1 Product and Company Identification
1.1 Product Name: Dimethylsulphoxide (DMSO)
1.2 Catalog Number: 01706
1.3 Product Use: Laboratory Chemical
1.4 Manufacturer/Supplier: STEMCELL Technologies
   Suite 500-1618 Station Street
   Vancouver, British Columbia V6A 1B6 Canada
1.5 In Case of Emergency Call: 1-800-667-0322

2 Hazards Identification
2.1 Classification of the substance or mixture
   Flammable liquids (Category 4)
2.2 Label elements
   Pictogram: None
   Signal word: Warning
   Hazard statement(s)
   H227: Combustible liquid.
   Precautionary statement(s)
   P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking.
   P280: Wear protective gloves/protective clothing/eye protection/face protection.
   P370+378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
2.3 Other hazards: No data available

3 Composition / Information on Ingredients
3.1 Substances
   Synonyms: Methyl sulfoxide
   Molecular formula: C_2H_6OS
   Molecular weight: 78.13 g/mol
<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Concentration</th>
<th>EC #</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimethyl sulfoxide</td>
<td>67-68-5</td>
<td>≤100%</td>
<td>200-664-3</td>
</tr>
</tbody>
</table>
4 First Aid Measures

4.1 Description of first aid measures

4.1.1 If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

4.1.2 In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

4.1.3 In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes as a precaution.

4.1.4 If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in section 2.2 and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5 Fire Fighting Measures

5.1 Extinguishing Media

5.1.1 Suitable Extinguishing Media
Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.

5.1.2 Unsuitable Extinguishing Media
No data available

5.2 Special hazards arising from the substance or mixture

5.2.1 Flammable Properties and Hazards
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

5.2.2 Flash Pt
No data available

5.2.3 Autoignition Pt
No data available

5.2.4 Explosive Limits
LEL: No data available UEL: No data available

5.2.5 Hazardous Combustion Products
Carbon oxides, sulphur oxides

5.3 Fire Fighting Instructions
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.
6 Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapors, mist or gas. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

7 Handling and Storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8 Exposure Controls/Personal Protection

8.1 Exposure limits
Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimethyl sulfoxide</td>
<td>67-68-5</td>
<td>TWA</td>
<td>250.000000 ppm</td>
<td>USA. Workplace Environmental Exposure Levels (WEEL)</td>
</tr>
</tbody>
</table>

8.2 Engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

8.3 Personal protective equipment

8.3.1 Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

8.3.2 Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
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8.3.3 Respiratory protection
Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

8.3.4 General hygiene considerations
General industrial hygiene practice.

8.3.5 Environmental exposure controls
Do not let product enter drains.

9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear, colourless liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>16 - 19°C (61 - 66°F)</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>189°C (372°F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>87°C (189°F) - closed cup</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>Upper explosion limit - 42% (V)</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.55 hPa (0.41 mmHg) at 20°C (68°F)</td>
</tr>
<tr>
<td>Density</td>
<td>1.1 g/mL</td>
</tr>
<tr>
<td>Relative vapour density</td>
<td>2.70 - (Air = 1.0)</td>
</tr>
<tr>
<td>Solubility</td>
<td>H₂O - completely miscible</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: -2.03</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
</tbody>
</table>

10 Stability and Reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Acid chlorides, phosphorus halides, strong acids, strong oxidizing agents, strong reducing agents
10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions - Carbon oxides, sulphur oxides

11 Toxicological Information

11.1 Acute toxicity
Oral: LD50 Oral - Rat - 14,500 mg/kg
Inhalation: LC50 Inhalation - Rat - 4 h – 40,250 ppm
Dermal: LD50 Dermal - Rabbit - > 5000 mg/kg
Other: No data available

11.2 Skin corrosion/irritation
No data available

11.3 Serious eye damage/eye irritation
No data available

11.4 Respiratory and/or skin sensitization
No data available

11.5 Germ cell mutagenicity
Genotoxicity in vitro - Mouse – lymphocyte
Cytogenetic analysis
Genotoxicity in vitro - Mouse – lymphocyte
Mutation in mammalian somatic cells
Genotoxicity in vivo - Rat - Intraperitoneal
Cytogenetic analysis
Genotoxicity in vivo - Mouse - Intraperitoneal
DNA damage

11.6 Carcinogenicity
Carcinogenicity - Rat - Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Carcinogenicity - Mouse - Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Leukaemia Skin and Appendages: Other: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

11.7 Reproductive toxicity
Reproductive toxicity - Rat – Intraperitoneal
Effects on Fertility: Abortion.
Reproductive toxicity - Rat - Intraperitoneal
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Reproductive toxicity - Rat - Subcutaneous
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Reproductive toxicity - Mouse – Oral
Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.
Developmental Toxicity - Mouse - Intraperitoneal
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

11.8 Specific target organ toxicity - single exposure
No data available

11.9 Specific target organ toxicity - repeated exposure
No data available

11.10 Aspiration hazard
No data available

11.11 Potential health effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion: May be harmful if swallowed.
Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Aggravated Medical Condition: Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body.

11.12 Signs and symptoms of exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Effects due to ingestion may include: Nausea, Fatigue, Headache
Eyes - Eye disease - Based on Human Evidence

11.13 RTECS # PV6210000

12 Ecological Information

12.1 Toxicity
Toxicity to fish
LC50 - Pimephales promelas (fathead minnow) - 34,000 mg/L - 96 h
LC50 - Oncorhynchus mykiss (rainbow trout) - 35,000 mg/L - 96 h
Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 24,600 mg/L - 48 h (OECD Test Guideline 202)
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Toxicity to algae
EC50 - Pseudokirchneriella subcapitata (green algae) - 17,000 mg/L - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
Biodegradability
Result: 31 % - According to the results of tests of biodegradability this product is not readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Other adverse effects
Stability in water: - 0.12 - 1.2 h at 30°C
Remarks: Hydrolyses readily.

13 Disposal Considerations

13.1 Waste disposal method
Offer surplus and non-recyclable solutions to a licensed disposal company. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

13.2 Contaminated packaging
Dispose of as unused product.

14 Transport Information

14.1 UN number
DOT 1993
ADR/RID Not dangerous goods
IMDG Not dangerous goods
IATA Not dangerous goods

14.2 UN proper shipping name
DOT Combustible liquid, n.o.s. (Dimethyl sulfoxide)
ADR/RID Not dangerous goods
IMDG Not dangerous goods
IATA Not dangerous goods

14.3 Transport hazard class(es)
DOT NONE
ADR/RID Not dangerous goods
IMDG Not dangerous goods
IATA Not dangerous goods

14.4 Packing group
DOT III
ADR/RID Not dangerous goods
IMDG Not dangerous goods
IATA Not dangerous goods

14.5 Environmental hazards
DOT Marine pollutant: No
ADR/RID Not dangerous goods
IMDG Not dangerous goods
IATA Not dangerous goods

14.6 Special precautions
No data available
15 Regulatory Information

15.1 USA

SARA 302 Components:
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components:
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312:
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimethyl sulfoxide</td>
<td>67-68-5</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimethyl sulfoxide</td>
<td>67-68-5</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

15.2 EU

This SDS was prepared in accordance with Regulation (EC) No.1272/2008 and European Directive 67/548/EEC as amended.

15.3 Canada

WHMIS Classification: B3 Combustible Liquid

This SDS was prepared in accordance with Hazardous Products Regulations (HPR) and WHMIS 2015.

16 Other Information

16.1 Prepared by: Quality Control, STEMCELL Technologies Inc.

16.2 Revision: N/A

16.3 Notice: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. STEMCELL Technologies Inc. shall not be held liable for any damage resulting from handling or from contact with the product. The information contained in this Safety Data Sheet (SDS) is current as of the Effective Date shown in this document and may be subject to amendment by STEMCELL Technologies Inc.

16.4 Disclaimer: THIS PRODUCT IS FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES.