



DIMETHYL DISULFIDE EVOLUTION (R)

Material Safety Data Sheet

Arkema Inc.

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals

Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:

Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name DIMETHYL DISULFIDE EVOLUTION (R)
Product Synonym(s) DMDS - E

Chemical Family Alkyl Sulfide
Chemical Formula C₂H₆S₂
Chemical Name 2,3-Dithiobutane
EPA Reg Num
Product Use Sulfurization Agent
Sulfiding

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Proprietary Fragrance	Proprietary	<1%	Y
Dimethyl disulfide	624-92-0	99%	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

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

3 HAZARDS IDENTIFICATION

Emergency Overview

Pale yellow liquid with a fruity, almond-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 EFFECTS

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.



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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.

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.

5 FIRE FIGHTING MEASURES

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

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.

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. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION**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

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

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. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients



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Exposure Limit

Value

Dimethyl disulfide

ACGIH Skin designator	-	Y
ACGIH TWA	-	0.5 ppm

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Pale yellow liquid with a fruity, almond-like odor
pH	NE
Specific Gravity	1.063 @ 20 C
Vapor Pressure	28hPa (mbar)
Vapor Density	3.25
Melting Point	NA
Freezing Point	-84.7 C (-120.5 F)
Boiling Point	107-110C (225-232F)
Solubility In Water	Insoluble
Solubility in Other Materials	Alcohols, hydrocarbons
Evaporation Rate	NE
Percent Volatile	100
Viscosity	0.62 mPa.s @ 20 C
Molecular Weight	94.2
n-Octanol/Water Partition Coefficient	1.77
Other Physical Data	Henry's Constant: 122.5 PaM ³ /mole Refractive Index: 1.526 @ 20 C Odor threshold: 8-10ppb

10 STABILITY AND REACTIVITY

Stability

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

Incompatibility

Contact with combustible materials may enhance risk of fire. Alkali, Acid, solid bleach (strong oxidizer) may cause violent reaction and fire.

Hazardous Decomposition Products

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

11 TOXICOLOGICAL INFORMATION

Toxicological Information

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

Dimethyl Disulfide

Single exposure (acute) studies indicate that this material is moderately toxic if swallowed (rat; 290 mg/kg <

11 TOXICOLOGICAL INFORMATION

LD50 < 500 mg/kg), no more than slightly toxic if absorbed through skin (rabbit LD50 >2,000 mg/kg), slightly toxic if inhaled (rat 4-hr LC50 1310 ppm), and slightly irritating to rabbit eyes (7.2/110) and skin (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.

12 ECOLOGICAL INFORMATION**Ecotoxicological Information**

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

Dimethyl Disulfide

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.

Dimethyl Disulfide

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.

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. Take appropriate measures to prevent release to the environment.



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14 TRANSPORT INFORMATION

DOT Name Dimethyl Disulfide
DOT Technical Name
DOT Hazard Class 3(6.1)
UN Number UN2381
DOT Packing Group PG II
RQ
DOT Special Information Primary Hazard - Flammable
Subsidiary Hazard - Toxic

15 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

CERCLA RQ

SARA TPQ

Dimethyl disulfide

NE

Massachusetts Right to Know

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

Dimethyl disulfide

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.

Dimethyl disulfide

Pennsylvania Environmental Hazard

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

Dimethyl disulfide

Pennsylvania Right to Know

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

Dimethyl disulfide

16 OTHER INFORMATION

Revision Information

Revision Date 08 MAY 2007 Revision Number 13
Supersedes Revision Dated 19-APR-2007

Revision Summary

Revised Section 8

Key

NE= Not Established NA= Not Applicable (R) = Registered Trademark



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