



DIMETHYLSULFOXIDE (DMSO)

1. PRODUCT AND COMPANY IDENTIFICATION

Company

Arkema Inc.
2000 Market Street
Philadelphia, Pennsylvania 19103

Thio and Fine Chemicals

Customer Service Telephone Number: (800) 628-4453
(Monday through Friday, 8:30 AM to 5:30 PM EST)

Emergency Information

Transportation: CHEMTREC: (800) 424-9300
(24 hrs., 7 days a week)
Medical: Rocky Mountain Poison Center: (303) 623-5716
(24 hrs., 7 days a week)

Product Information

Product name: DIMETHYLSULFOXIDE (DMSO)
Synonyms: DMSO
Molecular formula: (CH₃)₂SO
Chemical family: Organic sulfur compounds
Molecular weight: 78.13 g/mol
Product use: Solvent, Synthesis reaction medium

2. HAZARDS IDENTIFICATION

Emergency Overview

Color: colourless
Physical state: liquid
Odor: Strong solvent odour

CAUTION!
COMBUSTIBLE LIQUID AND VAPOR.
PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION.

Potential Health Effects

Primary routes of exposure:
Inhalation and skin contact.

Signs and symptoms of acute exposure:
Can be absorbed through the skin. Prolonged or repeated contact may dry skin and cause irritation. Objectionable odor may cause nausea, headache or dizziness. (strong garlic-like odor) Prolonged or repeated exposure may cause: fatigue.

Skin:
Practically nontoxic. Slightly irritating. (based on animal studies)

Inhalation:

**DIMETHYLSULFOXIDE (DMSO)**

Practically nontoxic. (based on animal studies)

Eyes:

Slightly irritating. (based on animal studies)

Ingestion:

Practically nontoxic. (based on animal studies)

Repeated exposure:

Prolonged or repeated exposure may cause: Strong garlic odour

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	OSHA Hazardous
Methane, sulfinylbis-	67-68-5	100 %	Y

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

This material is classified as hazardous under Federal OSHA regulation.

4. FIRST AID MEASURES**Inhalation:**

If inhaled, remove victim to fresh air.

Skin:

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:

Immediately flush eye(s) with plenty of water.

Ingestion:

If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

5. FIRE-FIGHTING MEASURES

Flash point 189 °F (87 °C) (closed cup)(Method: Standard ASTM D 93)

Auto-ignition temperature: 572 - 576 °F (300 - 302 °C)

Lower flammable limit (LFL): 2.6 %(V)

Upper flammable limit (UFL): 28.5 %(V)

Extinguishing media (suitable):

Foam, Dry chemical, Carbon dioxide (CO₂), Water spray

DIMETHYLSULFOXIDE (DMSO)**Protective equipment:**

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).

Further firefighting advice:

Fire fighting equipment should be thoroughly decontaminated after use.
Cool closed containers exposed to fire with water spray.

Fire and explosion hazards:

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

sulfur oxides
Carbon oxides
hydrogen sulfide

6. ACCIDENTAL RELEASE MEASURES**In case of spill or leak:**

Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay and then wet down (dampen) the mixture with water. Sweep or scoop up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. The sweepings should be wetted down further with water. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. 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****General information on handling:**

Keep away from heat and flames.
Avoid contact with skin, eyes and clothing.
Wash thoroughly after handling.
Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.

Storage**General information on storage conditions:**

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 grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All storage containers, including drums, cylinders and IBCs, must be bonded and grounded during filling and emptying operations. 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.

Storage incompatibility – General:

Sulphur compounds



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Strong acids

Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Methane, sulfinylbis- (67-68-5)

US. Workplace Environmental Exposure Level (WEEL) Guides

Remarks:	Listed
Time Weighted Average (TWA):	250 ppm

Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above mean that exposure to this material may cause allergic reactions.

Engineering controls:

Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above). 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.

Respiratory protection:

Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components and substances released during processing. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or 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.

Skin protection:

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. When handling this material, gloves of the following type(s) should be worn: butyl-rubber

neoprene

Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Wash contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

Eye protection:

Use good industrial practice to avoid eye contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

DIMETHYLSULFOXIDE (DMSO)

Color:	colourless
Physical state:	liquid
Odor:	Strong solvent odour
pH:	not determined
Density:	1,104 kg/m ³ (68 °F (20 °C))
Specific Gravity (Relative density):	1.104 (68 °F (20 °C))
Vapor pressure:	0.417 mmHg (68 °F (20 °C))
Relative vapor density:	2.7
Vapor density:	not applicable
Boiling point/boiling range:	372 °F (189 °C)
Melting point:	65.3 °F (18.5 °C)
Solubility in water:	68 °F (20 °C) completely soluble
Refractive index:	1.4785 68 °F (20 °C)
Viscosity, dynamic:	2.14 mPa.s 68 °F (20 °C)
Molecular weight:	78.13 g/mol
Thermal decomposition	> 374 °F (> 190 °C)
Surface Tension:	43 mN/m

10. STABILITY AND REACTIVITY**Stability:**

The product is stable under normal handling and storage conditions.

Materials to avoid:

Halogenated organic and mineral acids (sulphur, phosphorus)

Methylbromide

Sodium hydride

Zinc, Steel (in the presence of water)

Strong acids : perchloric acid, periodic acid

Strong oxidizing agents

Conditions / hazards to avoid:

Keep away from heat and sources of ignition. To avoid thermal decomposition, do not overheat.

DIMETHYLSULFOXIDE (DMSO)**Hazardous decomposition products:**

Thermal decomposition giving toxic products
sulfur oxides
formaldehyde
Methylmercaptan
Dimethylsulphide

11. TOXICOLOGICAL INFORMATION

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

Data for DIMETHYLSULFOXIDE (DMSO)**Acute toxicity****Oral:**

Practically nontoxic. (rat) LD50 = 28,300 mg/kg.

Dermal:

Practically nontoxic. (rat) LD50 = 40,000 mg/kg.

Inhalation:

Practically nontoxic. (rat) 4 h LC50 > 5.3 mg/l. (aerosol)

Skin Irritation:

Slightly irritating. (rabbit)

Eye Irritation:

Slightly irritating. (rabbit)

Skin Sensitization:

Not a skin sensitizer. Repeated skin exposure. (guinea pig, mouse) No skin allergy was observed.

Not a skin sensitizer. (human subjects) No skin allergy was observed.

Repeated dose toxicity

Oral, dermal administration to monkey / No adverse effects reported.

3 months inhalation administration to rat / Local irritation of the respiratory system

Oral administration to rat and dog / affected organ(s): eye / signs: changes in organ structure or function

Dermal administration to rat, rabbit, dog / affected organ(s): eye / signs: changes in organ structure or function

Genotoxicity**Assessment in Vitro:**

No genetic changes were observed in laboratory tests using: bacteria, animal cells, yeast

Assessment in Vivo:

Generally, no genetic changes were observed in laboratory studies using: rodent, fruit flies

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Genetic changes were observed in a laboratory test using: rats

Developmental toxicity

Exposure during pregnancy. oral (rat, rabbit) / No birth defects were observed.

Reproductive effects

Exposure prior to mating. oral (rat) / No toxicity to reproduction

12. ECOLOGICAL INFORMATION**Chemical Fate and Pathway**

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

Data for DIMETHYLSULFOXIDE (DMSO)**Biodegradation:**

Readily biodegradable. (27 d) 99 % / Standard : ISO 7827

Not readily biodegradable. (28 d) 31 % / OECD Guideline 301 D

Octanol Water Partition Coefficient:

log Pow -1.35 (Does not bioaccumulate.)

Ecotoxicology

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

Data for DIMETHYLSULFOXIDE (DMSO)**Aquatic toxicity data:**

Practically nontoxic. Fish 96 h LC50 = 25,000 - 43,000 mg/l

Aquatic invertebrates:

Practically nontoxic. Daphnia magna (Water flea) 48 h EC50 = 24,600 mg/l

Algae:

Practically nontoxic. Pseudokirchneriella subcapitata 72 h EC50 = 12,000 - 17,000 mg/l

Chronic toxicity to aquatic plants:

Algae 14 d EC50 = 3900 - 40200 mg/l

13. DISPOSAL CONSIDERATIONS**Waste disposal:**

Disposal via incineration is recommended. Dispose of in accordance with federal, state and local regulations. 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. 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.

DIMETHYLSULFOXIDE (DMSO)**14. TRANSPORT INFORMATION**

US Department of Transportation (DOT): not regulated

Special Shipping Information: Bulk Shipments: NA1993, Combustible liquid, n.o.s.(Dimethyl Sulfoxide), Combustible liquid, PGIII.

International Maritime Dangerous Goods Code (IMDG): not regulated

15. REGULATORY INFORMATION**Chemical Inventory Status**

EU. EINECS	EINECS	Conforms to
US. Toxic Substances Control Act	TSCA	The components of this product are all on the TSCA Inventory.
Australia. Industrial Chemical (Notification and Assessment) Act	AICS	Conforms to
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	DSL	All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List	ENCS (JP)	Conforms to
Korea. Toxic Chemical Control Law (TCCL) List	KECI (KR)	Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	PICCS (PH)	Conforms to
China. Inventory of Existing Chemical Substances	IECSC (CN)	Conforms to
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	NZIOC	Does not conform

United States – Federal Regulations**SARA Title III – Section 302 Extremely Hazardous Chemicals:**

The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:

Acute Health Hazard, Fire Hazard

SARA Title III – Section 313 Toxic Chemicals:

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.



DIMETHYLSULFOXIDE (DMSO)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

OSHA Regulated Carcinogens (NTP, IARC, OSHA Listed):

NTP:

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

IARC:

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA:

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

United States – State Regulations

Massachusetts Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Methane, thiobis-	75-18-3

Massachusetts Right to Know – Extraordinarily Hazardous Substance(s)

<u>Chemical Name</u>	<u>CAS-No.</u>
Methane, thiobis-	75-18-3

New Jersey Right to Know

No components are subject to the New Jersey Right to Know Act.

Pennsylvania Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Methane, sulfinylbis-	67-68-5

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

16. OTHER INFORMATION

Miscellaneous:

Grades:	DMSO, DMSO HP, DMSO EG
Latest Revision(s):	
Revised Section(s):	Initial entry
Reference number:	00000031905



Material Safety Data Sheet

DIMETHYLSULFOXIDE (DMSO)

Date of Revision: 10/08/2009
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