# SAFETY DATA SHEET

DMSO

## Section 1. Identification

**GHS product identifier** : DMSO

**Product code** : Not available.

**Chemical name** : dimethyl sulfoxide

**Other means of identification** : Methane, 1,1'-sulfinylbis-; Methane, sulfinylbis-; Dimethyl sulphoxide; (methylsulfinyl) methanedimethyl sulfoxide; Methyl sulfoxide; METHYLSULFINYLMETHANE; SULFINYLBIS(METHANE); DMSO; Methyl sulphoxide; Sulfinylbismethane; SULFOXIDE, DIMETHYL

**Product type** : Liquid.

**Relevant identified uses of the substance or mixture and uses advised against**

**Product use** : Research.

**Area of application** : Industrial applications.

**Supplier/Manufacturer** : BioLegend Inc.
8999 BioLegend Way
San Diego, CA 92121 – USA
Tel: +1-858-455-9588 (7:00AM – 5:00PM PT, M-F)

**e-mail address of person responsible for this SDS** : cs@biolegend.com

**Emergency telephone number (with hours of operation)** : +1-858-455-9588 (7:00AM – 5:00PM PT, M-F)

## Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : H227 FLAMMABLE LIQUIDS - Category 4

**GHS label elements**

**Signal word** : Warning

**Hazard statements** : H227 - Combustible liquid.

**Precautionary statements**

**Prevention** : P280 - Wear protective gloves, protective clothing and eye or face protection.
P210 - Keep away from flames and hot surfaces. No smoking.

**Response** : Not applicable.

**Storage** : P403 + P235 - Store in a well-ventilated place. Keep cool.

**Disposal** : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Hazards not otherwise classified** : None known.



**United States**

# Section 3. Composition/information on ingredients

**Substance/mixture** : Substance

**Chemical name** : dimethyl sulfoxide

**Other means of identification** : Methane, 1,1'-sulfinylbis-; Methane, sulfinylbis-; Dimethyl sulphoxide; (methylsulfinyl) methanedimethyl sulfoxide; Methyl sulfoxide; METHYLSULFINYLMETHANE; SULFINYLBIS(METHANE); DMSO; Methyl sulphoxide; Sulfinylbismethane; SULFOXIDE, DIMETHYL

## CAS number/other identifiers

**CAS number** : 67-68-5

| Ingredient name | Other names | % | CAS number |
|---|---|---|---|
| dimethyl sulfoxide | - | 100 | 67-68-5 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.**

**Occupational exposure limits, if available, are listed in Section 8.**

# Section 4. First aid measures

## Description of necessary first aid measures

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing.

**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

**Ingestion** : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel.

## Most important symptoms/effects, acute and delayed

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : No known significant effects or critical hazards.

**Ingestion** : No known significant effects or critical hazards.

### Over-exposure signs/symptoms

**Eye contact** : No specific data.

**Inhalation** : No specific data.

**Skin contact** : No specific data.

**Ingestion** : No specific data.

## Indication of immediate medical attention and special treatment needed, if necessary

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments** : No specific treatment.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

# Section 4. First aid measures

**See toxicological information (Section 11)**

# Section 5. Fire-fighting measures

## Extinguishing media

**Suitable extinguishing media** : Use dry chemical, $CO_2$, water spray (fog) or foam.

**Unsuitable extinguishing media** : Do not use water jet.

**Specific hazards arising from the chemical** : Combustible liquid. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

**Remark** : Combustible liquid.

# Section 6. Accidental release measures

## Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

## Methods and materials for containment and cleaning up

**Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

# Section 6. Accidental release measures

**Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

# Section 7. Handling and storage

## Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

# Section 8. Exposure controls/personal protection

## Control parameters

### Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| dimethyl sulfoxide | **OARS WEEL (United States, 4/2022).** TWA: 250 ppm 8 hours. |

### Biological exposure indices

None known.

**Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

## Section 8. Exposure controls/personal protection

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

**Skin protection**

**Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

**Appearance**

**Physical state** : Liquid. [Clear.]

**Color** : Colorless. to Yellow.

**Odor** : Slight; Almost odorless.

**Odor threshold** : Not available.

**pH** : 7.2

**Melting point/freezing point** : 18.5°C (65.3°F)

**Boiling point, initial boiling point, and boiling range** : 189°C (372.2°F)

**Flash point** : Closed cup: 87°C (188.6°F) [ASTM D 93]

**Evaporation rate** : 0.026 (butyl acetate = 1)

**Flammability** : Flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Combustible liquid.

## Section 9. Physical and chemical properties

**Lower and upper explosion limit/flammability limit** : Lower: 2.6%
Upper: 28.5%

**Vapor pressure** : 0.056 kPa (0.42 mm Hg) [EU A.4]

**Relative vapor density** : 2.7 [Air = 1]

**Relative density** : 1.1

**Density** : 1.1 g/cm³ [20°C (68°F)] [EU A.3]

**Solubility(ies)** : Not available.

**Solubility in water** : 1000 g/l

**Miscible with water** : Yes.

**Partition coefficient: n-octanol/water** : -1.35

**Auto-ignition temperature** : 300 to 302°C (572 to 575.6°F)

**Decomposition temperature** : 140 to 189°C (284 to 372.2°F)

**SADT** : Not available.

**Heat of combustion** : -25330140 J/kg

**Viscosity** : Dynamic: 2.14 mPa·s (2.14 cP)

**Molecular weight** : 78.14 g/mole

**Particle characteristics**

**Median particle size** : Not applicable.

**Aerosol product**

**Other information**

**Physical/chemical properties comments** : No additional information.

## Section 10. Stability and reactivity

**Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**Chemical stability** : The product is stable.

**Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
Absorbs moisture from the air.
Under normal conditions of storage and use, hazardous polymerization will not occur.

**Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

**Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials, reducing materials and moisture.
Hygroscopic. Keep container tightly closed.

**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

# Section 11. Toxicological information

## Information on toxicological effects

### Acute toxicity

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| dimethyl sulfoxide | LD50 Dermal<br>LD50 Oral | Rat<br>Rat | 40000 mg/kg<br>14500 mg/kg | -<br>- |

### Irritation/Corrosion

Not available.

### Sensitization

Not available.

### Mutagenicity

**Conclusion/Summary** : Not available.

### Carcinogenicity

**Conclusion/Summary** : Not available.

### Reproductive toxicity

**Conclusion/Summary** : Not available.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Specific target organ toxicity (single exposure)

Not available.

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Not available.

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : No known significant effects or critical hazards.

**Skin contact** : No known significant effects or critical hazards.

**Ingestion** : No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact** : No specific data.

**Inhalation** : No specific data.

**Skin contact** : No specific data.

**Ingestion** : No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

# Section 11. Toxicological information

## Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

## Potential chronic health effects

**General** : No known significant effects or critical hazards.

**Carcinogenicity** : No known significant effects or critical hazards.

**Mutagenicity** : No known significant effects or critical hazards.

**Reproductive toxicity** : No known significant effects or critical hazards.

## Numerical measures of toxicity

### Acute toxicity estimates

| Product/ingredient name | Oral (mg/kg) | Dermal (mg/kg) | Inhalation (gases) (ppm) | Inhalation (vapors) (mg/l) | Inhalation (dusts and mists) (mg/l) |
|---|---|---|---|---|---|
| dimethyl sulfoxide | 14500 | 40000 | N/A | N/A | N/A |

# Section 12. Ecological information

## Toxicity

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| dimethyl sulfoxide | Acute EC50 18299 µg/l Marine water<br>Acute LC50 25000 ppm Fresh water<br><br>Acute LC50 34000000 µg/l Fresh water<br>Chronic NOEC 3323 µg/l Marine water<br>Chronic NOEC 100 ul/L Fresh water | Algae - *Nitzschia pungens*<br>Daphnia - *Daphnia magna* - Neonate<br><br>Fish - *Pimephales promelas*<br>Algae - *Nitzschia pungens*<br>Daphnia - *Daphnia magna* - Juvenile (Fledgling, Hatchling, Weanling) | 96 hours<br>48 hours<br><br>96 hours<br>96 hours<br>21 days |

**Conclusion/Summary** : Not available.

## Persistence and degradability

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| dimethyl sulfoxide | 301C Ready Biodegradability - Modified MITI Test (I) | 3.1 % - 14 days | - | - |

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| dimethyl sulfoxide | - | - | Not readily |

## Bioaccumulative potential

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| dimethyl sulfoxide | -1.35 | 3.16 | Low |

## Section 12. Ecological information

**Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

| | DOT Classification | IMDG | IATA |
|---|---|---|---|
| **UN number** | NA1993 | Not regulated. | Not regulated. |
| **UN proper shipping name** | Combustible liquid, n.o.s. (dimethyl sulfoxide) | - | - |
| **Transport hazard class(es)** | Combustible liquid. | - | - |
| **Packing group** | III | - | - |
| **Environmental hazards** | No. | No. | No. |

**Additional information**

**DOT Classification** : Non-bulk packages (less than or equal to 119 gal) of combustible liquids are not regulated as hazardous materials.
**Limited quantity** Yes.
**Packaging instruction** Exceptions: 150. Non-bulk: 203. Bulk: 241.
**Quantity limitation** Passenger aircraft/rail: 60 L. Cargo aircraft: 220 L.
**Special provisions** 148, IB3, T1, TP1

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

# Section 14. Transport information

**Transport in bulk according to IMO instruments** : Not available.

# Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

**United States inventory (TSCA 8b)**: This material is active or exempted.

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

**SARA 302/304**

**Composition/information on ingredients**

No products were found.

**SARA 304 RQ** : Not applicable.

**SARA 311/312**

**Classification** : FLAMMABLE LIQUIDS - Category 4

**Composition/information on ingredients**

| Name | % | Classification |
|---|---|---|
| dimethyl sulfoxide | 100 | FLAMMABLE LIQUIDS - Category 4 |

**SARA 313**

Not applicable.

**State regulations**

**Massachusetts** : This material is not listed.

**New York** : This material is not listed.

**New Jersey** : This material is listed.

**Pennsylvania** : This material is not listed.

**California Prop. 65**

This product does not require a Safe Harbor warning under California Prop. 65.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

**Montreal Protocol**

Not listed.

**Stockholm Convention on Persistent Organic Pollutants**

Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**

# Section 15. Regulatory information

Not listed.

## UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

# Section 16. Other information

## National Fire Protection Association (U.S.A.)


## Procedure used to derive the classification

| Classification | Justification |
|---|---|
| FLAMMABLE LIQUIDS - Category 4 | On basis of test data |

## History

**Date of issue/Date of revision** : 09/28/2023

**Date of previous issue** : 12/22/2016

**Version** : 2

**Prepared by** : Sphera Solutions

**Key to abbreviations** : ATE = Acute Toxicity Estimate
AMP = Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
UN = United Nations

**References** : HCS (U.S.A.) - Hazard Communication Standard
International transport regulations

**Indicates information that has changed from previously issued version.**

## Notice to reader

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**