



CHEMSYNTH CORPORATION

(Exporter of chemical Raw materials)

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Material Safety Data Sheet

Diethyl sulfate MSDS

Section 1: Chemical Product

Company Identification Product Name: Diethyl sulfate Catalog Codes: 10585 CAS#: 64-67-5 RTECS: WS7875000 TSCA: Not applicable Synonym: Diethyl sulphate; DS; Dialkyl sulfates Chemical Formula: C₄H₁₀O₄S

Section 2: Composition

Information on Ingredients Composition: Name CAS # % Diethyl sulfate 64-67-5 99%

Section 3: Hazards Identification

EMERGENCY OVERVIEW Appearance: colorless oil. Danger! Causes eye and skin burns. Causes digestive and respiratory tract burns. Harmful if absorbed through the skin. May be harmful if swallowed or inhaled. Cancer suspect agent. May cause heritable genetic damage. Moisture sensitive. Target Organs: Lungs, eyes, skin, mucous membranes. Potential Health Effects Eye: Causes eye burns. Skin: Harmful if absorbed through the skin. Causes skin burns. Ingestion: Causes gastrointestinal tract burns. May cause systemic effects. Inhalation: Causes chemical burns to the respiratory tract. May be harmful if inhaled. Chronic: May cause fetal effects. May cause cancer in humans. Effects may be delayed. Chronic exposure may cause lung damage. Laboratory experiments have resulted in mutagenic effects. Prolonged exposure may cause corneal erosion, conjunctivitis, and possible blindness.

Section 4: First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes). Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing Health 3 Fire 1 Reactivity 1 Personal Protection E 1 3 1 contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes. Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Notes to Physician: Persons with asthma, chronic respiratory disease, skin disorders, eye problems or allergies may be at increased risk from exposure to this substance. Treat symptomatically and supportively.

Section 5: Fire and Explosion

Data General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Flash Point: 104 deg C (219.20 deg F) Autoignition Temperature: 436 deg C (816.80 deg F) Explosion Limits, Lower:4.1 vol % Upper: Not available. NFPA Rating: (estimated) Health: 3; Flammability: 1; Instability: 1

Section 6: Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8. Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

Section 7: Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes. Storage: Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep refrigerated. (Store below 4°C/39°F.) Material darkens in color during storage. Store protected from moisture.

Section 8: Exposure Controls/Personal Protection Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low. Exposure Limits Chemical Name ACGIH NIOSH OSHA - Final PELs Diethyl sulfate none listed none listed none listed OSHA Vacated PELs: Diethyl sulfate: No OSHA Vacated PELs are listed for this chemical. Personal Protective Equipment Eyes:

Wear chemical splash goggles. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure. Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9: Physical and Chemical Properties

Physical State: Oil Appearance: colorless Odor: peppermint odor - ethereal odor pH: Not available. Vapor Pressure: 0.29 mm Hg @ 25 deg C Vapor Density: 5.3 (air=1) Evaporation Rate: Not available. Viscosity: 1.79 cP @ 20 deg C Boiling Point: 208 deg C Freezing/Melting Point: -24 deg C Decomposition Temperature: Not available. Solubility: 0.7% @20°C. Dec in hot water. Specific Gravity/Density: 1.1795 Molecular Formula: C₄H₁₀O₄S Molecular Weight: 154.19

Section 10: Stability and Reactivity

Data Chemical Stability: Stable under normal temperatures and pressures. Decomposed by hot water into monoethyl sulfate (corrosive) and ethanol (flammable). Conditions to Avoid: Moisture, excess heat. Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, strong bases. Hazardous Decomposition Products: Carbon monoxide, oxides of sulfur, carbon dioxide, ethyl alcohol. Hazardous Polymerization: Has not been reported.

Section 11: Toxicological Information

RTECS#: CAS# 64-67-5: WS7875000 LD50/LC50: CAS# 64-67-5: Oral, mouse: LD50 = 647 mg/kg; Oral, rat: LD50 = 880 mg/kg; Skin, rabbit: LD50 = 600 uL/kg; Inhalation LC50 rat: >250 ppm/4H, 0/6 killed.; Inhalation LC50 rat: < 500 ppm /4H, 6/6 killed (Union Carbide). Carcinogenicity: CAS# 64-67-5: • ACGIH: Not listed. • California: carcinogen, initial date 1/1/88 • NTP: Suspect carcinogen • IARC: Group 2A carcinogen Epidemiology: No data available. Teratogenicity: No data available. Reproductive Effects: No information found Mutagenicity: DNA Damage: Human, HeLa cell = 20 mg.; DNA Inhibition: Human, HeLa cell = 600 umol/L.; Cytogenetic Analysis: Human, Lymphocyte = 300 umol/L.; Sex Chromosome Loss and Nondisjunction = Human, Lymphocyte = 100 umol/L. Neurotoxicity: No information found Other Studies:

Section 12: Ecological Information

Ecotoxicity: No data available. If released to soil, estimated soil adsorption coefficients ranging from 33 to 99 indicate that it may display high to very high mobility in soil; however, diethylsulfate is known to rapidly hydrolyze in water under neutral, basic and acidic conditions and this reaction is expected to dominate its fate in soil. If released to water diethylsulfate is expected to hydrolyze with an experimental half-life of 1.7 hrs at neutral pH. This reaction is catalyzed by both acids and bases. Environmental: Diethylsulfate is not expected to bioconcentrate in fish and aquatic organisms nor is it expected to adsorb to sediment and suspended organic matter. If released to the atmosphere, diethylsulfate is expected to undergo a gas-phase reaction with water vapor with an experimental half-life of 1.7 hrs at neutral pH. This reaction is catalyzed by both acids and bases. Environmental:

Diethylsulfate is not expected to bioconcentrate in fish and aquatic organisms nor is it expected to adsorb to sediment and suspended organic matter. If released to the atmosphere, diethylsulfate is expected to undergo a gas-phase reaction with water vapor with an experimental half-life of

Section 13: Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14: Transport Information

US DOT Canada TDG Shipping Name: DIETHYL SULFATE DIETHYL SULFATE Hazard Class: 6.1 6.1 UN Number: UN1594 UN1594 Packing Group: II II

Section 15: Other Regulatory Information

US FEDERAL TSCA CAS# 64-67-5 is listed on the TSCA inventory. Health & Safety Reporting List None of the chemicals are on the Health & Safety Reporting List. Chemical Test Rules None of the chemicals in this product are under a Chemical Test Rule. Section 12b None of the chemicals are listed under TSCA Section 12b. TSCA Significant New Use Rule None of the chemicals in this material have a SNUR under TSCA. CERCLA Hazardous Substances and corresponding RQs CAS# 64-67-5: 10 lb final RQ; 4.54 kg final RQ SARA Section 302 Extremely Hazardous Substances None of the chemicals in this product have a TPQ. SARA Codes CAS # 64-67-5: immediate, delayed, fire.

Section 16: Other Information

References: Not available. Other Special Considerations: Not available. Created: 10/06/2010 Last Updated: 24/11/2012 The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Finar Limited be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Finar Limited has been advised of the possibility of such damages.