1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier
Product Name: Dimethyl Sulfoxide (DMSO)
Product Code: SC-202581

Recommended use of the chemical and restrictions on use
For research use only. Not intended for diagnostic or therapeutic use.

2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification
Flammable liquids
Category 4

Label elements
Signal word: Warning
Hazard statements: Combustible liquid

Precautionary Statements - Prevention
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention
In case of fire: Use CO2, dry chemical, or foam for extinction

Precautionary Statements - Storage
Store in a well-ventilated place. Keep cool

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazard not otherwise classified (HNOC)
Not applicable

Other Information

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazards</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Stability</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Physical and chemical properties</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health hazards</td>
</tr>
<tr>
<td>Flammability</td>
</tr>
<tr>
<td>Physical hazards</td>
</tr>
<tr>
<td>Personal protection</td>
</tr>
</tbody>
</table>
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No.</th>
<th>Weight-%</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO)</td>
<td>67-68-5</td>
<td>&gt;98</td>
<td>14500 mg/kg (Rat) = 28300 mg/kg (Rat)</td>
<td>= 40 g/kg (Rat)</td>
<td>&gt; 5.33 mg/L (Rat) 4 h</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

First Aid Measures

General advice: If symptoms persist, call a physician. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.

Skin Contact: Consult a physician if necessary. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash contaminated clothing before reuse. Wash off immediately with plenty of water. If skin irritation persists, call a physician. Immediate medical attention is not required.

Inhalation: Remove to fresh air. Call a physician if breathing is irregular or stopped. Administer artificial respiration. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Immediate medical attention is not required. Move to fresh air in case of accidental inhalation of vapors. If symptoms persist, call a physician. Move to fresh air in case of accidental inhalation of vapors or decomposition products.

Ingestion: Rinse mouth. Drink plenty of water. If symptoms persist, call a physician. Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider: Use personal protective equipment as required.

Most important symptoms and effects, both acute and delayed

Symptoms: No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians: Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use: Dry chemical. Carbon dioxide (CO2). Water spray (fog). Alcohol resistant foam.

Unsuitable Extinguishing Media: No information available.

Specific hazards arising from the chemical

Specific hazards arising from the chemical: Keep product and empty container away from heat and sources of ignition. Risk of ignition.


Explosion data

Sensitivity to Mechanical Impact: No information available.

Sensitivity to Static Discharge: No information available.

Protective equipment and precautions for firefighters

Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions
Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges.

Environmental precautions
Prevent entry into waterways, sewers, basements or confined areas. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so.

Methods for cleaning up
Cover liquid spill with sand, earth or other non-combustible absorbent material. Cover powder spill with plastic sheet or tarp to minimize spreading. Pick up and transfer to properly labeled containers. Soak up with inert absorbent material. Dam up. Take precautionary measures against static discharges.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wash contaminated clothing before reuse. Do not breathe dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. Use with local exhaust ventilation. All equipment used when handling the product must be grounded. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors).

Conditions for safe storage, including any incompatibilities

Storage Conditions
Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a cool, well-ventilated place. Keep in properly labeled containers. Protect from moisture. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep away from heat. Store at room temperature.

Incompatible materials
None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate engineering controls

Engineering Controls
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection
Tight sealing safety goggles. Face protection shield.

Skin and Body Protection
Wear protective gloves and protective clothing.

Respiratory protection
If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
General Hygiene Considerations

When using do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>No information available</td>
</tr>
<tr>
<td>Odor</td>
<td>Sulphurous May be unpleasant</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>16 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>189 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>87 °C</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>1.10 g/mL</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>1.4</td>
</tr>
<tr>
<td>Upper flammability limits</td>
<td>42%</td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>3.5%</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>0.42 mmHg</td>
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<tr>
<td>Vapor density</td>
<td>2.7</td>
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<tr>
<td>Specific gravity</td>
<td>No information available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>No information available</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>-2.03</td>
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<tr>
<td>Autoignition temperature</td>
<td>301 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No information available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No information available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity

Not applicable

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization

No information available.

Conditions to avoid

Exposure to air or moisture over prolonged periods. Heat, flames and sparks.

Incompatible materials

Strong oxidizing agents.

Hazardous Decomposition Products

Hydrogen sulfide. Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation

No data available.

Eye contact

No data available.

Skin Contact

No data available.

Ingestion

No data available.

Information on toxicological effects

Symptoms

No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity

Avoid repeated exposure.

Numerical measures of toxicity

- Product Information
Unknown acute toxicity: No information available
The following values are calculated based on chapter 3.1 of the GHS document:
- ATEmix (oral): 14500 mg/kg
- ATEmix (dermal): 40000 mg/kg
- ATEmix (inhalation-vapor): 5.3

12. ECOLOGICAL INFORMATION

Ecotoxicity: May cause long lasting harmful effects to aquatic life.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO) 67-68-5</td>
<td>12350 - 25500: 96 h Skeletonema costatum mg/L</td>
<td>41.7: 96 h Cyprinus carpio g/L LC50 40: 96 h Lepomis macrochirus g/L LC50 static 33 - 37: 96 h Oncorhynchus mykiss g/L LC50 static 34000: 96 h Pimephales promelas mg/L LC50</td>
<td>-</td>
<td>7000: 24 h Daphnia species mg/L EC50</td>
</tr>
</tbody>
</table>

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

- Persistence and degradability: No information available.
- Bioaccumulation: No information available.
- Mobility: No information available.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Partition coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO) 67-68-5</td>
<td>-2.03</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

- Disposal of wastes: Disposal should be in accordance with applicable regional, national and local laws and regulations.
- Contaminated packaging: Do not reuse container.
- Other Information: Waste codes should be assigned by the user based on the application for which the product was used.

14. TRANSPORT INFORMATION

- DOT
  - UN/ID no: NA1993
  - Hazard Class: Combustible liquid
  - Packing Group: III
  - Proper shipping name: Combustible liquid, n.o.s.
  - Description: NA1993, Combustible liquid, n.o.s., Combustible liquid, III
  - Emergency Response Guide Number: 128

- IMDG: Not regulated

- IATA: Not regulated
### International Inventories

All of the components in the product are on the following Inventory lists:

- **TSCA** (United States)
- **DSL/NDSL** (Canada)
- **EINECS/ELINCS** (Europe)
- **AICS** (Australia)
- **South Korea (KECL)**
- **China (IECSC)**
- **Japan (ENCS)**
- **Philippines (PICCS)**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>ENCS</th>
<th>IECSC</th>
<th>KECL</th>
<th>PICCS</th>
<th>AICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO)</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**X - Listed**

- **TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
- **DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
- **EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
- **ENCS** - Japan Existing and New Chemical Substances
- **IECSC** - China Inventory of Existing Chemical Substances
- **KECL** - Korean Existing and Evaluated Chemical Substances
- **PICCS** - Philippines Inventory of Chemicals and Chemical Substances

### US Federal Regulations

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

**SARA 311/312 Hazard Categories**

- **Acute health hazard**: Yes
- **Chronic Health Hazard**: No
- **Fire hazard**: Yes
- **Sudden release of pressure hazard**: No
- **Reactive hazard**: No

**CWA (Clean Water Act)**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

### US State Regulations

**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO)</td>
<td>X</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
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<tbody>
<tr>
<td>Dimethyl Sulfoxide (DMSO)</td>
<td>X</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

### 16. OTHER INFORMATION

**Revision note**: No information available

**Disclaimer**

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**