd^2. For purposes of this environmental impact analysis the application used in calculations was 0.20 gal/yd^2.

A full range chemical analysis was performed on Soil Sement® by Tri-State Labs. Composition analysis included: volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), metals, herbicides/herbicides and polynuclear aromatic hydrocarbons (PAH). Please see TSL, July 2002 for full analysis. The only chemicals detected in Soil Sement® are seven metals and one VOC.

The US EPA has developed Risk Based Concentrations (RBC) tables for numerous toxic chemicals. These tables list the levels in various media (i.e.: fish, tap water, ground water, ambient air, industrial soil and residential soil) that a chemical can be present in that media and impart little if any risk to humans. The October 2005 Risk Based Concentrations (RBC) Table from EPA Region III was used in this evaluation. The Soil Sement® application rate used was 0.20 gal/yd^2, one (1) inch depth penetration was assumed and a soil density of 2.8 g/cm^3 was used for calculations. Chemical level in the soil was compared to the RBC levels in residential soil. Analysis shows that at a heavy application of Soil Sement®, for all detected constituents, the levels are significantly lower than the RBC levels in residential soil. Therefore, Soil Sement® is safe for use in terms of environmental impact. The results are tabulated in the table below.

Chemical Constituent	Soil Sement® Level (mg/kg)	Soil Level (mg/kg)	RBC level (mg/kg)
Aluminum	2.440	0.0330	78,000.0
Barium	3.480	0.0470	16,000.0
Chromium	0.075	0.0010	230.0
Iron	1.640	0.0220	23,000.0
Mercury	0.060	0.0008	7.8
Nickel	0.100	0.0013	1,600.0
Zinc	2.610	0.0350	23,000.0
Toluene	1.555	0.0210	6,300.0

Toxicological evaluation of Soil Sement® utilized EPA methods for both acute and chronic toxicity determination for aquatic organisms. LC_{50} values were determined for each of the species. The table below contains a synopsis of the results.

Soil Sement Aquatic Toxicity Test Results

*Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, EPA/600/4-90/027F.

*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-91/002.

*Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Marine and Estuarine Organisms, EPA/600/4-91/003.

	Ceriodaphnia dubia	Fathead minnow	Americamysis bahia	Rainbow trout
ACUTE/SURVIVAL (mg/L)				
LC50	>1000	>1000	>1000	320
NOEC	1000	1000	1000	
LOEC	>1000	>1000	>1000	
CHRONIC/SURVIVAL (mg/L)				
LC50	>1000	>1000	>1000	510
NOEC	1000	1000	1000	340
LOEC	>1000	>1000	>1000	700
CHRONIC/GROWTH/ REPRODUCTION (mg/L)				
LC50	>1000	>1000	>1000	540
NOEC	1000	1000	1000	340
LOEC	>1000	>1000	>1000	700

See attached test results:

1. ABC Laboratories, Inc. Americamysis bahia, Fathead minnow, Ceriodaphnia dubia.
2. BAR Invironmental, Inc. Rainbow trout
3. EnviroScience Inc. Rainbow Trout, Chronic (New Data)

LC50 - Lethal Concentration, 50%
NOEC - No Observable Effects Concentration
LOEC - Lowest Observable Effects Concentration

The LC_{50} level is the lethal concentration of the chemical under test that kills 50% of the test organisms in the specified amount of time. According to the EPA-540-9-85-006, suggested toxicity criteria for materials are listed in the table below.

LC_{50} (mg/L)	Category Description
<0.1	Very highly toxic
0.1 – 1	Highly toxic
1 – 10	Moderately toxic
10 –100	Slightly toxic
>100	Practically non-toxic

Comparison of the EPA guidelines to the LC_{50} levels of all species show that Soil Sement® is practically non-toxic to all species.

In conclusion, all testing shows that Soil Sement®, when applied properly, will not negatively impact soil quality or water quality in terms of toxicity. Generic risk assessment will not replace a conscientious site-specific evaluation, but the data used in this perspective is a necessary component for all risk assessments.