DIMETHYL SULFOXIDE

1. Product Identification

Synonyms: Methyl sulfoxide, DMSO; Sulfinylbis[Methane]
CAS No.: 67-68-5
Molecular Weight: 78.13
Chemical Formula: (CH3)2SO

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Dimethylsulfoxide	67-68-5	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 2 - Moderate
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May cause allergic reaction in sensitive individuals.
Ingestion:
Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. May cause abdominal pain, drowsiness, chills and chest pains.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. May cause scaling, Readily absorbed through the skin. Garlic-like taste and odor may develop on the breath and skin. Transient disturbances of color vision, photophobia, headache, diarrhea, and dermatitis may result from skin applications. A good solvent; may result in the increased skin absorption of other more toxic materials.
Eye Contact:
Causes irritation, redness, and pain. May cause blurred vision.
Chronic Exposure:
Absorption may affect the blood, Repeated skin application may cause scaling dermatitis. Repeated oral doses may effect the liver and kidneys.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. Topical application enhances dermal absorption of many other chemicals, including drugs and allergens of moderate molecular weight.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before

reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 89C (192F) CC
Autoignition temperature: 215C (419F)
Flammable limits in air % by volume:
lel: 2.6; uel: 42- 63
Combustible. Moderate fire hazard when exposed to heat or flame.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to the substance is apparent and engineering controls are not feasble, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid. Hygroscopic.
Odor:
Garlic-like odor.
Solubility:
Miscible in water.
Specific Gravity:
1.10
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
189C (372F)
Melting Point:
18.5C (64F)
Vapor Density (Air=1):
2.7
Vapor Pressure (mm Hg):
0.42 @ 20C (68F)
Evaporation Rate (BuAc=1):
4.3 (CCl4 = 1)

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Hygroscopic.

Hazardous Decomposition Products:
Upon heating above 100C (212F), sulfur dioxide is evolved from this substance. Hazardous thermo-oxidative degradation products from DMSO include formaldehyde, methyl mercaptan and sulfur dioxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidants, acylhalides, arylhalides, bromobenzoyl acetanilide, magnesium perchlorate, perchloric acid and sodium hydroxide.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 14,500 mg/Kg. Irritation data (std Draize, rabbit): Skin = 500 mg/24 hour, mild; Eye = 500 mg/24 hour, mild. Investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Dimethylsulfoxide (67-68-5)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may evaporate to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

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  --------\Chemical Inventory Status - Part 1\--------------------------
  Ingredient                                        TSCA  EC   Japan
Australia
  ------------------------------------------------  ----  ---  -----  --
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  Dimethylsulfoxide (67-68-5)                        Yes  Yes   Yes
Yes

  --------\Chemical Inventory Status - Part 2\--------------------------
                                                                --Canada--
  Ingredient                                       Korea  DSL   NDSL
Phil.
  ------------------------------------------------  -----  ---   ----  -
  Dimethylsulfoxide (67-68-5)                       Yes   Yes   No
Yes

  --------\Federal, State & International Regulations - Part 1\--------
                                           -SARA 302-    ------SARA
313------
  Ingredient                               RQ    TPQ     List
Chemical Catg.
  ---------------------------------------  ---   -----   ----  ------
  Dimethylsulfoxide (67-68-5)              No    No      No
No

  --------\Federal, State & International Regulations - Part 2\--------
                                                        -RCRA-    -
TSCA-
  Ingredient                               CERCLA     261.33     8(d)
  ---------------------------------------  ------     ------    -----
  Dimethylsulfoxide (67-68-5)              No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: No          (Pure / Liquid)
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Australian Hazchem Code: None allocated.
Poison Schedule: S6

WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.
Label Precautions:
Avoid breathing vapor or mist.
Keep container closed.
Use only with adequate ventilation.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Keep away from heat and flame.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. 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. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.