

1. Identification

Product identifier	Dimethyl Sulfoxide	
Other means of identification		
Catalog number	1211006	
CAS number	67-68-5	
Synonyms	DMSO * Methyl sulfoxide	
Chemical name	Methane, 1,1'-sulfinylbis	
Recommended use	Specified quality tests and assay use only.	
Recommended restrictions	Not for use as a drug. Not for administration to humans or animals.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	U. S. Pharmacopeia	
Address	12601 Twinbrook Parkway Rockville MD 20852-1790 United States	
Telephone	RS Technical Services	301-816-8129
Website	www.usp.org	
E-mail	RSTECH@usp.org	
Emergency phone number	CHEMTREC within US & Canada	1-800-424-9300
	CHEMTREC outside US & Canada	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 4
Health hazards	Serious eye damage/eye irritation	Category 2B
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	
Label elements		
Hazard symbol	None.	
Signal word	Warning	
Hazard statement	Combustible liquid. Causes eye irritation.	
Precautionary statement		
Prevention	Keep away from flames and hot surfaces-No smoking. Wear protective gloves/eye protection/face protection. Wash thoroughly after handling.	
Response	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. In case of fire: Use appropriate media for extinction.	
Storage	Store in a well-ventilated place. Keep cool.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	None known.	
Supplemental information	None.	

3. Composition/information on ingredients

Substance

Chemical name	Common name and synonyms	CAS number	%
Dimethyl Sulfoxide	DMSO Methyl sulfoxide	67-68-5	100

4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Rinse skin with water/shower. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Irritant effects. Dimethyl sulfoxide is rapidly absorbed through the skin and may serve as a vehicle for other chemicals.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically.
General information	Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	No unusual fire or explosion hazards noted.
Special protective equipment and precautions for firefighters	Wear suitable protective equipment. Use protective equipment appropriate for surrounding materials.
Fire fighting equipment/instructions	As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Combustible liquid.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Wear appropriate personal protective equipment. Avoid inhalation of vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Absorb spillage with suitable absorbent material. For waste disposal, see section 13 of the SDS. Remove sources of ignition. Keep combustibles (wood, paper, oil, etc.) away from spilled material.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	As a general rule, when handling USP Reference Standards, avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Clean equipment and work surfaces with suitable detergent or solvent after use. After removing gloves, wash hands and other exposed skin thoroughly. Select and use containment devices and personal protective equipment based on a risk assessment of material potency and exposure potential.
Conditions for safe storage, including any incompatibilities	Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. Workplace Environmental Exposure Level (WEEL) Guides

Material	Type	Value
----------	------	-------

Dimethyl Sulfoxide (CAS 67-68-5)	TWA	250 ppm
----------------------------------	-----	---------

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Local exhaust ventilation such as a laboratory fume hood or other vented enclosure is recommended, particularly for grinding, crushing, weighing, or other dust-generating procedures. For laboratory operations, use good technique and limit open handling. Control exposures to below the occupational exposure level (if available). Select and use containment devices and personal protective equipment based on a risk assessment of exposure potential. Cover all containers for solutions and slurries while being transferred.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face. An emergency eye wash station should be available.

Skin protection

Hand protection Wear nitrile or other impervious gloves if skin contact is possible. When the material is dissolved or suspended in an organic solvent, wear gloves that provide protection against the solvent.

Other Wear lab coat. Base the choice of skin protection on the job activity, potential for skin contact and solvents and reagents in use. Do not wear protective garments in common areas (e.g., cafeterias) or out-of-doors.

Respiratory protection Respirators are generally not required for laboratory operations. Chose respiratory protection appropriate to the task and the level of existing engineering controls.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice. Handling practices in this SDS are recommendations for laboratory use of reference standards. Procedures for any other uses or quantities should be determined after an appropriate assessment.

9. Physical and chemical properties

Appearance Appearance descriptions are general information and not specific to any USP lot.

Physical state Liquid.

Form Liquid.

Color Clear.

Odor Odorless.

Odor threshold Not available.

pH Not available.

Melting point/freezing point 64.4 - 66.2 °F (18 - 19 °C)

Initial boiling point and boiling range 372.2 °F (189 °C)

Flash point 188.6 °F (87.0 °C) Closed Cup
203.0 °F (95.0 °C) Open Cup

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 2.6 %

Flammability limit - upper (%) 42 %

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 0.6 mm Hg at 25° C

Vapor density 2.71 (air = 1)

Relative density Not available.

Solubility(ies)

Solubility (water) Soluble: (evolution of heat).

Solubility (other) Acetone: Practically Insoluble.

	Alcohol: Practically Insoluble. Benzene: Practically Insoluble. Chloroform: Practically Insoluble.
Partition coefficient (n-octanol/water)	-2.03
	-1.35
Auto-ignition temperature	419 °F (215 °C)
Decomposition temperature	Not available.
Viscosity	2.47 cP AT 20° C
Other information	
Chemical family	Dipolar aprotic solvent.
Molecular formula	C2H6OS
Molecular weight	78.13
Percent volatile	100 %
pH in aqueous solution	8.5 (50% mixture)
Specific gravity	1.1 at 20 °C
Surface tension	42.93 dyn/cm (77 °F (25 °C))
VOC	100 %

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Alkaline metals. Isocyanates. Acid chlorides.
Hazardous decomposition products	SOx. Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Knowledge about health hazard is incomplete.
Skin contact	Knowledge about health hazard is incomplete.
Eye contact	Causes eye irritation.
Ingestion	Knowledge about health hazard is incomplete.
Symptoms related to the physical, chemical, and toxicological characteristics	Gastrointestinal disturbances. Headache. Fatigue. Garlic-like taste or odor on breath and skin.

Information on toxicological effects

Acute toxicity

Product	Species	Test Results
Dimethyl Sulfoxide (CAS 67-68-5)		
<u>Acute</u>		
Dermal		
LD50	Mouse	50000 mg/kg
	Rat	40000 mg/kg
Inhalation		
LC50	Rat	> 2000 mg/m3, 40 hours > 1600 mg/m3, 4 hours
Oral		
LD50	Rat	14500 mg/kg

Product	Species	Test Results
		17.9 ml/kg
Skin corrosion/irritation	Based on available data, the classification criteria are not met.	
Serious eye damage/eye irritation	Causes eye irritation.	
Local effects		
Draize Test		
Species: Rabbit		
Organ: Eye		
Test Duration: 24 hours		
Severity: Slight.		
Draize Test		
Species: Rabbit		
Organ: Skin		
Test Duration: 24 hours		
Severity: Mild.		
Skin irritation		
Result: Negative.		
Species: Mouse		
Test Duration: 30 weeks		
Respiratory or skin sensitization		
Respiratory sensitization	Knowledge about health hazard is incomplete.	
Skin sensitization	Based on available data, the classification criteria are not met.	
Buehler test		
Result: Negative.		
Species: Guinea pig		
Organ: Skin.		
Germ cell mutagenicity	Knowledge about mutagenicity is incomplete.	
Mutagenicity		
Mutagenicity, Gene mutation assays in yeast		
Result: Negative.		
Mutagenicity, In vitro cytogenetic assay in Chinese hamster ovary cells		
Result: Negative.		
Mutagenicity, In vitro reverse mutation studies in Salmonella		
Result: Negative.		
Mutagenicity, In vivo cytogenetic assay in rats		
Result: Positive.		
Mutagenicity, In vivo micronucleus assay in mice		
Result: Negative.		
Mutagenicity, In vivo sex-linked recessive lethal mutation assay in D. melanogaster		
Result: Negative.		
Carcinogenicity	Knowledge about carcinogenicity is incomplete.	
9 g/kg Carcinogenicity		
Result: Negative		
Species: Rhesus monkey		
Test Duration: 18 months		
IARC Monographs. Overall Evaluation of Carcinogenicity		
Not listed.		
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)		
Not regulated.		
US. National Toxicology Program (NTP) Report on Carcinogens		
Not listed.		
Reproductive toxicity	Knowledge about health hazard is incomplete.	
Specific target organ toxicity - single exposure	Knowledge about health hazard is incomplete.	
Specific target organ toxicity - repeated exposure	Knowledge about health hazard is incomplete.	
Aspiration hazard	Knowledge about health hazard is incomplete.	

12. Ecological information

Ecotoxicity

Product	Species	Test Results
Dimethyl Sulfoxide (CAS 67-68-5)		
Aquatic		
Fish	LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss)	33000 - 37000 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Octanol/water partition coefficient log Kow

-1.35

-2.03

Mobility in soil No data available.

Other adverse effects The product contains volatile organic compounds which have a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose in accordance with all applicable regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

General information It is the shipper's responsibility to determine the correct transport classification at the time of shipment.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes**SARA 313 (TRI reporting)**
Not regulated.**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.**FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace**

Dimethyl Sulfoxide (CAS 67-68-5)

Low priority

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision**Issue date** 04-11-2008**Revision date** 09-21-2018**Version #** 10

Disclaimer USP Reference Standards are sold for chemical test and assay purposes only, and NOT for human consumption. The information contained herein is applicable solely to the chemical substance when used as a USP Reference Standard and does not necessarily relate to any other use of the substance described, (i.e. at different concentrations, in drug dosage forms, or in bulk quantities). USP Reference Standards are intended for use by persons having technical skill and at their own discretion and risk. This information has been developed by USP staff from sources considered reliable but has not been independently verified by the USP. Therefore, the USP Convention cannot guarantee the accuracy of the information in these sources nor should the statements contained herein be considered an official expression. NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE is made with respect to the information contained herein.