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# Material Safety Data Sheet

## Dimethyl sulfoxide

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Dimethyl sulfoxide

**Synonyms:** Methyl sulfoxide; DMSO; Sulfinylbis(methane); Dimethyl sulfoxide; Sulfinylbismethane.

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-68-5	Dimethyl sulfoxide	>99	200-664-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** clear, colorless liquid. Flash Point: 87.8 deg C.

**Warning!** DMSO readily penetrates skin and may carry other dissolved chemicals into the body. May cause eye, skin, and respiratory tract irritation. Hygroscopic (absorbs moisture from the air).

**Target Organs:** Central nervous system, eyes, skin.

### Potential Health Effects

**Eye:** May cause mild eye irritation. Two drops of >50% DMSO in the rabbit eye caused a temporary burning sensation and vasodilatation, but concentrations of <50% exhibited no effect. DMSO produced slight erythema of the conjunctiva over the first 3 days of the study, and a low level of key scoring was also recorded for chemosis, iritis and corneal opacity. The degree of eye injury described by these key scores would not result in DMSO being labelled as an eye irritant according to EEC classification. (ECB - Elf Aquitaine)

**Skin:** DMSO readily penetrates skin and may significantly enhance the absorption of numerous chemicals. Increased absorption of these other chemicals could lead to their increased toxicity. Skin sensitization was not observed with DMSO in human volunteers or in guinea pigs. Non-immunological whealing and flaring have been observed in animals and humans following short-term contact. Skin absorption of DMSO may result in a garlic-like breath and body odor, and CNS effects such as headache, nausea and dizziness. Undiluted DMSO applied topically to mice twice a week for 30 weeks failed to produce dermal injury. (EBC - Elf Aquitaine) Skin sensitization has not been reported in hundreds of human volunteers participating in a DMSO clinical trial. DMSO's ability to increase the absorption of other chemicals is its most significant occupational hazard.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system effects. May cause garlic smell on the breath and body.

**Inhalation:** Material has a very low vapor pressure at room temperature, so inhalation exposures are not expected unless material is heated or misted.

**Chronic:** Long-term skin application of 80-90% DMSO has produced CNS effects (such as fatigue, nausea, vomiting, sedation, dizziness and headache), and dermatitis (such as redness, dryness and scaling) in volunteers. A garlic-like breath odor has been noted.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**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. Use water spray to keep fire-exposed containers cool. Combustible liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam. Alcohol-resistant fire fighting foam is recommended for use on all water-soluble liquids or polar solvent-type liquids.

**Flash Point:** 87.8 deg C ( 190.04 deg F)

**Autoignition Temperature:** 215 deg C ( 419.00 deg F)

**Explosion Limits, Lower:**2.6 vol %

**Upper:** 42 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 2; Instability: 0

## 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. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation. Keep away from heat and flame.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Storage under a nitrogen blanket has been recommended. 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
Dimethyl sulfoxide	none listed	none listed	none listed

**OSHA Vacated PELs:** Dimethyl sulfoxide: 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:** Liquid

**Appearance:** clear, colorless

**Odor:** practically odorless

**pH:** Not available.

**Vapor Pressure:** 0.46 mm Hg @ 20 deg C

**Vapor Density:** 2.7 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** 1.1 cp @ 27 deg C

**Boiling Point:** 189 deg C

**Freezing/Melting Point:** 18.4 deg C

**Decomposition Temperature:** > 189 deg C

**Solubility:** Soluble.

**Specific Gravity/Density:** 1.100 g/ml

**Molecular Formula:** C<sub>2</sub>H<sub>6</sub>OS

**Molecular Weight:** 78.13

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions. Hygroscopic: absorbs moisture or water from the air.

**Conditions to Avoid:** Ignition sources, moisture, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong acids, strong bases, acid chlorides.

**Hazardous Decomposition Products:** Carbon monoxide, oxides of sulfur, carbon dioxide, formaldehyde, dimethyl sulfide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 67-68-5: PV6210000

**LD50/LC50:**

CAS# 67-68-5:

- Draize test, rabbit, eye: 100 mg;
- Draize test, rabbit, eye: 500 mg/24H Mild;
- Draize test, rabbit, skin: 500 mg/24H Mild;
- Oral, mouse: LD50 = 7920 mg/kg;
- Oral, rat: LD50 = 14500 mg/kg;
- Skin, rat: LD50 = 40 gm/kg;

**Carcinogenicity:**

CAS# 67-68-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

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**Ecotoxicity:** No data available. No information available.

**Environmental:** Terrestrial: Expected to be mobile in soil, due to its high water solubility. Some volatilization from dry soil and surfaces may be expected. Aquatic: Dimethyl sulfoxide disproportionates in water to dimethyl sulfide and dimethyl sulfone, a reaction catalyzed by light. Atmospheric: Exists primarily in the vapor phase and be removed by both wet and dry deposition. It will react with photochemically-produced hydroxyl radicals with a half-life of about 7 hr. DMSO is very difficult to biodegrade.

**Physical:** No information available.

**Other:** Bacterial decomposition of dimethyl sulfoxide during wastewater treatment can result in the release of dimethyl sulfide, a volatile substance with a strong, disagreeable odor.

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## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	<b>US DOT</b>	<b>Canada TDG</b>
<b>Shipping Name:</b>	Not Regulated	Not Regulated
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 67-68-5 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

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 67-68-5: fire.

#### Section 313

No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 67-68-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.



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## **European/International Regulations**

### **European Labeling in Accordance with EC Directives**

#### **Hazard Symbols:**

Not available.

#### **Risk Phrases:**

#### **Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

### **WGK (Water Danger/Protection)**

CAS# 67-68-5: 1

### **Canada - DSL/NDSL**

CAS# 67-68-5 is listed on Canada's DSL List.

### **Canada - WHMIS**

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

### **Canadian Ingredient Disclosure List**

CAS# 67-68-5 is listed on the Canadian Ingredient Disclosure List.

## **Section 16 - Additional Information**

**MSDS Creation Date:** 12/12/1997

**Revision #11 Date:** 7/19/2007

*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 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 you have been advised of the possibility of such damages.*