

## DIMETHYL SULFOXIDE

Bio-Strategy Pty Ltd

Chemwatch Hazard Alert Code: 2

Chemwatch: 21934

Version No: 4.1.1.1

Safety Data Sheet according to WHS and ADG requirements

Issue Date: 27/06/2017

Print Date: 17/08/2017

S.GHS.AUS.EN.RISK

### SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

#### Product Identifier

Product name	DIMETHYL SULFOXIDE
Chemical Name	dimethyl sulfoxide
Synonyms	C2-H6-O-S, (CH3)2-S-O, Deltan Gamasol 90 methyl sulfinyl methane, Demoso Durasorb sulfinyl bis(methane), Demasorb Hyadur sulphanyl bis(methane), Demavet Infiltrina dimethylsulfoxide, Demsox M176 Sigma D2650, dimethyl sulfoxide methane, sulfinylbis- Product Code 472301, Dimexide methyl sulfinyl methane, Dipartril-Tropico NSC-763, DMS-70 RIMSO-50, DMS-90 Somipront, Dolicur SQ 9453, Doligur SQ9453, Domoos sulfinyl bis(methane), Demoso Syntexan, DMSO Topsym, Dromisol methane, sulphanylbis-, Merck M13mp18 Perfectly Blunt Cloning Kit, Catalogue No. 70243
Chemical formula	C2H6OS
Other means of identification	23500260
CAS number	67-68-5

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

Relevant identified uses	Used as solvent for acetylene, sulfur dioxide and other gases, as an anti-freeze or hydraulic fluid when mixed with water, as a paint or varnish remover and as a solvent for Orlon and other synthetic fibres. Also used for polymerization and cyanide reactions and in industrial cleaners, pesticides, medicine (anti-inflammatory), veterinary medicine and pharmaceuticals.
--------------------------	---

#### Details of the supplier of the safety data sheet

Registered company name	Bio-Strategy Pty Ltd
Address	Unit 1A/60 Enterprise Place QLD 4173 Australia
Telephone	1300 727 696
Fax	Not Available
Website	www.bio-strategy.com.au
Email	csaus@bio-strategy.com

#### Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	07 3009 4188
Other emergency telephone numbers	Not Available

### SECTION 2 HAZARDS IDENTIFICATION


#### Classification of the substance or mixture

**HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.**

COMBUSTIBLE LIQUID, regulated for storage purposes only

Poisons Schedule	S6
Classification [1]	Flammable Liquid Category 4, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Respiratory Sensitizer Category 1*, Skin Sensitizer Category 1*, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation) <i>*LIMITED EVIDENCE</i>
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

#### Label elements

Hazard pictogram(s)	
SIGNAL WORD	<b>DANGER</b>

**DIMETHYL SULFOXIDE**

**Hazard statement(s)**

<b>H227</b>	Combustible liquid
<b>H315</b>	Causes skin irritation.
<b>H319</b>	Causes serious eye irritation.
<b>H334</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled.*
<b>H317</b>	May cause an allergic skin reaction.*
<b>H335</b>	May cause respiratory irritation.

\*LIMITED EVIDENCE

**Supplementary statement(s)**

Not Applicable

**Precautionary statement(s) Prevention**

<b>P210</b>	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
<b>P261</b>	Avoid breathing mist/vapours/spray.
<b>P271</b>	Use only outdoors or in a well-ventilated area.
<b>P280</b>	Wear protective gloves/protective clothing/eye protection/face protection.

**Precautionary statement(s) Response**

<b>P304+P340</b>	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
<b>P342+P311</b>	If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
<b>P362</b>	Take off contaminated clothing and wash before reuse.
<b>P370+P378</b>	In case of fire: Use water spray/fog for extinction.

**Precautionary statement(s) Storage**

<b>P403+P235</b>	Store in a well-ventilated place. Keep cool.
<b>P405</b>	Store locked up.

**Precautionary statement(s) Disposal**

<b>P501</b>	Dispose of contents/container in accordance with local regulations.
-------------	---

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

**Substances**

CAS No	%[weight]	Name
67-68-5	>97	<u>dimethyl sulfoxide</u>

**Mixtures**

See section above for composition of Substances

**SECTION 4 FIRST AID MEASURES**

**Description of first aid measures**

<b>Eye Contact</b>	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with fresh running water.</li> <li>▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.</li> <li>▶ Seek medical attention without delay; if pain persists or recurs seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Seek medical advice.</li> <li>▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

**Indication of any immediate medical attention and special treatment needed**

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours. Treat symptomatically.

## SECTION 5 FIREFIGHTING MEASURES

### Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

### Special hazards arising from the substrate or mixture

<b>Fire Incompatibility</b>	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
-----------------------------	--

### Advice for firefighters

<b>Fire Fighting</b>	<ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear full body protective clothing with breathing apparatus.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> <li>▶ Use water delivered as a fine spray to control fire and cool adjacent area.</li> </ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▶ Combustible.</li> <li>▶ Slight fire hazard when exposed to heat or flame.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ On combustion, may emit toxic fumes of carbon monoxide (CO).</li> </ul> Combustion products include: <ul style="list-style-type: none"> <li>, carbon dioxide (CO<sub>2</sub>)</li> <li>, sulfur oxides (SO<sub>x</sub>)</li> <li>, other pyrolysis products typical of burning organic material.</li> </ul> May emit poisonous fumes. May emit corrosive fumes. Decomposition products include formaldehyde, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, and bis (methylthio) methane
<b>HAZCHEM</b>	Not Applicable

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

See section 8

### Environmental precautions

See section 12

### Methods and material for containment and cleaning up

<b>Minor Spills</b>	<ul style="list-style-type: none"> <li>▶ Remove all ignition sources.</li> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid breathing vapours and contact with skin and eyes.</li> <li>▶ Control personal contact with the substance, by using protective equipment.</li> </ul>
<b>Major Spills</b>	Moderate hazard. <ul style="list-style-type: none"> <li>▶ Clear area of personnel and move upwind.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear breathing apparatus plus protective gloves.</li> </ul>

Personal Protective Equipment advice is contained in Section 8 of the SDS.

## SECTION 7 HANDLING AND STORAGE

### Precautions for safe handling

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>▶ <b>DO NOT allow clothing wet with material to stay in contact with skin</b></li> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> </ul>
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ No smoking, naked lights or ignition sources.</li> <li>▶ Store in a cool, dry, well-ventilated area.</li> </ul>

### Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ Glass container is suitable for laboratory quantities</li> <li>▶ Metal can or drum</li> <li>▶ Packaging as recommended by manufacturer.</li> <li>▶ Check all containers are clearly labelled and free from leaks.</li> </ul>
---------------------------	---

## DIMETHYL SULFOXIDE

<b>Storage incompatibility</b>	<ul style="list-style-type: none"> <li>▶ Many aprotic (non-hydroxylic) solvents are not inert towards other reagents and care must be taken when using untried combinations of solvents an reagents for the first time.</li> <li>▶ Some aprotic solvents have a dramatic effect on reaction rates</li> </ul> <p>Dimethyl sulfoxide:</p> <ul style="list-style-type: none"> <li>▶ reacts violently or explosively with oxidisers, acryl halides, aryl halides and related compounds, non-metallic chlorides and other active halogen compounds, p-bromobenzoyl acetanilide, diborane, boron compounds, iodine pentafluoride, magnesium perchlorate, methyl bromide, perchloric acid, periodic acid, silver fluoride, sodium hydride, potassium permanganate</li> <li>▶ forms powerfully explosive mixtures with metal salts of oxoacids</li> </ul> <p>All blends containing DMSO must be buffered at pH 7-9 before distillation.</p> <p>Prolonged heating above 15 deg.C (302 deg. F) can cause rapid, exothermic decomposition</p> <ul style="list-style-type: none"> <li>▶ Sulfoxide ion may react violently or explosively with acyl halides, non-metal halides, benzenesulfonyl halides, cyanuric halides, oxalyl phosphorus trihalides, phosphorus oxyhalides, sulfuryl halides and thionyl halides. These violent reactions may occur as a result of exothermic polymerisation of formaldehyde produced by the interaction of the sulfoxide with reactive halides, and acidic or basic reagents.</li> <li>▶ Alkyl halides may produce a delayed, vigorous and strongly exothermic reaction.</li> <li>▶ Strong bases may produce violent ignition.</li> <li>▶ Avoid reaction with oxidising agents</li> </ul>
--------------------------------	---

### SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Control parameters

##### OCCUPATIONAL EXPOSURE LIMITS (OEL)

##### INGREDIENT DATA

Not Available

##### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
dimethyl sulfoxide	Dimethyl sulfoxide; (DMSO)	150 ppm	290 ppm	1,800 ppm

Ingredient	Original IDLH	Revised IDLH
dimethyl sulfoxide	Not Available	Not Available

#### Exposure controls

<b>Appropriate engineering controls</b>	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.</p>
<b>Personal protection</b>	
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▶ Safety glasses with side shields.</li> <li>▶ Chemical goggles.</li> <li>▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.</li> </ul>
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Wear chemical protective gloves, e.g. PVC.</li> <li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.</li> <li>▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.</li> </ul> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care.</p> <ul style="list-style-type: none"> <li>▶ Aprotic solvents may greatly promote the toxic properties of solutes because of their unique ability to penetrate synthetic rubber protective gloves and the skin (butyl rubber gloves are reported to be more satisfactory than others</li> <li>▶ Neoprene gloves</li> </ul>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ P.V.C. apron.</li> <li>▶ Barrier cream.</li> </ul>
<b>Thermal hazards</b>	Not Available

#### Recommended material(s)

##### GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

**"Forsberg Clothing Performance Index".**

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

#### Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

## DIMETHYL SULFOXIDE

## DIMETHYL SULFOXIDE

Material	CPI
BUTYL	A
HYPALON	A
NEOPRENE	A
NEOPRENE/NATURAL	A
PE/EVAL/PE	A
NITRILE+PVC	B
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NITRILE	C
PVC	C

\* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

**NOTE:** As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

\* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	A-AUS / Class1	-
up to 50	1000	-	A-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	A-2
up to 100	10000	-	A-3
100+			Airline**

\* - Continuous Flow \*\* - Continuous-flow or positive pressure demand

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

## Information on basic physical and chemical properties

<b>Appearance</b>	Clear colourless, very hygroscopic liquid, practically no odour or slight garlic odour, slightly bitter taste with sweet after-taste. Miscible in water, alcohol, ether, benzene, chloroform and acetone. Viscosity (27 C): 1.1 cps. Evaporation rate (n-butyl acetate=1): 1.4 Upper explosive limit in air has been reported as high as 63%.		
<b>Physical state</b>	Liquid	<b>Relative density (Water = 1)</b>	1.10
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	-2.03
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	300-302
<b>pH (as supplied)</b>	Not Applicable	<b>Decomposition temperature</b>	100 approx.
<b>Melting point / freezing point (°C)</b>	18.4	<b>Viscosity (cSt)</b>	1.1
<b>Initial boiling point and boiling range (°C)</b>	189	<b>Molecular weight (g/mol)</b>	78.13
<b>Flash point (°C)</b>	89-95	<b>Taste</b>	Not Available
<b>Evaporation rate</b>	1.4 BuAc=1	<b>Explosive properties</b>	Not Available
<b>Flammability</b>	Combustible.	<b>Oxidising properties</b>	Not Available
<b>Upper Explosive Limit (%)</b>	29-63	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Available
<b>Lower Explosive Limit (%)</b>	2.6-3.5	<b>Volatile Component (%vol)</b>	100 approx.
<b>Vapour pressure (kPa)</b>	0.053	<b>Gas group</b>	Not Available
<b>Solubility in water (g/L)</b>	Miscible	<b>pH as a solution (1%)</b>	Not Applicable
<b>Vapour density (Air = 1)</b>	2.7	<b>VOC g/L</b>	Not Available

## SECTION 10 STABILITY AND REACTIVITY

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	<ul style="list-style-type: none"> <li>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul>
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

## SECTION 11 TOXICOLOGICAL INFORMATION

## Information on toxicological effects

<b>Inhaled</b>	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
----------------	--

Continued...

## DIMETHYL SULFOXIDE

	Inhalation hazard is increased at higher temperatures. Inhalation of vapours of DMSO may cause cough or a burning sensation. High concentrations may cause nausea, vomiting, chills, cramps, headache, dizziness, tiredness, and allergic reactions. Very high doses may be lethal. Repeated exposure may cause liver damage and inflammation of the airway and lung.
<b>Ingestion</b>	Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) Accidental ingestion of the material may be damaging to the health of the individual. DMSO has very few toxic symptoms in humans. The most common are nausea, skin rashes and an unusual garlic-onion-oyster smell on the body and breath. Swallowing large quantities of DMSO may cause vomiting, diarrhoea, cramps, chills and drowsiness.
<b>Skin Contact</b>	The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering. Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Topical exposure to DMSO results in stinging sensation, skin burns, redness, itching, scaly rashes and blisters. There may be ♦ garlic ♦ breath, transient disturbances of colour vision, headache, aversion to light, diarrhoea, numbness, tiredness, chills, chest pains, aching eyes, dark urine from rapid breakdown of the blood, drowsiness and shock. DMSO is commonly used as a carrier for topical preparations of many chemicals including drugs. Contact with DMSO solutions containing toxic material or materials with unknown toxicology should be avoided, as DMSO easily penetrates the skin and may enhance the rate of skin absorption of other skin-permeable substances. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
<b>Eye</b>	Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals. Prolonged eye contact may cause inflammation characterised by a temporary redness of the conjunctiva (similar to windburn). Direct contact with high concentrations of DMSO produces irritation with temporary stinging and burning. Lower concentrations do not appear to cause injury and are tolerated well. Application of its full strength to the eye may cause pain, moderate discharge, corneal injury and dilation of the conjunctival blood vessels with bleeding. These effects are reversed within 2 days.
<b>Chronic</b>	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population. Topical application for 6 months resulted in bad breath, transient reddening of skin, burning and stinging with moderate inflammation. These reversed with continuation of treatment. Continuous applications under an occluding membrane produced hardening of the skin within a month. There could be eye changes, leading to visual impairment; lung inflammation, liver enlargement, and kidney damage may occur.

<b>dimethyl sulfoxide</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: 14500 mg/kg <sup>[2]</sup>	Not Available

**Legend:** 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.\* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

<b>DIMETHYL SULFOXIDE</b>	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. DMSO (dimethyl sulfoxide) is absorbed following inhalation, through the skin and after oral intake. Topical application causes mild redness, burning, stinging and itching, which disappear after discontinuation. It is mildly irritating to the eye and may induce tear formation with a brief burning sensation. Long term exposure may cause poor weight gain and changes in the blood and eye. Extensive monitoring of humans has shown that DMSO does not affect human kidney function. Although it causes an increase in urine production, no sign of kidney damage or cancer has been found. Repeated skin application can cause occasional skin irritation, garlicky breath and body odour. It is metabolised in the body and excreted in the urine, faeces, through the breath and skin. The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
---------------------------	--

<b>Acute Toxicity</b>	✗	<b>Carcinogenicity</b>	⊖
<b>Skin Irritation/Corrosion</b>	✓	<b>Reproductivity</b>	⊖
<b>Serious Eye Damage/Irritation</b>	✓	<b>STOT - Single Exposure</b>	✓
<b>Respiratory or Skin sensitisation</b>	✓	<b>STOT - Repeated Exposure</b>	⊖
<b>Mutagenicity</b>	⊖	<b>Aspiration Hazard</b>	⊖

**Legend:** ✗ – Data available but does not fill the criteria for classification  
✓ – Data available to make classification  
⊖ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

## Toxicity

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
<b>dimethyl sulfoxide</b>	LC50	96	Fish	≈30800.0mg/L	1
	EC50	96	Algae or other aquatic plants	≈12350-25500mg/L	1
	NOEC	168	Crustacea	0.1750000mg/L	4

**Legend:** Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE

(Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

For Dimethyl Sulfoxide (DMSO): Half-life (hr): 7; Melting Point: 18.5 C; Boiling Point: 189 C (at 1,013 hPa); log Kow: -1.35; Vapor Pressure: 0.81 hPa @ 25 C; Henry Law's Constant: 1.17 10+5 mol.kg-1.atm-1.

Environmental Fate: DMSO is a colorless liquid which, in some cases, has a light, characteristic sulfur odor due to traces of the raw material dimethyl sulfide. The main compartments will be soil (60.4%) and water (39.5%) with the remainder partitioning between air (0.0334%) and sediment (0.0723%).

Aquatic Fate: DMSO is able to mix in all proportion with water and with most of the common organic solvents such as alcohols, esters, ketones, ethers, chlorinated solvents and aromatics.

**DO NOT discharge into sewer or waterways.**

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
dimethyl sulfoxide	HIGH	HIGH

#### Bioaccumulative potential

Ingredient	Bioaccumulation
dimethyl sulfoxide	LOW (BCF = 0.4)

#### Mobility in soil

Ingredient	Mobility
dimethyl sulfoxide	LOW (KOC = 4.411)

## SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

<b>Product / Packaging disposal</b>	<p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> <li>▶ Reduction</li> <li>▶ Reuse</li> <li>▶ Recycling</li> <li>▶ Disposal (if all else fails)</li> </ul> <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.</p> <ul style="list-style-type: none"> <li>▶ <b>DO NOT allow wash water from cleaning or process equipment to enter drains.</b></li> <li>▶ It may be necessary to collect all wash water for treatment before disposal.</li> <li>▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li> <li>▶ Where in doubt contact the responsible authority.</li> </ul> <p>In the absence of dissolved oxygen and in the presence of bacteria, a small amount of DMSO can be reduced to DMS (dimethyl sulfide), which produces a nauseating odour at very small concentrations.</p> <p>These specific conditions occur mainly with DMSO effluents in poorly aerated, non sterile storage tanks or in biological waste treatment plant.</p> <ul style="list-style-type: none"> <li>▶ With spot quantity of DMSO effluents in drums or storage tank, odour can be prevented or eliminated with 0,3% concentration of castor oil based formulation.</li> <li>▶ In biological water treatment plant, DMS formation can be inhibited with less than 5 ppm of nitrates such as KNO3.</li> <li>▶ Recycle wherever possible or consult manufacturer for recycling options.</li> <li>▶ Consult State Land Waste Authority for disposal.</li> <li>▶ Bury or incinerate residue at an approved site.</li> <li>▶ Recycle containers if possible, or dispose of in an authorised landfill.</li> </ul>
-------------------------------------	--

## SECTION 14 TRANSPORT INFORMATION

#### Labels Required

<b>COMBUSTIBLE LIQUID</b>	COMBUSTIBLE LIQUID, regulated for storage purposes only
<b>Marine Pollutant</b>	NO
<b>HAZCHEM</b>	Not Applicable

**Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

**Transport in bulk according to Annex II of MARPOL and the IBC code**

Not Applicable

## SECTION 15 REGULATORY INFORMATION

**Safety, health and environmental regulations / legislation specific for the substance or mixture**

**DIMETHYL SULFOXIDE(67-68-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Inventory of Chemical Substances (AICS)	
National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y

## DIMETHYL SULFOXIDE

Canada - NDSL	N (dimethyl sulfoxide)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
<b>Legend:</b>	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

**SECTION 16 OTHER INFORMATION****Other information**

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

**Definitions and abbreviations**

PC – TWA: Permissible Concentration-Time Weighted Average  
PC – STEL: Permissible Concentration-Short Term Exposure Limit  
IARC: International Agency for Research on Cancer  
ACGIH: American Conference of Governmental Industrial Hygienists  
STEL: Short Term Exposure Limit  
TEEL: Temporary Emergency Exposure Limit,  
IDLH: Immediately Dangerous to Life or Health Concentrations  
OSF: Odour Safety Factor  
NOAEL: No Observed Adverse Effect Level  
LOAEL: Lowest Observed Adverse Effect Level  
TLV: Threshold Limit Value  
LOD: Limit Of Detection  
OTV: Odour Threshold Value  
BCF: BioConcentration Factors  
BEI: Biological Exposure Index

This document is copyright.

Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH.

TEL (+61 3) 9572 4700.