SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product Identifier:

- **Product Identity:** *Dimethyl Sulfoxide (DMSO)*

1.2 Relevant identified uses of the substance or mixture and uses advised against:

- Intended use: Cryoprotectant for human cells intended for later human transplant.
- Application Method See Instructions for Use.

1.3 Details of the supplier of the safety data sheet

- **Company**
  OriGen Biomedical
  7000 Burleson Road, Building D, Austin, TX 78744
  www.origen.com
  1-800-233-9014 or 1-512-474-7278 for product information
- **Emergency telephone number:**
  PERS Emergency Response
  United States and Canada 1-800-633-8253
  International 1-801-629-0667

SECTION 2: Hazard Identification of the Product

2.1 Classification of the substance/mixture
Combustible Liquid; H227
Skin Irrit. 2; H315 Causes skin irritation.
Eye Irrit. 2; H319 Causes serious eye irritation.

2.2 Label elements

- **Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.**
- **GHS Label Pictogram**
- **Signal Word: Warning**

Warning

H227 Combustible liquid.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

[Prevention]:
P210 Keep away from heat / sparks / open flames / hot surfaces - No smoking.
P264 Wash thoroughly after handling.
P280 Wear protective gloves / eye protection / face protection.

[Response]:
P302+352 IF ON SKIN: Wash with plenty of soap and water.
P305+351+338 IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.
P321 Specific treatment (see information on this label).
P337+313 If eye irritation persists: Get medical advice / attention.

P362 Take off contaminated clothing and wash before reuse.

[Storage]:
P403+235 Store in a well ventilated place. Keep cool.
[Disposal]:
P501 Dispose of contents / container in accordance with local / national regulations.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/Information on Ingredients

3.1 This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
Methane, sulfinylbis- CAS Number: 0000067-68-5	75 - 100	Skin Irrit. 2; H315 Eye Irrit. 2; H319	[1]

[1] Substance classified with a health or environmental hazard.
[2] Substance with a workplace exposure limit.
[3] PBT-substance or vPvB-substance. *The full texts of the phrases are shown in Section 16.

SECTION 4: First Aid Measures

4.1 Description of first aid measures:

- **General Information**
  In all cases of doubt, or when symptoms persist, seek medical attention.
  Never give anything by mouth to an unconscious person. In general, DMSO is not dangerous to people, but like any other chemical, it should be treated with care, respect and common sense.

- **Inhalation:**
  Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.
- **Eyes:**
  Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.
- **Skin:**
  Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.
- **Ingestion:**
  If swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

- **Overview**
  General: DMSO has shown very few toxic symptoms in humans. The most common are nausea, skin rashes and an unusual garlic-onion-oyster smell on body and breath.
  Inhalation: High vapor concentrations may cause headache, dizziness, and sedation.
  Eyes: Low hazard for usual industrial/ commercial handling by trained personnel.

Skin: Stinging and burning of the skin as well as rashes and vesicles have been seen. A heat reaction may occur if applied to wet skin. Avoid contact with DMSO solutions containing toxic material or materials whose toxicological properties are not known. DMSO easily penetrates the skin and may enhance the rate of skin absorption of skin-permeable substances. But because of DMSO's low toxicity and its inability to carry less-permeable substances with it through the skin, it can be concluded that DMSO does not pose a significant threat by skin absorption.
Ingestion: A low ingestion hazard. See section 2 for further details.

- **Eyes:** Causes serious eye irritation
- **Skin:** Causes skin irritation

SECTION 5: Fire-fighting Measures

5.1 Extinguishing media:
Recommended extinguishing media; alcohol resistant foam, CO2, powder, water spray.

5.2 Special hazards arising from the substance or mixture
***Hazardous decomposition**: Sulfur dioxide, formaldehyde, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, and bis (methylthio) methane.*
Keep away from heat / sparks / open flames / hot surfaces - No smoking.

5.3 Advice for firefighters:
- **Special Exposure Hazards**:
  Burning dimethyl sulfoxide produces poisonous gases (sulfur oxides). Wear rubber gloves, SCBA, and rubber suit.
  Wear positive pressure, self-contained breathing apparatus, (SCBA) with a full facepiece and protective clothing. Persons without respiratory protection should leave area. Wear SCBA during clean-up immediately after fire. No smoking.
- **ERG Guide No. 128**

SECTION 6 Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures
In case of mist formation use a respirator of self-contained breathing apparatus (SCBA). Put on appropriate personal protective equipment (see section 8).

6.2 Environmental precautions:
Do not allow spills to enter drains or waterways.
Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3 Methods and material for containment and cleaning up:
If a spill or leak occurs, immediately consult your environmental supervisor. Remove ignition sources. Ventilate the area. Do not breathe the vapor or get liquid in eyes or on skin/clothing. Dilute and flush to wastewater treatment or absorb with inert material. Do not allow the material to enter streams or waterways.

SECTION 7: Handling and Storage

7.1 Precautions for safe handling

Keep away from sources of ignition. No smoking. Do not breathe vapor or mist. Avoid contact with skin, eyes, or clothing.
Store in accordance with the National Fire Protection Association's publication NFPA 30, Flammable and Combustible Liquids Code. 29 CFR 1910.106 applies to the handling, storage, and use of flammable and combustible liquids.
See section 2 for further details. - [Prevention]

7.2 Conditions for safe storage, including any incompatibilities

- **Storage**:
  Keep container tightly closed, in a well-ventilated place. Freezes (solidifies) at 18°C (64°F).
  Store in a cool dry area, away from heat, sparks and open flame. Keep containers sealed when not in use. Store out of direct sunlight.
  Prolonged heating above 150°C (302°F) can cause rapid, exothermic decomposition.
  Incompatible materials: Organic and inorganic acid chlorides, strong oxidizing agents, alkali metals, hydrobromic acid, acidic solutions of alkali bromides.
  See section 2 for further details. - [Storage]

7.3 Specific end use(s): *No data available*

SECTION 8: Exposure Controls/Personal Protection

8.1 Control parameters

Exposure			
CAS No.	Ingredient	Source	Value
0000067-68-5	Methane, sulfinylbis-	OSHA	No Established Limit
		ACGIH	
		NIOSH	
		Supplier	

Carcinogen data			
CAS No.	Ingredient	Source	Value
0000067-68-5	Methane, sulfinylbis-	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No

8.2 Exposure controls

- **Respiratory**: *In case of mist formation use a respirator. Respirator type: organic vapor cartridge, SCBA or SAR. If respirators are used, a program should be instituted to assure compliance with OSHA standard 29 CFR 1910.134*
- **Eyes:** *Safety glasses with side shield, tight-fitting goggles or face shield.*
- **Skin:** *Butyl rubber or nitrile (NBR) rubber gloves. Rubber apron and boots if splash hazard.*
- **Engineering Controls:** *Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not*

sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

- **Other Work Practices:** *Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.*

See section 2 for further details. - [Prevention]:

SECTION 9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance: *Colorless liquid*
Odor: *Odorless*
Odor threshold: *Not measured*
pH-value: *8.5 (50/50 in water)*
Melting point/freezing point: *18.5°C (64°F)*
Initial Boiling point/Boiling range: *189°C (372°F)*
Flash point: *89°C (192°F) Closed Cup, 95°C (203°F) Open Cup*
Evaporation rate (Ether=1): *0.026 (n-butyl acetate = 1)*
Flammability (solid, gas): *Not applicable*
Upper/lower flammability or explosive limits
Lower Explosive Limit: 3.0-3.5% by volume
Upper Explosive Limit: 42-63% by volume
Vapor pressure (Pa): *0.55 mbar (0.46 mmHg) @ 20°C (68°F)*
Vapor density: *2.7*
Specific gravity: *1.1 @ 20°C (68°F) (water=1)*
Solubility in / Miscibility with water at 25 °C: *Miscible*
Auto-ignition temperature: 300-302°C (572-575°F)
Decomposition temperature: *190 °C*
Viscosity: *2.0 mPas or cP (@ 25°C/77°F)*
Partition coefficient n-octanol/water (log K_{ow}): *Not measured*
Partition coefficient n-octanol/water (log P_{ow}): *-2.03*

9.2 Other information: *No further relevant information available.*

SECTION 10 Stability and Reactivity

10.1 Reactivity: *Hazardous Polymerization will not occur*

10.2 Chemical stability: *Stable under normal circumstances*

10.3 Possibility of hazardous reactions: *See materials to be avoided*

10.4 Conditions to avoid: *Prolonged heating above 150°C (302°F) can cause rapid, exothermic decomposition.*

10.5 Incompatible materials: *Organic and inorganic acid chlorides, strong oxidizing agents, alkali metals, hydrobromic acid, acidic solutions of alkali bromides.*

10.6 Hazardous decomposition products: *Sulfur dioxide, formaldehyde, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, and bis (methylthio) methane.*

SECTION 11: Toxicological Information

Acute toxicity					
Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LD50, mg/L/4hr	Inhalation Dust/Mist LD50, mg/L/4hr	Inhalation Gas LD50, ppm
Methane, sulfinylbis- - (67-68-5)	14,500.00, Rat - Category: NA	5,000.00, Rabbit - Category: 5	No data available	No data available	40,250.00, Rat - Category: NA

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	---	Not Applicable
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	---	Not Applicable
Skin corrosion/irritation	2	Causes skin irritation.
Serious eye damage/irritation	2	Causes serious eye irritation.
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	---	Not Applicable
Reproductive toxicity	---	Not Applicable
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	---	Not Applicable
Aspiration hazard	---	Not Applicable

SECTION 12: Ecological Information

12.1 Toxicity: *No additional information provided for this product. See Section 3 for chemical specific data.*

12.2 Aquatic Ecotoxicity: *Methane, sulfinylbis- - (67-68-5)*
96 hr LC50 fish, mg/l: *34,000.00, Pimephales promelas*
ErC50 algae, mg/l: *12,350.00 (96 hr), Skeletonema costatum*
48 hr EC50 crustacea, mg/l: *25,000.00, Daphnia magna*

12.3 Persistence and degradability: *There is no data available on the preparation itself*

12.4 Bioaccumulative potential: *Not measured*

12.5 Mobility in soil: No data available

12.6 Other adverse effects:
Biological Oxygen Demand:
***Theoretical Oxygen Demand at 10 ppm**: 123mg oxygen*
***Chemical Oxygen Demand at 10ppm**: 107 mg/L*
***Biological Oxygen Demand-5 at 10 ppm**: < 1.0 mg/L*

SECTION 13: Disposal Considerations

13.1 Waste treatment methods:
Observe all federal, state and local regulations when disposing of this substance.

SECTION 14: Transport Information

	DOT (Domestic Surface Transportation)	IMO / IMDG (Ocean Transportation)	ICAO/IATA
14.1 UN number	NA1993	Not regulated	Not regulated
14.2 UN proper shipping name	Combustible liquid, n.o.s., (Dimethyl Sulfoxide)	Not regulated	Not regulated
14.3 Transport hazard class(es)	DOT Hazard Class: 3 DOT Label: Combustible liquid 119 gallons: Combustible	IMDG: Not Applicable Sub Class: Not Applicable	Air Class: Not Applicable
14.4 Packing group	III	Not Applicable	Not Applicable

14.5 Environmental hazards: *IMDG Marine Pollutant: No*

14.6 Special precautions for user: *No further information*

SECTION 15: Regulatory Information

15.1 Regulatory Overview: *The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.*
15.2 Toxic Substance Control Act (TSCA): *All components of this material are either listed or exempt from listing on the TSCA Inventory.*
15.3 WHMIS Classification: ***B3 D2B***
15.4 US EPA Tier II Hazards
Fire: Yes
Sudden Release of Pressure: No
Reactive: No
Immediate (Acute): Yes
Delayed (Chronic): No
15.5 EPCRA 311/312 Chemicals and RQs: *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.6 EPCRA 302 Extremely Hazardous: *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.7 EPCRA 313 Toxic Chemicals: *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.8 Proposition 65 - Carcinogens (>0.0%): *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*

15.9 Proposition 65 - Developmental Toxins (>0.0%): *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.10 Proposition 65 - Female Repro Toxins (>0.0%): *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.11 Proposition 65 - Male Repro Toxins (>0.0%): *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*
15.12 N.J. RTK Substances (>1%): *Methane, sulfinylbis*
15.13 Penn RTK Substances (>1%): *To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.*

SECTION 16: Other Information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

The full text of the phrases appearing in section 3 is:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Revision Log Revision Date	Changes made for new revision
29July2016	Annual review. Updated format and content to current requirements.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of this material and the safety and health of employees and customers and the protection of the environment. To the best of our knowledge the facts given are correct. However, the information is given without warranty as to its accuracy.

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