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## Material Safety Data Sheet

### Dimethyl Disulfide(DMDS)

#### Section 1: Chemical Product and Company Identification

Molecular formula: C<sub>2</sub>H<sub>6</sub>S<sub>2</sub>

CAS Nr: 624-92-0

EINECS: 210-871-0

Molecular weight: 94.2 g/mol

Chemical family: Alkyl Sulfide

Synonyms: (CH<sub>3</sub>S)<sub>2</sub>; (Methyldisulfanyl)methane; (Methyldithio)methane; 2,3-dithiobutane; dimethyldisulfane

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#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS # %	By Weight
Dimethyl disulfide	624-92-0	≥ 99.0%

#### Section 3: Hazards Identification

##### Emergency overview

Pale yellow liquid, strong garlic-like odor

WARNING!

FLAMMABLE LIQUID AND VAPOR.

HARMFUL IF SWALLOWED.

HARMFUL IF INHALED.

MAY CAUSE EYE AND SKIN IRRITATION.  
MAY CAUSE RESPIRATORY TRACT IRRITATION.  
MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECT  
MAY CAUSE NAUSEA, HEADACHE OR DIZZINESS.

**Potential health effects**

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be moderately toxic if swallowed, no more than slightly toxic if absorbed through skin, slightly toxic if inhaled, and slightly irritating to eyes and skin. This material has a strong objectionable odor that may cause nausea, headache, or dizziness. The odor threshold is approximately 8 ppb. Prolonged or repeated contact may remove oils from the skin and may dry skin and cause irritation, redness and rash. High vapor concentrations may be irritating to the eyes and respiratory tract, and may result in central nervous system (CNS) effects such as headache, dizziness, nausea, drowsiness and, in severe exposures, loss of consciousness. These CNS effects may also occur if the material is absorbed through the skin.

**Section 4: First Aid Measures**

**IF IN EYES**, immediately flush with plenty of water. Get medical attention if irritation persists.  
**IF ON SKIN**, immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Thoroughly clean shoes before reuse.  
**IF SWALLOWED**, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.  
**IF INHALED**, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Section 5: Fire and Explosion Data**

**Fire and Explosive Properties**

Auto-Ignition Temperature	300 C (572 F)	
Flash Point	16 C	Flash Point Method TCC
Flammable Limits- Upper	16	
Lower	1.1	

**Extinguishing Media**

Use water spray, carbon dioxide, foam or dry chemical.

**Fire Fighting Instructions**

Use water spray to cool containers exposed to fire. Contain run-off from fire. Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

**Fire and Explosion Hazards**

When burned, the following hazardous products of combustion can occur:

Oxides of carbon

Sulfur oxides  
Hydrogen sulfide

## Section 6: Accidental Release Measures

### In Case of Spill or Leak

Ventilate the area. Contain spill by building a dike using absorbent material. Consult with environmental engineer or professional to determine if neutralization is appropriate and for handling procedures for residual materials. Do not use solid bleach for neutralization, as fire or violent reaction can occur. Collect the liquid and solid absorbent into a drum approved for waste disposal. Flush area with water. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

## Section 7: Handling and Storage

### Handling

Keep away from heat, sparks and flame.

Keep container closed.

Use only with adequate ventilation.

Do not taste or swallow.

Do not breathe vapor.

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

CONTAINER HAZARDOUS WHEN EMPTY. Emptied container retains vapor and product residue. Follow labeled warnings even after container is emptied. RESIDUAL VAPORS MAY EXPLODE ON IGNITION. DO NOT CUT, DRILL GRIND OR WELD ON OR NEAR THIS CONTAINER. Improper disposal or reuse of this container may be dangerous and/or illegal.

### Storage

Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity.

Ensure that all storage and handling equipment is properly rated, grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate and create a fire hazard. All storage containers, including containers such as drums, cylinders and IBC's, must be bonded and grounded during filling and emptying operations. Store away from oxidizers and reactive materials. Keep container tightly closed.

## Section 8: Exposure Controls/Personal Protection

### Other Protective Equipment

The following personal protection equipment (PPE) recommendation is for use of Dimethyl disulfide (DMDS) as an Industrial Chemical.

### Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if

necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

#### **Eye / Face Protection**

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

#### **Skin Protection**

Butyl rubber, Nitrile gloves should be worn when handling this material. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Wash contaminated clothing and clean protective equipment before reuse. Rinse contaminated skin promptly. Wash skin thoroughly after handling. Wash the outside of gloves before removing.

#### **Respiratory Protection**

Avoid breathing vapor or mist. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

## **Section 9: Physical and Chemical Properties**

Appearance/Odor: Pale yellow liquid, strong garlic-like odor

pH: NE

Specific Gravity: 1.063 @ 20 C

Vapor Pressure: 0.42 psia

Vapor Density: 3.25

Melting Point: NA

Freezing Point: -84.7 C (-120.5 F)

Boiling Point: 107-110 C (225-232 F)

Solubility In Water: Insoluble @ 20 C

Solubility in Other Materials: Alcohols, hydrocarbons

Evaporation Rate: NE

Percent Volatile: 100

Viscosity: 0.62 cP @ 20 C

Molecular Weight: 94.20

n-Octanol/Water Partition Coefficient: 1.77

Other Physical Data: Odor Threshold: 8-10 ppb approximately

Henry's Constant: 122.5 Pa.M<sup>3</sup>/mole

Refractive Index: 1.526 @ 20 C

## **Section 10: Stability and Reactivity Data**

**Stability**

This material is chemically stable under normal and anticipated storage and handling conditions.

**Incompatibility**

Contact with combustible materials may enhance the risk of fire. Alkali, Acid, solid bleach (strong oxidizer) may cause violent and fire. Keep away from heat and sources of ignition.

**Hazardous Decomposition Products**

Thermal decomposition giving flammable and toxic products: Hydrogen sulfide, methyl mercaptan, dimethyl sulfide.

**Section 11: Toxicological Information****Toxicological Information**

Data on this material and/or its components are summarized below.

Single exposure (acute) studies indicate:

Oral - Moderately Toxic to Rats (290 mg/kg < LD50 < 500 mg/kg)

Dermal - No More than Slightly Toxic to Rabbits (LD50 >2,000 mg/kg)

Inhalation - Slightly Toxic to Rats (4-hr LC50 1310 ppm)

Eye Irritation - Slightly Irritating to Rabbits (7.2/110)

Skin Irritation - Slightly Irritating to Rabbits (4-hr exposure, 2.9/8.0) No mortality was seen in rabbits following a single application to the skin, although rapid onset of eye irritation, central nervous system and respiratory signs were noted. These effects disappeared within a day after application. No skin allergy was observed in guinea pigs following repeated exposure. Following repeated application to the skin of rabbits, severe skin irritation and necrosis, transient lethargy, increased mortality, spasms, and effects on the heart and red blood cells were observed.

Following repeated inhalation exposure, irritation of the eyes, nose and respiratory tract were the most significant effects reported. Reduced body weights, slight effects on blood cells and some clinical chemistry parameters, and microscopic changes in the nose and spleen were also observed in some studies.

No neurotoxic effects were observed. No birth defects were observed in the offspring of rats and rabbits exposed by inhalation during pregnancy, but slight effects on the development of offspring and adverse effects on the mothers were reported in the study with rats. No adverse effects were observed when rats were exposed by inhalation for two successive generations. No genetic changes were observed in standard tests using bacteria, animal cells, or animals.

**Section 12: Ecological Information****Ecotoxicological Information**

Data on this material and/or its components are summarized below.

This material is moderately toxic to Daphnia (48-hr LC50 1.8 mg/l), trout (96-hr LC50 0.97 mg/l), and bobwhite quail (oral LD50 342 mg/kg and inhalation 4-hr LC50 478 ppm). It is slightly toxic to zebrafish (96-hr LC50 5 mg/l) and algae (72-hr EC50 14-26 mg/l), and practically non-toxic to earthworm (14d LC50 32 mg/kg soil, NOEC=22 mg/kg soil).

**Chemical Fate Information**

Data on this material and/or its components are summarized below.

This material is not readily biodegradable (<10% after 28-days; OECD 301 D) and has a low potential to bioaccumulate (log Pow 1.77). It has low sorption to soil and sediments (log Koc 2.34). It is degraded in air by OH

radicals (half-life 0.66-hrs) and is hydrolytically stable.

### Section 13: Disposal Considerations

#### Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

### Section 14: Transport Information

DOT Name: Dimethyl Disulfide  
DOT Technical Name  
DOT Hazard Class: 3(6)  
UN Number: UN2381  
DOT Packing Group: PG II  
RQ  
DOT Special Information: Primary Hazard - FLAMMABLE  
Subsidiary Hazard - TOXIC

### Section 15: Other Regulatory Information

#### Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health Y    Fire    Y  
Delayed (Chronic) Health N    Reactive N  
Sudden Release of Pressure N

The components of this product are all on the TSCA Inventory list.

#### Ingredient Related Regulatory Information:

##### SARA Reportable Quantities

Dimethyl disulfide

##### Massachusetts Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

##### New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

##### Pennsylvania Environmental Hazard

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.

##### Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

**Section 16: Other Information**

NE= Not Established NA= Not Applicable (R) = Registered Trademark  
Reversion Date: June 01, 2010  
Version No.: 20100601015

*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 we m 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 we have been advised of the possibility of such damages.*