

Borate Salts	Proprietary	30 - 60%	Eye Irrit. 2A (H319) Repr. 1 (H360)
Crystalline silica, quartz	14808-60-7	1 - 5%	Carc. 1 (H350) STOT RE 1 (H372)

## 4. First aid measures

### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

### Symptoms caused by exposure

Causes eye irritation Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease. Potential reproductive hazard. May cause birth defects. Prolonged or repeated exposure may cause damage to organs.

### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

### Suitable extinguishing equipment

#### **Suitable Extinguishing Media**

All standard fire fighting media

#### **Extinguishing media which must not be used for safety reasons**

None known.

### Specific hazards arising from the chemical

#### **Special Exposure Hazards**

Decomposition in fire may produce harmful gases.

### Special protective equipment and precautions for fire fighters

#### **Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for Safe Handling

#### **Handling Precautions**

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when

wet.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Keep container closed when not in use. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
---

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Borate Salts	Proprietary	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

**Appropriate engineering controls****Engineering Controls**

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

**Personal protective equipment (PPE)****Respiratory Protection**

Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), AS/NZS 1715, or equivalent respirator when using this product.

**Hand Protection**

Normal work gloves.

**Skin Protection**

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**Environmental Exposure Controls**

No information available

<b>9. Physical and Chemical Properties</b>
--

**9.1. Information on basic physical and chemical properties****Physical State:** Liquid**Color:** Gray to tan**Odor:** Odorless**Odor Threshold:** No information availablePropertyValues

Remarks/ - Method

**pH:**

No data available

**Freezing Point/Range**

0 °C

**Melting Point/Range**

No data available

**Boiling Point/Range**

100 °C / 212 °F

**Flash Point**

No data available

**Evaporation rate**

No data available

**Vapor Pressure**

No data available

**Vapor Density**

No data available

**Specific Gravity**

1.27

**Water Solubility**

Insoluble in water

**Solubility in other solvents**

No data available

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

No data available

**Autoignition Temperature**

No data available

**Decomposition Temperature**

No data available

**Viscosity**

No data available

**Explosive Properties**

No information available

**Oxidizing Properties**

No information available

**9.2. Other information**

VOC Content (%)

No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Hydrofluoric acid.

### 10.6. Hazardous Decomposition Products

Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

Causes eye irritation Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease. Potential reproductive hazard. May cause birth defects. Prolonged or repeated exposure may cause damage to organs.

### Numerical measures of toxicity

#### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Borate Salts	Proprietary	3493-6080 mg/kg (Rat) (similar substance) 3450 mg/kg (Male Rat) (similar substance)	> 2000 mg/kg (Rabbit) (similar substance)	> 2 mg/L (Rat) 4h (similar substance) > 2.12 mg/L (Rat) 4h (similar substance) > 2.04 mg/L (Rat) 4h (similar substance)
Crystalline silica, quartz	14808-60-7	>15,000 mg/kg (Human)	No data available	No data available

### Immediate, delayed and chronic health effects from exposure

#### **Inhalation**

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

May cause respiratory irritation.

#### **Eye Contact**

Causes eye irritation.

#### **Skin Contact**

May cause mild skin irritation.

#### **Ingestion**

May cause abdominal pain, vomiting, nausea, and diarrhea.

#### **Chronic Effects/Carcinogenicity**

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Prolonged or repeated exposure may cause reproductive system damage.

#### **Exposure Levels**

No data available

#### **Interactive effects**

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

#### **Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Borate Salts		Non-irritating to the skin (Rabbit) (similar substances)
Crystalline silica, quartz	14808-60-7	Non-irritating to the skin

Substances	CAS Number	Eye damage/irritation
Borate Salts		Causes moderate eye irritation. (Rabbit) (similar substances)
Crystalline silica, quartz	14808-60-7	Mechanical irritation of the eyes is possible.

Substances	CAS Number	Skin Sensitization
Borate Salts		Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Crystalline silica, quartz	14808-60-7	No information available.

Substances	CAS Number	Respiratory Sensitization
Borate Salts		No information available
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	Mutagenic Effects
Borate Salts		In vitro tests did not show mutagenic effects (similar substances)
Crystalline silica, quartz	14808-60-7	Not regarded as mutagenic.

Substances	CAS Number	Carcinogenic Effects
Borate Salts		Did not show carcinogenic effects in animal experiments (similar substances)
Crystalline silica, quartz	14808-60-7	Contains crystalline silica which may cause silicosis, a delayed and progressive lung disease. The IARC and NTP have determined there is sufficient evidence in humans of the carcinogenicity of crystalline silica with repeated respiratory exposure. Based on available scientific evidence, this substance is a threshold carcinogen with a mode of action involving indirect genotoxicity secondary to lung injury.

Substances	CAS Number	Reproductive toxicity
Borate Salts		Experiments have shown reproductive toxicity effects on laboratory animals (similar substances)
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	STOT - single exposure
Borate Salts		None under normal use conditions
Crystalline silica, quartz	14808-60-7	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Borate Salts		None under normal use conditions
Crystalline silica, quartz	14808-60-7	Causes damage to organs through prolonged or repeated exposure if inhaled: (Lungs)

Substances	CAS Number	Aspiration hazard
Borate Salts		Not applicable
Crystalline silica, quartz	14808-60-7	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

No data available

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Borate Salts	Proprietary	EC50 (72h) 1398.64 mg/L (Skeletonema costatum)	LC50 (96h) > 320 mg/L (Scophthalmus maximus) LC50 (96h) > 1100 mg/L (Oncorhynchus mykiss) LC50 (96h) > 1021 mg/L (Lepomis macrochirus) LD50 (28d) 65 mg/L (Oncorhynchus mykiss)	No information available	EC50 (48h) 7341.67 mg/L (Acartia tonsa) EC50 (48h) 133 mg/L (Daphnia magna)
Crystalline silica, quartz	14808-60-7	No information available	LL0 (96h) 10,000 mg/L (Danio rerio) (similar substance)	No information available	LL50 (24h) > 10,000 mg/L (Daphnia magna) (similar substance)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Borate Salts	Proprietary	The methods for determining biodegradability are not applicable to inorganic substances.
Crystalline silica, quartz	14808-60-7	No information available

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Borate Salts	Proprietary	0.175
Crystalline silica, quartz	14808-60-7	No information available

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Borate Salts	Proprietary	No information available
Crystalline silica, quartz	14808-60-7	No information available

### 12.6. Other adverse effects

#### Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

### Safe handling and disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	Product contains one or more components not listed on inventory.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian DSL Inventory</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review****Revision Date:** 03-Apr-2015**Revision Note** Revision Note  
SDS sections updated: 2**Full text of R-phrases referred to under Sections 2 and 3**

R36 - Irritating to eyes  
R49 May cause cancer by inhalation.  
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.  
R62 Possible risk of impaired fertility.

**Full text of H-Statements referred to under sections 2 and 3**

H319 - Causes serious eye irritation  
H350i - May cause cancer by inhalation  
H360 - May damage fertility or the unborn child  
H372 - Causes damage to organs through prolonged or repeated exposure if inhaled  
H373 - May cause damage to organs through prolonged or repeated exposure if inhaled

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50 – Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

NZ CCID

OSHA

ECHA C&L

**Disclaimer Statement**

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**End of Safety Data Sheet**

**SAFETY DATA SHEET****Clayfix II Plus**

Revision Date: 26-Oct-2017

Revision Number: 2

**1. Product Identifier & Identity for the Chemical**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** Clayfix II Plus

**Other means of Identification**

**Synonyms** None  
**Hazardous Material Number:** HM006534

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Clay Control  
**Uses advised against** No information available

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951  
Global Incident Response Access Code: 334305  
Contract Number: 14012

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

**2. Hazard Identification**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Acute Oral Toxicity	Category 3 - H301
Acute toxicity - Dermal	Category 3 - H311
Skin Corrosion/Irritation	Category 2 - H315
Acute Aquatic Toxicity	Category 2 - H401
Chronic Aquatic Toxicity	Category 1 - H410

**Label elements, including precautionary statements****Hazard Pictograms**



**Signal Word**

DANGER

**Hazard Statements:**

H301 - Toxic if swallowed  
 H311 - Toxic in contact with skin  
 H315 - Causes skin irritation  
 H401 - Toxic to aquatic life  
 H410 - Very toxic to aquatic life with long lasting effects

**Precautionary Statements****Prevention**

P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P273 - Avoid release to the environment

**Response**

P280 - Wear protective gloves/eye protection/face protection  
 P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician  
 P330 - Rinse mouth  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P312 - Call a POISON CENTER/doctor/physician if you feel unwell  
 P361 - Take off immediately all contaminated clothing.

**Storage**

P391 - Collect spillage

**Disposal**

P405 - Store locked up

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Tetramethyl ammonium chloride

**CAS Number**

75-57-0

**Other hazards which do not result in classification**

None known

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Tetramethyl ammonium chloride	75-57-0	60 - 100%	Acute Tox. 2 (H300) Acute Tox. 3 (H311) Skin Irrit. 2 (H315) Aquatic Acute 2 (H401) Aquatic Chronic 1 (H410)

### 4. First aid measures

**Description of necessary first aid measures****Inhalation**

If inhaled, move victim to fresh air and seek medical attention.

**Eyes**

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

**Skin**

In case of contact, immediately flush skin with plenty of soap and water for at least

**Ingestion** 15 minutes. Get medical attention.  
Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes skin irritation. Toxic if swallowed. Toxic in contact with skin.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases. Use water spray to cool fire exposed surfaces.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Wash hands after use. Launder contaminated clothing before reuse. Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Do NOT consume food, drink, or tobacco in contaminated areas.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use. Store locked up. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA

Tetramethyl ammonium chloride	75-57-0	Not applicable	Not applicable
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**Appropriate engineering controls**

**Engineering Controls** Use in a well ventilated area.

**Personal protective equipment (PPE)**

<b>Personal Protective Equipment</b>	If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.
<b>Respiratory Protection</b>	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Organic vapor/acid gas respirator with a dust/mist filter.
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Rubber apron.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	None known.
<b>Environmental Exposure Controls</b>	No information available

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties**

<b>Physical State:</b>	Liquid	<b>Color</b>	Colorless
<b>Odor:</b>	Mild amine	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	4- 9
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	100 °C / 212 °F
<b>Boiling Point / Range</b>	> 93 °C / > 200 °F PMCC
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.035
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

None anticipated

**10.5. Incompatible materials**

Strong oxidizers.

**10.6. Hazardous decomposition products**

Chlorine. Hydrogen chloride. Oxides of nitrogen. Carbon monoxide and carbon dioxide.

**11. Toxicological Information****Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation. Ingestion.**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes skin irritation. Toxic if swallowed. Toxic in contact with skin.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetramethyl ammonium chloride	75-57-0	47 mg/kg (Rat)	200 mg/kg - 500 mg/kg (rat)	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation**

May cause respiratory irritation.

**Eye Contact**

Non-irritating to rabbit's eye

**Skin Contact**

Toxic in contact with skin. Causes skin irritation.

**Ingestion**

Toxic if swallowed.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.**Exposure Levels**

No data available

**Interactive effects**

Eye ailments. Skin disorders.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Tetramethyl ammonium chloride	75-57-0	Causes moderate skin irritation.

Substances	CAS Number	Serious eye damage/irritation
Tetramethyl ammonium chloride	75-57-0	Non-irritating to rabbit's eye

Substances	CAS Number	Skin Sensitization
Tetramethyl ammonium chloride	75-57-0	Did not cause sensitization on laboratory animals (mouse)

Substances	CAS Number	Respiratory Sensitization
Tetramethyl ammonium chloride	75-57-0	No information available

Substances	CAS Number	Mutagenic Effects
Tetramethyl ammonium chloride	75-57-0	In vitro tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Tetramethyl ammonium chloride	75-57-0	No information available

Substances	CAS Number	Reproductive toxicity
Tetramethyl ammonium chloride	75-57-0	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)

Substances	CAS Number	STOT - single exposure
Tetramethyl ammonium chloride	75-57-0	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Tetramethyl ammonium chloride	75-57-0	No data of sufficient quality are available.

Substances	CAS Number	Aspiration hazard
Tetramethyl ammonium chloride	75-57-0	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Tetramethyl ammonium chloride	75-57-0	No information available	LC50 (96h) 462 mg/L (Pimephales promelas)	No information available	LC50 (48h) 1.86 mg/L (Daphnia magna) NOEL (11d) 0.03 mg/L (Daphnia magna)

#### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Tetramethyl ammonium chloride	75-57-0	No information available

#### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Tetramethyl ammonium chloride	75-57-0	No information available

#### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Tetramethyl ammonium chloride	75-57-0	No information available

#### 12.6. Other adverse effects

##### Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

### Safe handling and disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

### Disposal of any contaminated packaging

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

### Environmental regulations

Not applicable

## 14. Transport Information

### Transportation Information

#### Australia ADG

**UN Number** UN2810  
**UN proper shipping name:** Toxic Liquid, Organic, N.O.S. (Contains Tetramethylammonium Chloride)  
**Transport Hazard Class(es):** 6.1  
**Packing Group:** III  
**Environmental Hazards:** Marine Pollutant

#### IMDG/IMO

**UN Number** UN2810  
**UN proper shipping name:** Toxic Liquid, Organic, N.O.S. (Contains Tetramethylammonium Chloride)  
**Transport Hazard Class(es):** 6.1  
**Packing Group:** III  
**Environmental Hazards:** Marine Pollutant  
**EMS:** EmS F-A, S-A

#### IATA/ICAO

**UN Number** UN2810  
**UN proper shipping name:** Toxic Liquid, Organic, N.O.S. (Contains Tetramethylammonium Chloride)  
**Transport Hazard Class(es):** 6.1  
**Packing Group:** III  
**Environmental Hazards:** Marine Pollutant

#### Special precautions during transport

None

#### HazChem Code

2X

## 15. Regulatory Information

### Safety, health and environmental regulations specific for the product

#### International Inventories

**Australian AICS Inventory** All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.  
**New Zealand Inventory of Chemicals** All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.  
**EINECS (European Inventory of Existing Chemical Substances)** This product, and all its components, complies with EINECS  
**US TSCA Inventory** All components listed on inventory or are exempt.  
**Canadian Domestic Substances List (DSL)** All components listed on inventory or are exempt.

#### Poisons Schedule number

None Allocated

#### International Agreements

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

## 16. Other information

### Date of preparation or review

Revision Date: 26-Oct-2017

**Revision Note****Full text of H-Statements referred to under sections 2 and 3**

H300 - Fatal if swallowed  
H301 - Toxic if swallowed  
H311 - Toxic in contact with skin  
H315 - Causes skin irritation  
H401 - Toxic to aquatic life  
H410 - Very toxic to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### CLSAU352

Revision Date: 04-Mar-2015

Revision Number: 8

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** CLSAU352

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM007421

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Surfactant  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: 61 (08) 9455 8300  
Fax Number: 61 (08) 9455 5300

**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

61 (08) 9455 8300

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Skin Corrosion / irritation	Category 2 - H315
Serious Eye Damage / Eye Irritation	Category 1 - H318

##### Label elements, including precautionary statements

##### Hazard Pictograms





**Signal Word**  
Danger

**Hazard Statements**  
H315 - Causes skin irritation  
H318 - Causes serious eye damage

**Precautionary Statements**

**Prevention** P264 - Wash face, hands and any exposed skin thoroughly after handling  
P280 - Wear protective gloves/eye protection/face protection

**Response** P302 + P352 - IF ON SKIN: Wash with plenty of soap and water  
P332 + P313 - If skin irritation occurs: Get medical advice/attention  
P362 - Take off contaminated clothing and wash before reuse  
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P310 - Immediately call a POISON CENTER or doctor/physician

**Storage** None

**Disposal** None

**Contains**

<b>Substances</b>	<b>CAS Number</b>
Sodium lauryl sulfate	151-21-3

**Other hazards which do not result in classification**

None known

**Australia Classification**

For the full text of the R/H-phrases mentioned in this Section, see Section 16

**Classification** Xi - Irritant.

**Risk Phrases** R41 Risk of serious damage to eyes.  
R38 Irritating to skin.

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia

Sodium lauryl sulfate	151-21-3	10 - 30%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Skin Irrit. 2 (H315) Eye Irrit. 1 (H318) STOT SE 3 (H335) Aquatic Acute 2 (H401) Aquatic Chronic 3 (H412)
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#### 4. First aid measures

##### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	If swallowed, give at least 3-4 glasses of water, but do not induce vomiting. Do not give anything by mouth to an unconscious or convulsing person. Get medical attention.

##### Symptoms caused by exposure

May cause severe eye irritation. May cause skin irritation.

##### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

#### 5. Fire Fighting Measures

##### Suitable extinguishing equipment

##### Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

##### Extinguishing media which must not be used for safety reasons

None known.

##### Specific hazards arising from the chemical

##### Special Exposure Hazards

Decomposition in fire may produce toxic gases.

##### Special protective equipment and precautions for fire fighters

##### Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

#### 6. Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.

##### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

##### 6.3. Methods and material for containment and cleaning up

Do NOT spread spilled product with water. Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

#### 7. Handling and storage

**7.1. Precautions for Safe Handling****Handling Precautions**

Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Avoid breathing mist. Avoid contact with eyes, skin, or clothing.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Keep from freezing. Keep container closed when not in use. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
---

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Sodium lauryl sulfate	151-21-3	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)****Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Dust/mist respirator. (N95, P2/P3)

**Hand Protection**

Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374); Nitrile gloves. (>= 0.35 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection**

Wear impervious protective clothing, including boots, gloves, lab coat, apron, rain jacket, pants or coverall, as appropriate, to prevent skin contact.

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

**Environmental Exposure Controls**

No information available

<b>9. Physical and Chemical Properties</b>
--

**9.1. Information on basic physical and chemical properties**

**Physical State:** Liquid  
**Odor:** Odorless

**Color:** Off white  
**Odor Threshold:** No information available

**Property**

Remarks/ - Method

**Values****pH:**

No data available

**Freezing Point/Range**

No data available

**Melting Point/Range**

No data available

**Boiling Point/Range**

100 °C / 212 °F

**Flash Point**

No data available

Evaporation rate	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	0.98
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available
<b>9.2. Other information</b>	
VOC Content (%)	No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not applicable

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Oxides of sulfur. Sodium oxides. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

May cause severe eye irritation. May cause skin irritation.

### Numerical measures of toxicity

#### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium lauryl sulfate	151-21-3	1288 mg/kg (Rat) 1200 mg/kg (Rat)	> 2000 mg/kg (Rabbit) (similar substance)	3900 mg/m <sup>3</sup> ( Rat ) 1 h

### Immediate, delayed and chronic health effects from exposure

#### **Inhalation**

May cause respiratory irritation. May cause allergic respiratory reaction.

#### **Eye Contact**

May cause severe eye irritation.

#### **Skin Contact**

May cause an allergic skin reaction. Prolonged or repeated contact may cause skin irritation.

#### **Ingestion**

Irritation of the mouth, throat, and stomach.

### Exposure Levels

No data available

### Interactive effects

Eye ailments. Skin disorders. Respiratory disorders.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Sodium lauryl sulfate	151-21-3	Irritating to skin. (rabbit)

Substances	CAS Number	Eye damage/irritation
Sodium lauryl sulfate	151-21-3	Causes severe eye irritation. (rabbit)

Substances	CAS Number	Skin Sensitization
Sodium lauryl sulfate	151-21-3	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)

Substances	CAS Number	Respiratory Sensitization
Sodium lauryl sulfate	151-21-3	No information available

Substances	CAS Number	Mutagenic Effects
Sodium lauryl sulfate	151-21-3	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Sodium lauryl sulfate	151-21-3	Did not show carcinogenic effects in animal experiments (similar substances)

Substances	CAS Number	Reproductive toxicity
Sodium lauryl sulfate	151-21-3	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	STOT - single exposure
Sodium lauryl sulfate	151-21-3	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Sodium lauryl sulfate	151-21-3	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Sodium lauryl sulfate	151-21-3	Not applicable

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Sodium lauryl sulfate	151-21-3	EC50(72h): > 120 mg/L (growth rate) (Desmodesmus subspicatus)	LC50(96h): 29 mg/L (Pimephales promelas) LC50(96h): 4.5 mg/L (Lepomis macrochirus) NOEC(28d): < 3.8 mg/L (Pimephales promelas)	EC50(3h): 135 mg/L (activated sludge)	LC50(48h): 5.55 mg/L (Ceriodaphnia dubia) NOEC(7d): 0.88 mg/L (Ceriodaphnia dubia)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Sodium lauryl sulfate	151-21-3	Readily biodegradable (95% @ 28d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Sodium lauryl sulfate	151-21-3	<= -2.03

**12.4. Mobility in soil**

No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

UN Number:	Not restricted
UN Proper Shipping Name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian DSL Inventory</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review**

**Revision Date:** 04-Mar-2015

**Revision Note**

SDS sections updated SECTION: 2

**Full text of R-phrases referred to under Sections 2 and 3**

R22 Harmful if swallowed.

R38 Irritating to skin.

R41 Risk of serious damage to eyes.

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Full text of H-Statements referred to under sections 2 and 3**

H302 - Harmful if swallowed

H315 - Causes skin irritation

H318 - Causes serious eye damage

H412 - Harmful to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

Not applicable

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### D-AIR 3000L

Revision Date: 17-Feb-2015

Revision Number: 16

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** D-AIR 3000L

##### Other means of Identification

**Synonyms:** None

**Product Code:** HM003191

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Defoamer

**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775

Telephone Number: 61 (08) 9455 8300

Fax Number: 61 (08) 9455 5300

**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

61 (08) 9455 8300

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

**Hazard Pictograms**



**Signal Word**

Not Hazardous

**Hazard Statements**

Not Classified

**Precautionary Statements****Prevention** None**Response** None**Storage** None**Disposal** None**Contains****Substances**

Alkenes

**CAS Number**

Proprietary

**Other hazards which do not result in classification**

None known

**Australia Classification***For the full text of the R/H-phrases mentioned in this Section, see Section 16***Classification**

Not Classified

**Risk Phrases**

None

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Alkenes	Proprietary	60 - 100%	

**4. First aid measures****Description of necessary first aid measures****Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin**

Wash with soap and water. Get medical attention if irritation persists.

**Ingestion**

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

**Symptoms caused by exposure**

May cause lung damage if swallowed.

**Medical Attention and Special Treatment****Notes to Physician**

Treat symptomatically

**5. Fire Fighting Measures****Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special Exposure Hazards**

Decomposition in fire may produce toxic gases.

**Special protective equipment and precautions for fire fighters****Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

<b>6. Accidental release measures</b>
---------------------------------------

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment.

**6.2. Environmental precautions**

None known.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

<b>7. Handling and storage</b>
--------------------------------

**7.1. Precautions for Safe Handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
---

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Alkenes	Proprietary	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area.

**Personal protective equipment (PPE)****Respiratory Protection**

Not normally necessary.

**Hand Protection**

None known.

**Skin Protection**

Normal work coveralls.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**Environmental Exposure Controls**

No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid      **Color:** Opaque  
**Odor:** Hydrocarbon      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	5.5-7.9
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	> 121 °C PMCC
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	0.92
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

**VOC Content (%)** No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not applicable

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### Most Important Symptoms/Effects

May cause lung damage if swallowed.

### Numerical measures of toxicity

#### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Alkenes	Proprietary	> 5000 mg/kg (Rat) (similar substance)	> 2000 mg/kg (Rat) (similar substance)	> 2.1 mg/L (Rat)

**Immediate, delayed and chronic health effects from exposure****Inhalation**

May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

**Eye Contact**

May cause mild eye irritation.

**Skin Contact**

May cause mild skin irritation.

**Ingestion**

May cause abdominal pain, vomiting, nausea, and diarrhea. Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Alkenes	Proprietary	EC50(72h): > 1000 mg/L (Selenastrum capicomutum) (similar substance)	LL50(96h): > 1000 mg/L (Oncorhynchus mykiss) (similar substance) LL50(96h): > 10000 mg/L (Scophthalmus maximus) (similar substance)	No information available	EC50(48h): > 1000 mg/L (Daphnia magna) (similar substance)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Alkenes	Proprietary	Readily biodegradable (77 - 81% @ 28d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Alkenes	Proprietary	> 7

**12.4. Mobility in soil**

No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian DSL Inventory</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review**

Revision Date: 17-Feb-2015

**Revision Note**

Update to Format SECTION: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

Not applicable

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-11001

Revision Date: 23-Jan-2017

Revision Number: 19

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-11001

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007644

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Additive

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Multi-Chem Mintech  
1 Ward Road  
East Rockingham  
WA 6168  
Australia

Telephone Number: 61 (08) 9419 5300  
Fax Number: 61 (08) 9439 1055  
Emergency Telephone Number: + 61 1 800 686 951  
fdunexchem@halliburton.com

##### E-mail Address

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Skin Corrosion/Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Repeated Exposure)	Category 2 - H373
Acute Aquatic Toxicity	Category 3 - H402

##### Label elements, including precautionary statements

**Hazard Pictograms****Signal Word**

DANGER

**Hazard Statements:**

H315 - Causes skin irritation  
 H318 - Causes serious eye damage  
 H373 - May cause damage to organs through prolonged or repeated exposure  
 H402 - Harmful to aquatic life

**Precautionary Statements****Prevention**

P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P273 - Avoid release to the environment

**Response**

P280 - Wear protective gloves/eye protection/face protection  
 P302 + P352 - IF ON SKIN: Wash with plenty of soap and water  
 P332 + P313 - If skin irritation occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P314 - Get medical attention/advice if you feel unwell

**Storage**

None

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Diethanolamine

**CAS Number**

111-42-2

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).  
 This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Diethanolamine	111-42-2	10 - 30%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) STOT RE 2 (H373) Aquatic Acute 2 (H401) Aquatic Chronic 3 (H412)

### 4. First aid measures

**Description of necessary first aid measures**



<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Seek immediate medical attention/advice. Suitable emergency eye wash facility should be immediately available
<b>Skin</b>	Remove contaminated clothing and launder before reuse. In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Prolonged or repeated exposure may cause damage to organs.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Carbon dioxide, dry chemical, foam.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation. Evacuate all persons from the area.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas. Consult local authorities.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ensure adequate ventilation. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of

12 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Diethanolamine	111-42-2	TWA: 3 ppm TWA: 13 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup>

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), AS/NZS 1715, or equivalent respirator when using this product.

**Hand Protection**

Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection**

Rubber apron.

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

**Environmental Exposure Controls**

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties****Physical State:** Liquid**Color:** Water white**Odor:** Characteristic**Odor Threshold:** No information availablePropertyValues

Remarks/ - Method

**pH:**

10.5

**Freezing Point / Range**

16 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

250 °C / 482 °F

**Flash Point**

194 °C / 382 °F PMCC

Upper flammability limit

8.5

Lower flammability limit

1.3

**Evaporation rate**

No data available

**Vapor Pressure**

0.01 mmHg

**Vapor Density**

No data available

**Specific Gravity**

1.11

**Water Solubility**

Soluble in water

**Solubility in other solvents**

No data available

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

No data available

<b>Autoignition Temperature</b>	315 °C / 600 °F
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

**VOC Content (%)** No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

None anticipated

**10.5. Incompatible materials**

Strong oxidizers. Violent, explosive reaction with sulfur trioxide, decaborane, silver perchlorate, triethenyl aluminum, and hydrogen in presence of nickel catalyst at temperatures above 200 C.

**10.6. Hazardous decomposition products**

Oxides of nitrogen. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Prolonged or repeated exposure may cause damage to organs.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Diethanolamine	111-42-2	620 µL/kg (Rat) 1600 mg/kg (Rat)	7640 µL/kg (Rabbit) 13,000 mg/kg (Rabbit)	3.35 mg/L (Rat)

**Immediate, delayed and chronic health effects from exposure**

**Inhalation** May cause respiratory irritation.  
**Eye Contact** Causes severe eye irritation which may damage tissue.  
**Skin Contact** Causes skin irritation.  
**Ingestion** Irritation of the mouth, throat, and stomach.

**Chronic Effects/Carcinogenicity** Repeated overexposure may cause liver and kidney effects. Amines may form nitrosamines, a suspect carcinogen, if product is mixed with nitrates, nitrites, nitrogen oxides or other nitrosamines.

**Exposure Levels**

No data available

**Interactive effects**

Skin disorders.

**Data limitations**

No data available

<b>Substances</b>	<b>CAS Number</b>	<b>Skin corrosion/irritation</b>
Diethanolamine	111-42-2	Causes moderate skin irritation. (Rabbit)
<b>Substances</b>	<b>CAS Number</b>	<b>Serious eye damage/irritation</b>
Diethanolamine	111-42-2	Causes severe eye irritation (Rabbit)
<b>Substances</b>	<b>CAS Number</b>	<b>Skin Sensitization</b>
Diethanolamine	111-42-2	Did not cause sensitization on laboratory animals (guinea pig)
<b>Substances</b>	<b>CAS Number</b>	<b>Respiratory Sensitization</b>
Diethanolamine	111-42-2	No information available
<b>Substances</b>	<b>CAS Number</b>	<b>Mutagenic Effects</b>
Diethanolamine	111-42-2	In vivo tests did not show mutagenic effects.
<b>Substances</b>	<b>CAS Number</b>	<b>Carcinogenic Effects</b>
Diethanolamine	111-42-2	No data of sufficient quality are available.
<b>Substances</b>	<b>CAS Number</b>	<b>Reproductive toxicity</b>
Diethanolamine	111-42-2	Animal testing did not show any effects on fertility. (similar substances) Did not show teratogenic effects in animal experiments.
<b>Substances</b>	<b>CAS Number</b>	<b>STOT - single exposure</b>
Diethanolamine	111-42-2	No information available
<b>Substances</b>	<b>CAS Number</b>	<b>STOT - repeated exposure</b>
Diethanolamine	111-42-2	Causes damage to organs through prolonged or repeated exposure if swallowed: (Liver) (Blood) (Kidney)
<b>Substances</b>	<b>CAS Number</b>	<b>Aspiration hazard</b>
Diethanolamine	111-42-2	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### **Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Diethanolamine	111-42-2	EC50 7.8 mg/L (Desmodesmus subspicatus) EC50 (96h) 2.2 mg/L (growth rate) (Selastrum capricornutum)	LC50 4460-4980 mg/L (Pimephales promelas) LC50 (96h) 1460 mg/L (Pimephales promelas)	EC20 >1000 mg/L (respiration rate) (activated sludge) EC90 (30min) > 1000 mg/L (Activated sludge)	EC50 (48h) 30.1 mg/L (Ceriodaphnia dubia) EC50 (48h) 55 mg/L (Daphnia magna) NOEC (21d) 0.78 mg/L (Daphnia magna) (Reproduction)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Diethanolamine	111-42-2	Readily biodegradable (88 - 97% @ 28d)

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Diethanolamine	111-42-2	-1.71

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Diethanolamine	111-42-2	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>13. Disposal Considerations</b>
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**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

<b>14. Transport Information</b>
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**Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

<b>15. Regulatory Information</b>
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**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 23-Jan-2017**Revision Note****Full text of H-Statements referred to under sections 2 and 3**

H302 - Harmful if swallowed  
 H315 - Causes skin irritation  
 H318 - Causes serious eye damage  
 H373 - May cause damage to organs through prolonged or repeated exposure if swallowed  
 H401 - Toxic to aquatic life  
 H402 - Harmful to aquatic life  
 H412 - Harmful to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
 CAS – Chemical Abstracts Service  
 EC50 – Effective Concentration 50%  
 LC50 – Lethal Concentration 50%  
 LD50 – Lethal Dose 50%  
 LL50 – Lethal Loading 50%  
 mg/kg – milligram/kilogram  
 mg/L – milligram/liter  
 NOEC – No Observed Effect Concentration  
 OEL – Occupational Exposure Limit  
 PBT – Persistent Bioaccumulative and Toxic  
 ppm – parts per million  
 STEL – Short Term Exposure Limit  
 TWA – Time-Weighted Average  
 vPvB – very Persistent and very Bioaccumulative  
 h - hour  
 mg/m<sup>3</sup> - milligram/cubic meter  
 mm - millimeter  
 mmHg - millimeter mercury  
 w/w - weight/weight  
 d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

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conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-13002

Revision Date: 21-Sep-2017

Revision Number: 22

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-13002

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007647

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Breaker

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Acute Oral Toxicity	Category 4 - H302
Skin Corrosion/Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 2 - H319
Respiratory Sensitization	Category 1 - H334
Skin Sensitization	Category 1 - H317
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Oxidizing solids.	Category 3 - H272

##### Label elements, including precautionary statements



**Hazard Pictograms****Signal Word**

DANGER

**Hazard Statements:**

H272 - May intensify fire; oxidizer  
 H302 - Harmful if swallowed  
 H315 - Causes skin irritation  
 H317 - May cause an allergic skin reaction  
 H319 - Causes serious eye irritation  
 H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled  
 H335 - May cause respiratory irritation

**Precautionary Statements****Prevention**

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P221 - Take any precaution to avoid mixing with combustibles  
 P261 - Avoid breathing dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P271 - Use only outdoors or in a well-ventilated area  
 P272 - Contaminated work clothing should not be allowed out of the workplace  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P285 - In case of inadequate ventilation wear respiratory protection

**Response**

P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell  
 P330 - Rinse mouth  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P332 + P313 - If skin irritation occurs: Get medical advice/attention  
 P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing  
 P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P337 + P313 - If eye irritation persists: Get medical advice/attention  
 P370 + P378 - In case of fire: Use water spray for extinction  
 P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
 P405 - Store locked up  
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Storage****Disposal****Contains****Substances**

Sodium persulfate

**CAS Number**

7775-27-1

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Sodium persulfate	7775-27-1	60 - 100%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Resp. Sens. 1 (H334) Skin Sens. 1 (H317) STOT SE 3 (H335) Ox. Sol. 3 (H272)

### 4. First aid measures

**Description of necessary first aid measures**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Skin</b>	Wash off immediately with soap and plenty of water for at least 15 minutes while removing all contaminated clothing and shoes.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes eye irritation. Causes skin irritation. May cause allergic skin reaction. May cause allergic respiratory reaction. May cause respiratory irritation. Harmful if swallowed.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Oxidizer. May ignite combustibles. Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

### 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Remove sources of ignition. Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Evacuate all persons from the area.

### **6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas. Consult local authorities.

### **6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

## **7. Handling and storage**

### **7.1. Precautions for safe handling**

#### **Handling Precautions**

Remove sources of ignition. Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid dust accumulations. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### **7.2. Conditions for safe storage, including any incompatibilities**

#### **Storage Information**

Store away from combustibles. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 12 months.

#### **Other Guidelines**

No information available

## **8. Exposure Controls/Personal Protection**

### **Control parameters - exposure standards, biological monitoring**

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Sodium persulfate	7775-27-1	0.01 mg/m <sup>3</sup>	TWA: 0.1 mg/m <sup>3</sup>

### **Appropriate engineering controls**

#### **Engineering Controls**

Use in a well ventilated area. Localized ventilation should be used to control dust levels.

### **Personal protective equipment (PPE)**

#### **Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

#### **Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

#### **Hand Protection**

Dust/mist respirator. (N95, P2/P3)  
Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)

This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

#### **Skin Protection**

Rubber apron.

#### **Eye Protection**

Dust proof goggles.

#### **Other Precautions**

None known.

#### **Environmental Exposure Controls**

Do not allow material to contaminate ground water system



Sodium persulfate	7775-27-1	895 mg/kg (Rat) 1200 mg/kg 930 mg/kg 1000 mg/kg 920 mg/kg	> 10000 mg/kg (Rat)	19.0 mg/L (Rat) 4h > 5.1 mg/L (Rat) 4h
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**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause respiratory irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled
<b>Eye Contact</b>	Causes eye irritation.
<b>Skin Contact</b>	Causes skin irritation. May cause an allergic skin reaction.
<b>Ingestion</b>	Harmful if swallowed. Irritation of the mouth, throat, and stomach.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

Lung disorders.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Sodium persulfate	7775-27-1	Causes skin irritation. (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Sodium persulfate	7775-27-1	Causes severe eye irritation (Rabbit)

Substances	CAS Number	Skin Sensitization
Sodium persulfate	7775-27-1	Skin sensitizer in guinea pig.

Substances	CAS Number	Respiratory Sensitization
Sodium persulfate	7775-27-1	May cause sensitization by inhalation

Substances	CAS Number	Mutagenic Effects
Sodium persulfate	7775-27-1	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
Sodium persulfate	7775-27-1	Did not show carcinogenic effects in animal experiments (similar substances)

Substances	CAS Number	Reproductive toxicity
Sodium persulfate	7775-27-1	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)

Substances	CAS Number	STOT - single exposure
Sodium persulfate	7775-27-1	May cause respiratory irritation.

Substances	CAS Number	STOT - repeated exposure
Sodium persulfate	7775-27-1	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Sodium persulfate	7775-27-1	Not applicable

## 12. Ecological Information

**Ecotoxicity****Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Sodium persulfate	7775-27-1	EC50 (72h) 116 mg/L (biomass) (Pseudokirchnerella subcapitata)	LC50 (96h) 163 mg/L (Oncorhynchus mykiss)	EC10 (18h) 36 mg/L (Pseudomonas putida)	EC50 (48h) 133 mg/L (Daphnia magna)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Sodium persulfate	7775-27-1	The methods for determining biodegradability are not applicable to inorganic substances.

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Sodium persulfate	7775-27-1	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Sodium persulfate	7775-27-1	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

This bag may contain residue of a hazardous material. Some authorities may regulate such containers as hazardous waste. Dispose of container according to national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information****Australia ADG**

UN Number: UN1505  
 UN proper shipping name: Sodium Persulfate  
 Transport Hazard Class(es): 5.1  
 Packing Group: III  
 Environmental Hazards: Not applicable

**IMDG/IMO**

UN Number: UN1505  
 UN proper shipping name: Sodium Persulfate  
 Transport Hazard Class(es): 5.1  
 Packing Group: III  
 Environmental Hazards: Not applicable  
 EMS: EmS F-A, S-Q

**IATA/ICAO**

UN Number: UN1505  
 UN proper shipping name: Sodium Persulfate  
 Transport Hazard Class(es): 5.1

**Packing Group:** III  
**Environmental Hazards:** Not applicable

**Special precautions during transport**

None

**HazChem Code**

1Z

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

**Australian AICS Inventory** All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals** All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)** This product, and all its components, complies with EINECS

**US TSCA Inventory** All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)** All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

**Montreal Protocol - Ozone Depleting Substances:** Does not apply

**Stockholm Convention - Persistent Organic Pollutants:** Does not apply

**Rotterdam Convention - Prior Informed Consent:** Does not apply

**Basel Convention - Hazardous Waste:** Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 21-Sep-2017**Revision Note**

SDS sections updated:

2

**Full text of H-Statements referred to under sections 2 and 3**

H272 - May intensify fire; oxidizer  
 H302 - Harmful if swallowed  
 H315 - Causes skin irritation  
 H317 - May cause an allergic skin reaction  
 H319 - Causes serious eye irritation  
 H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled  
 H335 - May cause respiratory irritation

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
OSHA  
ECHA C&L

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**



**SAFETY DATA SHEET****DCA-13003**

Revision Date: 05-Jul-2016

Revision Number: 13

**1. Product Identifier & Identity for the Chemical**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** DCA-13003

**Other means of Identification**

**Synonyms** None  
**Hazardous Material Number:** HM007648

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Breaker  
**Uses advised against** No information available

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia  
  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

**2. Hazard Identification**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Acute toxicity - Dermal	Category 4 - H312
Acute inhalation toxicity - vapor	Category 4 - H332
Skin Corrosion/Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Acute Aquatic Toxicity	Category 2 - H401

**Label elements, including precautionary statements**

## Hazard pictograms



## Signal Word

Danger

## Hazard Statements:

H312 - Harmful in contact with skin  
 H314 - Causes severe skin burns and eye damage  
 H318 - Causes serious eye damage  
 H332 - Harmful if inhaled  
 H401 - Toxic to aquatic life

## Precautionary Statements

## Prevention

P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P271 - Use only outdoors or in a well-ventilated area  
 P273 - Avoid release to the environment

## Response

P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower  
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

## Storage

P310 - Immediately call a POISON CENTER or doctor/physician  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

## Disposal

P405 - Store locked up  
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

## Contains

## Substances

Chlorous acid, sodium salt  
 Sodium chloride

## CAS Number

7758-19-2  
 7647-14-5

Other hazards which do not result in classification

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).  
 This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Chlorous acid, sodium salt	7758-19-2	5 - 10%	Acute Tox. 3 (H301) Acute Tox. 2 (H310) Acute Tox. 2 (H330) Skin Corr. 1B (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) STOT RE 2 (H373) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412) Ox. Sol. 2 (H272)

Sodium chloride	7647-14-5	10 - 30%	Not Classified
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## 4. First aid measures

### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Seek immediate medical attention/advice. Suitable emergency eye wash facility should be immediately available
<b>Skin</b>	In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
<b>Ingestion</b>	DO NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

### Symptoms caused by exposure

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. Harmful in contact with skin. Harmful if inhaled.

### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

### Suitable extinguishing equipment

#### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

#### **Extinguishing media which must not be used for safety reasons**

None known.

### Specific hazards arising from the chemical

#### **Special exposure hazards in a fire**

Product is not expected to burn unless all the water is boiled away. Use water spray to cool fire exposed surfaces. Decomposition in fire may produce harmful gases. If allowed to dry, this product is an oxidizer.

### Special protective equipment and precautions for fire fighters

#### **Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation. Evacuate all persons from the area.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for safe handling

#### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Ensure adequate ventilation. Wash hands after use. Launder

contaminated clothing before reuse. Use appropriate protective equipment.

#### Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

#### 7.2. Conditions for safe storage, including any incompatibilities

##### Storage Information

Store away from acids. Store away from reducing agents. Store away from direct sunlight. Keep from excessive heat. Product has a shelf life of 24 months.

##### Other Guidelines

No information available

## 8. Exposure Controls/Personal Protection

#### Control parameters - exposure standards, biological monitoring

##### Exposure Limits

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Chlorous acid, sodium salt	7758-19-2	Not applicable	Not applicable
Sodium chloride	7647-14-5	Not applicable	Not applicable

#### Appropriate engineering controls

##### Engineering Controls

Use in a well ventilated area.

#### Personal protective equipment (PPE)

##### Personal Protective Equipment

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

##### Respiratory Protection

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

##### Hand Protection

Organic vapor/acid gas/chlorine respirator.  
Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)

This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

##### Skin Protection

Full protective chemical resistant clothing.

##### Eye Protection

Chemical goggles; also wear a face shield if splashing hazard exists.

##### Other Precautions

Eyewash fountains and safety showers must be easily accessible.

##### Environmental Exposure Controls

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

#### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid

**Color:** Clear tan

**Odor:** Mild chlorine

**Odor Threshold:** No information available

##### Property

##### Values

Remarks/ - Method

**pH:**

11.5-12.5

**Freezing Point / Range**

3-4 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

106 - 108 °C

**Flash Point**

No data available

Evaporation rate	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	1.17 - 1.23
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

**9.2. Other information**

VOC Content (%) No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions****10.4. Conditions to avoid**

Keep away from heat, sparks and flame. Avoid contact with organic materials. Avoid friction.

**10.5. Incompatible materials**

Prolonged contact with aluminum. Contact with metals. Organic matter. Contact with ammonia. All flammables, especially petroleum products, asphalt & other volatile flammables. Ammonium compounds. Strong acids.

**10.6. Hazardous decomposition products**

Chlorine.

## 11. Toxicological Information

**Information on routes of exposure**

Principle Route of Exposure Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. Harmful in contact with skin. Harmful if inhaled.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Chlorous acid, sodium salt	7758-19-2	165 mg/kg (Rat) 390 - 500 mg/kg (Rat) 212 - 284 mg/kg (Rat)	315 mg/kg (Rat) 134 mg/kg (Rabbit)	0.29 mg/L (Rat) 4h 230 mg/m <sup>3</sup> (Rat) 4h
Sodium chloride	7647-14-5	3000 mg/kg-bw (rat)	No data available	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation**

Harmful if inhaled. Causes severe respiratory irritation.

**Eye Contact**

Causes severe eye irritation which may damage tissue.

**Skin Contact**

Harmful in contact with skin. Causes severe burns.

**Ingestion**

Causes burns of the mouth, throat and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** Prolonged or repeated exposure may cause adverse effects on the blood.

**Exposure Levels**

No data available

### Interactive effects

Blood disorders.

### Data limitations

No data available

Substances	CAS Number	Skin corrosion/irritation
Chlorous acid, sodium salt	7758-19-2	Corrosive to skin (Rabbit)
Sodium chloride	7647-14-5	Non-irritating to the skin (Rabbit) Not a dermal irritant

Substances	CAS Number	Serious eye damage/irritation
Chlorous acid, sodium salt	7758-19-2	Corrosive to eyes (Rabbit)
Sodium chloride	7647-14-5	May cause mild eye irritation. (Rabbit)

Substances	CAS Number	Skin Sensitization
Chlorous acid, sodium salt	7758-19-2	Did not cause sensitization on laboratory animals (guinea pig)
Sodium chloride	7647-14-5	No information available Not confirmed to cause skin or respiratory sensitization.

Substances	CAS Number	Respiratory Sensitization
Chlorous acid, sodium salt	7758-19-2	No information available
Sodium chloride	7647-14-5	No information available

Substances	CAS Number	Mutagenic Effects
Chlorous acid, sodium salt	7758-19-2	Not regarded as mutagenic.
Sodium chloride	7647-14-5	No information available

Substances	CAS Number	Carcinogenic Effects
Chlorous acid, sodium salt	7758-19-2	Did not show carcinogenic effects in animal experiments
Sodium chloride	7647-14-5	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
Chlorous acid, sodium salt	7758-19-2	Animal testing did not show any effects on fertility. (fetotoxic and teratogenic effects).
Sodium chloride	7647-14-5	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
Chlorous acid, sodium salt	7758-19-2	May cause respiratory irritation.
Sodium chloride	7647-14-5	No information available

Substances	CAS Number	STOT - repeated exposure
Chlorous acid, sodium salt	7758-19-2	Causes damage to organs through prolonged or repeated exposure if swallowed: (spleen) (Blood)
Sodium chloride	7647-14-5	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Chlorous acid, sodium salt	7758-19-2	Not applicable
Sodium chloride	7647-14-5	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### **Product Ecotoxicity Data**

No data available

#### **Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Chlorous acid, sodium salt	7758-19-2	EC50 (72h) 9.09 mg/L (Skeletonema costatum) EC50 (72h) 0.2 mg/L (Pseudokirchnerella)	LC50 (96h) 210 mg/L (Scophthalmus maximus) TLM96 290 mg/L (Oncorhynchus mykiss)	EC50 (3h) > 75 mg/L (activated sludge)	LC50 (48h) 50.67 mg/L (Acartia tonsa) TLM96 0.29 mg/L (Daphnia magna)

		subcapitata)	TLM96 208 mg/L (Lepomis macrochirus)		NOEC (22d) 25 ug/L (Daphnia magna)
Sodium chloride	7647-14-5	EC50 (120h) 2430 mg/L (Nitzschia sp.)	TLM96 > 1000 mg/L (Oncorhynchus mykiss) LC50 (96h) 5840 mg/L (Lepomis macrochirus) NOEC (33d) 252 mg/L (Pimephales promelas)	NOEC 5000 – 8000 mg/L (activated sludge) NOEC 292-584 mg/L (Escherichia coli)	TLM96 > 1,000,000 ppm (Mysidopsis bahia) LC50 (48h) 874-4136 mg/L (Daphnia magna) NOEC (21d) 314 mg/L (Daphnia pulex)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Chlorous acid, sodium salt	7758-19-2	The methods for determining biodegradability are not applicable to inorganic substances.
Sodium chloride	7647-14-5	No information available

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Chlorous acid, sodium salt	7758-19-2	No information available
Sodium chloride	7647-14-5	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Chlorous acid, sodium salt	7758-19-2	No information available
Sodium chloride	7647-14-5	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information****Australia ADG**

UN Number	UN1908
UN proper shipping name:	Chlorite Solution (14% Available Chlorine)
Transport Hazard Class(es):	8
Packing Group:	III
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	UN1908
UN proper shipping name:	Chlorite Solution (14% Available Chlorine)
Transport Hazard Class(es):	8
Packing Group:	III
Environmental Hazards:	Not applicable
EMS:	EmS F-A, S-B

**IATA/ICAO**

<b>UN Number</b>	UN1908
<b>UN proper shipping name:</b>	Chlorite Solution (14% Available Chlorine)
<b>Transport Hazard Class(es):</b>	8
<b>Packing Group:</b>	III
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

2X

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stokholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review**

Revision Date: 05-Jul-2016

**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

H272 - May intensify fire; oxidizer  
H301 - Toxic if swallowed  
H310 - Fatal in contact with skin  
H312 - Harmful in contact with skin  
H314 - Causes severe skin burns and eye damage  
H318 - Causes serious eye damage  
H320 - Causes eye irritation  
H330 - Fatal if inhaled  
H332 - Harmful if inhaled  
H335 - May cause respiratory irritation  
H373 - May cause damage to organs through prolonged or repeated exposure if inhaled  
H400 - Very toxic to aquatic life  
H412 - Harmful to aquatic life with long lasting effects



**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
OSHA  
ECHA C&L

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-14003

Revision Date: 27-Sep-2016

Revision Number: 11

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-14003

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007651

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Buffer

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

**Hazard pictograms**

**Signal Word** Not Hazardous

**Hazard Statements:** Not Classified

**Precautionary Statements**

**Prevention** None  
**Response** None  
**Storage** None  
**Disposal** None

**Contains Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

<b>3. Composition/information on Ingredients</b>
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Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

<b>4. First aid measures</b>
------------------------------

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.  
**Eyes** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.  
**Skin** Wash with soap and water. Get medical attention if irritation persists.  
**Ingestion** Under normal conditions, first aid procedures are not required.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

<b>5. Fire Fighting Measures</b>
----------------------------------

**Suitable extinguishing equipment****Suitable Extinguishing Media**

All standard fire fighting media

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

None anticipated

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**6. Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

**7. Handling and storage**

**7.1. Precautions for safe handling**

**Handling Precautions**

Avoid creating or inhaling dust. Ensure adequate ventilation. Avoid contact with eyes, skin, or clothing. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities**

**Storage Information**

Store away from acids. Store in a dry location.

**Other Guidelines**

No information available

**8. Exposure Controls/Personal Protection**

**Control parameters - exposure standards, biological monitoring**

**Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

**Appropriate engineering controls**

**Engineering Controls**

A well ventilated area to control dust levels. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)**

**Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

Not normally needed. But if significant exposures are possible then the following respirator is recommended:  
Dust/mist respirator. (N95, P2/P3)

**Hand Protection**

Normal work gloves.

**Skin Protection**

Normal work coveralls.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**Environmental Exposure Controls**

Do not allow material to contaminate ground water system

**9. Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

**Physical State:** Solid

**Color:** White

**Odor:** Odorless

**Odor Threshold:** No information available

<u>Property</u> <u>Remarks/ - Method</u>	<u>Values</u>
<b>pH:</b>	8
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.87
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available
<b><u>9.2. Other information</u></b>	
<b>VOC Content (%)</b>	No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

None anticipated

### 10.5. Incompatible materials

Strong acids.

### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

No significant hazards expected.

### Numerical measures of toxicity

#### Toxicology data for the components

<b>Substances</b>	<b>CAS Number</b>	<b>LD50 Oral</b>	<b>LD50 Dermal</b>	<b>LC50 Inhalation</b>
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

### Immediate, delayed and chronic health effects from exposure

**Inhalation** May cause mild respiratory irritation.

**Eye Contact** May cause mechanical irritation to eye.  
**Skin Contact** None known.  
**Ingestion** None known.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>13. Disposal Considerations</b>
------------------------------------

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

<b>14. Transport Information</b>
----------------------------------

**Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

<b>15. Regulatory Information</b>
-----------------------------------

**Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements****Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stockholm Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 27-Sep-2016**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit

PBT – Persistent Bioaccumulative and Toxic

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

vPvB – very Persistent and very Bioaccumulative

h - hour

mg/m<sup>3</sup> - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

w/w - weight/weight

d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)**Disclaimer Statement**

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**End of Safety Data Sheet**



## SAFETY DATA SHEET

### DCA-14004

Revision Date: 30-May-2017

Revision Number: 6

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-14004

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007652

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Additive

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Serious Eye Damage/Irritation

Category 2 - H319

##### Label elements, including precautionary statements

**Hazard Pictograms**



**Signal Word** WARNING

**Hazard Statements:** H319 - Causes serious eye irritation

**Precautionary Statements**

**Prevention** P264 - Wash face, hands and any exposed skin thoroughly after handling  
P280 - Wear eye protection/face protection

**Response** P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P337 + P313 - If eye irritation persists: Get medical advice/attention

**Storage** None

**Disposal** None

**Contains**

**Substances** CAS Number  
Sodium carbonate 497-19-8

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).  
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Sodium carbonate	497-19-8	60 - 100%	Eye Irrit. 2 (H319)

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes** In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

**Skin** Wash with soap and water. Get medical attention if irritation persists.

**Ingestion** Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes eye irritation.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from acids. Store in a cool, dry location. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Sodium carbonate	497-19-8	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Localized ventilation should be used to control dust levels.

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

Dust/mist respirator. (N95, P2/P3)

**Hand Protection**

Normal work gloves.

**Skin Protection**

Normal work coveralls.

**Eye Protection**

Dust proof goggles.

**Other Precautions** None known.  
**Environmental Exposure Controls** Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Powder      **Color** White  
**Odor:** Odorless      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	11.4
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	2.5
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

**Molecular Weight** 105.99 g/mol  
**VOC Content (%)** No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

None anticipated

### 10.5. Incompatible materials

Strong acids.

### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

Causes eye irritation.

### Numerical measures of toxicity

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium carbonate	497-19-8	4090 mg/kg (Rat) 2800 mg/kg (Rat)	2210 mg/kg (Mouse) > 2000 mg/kg (Rabbit)	2.3 mg/L (Rat) 2h

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	Causes eye irritation.
<b>Skin Contact</b>	Not irritating to skin in rabbits.
<b>Ingestion</b>	Irritation of the mouth, throat, and stomach.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Sodium carbonate	497-19-8	Non-irritating to the skin

Substances	CAS Number	Serious eye damage/irritation
Sodium carbonate	497-19-8	Irritating to eyes

Substances	CAS Number	Skin Sensitization
Sodium carbonate	497-19-8	Not classified

Substances	CAS Number	Respiratory Sensitization
Sodium carbonate	497-19-8	No information available

Substances	CAS Number	Mutagenic Effects
Sodium carbonate	497-19-8	In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
Sodium carbonate	497-19-8	No information available

Substances	CAS Number	Reproductive toxicity
Sodium carbonate	497-19-8	Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
Sodium carbonate	497-19-8	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Sodium carbonate	497-19-8	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Sodium carbonate	497-19-8	Not applicable

## 12. Ecological Information

**Ecotoxicity****Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Sodium carbonate	497-19-8	EC50 242 mg/L (Nitzschia)	TLM24 385 mg/L (Lepomis macrochirus)	No information available	EC50 265 mg/L (Daphnia magna)

			LC50 310-1220 mg/L (Pimephales promelas) LC50 (96h) 300 mg/L (Lepomis macrochirus)		EC50 (48h) 200 – 227 mg/L (Ceriodaphnia sp.)
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**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Sodium carbonate	497-19-8	The methods for determining biodegradability are not applicable to inorganic substances.

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Sodium carbonate	497-19-8	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Sodium carbonate	497-19-8	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements****Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stockholm Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

**16. Other information****Date of preparation or review****Revision Date:**

30-May-2017

**Revision Note**

SDS sections updated:

2

**Full text of H-Statements referred to under sections 2 and 3**

H319 - Causes serious eye irritation

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID

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**End of Safety Data Sheet**



## SAFETY DATA SHEET

### DCA-16001

Revision Date: 05-Jul-2017

Revision Number: 11

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-16001

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007655

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Clay Stabilization Agent

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

##### **Hazard Pictograms**

**Signal Word** Not Hazardous

**Hazard Statements:** Not Classified

**Precautionary Statements**

<b>Prevention</b>	None
<b>Response</b>	None
<b>Storage</b>	None
<b>Disposal</b>	None

**Contains****Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

<b>3. Composition/information on Ingredients</b>
--

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not classified

<b>4. First aid measures</b>
------------------------------

**Description of necessary first aid measures**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

<b>5. Fire Fighting Measures</b>
----------------------------------

**Suitable extinguishing equipment****Suitable Extinguishing Media**

All standard fire fighting media

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Not applicable

**Special protective equipment and precautions for fire fighters**

Special protective equipment for firefighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for safe handling

#### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### **Storage Information**

Store in a cool, dry location. Keep container closed when not in use. Product has a shelf life of 24 months.

#### **Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

### Appropriate engineering controls

**Engineering Controls** Use in a well ventilated area.

### Personal protective equipment (PPE)

**Personal Protective Equipment** If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection** Not normally necessary.

**Hand Protection** Rubber gloves.

**Skin Protection** Normal work coveralls.

**Eye Protection** Wear safety glasses or goggles to protect against exposure.

**Other Precautions** None known.

**Environmental Exposure Controls** Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Liquid	<b>Color</b>	White
<b>Odor:</b>	Mild amine	<b>Odor Threshold:</b>	No information available

<u>Property</u> <u>Remarks/ - Method</u>	<u>Values</u>
<b>pH:</b>	7-9
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.07 - 1.091
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

Avoid contact with metals such as aluminum, tin, lead, brass, bronze, copper, and zinc.

**10.5. Incompatible materials**

Strong oxidizers.

**10.6. Hazardous decomposition products**

Oxides of nitrogen. Hydrogen chloride. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure****Symptoms related to exposure****Most Important Symptoms/Effects**

No significant hazards expected.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	None known.
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**Eye Contact** None known.  
**Skin Contact** None known.  
**Ingestion** None known.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity**

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Expected to be readily biodegradable

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Does not bioaccumulate.

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects**

**Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

### 13. Disposal Considerations

#### Safe handling and disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

#### Disposal of any contaminated packaging

Follow all applicable national or local regulations.

#### Environmental regulations

Not applicable

### 14. Transport Information

#### Transportation Information

##### Australia ADG

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

##### IMDG/IMO

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

##### IATA/ICAO

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

#### Special precautions during transport

None

#### HazChem Code

None Allocated

### 15. Regulatory Information

#### Safety, health and environmental regulations specific for the product

##### International Inventories

##### Australian AICS Inventory

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

##### New Zealand Inventory of Chemicals

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

##### EINECS (European Inventory of Existing Chemical Substances)

This product, and all its components, complies with EINECS

##### US TSCA Inventory

All components listed on inventory or are exempt.

##### Canadian Domestic Substances List (DSL)

All components listed on inventory or are exempt.

#### Poisons Schedule number

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review**

**Revision Date:** 05-Jul-2017

**Revision Note**

SDS sections updated:  
2

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-17001

Revision Date: 09-Nov-2017

Revision Number: 16

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** DCA-17001

**Other means of Identification**

**Synonyms** None  
**Hazardous Material Number:** HM007659

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Corrosion Inhibitor  
**Uses advised against** No information available

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
 15 Marriott Road, Jandakot, WA 6164  
 Australia  
 ACN Number: 009 000 775  
 Telephone Number: + 61 1 800 686 951  
 Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951  
 Global Incident Response Access Code: 334305  
 Contract Number: 14012

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
 Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Acute Oral Toxicity	Category 4 - H302
Skin Corrosion/Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 1 - H318
Skin Sensitization	Category 1 - H317
Reproductive Toxicity	Category 1B - H360
Specific Target Organ Toxicity - (Single Exposure)	Category 1 - H370
Specific Target Organ Toxicity - (Repeated Exposure)	Category 2 - H373
Acute Aquatic Toxicity	Category 2 - H401
Flammable liquids.	Category 3 - H226



**Label elements, including precautionary statements****Hazard Pictograms****Signal Word**

DANGER

**Hazard Statements:**

H226 - Flammable liquid and vapor  
 H302 - Harmful if swallowed  
 H315 - Causes skin irritation  
 H317 - May cause an allergic skin reaction  
 H318 - Causes serious eye damage  
 H360 - May damage fertility or the unborn child  
 H370 - Causes damage to organs  
 H373 - May cause damage to organs through prolonged or repeated exposure  
 H401 - Toxic to aquatic life

**Precautionary Statements****Prevention**

P201 - Obtain special instructions before use  
 P202 - Do not handle until all safety precautions have been read and understood  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P233 - Keep container tightly closed  
 P240 - Ground and bond container and receiving equipment.  
 P241 - Use explosion-proof electrical/ventilating/lighting/equipment  
 P242 - Use only non-sparking tools  
 P243 - Take action to prevent static discharges.  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P272 - Contaminated work clothing should not be allowed out of the workplace  
 P273 - Avoid release to the environment  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P281 - Use personal protective equipment as required

**Response**

P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell  
 P330 - Rinse mouth  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P307 + P311 - IF exposed: Call a POISON CENTER or doctor/physician  
 P314 - Get medical attention/advice if you feel unwell  
 P370 + P378 - In case of fire: Use water spray for extinction  
 P403 + P235 - Store in a well-ventilated place. Keep cool  
 P405 - Store locked up

**Storage**

**Disposal** P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains**

Substances	CAS Number
Diethylene glycol	111-46-6
Cinnamaldehyde	104-55-2
Amine oxides, cocoalkyldimethyl	61788-90-7
Methanol	67-56-1
Benzaldehyde	100-52-7
Alcohols, C12-16, ethoxylated	68551-12-2
Sodium iodide	7681-82-5

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Diethylene glycol	111-46-6	30 - 60%	Acute Tox. 4 (H302) STOT RE 2 (H373)
Cinnamaldehyde	104-55-2	30 - 60%	Acute Tox. 4 (H312) Skin Irrit. 2 (H315) Skin Sens. 1 (H317) Aquatic Acute 2 (H401)
Amine oxides, cocoalkyldimethyl	61788-90-7	10 - 30%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 1 (H400)
Methanol	67-56-1	10 - 30%	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) Repr. 1B (H360) STOT SE 1 (H370) Flam. Liq. 2 (H225)
Benzaldehyde	100-52-7	5 - 10%	Acute Tox. 4 (H302) Acute Tox. 4 (H332) Aquatic Acute 2 (H401) Flam. Liq. 4 (H227)
Alcohols, C12-16, ethoxylated	68551-12-2	1 - 5%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412)
Sodium iodide	7681-82-5	1 - 5%	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) STOT SE 3 (H335) STOT RE 1 (H372)

### 4. First aid measures

**Description of necessary first aid measures****Inhalation**

If inhaled, move victim to fresh air and seek medical attention.

**Eyes**

In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

**Skin**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

**Ingestion** Get immediate medical attention. Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes severe eye irritation which may damage tissue. Causes skin irritation. May cause allergic skin reaction. Harmful if swallowed. May cause damage to internal organs. May cause damage to organs through prolonged or repeated exposure. Potential reproductive hazard. May cause birth defects.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Carbon dioxide, dry chemical, foam.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical**

**Special exposure hazards in a fire**

May be ignited by heat, sparks or flames Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce harmful gases. Runoff to sewer may cause fire or explosion hazard.

**Special protective equipment and precautions for fire fighters**

**Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Remove sources of ignition. Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas. Avoid breathing vapors. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling**

**Handling Precautions**

Remove sources of ignition. Ensure adequate ventilation. Avoid breathing vapors. Avoid contact with eyes, skin, or clothing. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities**

**Storage Information**

Store away from oxidizers. Keep from heat, sparks, and open flames. Store in a well ventilated area. Store locked up. Keep container closed when not in use. Product has a shelf life of 60 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### Exposure Limits

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Diethylene glycol	111-46-6	TWA: 23 ppm TWA: 100 mg/m <sup>3</sup>	Not applicable
Cinnamaldehyde	104-55-2	Not applicable	Not applicable
Amine oxides, cocoalkyldimethyl	61788-90-7	Not applicable	Not applicable
Methanol	67-56-1	TWA: 200 ppm TWA: 262 mg/m <sup>3</sup> STEL: 250 ppm STEL: 328 mg/m <sup>3</sup>	TWA: 200 ppm STEL: 250 ppm
Benzaldehyde	100-52-7	Not applicable	Not applicable
Alcohols, C12-16, ethoxylated	68551-12-2	Not applicable	Not applicable
Sodium iodide	7681-82-5	Not applicable	TWA: 0.01 ppm

### Appropriate engineering controls

#### **Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

### Personal protective equipment (PPE)

#### **Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

#### **Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Positive pressure self-contained breathing apparatus if methanol is released.

#### **Hand Protection**

Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

#### **Skin Protection**

Rubber apron.

#### **Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

#### **Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

#### **Environmental Exposure Controls**

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid

**Color:** Yellow-orange

**Odor:** Cinnamon

**Odor Threshold:** No information available

#### Property

#### Values

#### Remarks/ - Method

#### **pH:**

6.85 (10%)

#### **Freezing Point / Range**

-21 °C

#### **Melting Point / Range**

No data available

#### **Boiling Point / Range**

No data available

#### **Flash Point**

28.9 °C / 84 °F PMCC

#### **Evaporation rate**

No data available

Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	1.015
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

**9.2. Other information**

VOC Content (%) No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

Keep away from heat, sparks and flame.

**10.5. Incompatible materials**

Strong oxidizers.

**10.6. Hazardous decomposition products**

Ammonia. Oxides of nitrogen. Hydrocarbons. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes skin irritation. May cause allergic skin reaction. Harmful if swallowed. May cause damage to internal organs. May cause damage to organs through prolonged or repeated exposure. Potential reproductive hazard. May cause birth defects.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Diethylene glycol	111-46-6	12565 - 19600 mg/kg (Rat)	11890 - 13300 mg/kg (Rabbit)	> 4.6 mg/L (Rat) 4h
Cinnamaldehyde	104-55-2	2220 mg/kg (rat)	620 mg/kg (rabbit)	No data available
Amine oxides, cocoalkyldimethyl	61788-90-7	846 - 3873 mg/kg (Rat) 1000-1250 mg/kg (Rat)	4290 mg/kg (Rabbit)	No data available
Methanol	67-56-1	300 mg/kg-bw (human) < 790 to 13,000 mg/kg (rat)	1000 mg/kg-bw (human) 17,100 mg/kg (rabbit)	10 mg/L (human, 4h, vapor)
Benzaldehyde	100-52-7	1430 mg/kg (rat)	No information available	>1 <5 mg/L air (Rat, 4h, mist)
Alcohols, C12-16, ethoxylated	68551-12-2	1600 mg/kg	No data available	No data available
Sodium iodide	7681-82-5	4340 mg/kg (Rat) 3118 mg/kg (Rats) (Similar substance)	No data available	LCLo: 50000 mg/m <sup>3</sup> (Mouse) 2h

**Immediate, delayed and chronic health effects from exposure****Product Information**

Based on the collective toxicity of product ingredients, the mixture should be considered to cause the following:

<b>Inhalation</b>	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
<b>Eye Contact</b>	Causes severe eye irritation which may damage tissue.
<b>Skin Contact</b>	Causes skin irritation. May cause an allergic skin reaction.
<b>Ingestion</b>	Harmful if swallowed. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions. May cause liver and kidney damage.

**Chronic Effects/Carcinogenicity** Prolonged or repeated exposure may cause reproductive system damage.  
Prolonged or repeated exposure may cause embryo and fetus toxicity.

**Exposure Levels**

No data available

**Interactive effects**

Skin disorders. Eye ailments.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Diethylene glycol	111-46-6	Non-irritating to the skin (Rabbit)
Cinnamaldehyde	104-55-2	Causes severe irritation and or burns (human)
Amine oxides, cocoalkyldimethyl	61788-90-7	Skin, rabbit: Causes moderate skin irritation.
Methanol	67-56-1	Non-irritating to the skin (Rabbit)
Benzaldehyde	100-52-7	Non-irritating to the skin (Rabbit)
Alcohols, C12-16, ethoxylated	68551-12-2	Causes skin irritation.
Sodium iodide	7681-82-5	Moderate dermal irritant (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Diethylene glycol	111-46-6	Non-irritating to the eye (Rabbit)
Cinnamaldehyde	104-55-2	Mild eye irritant. (human) (8 % solution)
Amine oxides, cocoalkyldimethyl	61788-90-7	Corrosive to eyes
Methanol	67-56-1	Non-irritating to the eye (Rabbit)
Benzaldehyde	100-52-7	Non-irritating to the eye (Rabbit)
Alcohols, C12-16, ethoxylated	68551-12-2	Causes severe eye irritation which may damage tissue.
Sodium iodide	7681-82-5	Moderately irritating to the eyes (Rabbit)

Substances	CAS Number	Skin Sensitization
Diethylene glycol	111-46-6	Did not cause sensitization on laboratory animals (guinea pig)
Cinnamaldehyde	104-55-2	Skin sensitizer in guinea pig.
Amine oxides, cocoalkyldimethyl	61788-90-7	No information available
Methanol	67-56-1	Did not cause sensitization on laboratory animals (guinea pig)
Benzaldehyde	100-52-7	Not sensitizing in Guinea Pigs (Guinea Pig Maximisation Test and Open Epicutaneous Test, Sensitizing in Draize Test and Freund's Complete Adjuvant Test)
Alcohols, C12-16, ethoxylated	68551-12-2	Did not cause sensitization on laboratory animals
Sodium iodide	7681-82-5	Patch test on human volunteers did not demonstrate sensitization properties

Substances	CAS Number	Respiratory Sensitization
Diethylene glycol	111-46-6	No information available
Cinnamaldehyde	104-55-2	No information available
Amine oxides, cocoalkyldimethyl	61788-90-7	No information available
Methanol	67-56-1	No information available
Benzaldehyde	100-52-7	No information available
Alcohols, C12-16, ethoxylated	68551-12-2	No information available

Sodium iodide	7681-82-5	No information available
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Substances	CAS Number	Mutagenic Effects
Diethylene glycol	111-46-6	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.
Cinnamaldehyde	104-55-2	In vitro tests did not show mutagenic effects.
Amine oxides, cocoalkyldimethyl	61788-90-7	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)
Methanol	67-56-1	The weight of evidence from available in vitro and in vivo studies indicates that this substance is not expected to be mutagenic.
Benzaldehyde	100-52-7	Not mutagenic in AMES Test. Negative in the chromosomal aberration assay In vitro tests have shown mutagenic effects In vivo tests did not show mutagenic effects.
Alcohols, C12-16, ethoxylated	68551-12-2	Not regarded as mutagenic.
Sodium iodide	7681-82-5	In vitro tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Diethylene glycol	111-46-6	Did not show carcinogenic effects in animal experiments (Rat)
Cinnamaldehyde	104-55-2	No information available
Amine oxides, cocoalkyldimethyl	61788-90-7	No information available
Methanol	67-56-1	No data of sufficient quality are available.
Benzaldehyde	100-52-7	Did not show carcinogenic effects in animal experiments (Rat) There was some evidence of carcinogenic activity in the forestomachs of mice.
Alcohols, C12-16, ethoxylated	68551-12-2	Not regarded as carcinogenic.
Sodium iodide	7681-82-5	No information available

Substances	CAS Number	Reproductive toxicity
Diethylene glycol	111-46-6	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Cinnamaldehyde	104-55-2	Did not show teratogenic effects in animal experiments.
Amine oxides, cocoalkyldimethyl	61788-90-7	Did not show teratogenic effects in animal experiments. When tested at maternally toxic doses, no adverse effects on teratogenicity or development were observed.
Methanol	67-56-1	Experiments have shown reproductive toxicity effects on laboratory animals
Benzaldehyde	100-52-7	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)
Alcohols, C12-16, ethoxylated	68551-12-2	Not regarded as a reproductive and developmental toxicant.
Sodium iodide	7681-82-5	Animal testing did not show any effects on fertility.

Substances	CAS Number	STOT - single exposure
Diethylene glycol	111-46-6	No significant toxicity observed in animal studies at concentration requiring classification.
Cinnamaldehyde	104-55-2	No information available
Amine oxides, cocoalkyldimethyl	61788-90-7	May cause respiratory irritation.
Methanol	67-56-1	May cause disorder and damage to the Central Nervous System (CNS)
Benzaldehyde	100-52-7	May cause respiratory irritation.
Alcohols, C12-16, ethoxylated	68551-12-2	No significant toxicity observed in animal studies at concentration requiring classification.
Sodium iodide	7681-82-5	No information available

Substances	CAS Number	STOT - repeated exposure
Diethylene glycol	111-46-6	Causes damage to organs through prolonged or repeated exposure: Kidney
Cinnamaldehyde	104-55-2	No significant toxicity observed in animal studies at concentration requiring classification.
Amine oxides, cocoalkyldimethyl	61788-90-7	No data of sufficient quality are available.
Methanol	67-56-1	No data of sufficient quality are available.
Benzaldehyde	100-52-7	No significant toxicity observed in animal studies at concentration requiring classification.
Alcohols, C12-16, ethoxylated	68551-12-2	No significant toxicity observed in animal studies at concentration requiring classification.
Sodium iodide	7681-82-5	Causes damage to organs through prolonged or repeated exposure: (Thyroid)

Substances	CAS Number	Aspiration hazard
Diethylene glycol	111-46-6	No information available
Cinnamaldehyde	104-55-2	Not applicable
Amine oxides, cocoalkyldimethyl	61788-90-7	No information available

Methanol	67-56-1	Not applicable
Benzaldehyde	100-52-7	Not applicable
Alcohols, C12-16, ethoxylated	68551-12-2	Not applicable
Sodium iodide	7681-82-5	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Diethylene glycol	111-46-6	TGK (8d) 2700 mg/L (Scenedesmus quadricauda)	LC50 75200 mg/L (Pimephales promelas)	EC20 (30m) > 1995 mg/L (domestic activated sludge)	EC50 84000 mg/L (Daphnia magna) EC50 >10000 mg/L (Daphnia magna)
Cinnamaldehyde	104-55-2	EC50 (72 h) 2.1 mg/L (Skeletonema costatum)	LC50 (96 h) 2.38 mg/L (Scophthalmus maximus)	IC50 (48h) 131.2 mg/L (Tetrahymena pyriformis)	LC50 (48 h) 1.4 mg/L (Acartia tonsa)
Amine oxides, cocoalkyldimethyl	61788-90-7	ErC50 (72h) 0.29 mg/L (Selenastrum capricornutum) ErC50 (72h) 0.0235 mg/L (Scenedesmus subspicatus) (similar substance)	LC50 (96h) 1.0–3.4 mg/L (Brachydanio rerio) LC50 (96h) 13.0 (Salmo gairdneri) LC50 (96h) 0.1-1 mg/L (Brachydanio rerio)	EC50 (3h) 240 mg/L (Pseudomonas putida) EC50 (3h) 13 mg/L (Activated sludge)	EC50 (48h) 2.9 mg/L (Daphnia magna) EC50 (48h) 0.083 mg/L (Daphnia magna) (similar substance)
Methanol	67-56-1	EC50 (96 h) =22000 mg/L (Pseudokirchnerella subcapitata) NOEC (8 d) =8000 mg/L (Scenedesmus quadricauda)	LC50 (96 h) =15400 mg/L (Lepomis macrochirus) EC50 (200 h) =14536 mg/L (Oryzias latipes)	IC50 (3h) > 1000 mg/L (activated sludge)	EC50 (96 h) =18260 mg/L (Daphnia magna) NOEC (21 d) =208 mg/L (Daphnia magna)
Benzaldehyde	100-52-7	NOEC (8d) 20 mg/L (Microcystis aeruginosa) NOEC (8d) 132 mg/L	LC50 (96 h) 1.07 mg/L (Lepomis macrochirus)	IC50 (3 h) 740 mg/L (Activated sludge)	EC50 (24 h) 50 mg/L (Daphnia magna)
Alcohols, C12-16, ethoxylated	68551-12-2	EC50 0.7 mg/L (Selenastrum capricornutum)	No information available	No information available	0.39 mg/L (Daphnia Magna)
Sodium iodide	7681-82-5	7 d Tox threshold: 2370 mg/L (Scenedesmus quadricauda, biomass) EC50(72h): 2588.7 mg/L (Skeletonema costatum)	LC50(96h): 3780 mg/L (Oncorhynchus mykiss) LC50(96h): > 100 mg/L (Scophthalmus maximus)	No information available	EC50(48h): 1.27 mg/L (Daphnia magna) EC50(48h): 575 mg/L (Acartia tonsa)

#### 12.2. Persistence and degradability

No data is available on the product itself

Substances	CAS Number	Persistence and Degradability
Diethylene glycol	111-46-6	Readily biodegradable (90-100% @ 28d)
Cinnamaldehyde	104-55-2	Predicted to be readily biodegradable.
Amine oxides, cocoalkyldimethyl	61788-90-7	Readily biodegradable (81% @ 28d)
Methanol	67-56-1	Readily biodegradable (95% @ 20d)
Benzaldehyde	100-52-7	Readily biodegradable (>=95% @ 28d)
Alcohols, C12-16, ethoxylated	68551-12-2	No information available
Sodium iodide	7681-82-5	Not applicable

#### 12.3. Bioaccumulative potential

No data is available on the product itself

Substances	CAS Number	Log Pow
Diethylene glycol	111-46-6	BCF: 100 (Leuciscus idus melanotus)
Cinnamaldehyde	104-55-2	Log Pow =1.4
Amine oxides, cocoalkyldimethyl	61788-90-7	Log Kow = 7.5
Methanol	67-56-1	Not Bioaccumulative; BCF=1
Benzaldehyde	100-52-7	Log Pow =1.1
Alcohols, C12-16, ethoxylated	68551-12-2	No information available
Sodium iodide	7681-82-5	-1.301



**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Diethylene glycol	111-46-6	No information available
Cinnamaldehyde	104-55-2	No information available
Amine oxides, cocoalkyldimethyl	61788-90-7	No information available
Methanol	67-56-1	No information available
Benzaldehyde	100-52-7	No information available
Alcohols, C12-16, ethoxylated	68551-12-2	No information available
Sodium iodide	7681-82-5	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Incineration recommended in approved incinerator according to federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information****Australia ADG**

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Methanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable

**IMDG/IMO**

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Methanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable  
 EMS: EmS F-E, S-E

**IATA/ICAO**

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Methanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable

**Special precautions during transport**

None

**HazChem Code**

•3Y

## 15. Regulatory Information

### Safety, health and environmental regulations specific for the product

#### International Inventories

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product does not comply with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

#### Poisons Schedule number

None Allocated

#### International Agreements

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

## 16. Other information

### Date of preparation or review

**Revision Date:** 09-Nov-2017

#### **Revision Note**

SDS sections updated:  
14

#### **Full text of H-Statements referred to under sections 2 and 3**

H225 - Highly flammable liquid and vapor  
 H226 - Flammable liquid and vapor  
 H227 - Combustible liquid  
 H301 - Toxic if swallowed  
 H302 - Harmful if swallowed  
 H311 - Toxic in contact with skin  
 H312 - Harmful in contact with skin  
 H315 - Causes skin irritation  
 H317 - May cause an allergic skin reaction  
 H318 - Causes serious eye damage  
 H319 - Causes serious eye irritation  
 H331 - Toxic if inhaled  
 H332 - Harmful if inhaled  
 H335 - May cause respiratory irritation  
 H370 - Causes damage to organs  
 H372 - Causes damage to organs through prolonged or repeated exposure  
 H373 - May cause damage to organs through prolonged or repeated exposure  
 H400 - Very toxic to aquatic life  
 H401 - Toxic to aquatic life  
 H412 - Harmful to aquatic life with long lasting effects

#### **Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-19001

Revision Date: 05-Jul-2016

Revision Number: 20

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-19001

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007662

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Crosslinker

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
fdunexchem@halliburton.com

##### **E-mail Address**

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Serious Eye Damage/Irritation	Category 2 - H319
Reproductive Toxicity	Category 2 - H361

##### Label elements, including precautionary statements

**Hazard pictograms**

**Signal Word**

Danger

**Hazard Statements:**

H319 - Causes serious eye irritation  
 H361 - Suspected of damaging fertility or the unborn child

**Precautionary Statements****Prevention**

P201 - Obtain special instructions before use  
 P202 - Do not handle until all safety precautions have been read and understood  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P280 - Wear eye protection/face protection

**Response**

P281 - Use personal protective equipment as required  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P337 + P313 - If eye irritation persists: Get medical advice/attention  
 P308 + P313 - IF exposed or concerned: Get medical advice/attention

**Storage**

P405 - Store locked up

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Disodium octaborate tetrahydrate

**CAS Number**

12008-41-2

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

<b>3. Composition/information on Ingredients</b>
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Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Disodium octaborate tetrahydrate	12008-41-2	60 - 100%	Eye Irrit. 2A (H319) Repr. 2 (H361)

<b>4. First aid measures</b>
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**Description of necessary first aid measures****Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin**

Wash with soap and water. Get medical attention if irritation persists.

**Ingestion**

Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes eye irritation Potential reproductive hazard. May cause birth defects.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

None anticipated

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Evacuate all persons from the area.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid creating or inhaling dust. Ensure adequate ventilation. Avoid contact with eyes, skin, or clothing. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store in a cool, dry location. Product has a shelf life of 60 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Disodium octaborate tetrahydrate	12008-41-2	Not applicable	2 mg/m <sup>3</sup>

**Appropriate engineering controls**

**Engineering Controls** Use in a well ventilated area.

**Personal protective equipment (PPE)**

<b>Personal Protective Equipment</b>	If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.
<b>Respiratory Protection</b>	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Dust proof goggles.
<b>Other Precautions</b>	None known.
<b>Environmental Exposure Controls</b>	Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Solid	<b>Color</b>	White
<b>Odor:</b>	Odorless	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
<b>pH:</b>	7.3
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	> 1000 °C
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	9.9E-17 pa @ 25°C
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.7
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

None anticipated

### 10.5. Incompatible materials

None known.

### 10.6. Hazardous decomposition products

None known.

## 11. Toxicological Information

**Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes eye irritation Potential reproductive hazard. May cause birth defects.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Disodium octaborate tetrahydrate	12008-41-2	2550 mg/kg-bw (rat) (similar substance)	>2000 mg/kg-bw (rat) (similar substance)	>2 mg/L (dust, rat, 4 h) (similar substance)

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause respiratory irritation.
<b>Eye Contact</b>	Causes eye irritation.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Ingestion</b>	May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** Prolonged or repeated exposure may cause reproductive system damage.  
Prolonged or repeated exposure may cause embryo and fetus toxicity.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Disodium octaborate tetrahydrate	12008-41-2	Not irritating to skin in rabbits. (similar substances)

Substances	CAS Number	Serious eye damage/irritation
Disodium octaborate tetrahydrate	12008-41-2	Eye, rabbit: Causes moderate eye irritation

Substances	CAS Number	Skin Sensitization
Disodium octaborate tetrahydrate	12008-41-2	Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Disodium octaborate tetrahydrate	12008-41-2	No information available

Substances	CAS Number	Mutagenic Effects
Disodium octaborate tetrahydrate	12008-41-2	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Disodium octaborate tetrahydrate	12008-41-2	Did not show carcinogenic effects in animal experiments (similar substances)

Substances	CAS Number	Reproductive toxicity
Disodium octaborate tetrahydrate	12008-41-2	May impair fertility May cause birth defects (similar substances)

Substances	CAS Number	STOT - single exposure
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Disodium octaborate tetrahydrate	12008-41-2	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
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Substances	CAS Number	STOT - repeated exposure
Disodium octaborate tetrahydrate	12008-41-2	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	Aspiration hazard
Disodium octaborate tetrahydrate	12008-41-2	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### **Product Ecotoxicity Data**

No data available

#### **Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Disodium octaborate tetrahydrate	12008-41-2	EC10 (3 d) 96.5 mg/L (Pseudokirchneriella subcapitata)	LC50 (96 h) 314.6 mg/L (Pimephales promelas) NOEC (34 d) 25.2 mg/L (Danio rerio)	EC50 (3 h) >39371 mg/L (activated sludge)	NOEC (21 d) 42.5 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Disodium octaborate tetrahydrate	12008-41-2	The methods for determining biodegradability are not applicable to inorganic substances.

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Disodium octaborate tetrahydrate	12008-41-2	No information available

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Disodium octaborate tetrahydrate	12008-41-2	No information available

### 12.6. Other adverse effects

#### **Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

### Safe handling and disposal methods

Bury in a licensed landfill according to federal, state, and local regulations.

### Disposal of any contaminated packaging

Follow all applicable national or local regulations.

### Environmental regulations

Not applicable

## 14. Transport Information

### Transportation Information

#### Australia ADG

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**IMDG/IMO**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**IATA/ICAO**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

S5

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stolkhom Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review**

Revision Date: 05-Jul-2016

**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

H319 - Causes serious eye irritation

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H361 - Suspected of damaging fertility or the unborn child

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
OSHA  
ECHA C&L

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-19002

Revision Date: 05-Jul-2016

Revision Number: 19

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-19002

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007663

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Crosslinker

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
fdunexchem@halliburton.com

##### **E-mail Address**

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Serious Eye Damage/Irritation	Category 2 - H319
Reproductive Toxicity	Category 1B - H360
Specific Target Organ Toxicity - (Repeated Exposure)	Category 1 - H372

##### Label elements, including precautionary statements

**Hazard pictograms**



<b>Signal Word</b>	Danger
<b>Hazard Statements:</b>	H319 - Causes serious eye irritation H360 - May damage fertility or the unborn child H372 - Causes damage to organs through prolonged or repeated exposure
<b>Precautionary Statements</b>	
<b>Prevention</b>	P201 - Obtain special instructions before use P202 - Do not handle until all safety precautions have been read and understood P260 - Do not breathe dust/fume/gas/mist/vapors/spray P264 - Wash face, hands and any exposed skin thoroughly after handling P270 - Do not eat, drink or smoke when using this product P280 - Wear eye protection/face protection P281 - Use personal protective equipment as required
<b>Response</b>	P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337 + P313 - If eye irritation persists: Get medical advice/attention P308 + P313 - IF exposed or concerned: Get medical advice/attention P314 - Get medical attention/advice if you feel unwell
<b>Storage</b>	P405 - Store locked up
<b>Disposal</b>	P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
<b>Contains Substances</b>	<b>CAS Number</b>
Ulexite	1319-33-1
Ethylene glycol	107-21-1
Crystalline silica, quartz	14808-60-7

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).  
This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Ulexite	1319-33-1	30 - 60%	Eye Irrit. 2A (H319) Repr. 1 (H360)
Ethylene glycol	107-21-1	10 - 30%	Acute Tox. 4 (H302) STOT RE 1 (H372)
Crystalline silica, quartz	14808-60-7	1 - 5%	Carc. 2 (H351) STOT RE 1 (H372)

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation** If inhaled, move victim to fresh air and seek medical attention.

<b>Eyes</b>	Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.
<b>Skin</b>	Wash off immediately with soap and plenty of water for at least 15 minutes while removing all contaminated clothing and shoes.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes eye irritation Potential reproductive hazard. May cause birth defects. Prolonged or repeated exposure may cause damage to organs. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation. Evacuate all persons from the area.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas. Consult local authorities.

**6.3. Methods and material for containment and cleaning up**

Contain spill with sand or other inert materials. Scoop up and remove. Isolate spill and stop leak where safe.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Avoid breathing mist. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud if this product becomes dry. Avoid breathing or creating dust. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using dried product. Ensure adequate ventilation. Material is slippery underfoot. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### Exposure Limits

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Ulexite	1319-33-1	Not applicable	Not applicable
Ethylene glycol	107-21-1	TWA: 10 mg/m <sup>3</sup> TWA: 20 ppm TWA: 52 mg/m <sup>3</sup> STEL: 40 ppm STEL: 104 mg/m <sup>3</sup>	Ceiling: 100 mg/m <sup>3</sup> (aerosol only)
Crystalline silica, quartz	14808-60-7	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

### Appropriate engineering controls

**Engineering Controls** Use in a well ventilated area.

### Personal protective equipment (PPE)

**Personal Protective Equipment** If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection** If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Organic vapor respirator.

**Hand Protection**

Rubber gloves.

**Skin Protection**

Rubber apron.

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

None known.

**Environmental Exposure Controls**

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid

**Color:** Milky white

**Odor:** Odorless

**Odor Threshold:** No information available

#### Property

#### Values

Remarks/ - Method

**pH:**

6.5 - 7.5

**Freezing Point / Range**

-34 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

No data available

**Flash Point**

No data available

**Evaporation rate**

No data available

**Vapor Pressure**

No data available

**Vapor Density**

No data available

**Specific Gravity**

1.45

**Water Solubility**

Soluble in water

**Solubility in other solvents**

No data available

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

No data available

**Autoignition Temperature**

No data available

**Decomposition Temperature**

No data available

**Viscosity**

No data available

**Explosive Properties**

No information available

**Oxidizing Properties**

No information available

**9.2. Other information****VOC Content (%)**

No data available

**10. Stability and Reactivity****10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

None anticipated

**10.5. Incompatible materials**

Strong oxidizers.

**10.6. Hazardous decomposition products**

Carbon monoxide and carbon dioxide.

**11. Toxicological Information****Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes eye irritation Potential reproductive hazard. May cause birth defects. Prolonged or repeated exposure may cause damage to organs. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ulexite	1319-33-1	3493-6080 mg/kg (Rat) (similar substance) 3450 mg/kg (Male Rat) (similar substance)	> 2000 mg/kg (Rabbit) (similar substance)	> 2 mg/L (Rat) 4h (similar substance) > 2.12 mg/L (Rat) 4h (similar substance) > 2.04 mg/L (Rat) 4h (similar substance)
Ethylene glycol	107-21-1	4000 mg/kg (Rat) 7712 mg/kg (Rat) > 10000 mg/kg (Rat) 1670 mg/kg (Cat) 1400 – 1600 mg/kg (Human)	9530 µL/kg (Rabbit) > 3500 mg/kg (Mouse)	> 2.5 mg/L (Rat) 6h (saturated concentration)
Crystalline silica, quartz	14808-60-7	> 15000 mg/kg (human)	No information available	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation**

May cause respiratory irritation. In high air concentrations: May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness. Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

**Eye Contact**

Causes eye irritation.

**Skin Contact**

May cause mild skin irritation.

**Ingestion**

May be harmful if swallowed. In large amounts: May cause abdominal pain, vomiting,



nausea, and diarrhea. May cause heart, kidney and brain disorders.

**Chronic Effects/Carcinogenicity** Prolonged or repeated exposure may cause embryo and fetus toxicity. Prolonged or repeated exposure may cause reproductive system damage. Repeated overexposure may cause liver and kidney effects. Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

See "Inhalation" subsection above with respect to silicosis, cancer status and other data with possible relevance to human health. There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

#### **Exposure Levels**

No data available

#### **Interactive effects**

Eye ailments. Skin disorders. Liver and kidney disorders. Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

#### **Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Ulexite	1319-33-1	Non-irritating to the skin (Rabbit) (similar substances)
Ethylene glycol	107-21-1	Non-irritating to the skin (Rabbit)
Crystalline silica, quartz	14808-60-7	Non-irritating to the skin

Substances	CAS Number	Serious eye damage/irritation
Ulexite	1319-33-1	Causes moderate eye irritation (Rabbit) (similar substances)
Ethylene glycol	107-21-1	Non-irritating to the eye (Rabbit)
Crystalline silica, quartz	14808-60-7	Mechanical irritation of the eyes is possible. No information available

Substances	CAS Number	Skin Sensitization
Ulexite	1319-33-1	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Ethylene glycol	107-21-1	Did not cause sensitization on laboratory animals (guinea pig) Patch test on human volunteers did not demonstrate sensitization properties
Crystalline silica, quartz	14808-60-7	No information available.

Substances	CAS Number	Respiratory Sensitization
Ulexite	1319-33-1	No information available
Ethylene glycol	107-21-1	No information available
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	Mutagenic Effects
Ulexite	1319-33-1	In vitro tests did not show mutagenic effects (similar substances)
Ethylene glycol	107-21-1	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.
Crystalline silica, quartz	14808-60-7	Not regarded as mutagenic.

Substances	CAS Number	Carcinogenic Effects
Ulexite	1319-33-1	Did not show carcinogenic effects in animal experiments (similar substances)
Ethylene glycol	107-21-1	Did not show carcinogenic effects in animal experiments
Crystalline silica, quartz	14808-60-7	Contains crystalline silica which may cause silicosis, a delayed and progressive lung disease. The IARC and NTP have determined there is sufficient evidence in humans of the carcinogenicity of crystalline silica with repeated respiratory exposure. Based on available scientific evidence, this

		substance is a threshold carcinogen with a mode of action involving indirect genotoxicity secondary to lung injury.
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Substances	CAS Number	Reproductive toxicity
Ulexite	1319-33-1	Experiments have shown reproductive toxicity effects on laboratory animals (similar substances)
Ethylene glycol	107-21-1	Fetotoxic and teratogenic effects observed in experimental animals at concentrations that did not produce maternal toxicity.
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	STOT - single exposure
Ulexite	1319-33-1	None under normal use conditions
Ethylene glycol	107-21-1	No significant toxicity observed in animal studies at concentration requiring classification.
Crystalline silica, quartz	14808-60-7	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Ulexite	1319-33-1	None under normal use conditions
Ethylene glycol	107-21-1	Causes damage to organs through prolonged or repeated exposure: (Kidney)
Crystalline silica, quartz	14808-60-7	Causes damage to organs through prolonged or repeated exposure if inhaled: (Lungs)

Substances	CAS Number	Aspiration hazard
Ulexite	1319-33-1	Not applicable
Ethylene glycol	107-21-1	No information available
Crystalline silica, quartz	14808-60-7	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

No data available

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Ulexite	1319-33-1	EC50 (72h) 1398.64 mg/L (Skeletonema costatum)	LC50 (96h) > 320 mg/L (Scophthalmus maximus) LC50 (96h) > 1100 mg/L (Oncorhynchus mykiss) LC50 (96h) > 1021 mg/L (Lepomis macrochirus) LD50 (28d) 65 mg/L (Oncorhynchus mykiss)	No information available	EC50 (48h) 7341.67 mg/L (Acartia tonsa) EC50 (48h) 133 mg/L (Daphnia magna)
Ethylene glycol	107-21-1	EC50 6500 - 13000 mg/L (Pseudokirchneriella subcapitata) TGK (8d) > 10000 mg/L (Scenedesmus quadricauda)	LC50 41000 mg/L (Oncorhynchus mykiss) LC50 (96h) 72860 mg/L (Pimephales promelas) NOEC (7d) 15380 mg/L (mortality) (Pimephales promelas)	TTC (16h) > 10000 mg/L (Pseudomonas putida ) EC20 (30 m) > 1995 mg/L (activated sludge, domestic) (similar substance)	EC50 46300 mg/L (Daphnia magna) EC50 (48h) >100 mg/L (Daphnia magna) NOEC (7d) 8590 mg/L (reproduction) (Ceriodaphnia dubia)
Crystalline silica, quartz	14808-60-7	EC50 (72 h) =440 mg/L (Selenastrum capricornutum)	LL0 (96 h) =10000 mg/L (Danio rerio)	No information available	LL50 (24 h) >10000 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Ulexite	1319-33-1	The methods for determining biodegradability are not applicable to inorganic substances.
Ethylene glycol	107-21-1	Readily biodegradable (100% @ 10d)
Crystalline silica, quartz	14808-60-7	The methods for determining biodegradability are not applicable to inorganic substances.

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow

Ulexite	1319-33-1	0.175
Ethylene glycol	107-21-1	-1.36
Crystalline silica, quartz	14808-60-7	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Ulexite	1319-33-1	No information available
Ethylene glycol	107-21-1	No information available
Crystalline silica, quartz	14808-60-7	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product**

**International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stokholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 05-Jul-2016**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

H302 - Harmful if swallowed  
H319 - Causes serious eye irritation  
H351 - Suspected of causing cancer if inhaled  
H360 - May damage fertility or the unborn child  
H372 - Causes damage to organs through prolonged or repeated exposure if swallowed  
H372 - Causes damage to organs through prolonged or repeated exposure if inhaled

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter

mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
OSHA  
ECHA C&L

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-21003

Revision Date: 30-Sep-2015

Revision Number: 9

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-21003

##### Other means of Identification

**Synonyms:** None

**Product Code:** HM007806

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Fluid Loss Additive

**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton/Baroid Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: 61 (08) 9455 8300  
Fax Number: 61 (08) 9455 5300

##### **Product Emergency Telephone**

Australia: + 61 1 800 686 951  
Papua New Guinea: + 61 1 800 686 951  
NewZealand: +64 800 451719

##### **Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous

---

Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Not classified

**Label elements, including precautionary statements****Hazard Pictograms**

Signal Word Not Hazardous

Hazard Statements Not Classified

**Precautionary Statements**

Prevention None

Response None

Storage None

Disposal None

**Contains****Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

None known

**Australia Classification***For the full text of the H-phrases mentioned in this Section, see Section 16*

Classification Not Classified

Risk Phrases None

<b>3. Composition/information on Ingredients</b>
--

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

<b>4. First aid measures</b>
------------------------------

**Description of necessary first aid measures**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	If swallowed, induce vomiting immediately by giving two glasses of water and sticking fingers down throat; never give anything to an unconscious person. Get medical attention.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

Notes to Physician Treat symptomatically

**5. Fire Fighting Measures****Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special Exposure Hazards**

Decomposition in fire may produce harmful gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

**Special protective equipment and precautions for fire fighters****Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**6. Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Spills of this product are very slippery.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

**7. Handling and storage****7.1. Precautions for Safe Handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid dust accumulations.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Store between 40.5 F (4.7 C) and 120.5 F (49 C). Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

**8. Exposure Controls/Personal Protection****Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

**Appropriate engineering controls**



**Engineering Controls** Use in a well ventilated area.

**Personal protective equipment (PPE)**

**Respiratory Protection** If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Dust/mist respirator. (N95, P2/P3)

**Hand Protection** Normal work gloves.

**Skin Protection** Normal work coveralls.

**Eye Protection** Wear safety glasses or goggles to protect against exposure.

**Other Precautions** None known.

**Environmental Exposure Controls** No information available

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties**

**Physical State:** Powder      **Color:** White to off white  
**Odor:** Sweet      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	No data available
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.24
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	388 °C / 730 °F
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

**VOC Content (%)** No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical Stability**

Stable

**10.3. Possibility of Hazardous Reactions**

Will Not Occur

**10.4. Conditions to Avoid**

Temperature over 440 F (240 C).

**10.5. Incompatible Materials**

Strong oxidizers. Strong alkalis.

**10.6. Hazardous Decomposition Products**

Toxic fumes. Aldehydes. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

No significant hazards expected.

**Numerical measures of toxicity****LD50 Oral:** > 5000 mg/kg; (Rat)**LD50 Dermal:** > 2000 mg/kg; (Rabbit)**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation** May cause mild respiratory irritation.**Eye Contact** May cause mild eye irritation.**Skin Contact** Prolonged or repeated contact may cause slight skin irritation.**Ingestion** Irritation of the mouth, throat, and stomach. Large doses may cause nausea, vomiting and diarrhea.**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

<b>12. Ecological Information</b>
-----------------------------------

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances	NA	No information available	No information available	No information available	No information available

in concentrations above cut-off values according to the competent authority					
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**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Does not bioaccumulate

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>13. Disposal Considerations</b>
------------------------------------

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

<b>14. Transport Information</b>
----------------------------------

**Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

<b>15. Regulatory Information</b>
-----------------------------------

**Safety, health and environmental regulations specific for the product**

**International Inventories****Australian AICS Inventory**

All components listed on inventory or are exempt.

**New Zealand Inventory of Chemicals**

All components listed on inventory or are exempt.

**EINECS Inventory**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian DSL Inventory**

All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review****Revision Date:** 30-Sep-2015**Revision Note**

SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50 – Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)**Disclaimer Statement**

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-23001

Revision Date: 30-Sep-2015

Revision Number: 10

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-23001

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM007701

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Friction Reducer  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia  
  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

##### **Hazard Pictograms**

**Signal Word** Not Hazardous

**Hazard Statements** Not Classified

**Precautionary Statements**

**Prevention** None

**Response** None

**Storage** None

**Disposal** None

**Contains**

**Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

**Australia Classification**

For the full text of the H-phrases mentioned in this Section, see Section 16

**Classification** Not Classified

**Risk Phrases** None

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes** Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

**Skin** Wash with soap and water. Get medical attention if irritation persists.

**Ingestion** Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

All standard fire fighting media

**Extinguishing media which must not be used for safety reasons**

None known.

### Specific hazards arising from the chemical

#### Special Exposure Hazards

Not applicable.

### Special protective equipment and precautions for fire fighters

#### Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for Safe Handling

#### Handling Precautions

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Ensure adequate ventilation. Ground and bond containers when transferring from one container to another. Slippery when wet. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

#### Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### Storage Information

Store in a cool, dry location. Keep container closed when not in use. Keep from heat, sparks, and open flames. Product has a shelf life of 24 months.

#### Other Guidelines

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### Exposure Limits

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

### Appropriate engineering controls

#### Engineering Controls

Use in a well ventilated area.

### Personal protective equipment (PPE)

#### Respiratory Protection

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

#### Hand Protection

Normal work gloves.

#### Skin Protection

Normal work coveralls.

<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	None known.
<b>Environmental Exposure Controls</b>	Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Powder	<b>Color:</b>	White
<b>Odor:</b>	Slight	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
<b>pH:</b>	9
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	2
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Carbon monoxide and carbon dioxide. Ammonia.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

No significant hazards expected.

### Numerical measures of toxicity

### Toxicology data for the components



Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Ingestion</b>	Large doses may cause nausea, vomiting and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

Respiratory disorders. Skin disorders.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information**

**UN Number:** Not restricted  
**UN Proper Shipping Name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

**Australian AICS Inventory** All components listed on inventory or are exempt.  
**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.  
**EINECS Inventory** This product, and all its components, complies with EINECS  
**US TSCA Inventory** All components listed on inventory or are exempt.  
**Canadian DSL Inventory** All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

## 16. Other information

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**Date of preparation or review****Revision Date:** 30-Sep-2015**Revision Note**

SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50 – Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)**Disclaimer Statement**

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-24001

Revision Date: 11-Jan-2017

Revision Number: 15

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-24001

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007732

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Stabilizer

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

##### **Hazard Pictograms**

**Signal Word** Not Hazardous

**Hazard Statements:** Not Classified

**Precautionary Statements**

**Prevention** None  
**Response** None  
**Storage** None  
**Disposal** None

**Contains**

**Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

None known

*For the full text of the H-phrases mentioned in this Section, see Section 16*

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin** Wash with soap and water. Get medical attention if irritation persists.

**Ingestion** Under normal conditions, first aid procedures are not required.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical**

**Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters**

**Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for safe handling

#### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### **Storage Information**

Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 24 months.

#### **Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

### Appropriate engineering controls

#### **Engineering Controls**

Use in a well ventilated area.

### Personal protective equipment (PPE)

#### **Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

#### **Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Dust/mist respirator. (N95, P2/P3)

#### **Hand Protection**

Normal work gloves.

#### **Skin Protection**

Normal work coveralls.

#### **Eye Protection**

Wear safety glasses or goggles to protect against exposure.

#### **Other Precautions**

None known.

#### **Environmental Exposure Controls**

No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b> Liquid	<b>Color:</b> Clear to hazy
<b>Odor:</b> Mild sulfur	<b>Odor Threshold:</b> No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	8
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	106 °C / 224 °F
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.29
<b>Water Solubility</b>	Miscible with water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

<b>VOC Content (%)</b>	No data available
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<b>10. Stability and Reactivity</b>
-------------------------------------

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

None anticipated

**10.5. Incompatible materials**

Strong oxidizers. Hydrochloric acid

**10.6. Hazardous decomposition products**

Oxides of sulfur.

<b>11. Toxicological Information</b>
--------------------------------------

**Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

No significant hazards expected.

**Numerical measures of toxicity****Toxicology data for the components**

<b>Substances</b>	<b>CAS Number</b>	<b>LD50 Oral</b>	<b>LD50 Dermal</b>	<b>LC50 Inhalation</b>
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	None known.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	Not irritating to skin in rabbits.
<b>Ingestion</b>	Large doses may cause nausea, vomiting and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Does not bioaccumulate.

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available



**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>13. Disposal Considerations</b>
------------------------------------

**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

**Environmental regulations**

Not applicable

<b>14. Transport Information</b>
----------------------------------

**Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

<b>15. Regulatory Information</b>
-----------------------------------

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List</b>	All components listed on inventory or are exempt.

---

(DSL)

**Poisons Schedule number**

None Allocated

**International Agreements****Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stockholm Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

<b>16. Other information</b>
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**Date of preparation or review****Revision Date:** 11-Jan-2017**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit

PBT – Persistent Bioaccumulative and Toxic

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

vPvB – very Persistent and very Bioaccumulative

h - hour

mg/m<sup>3</sup> - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

w/w - weight/weight

d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

NZ CCID

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-25003

Revision Date: 30-Sep-2015

Revision Number: 13

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-25003

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM007670

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Gelling Agent  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia  
  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

**Hazard Pictograms**

**Signal Word** Not Hazardous

**Hazard Statements** Not Classified

**Precautionary Statements**

**Prevention** None

**Response** None

**Storage** None

**Disposal** None

**Contains**

**Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

Dust can form an explosive mixture in air

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

**Australia Classification**

For the full text of the H-phrases mentioned in this Section, see Section 16

**Classification** Not Classified

**Risk Phrases** None

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin** Wash with soap and water.

**Ingestion** Under normal conditions, first aid procedures are not required.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

### Specific hazards arising from the chemical

#### **Special Exposure Hazards**

Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

### Special protective equipment and precautions for fire fighters

#### **Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Avoid creating and breathing dust. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for Safe Handling

#### **Handling Precautions**

Avoid creating or inhaling dust. Avoid contact with eyes, skin, or clothing. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### **Storage Information**

Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

#### **Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

### Appropriate engineering controls

#### **Engineering Controls**

Use in a well ventilated area.

### Personal protective equipment (PPE)

#### **Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

Dust/mist respirator. (N95, P2/P3)

#### **Hand Protection**

Normal work gloves.

#### **Skin Protection**

Normal work coveralls.

#### **Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions** None known.  
**Environmental Exposure Controls** Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Solid      **Color:** White to light straw  
**Odor:** Bean      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	10.1
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.3
<b>Water Solubility</b>	Hydrolyzes
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	510 °C / 950 °F
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

**VOC Content (%)** No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

No significant hazards expected.

### Numerical measures of toxicity

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Ingestion</b>	None known.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**



Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Follow all applicable community, national or regional regulations regarding waste management methods.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

**UN Number:** Not restricted  
**UN Proper Shipping Name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

**Australian AICS Inventory** All components listed on inventory or are exempt.  
**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.  
**EINECS Inventory** This product, and all its components, complies with EINECS  
**US TSCA Inventory** All components listed on inventory or are exempt.  
**Canadian DSL Inventory** All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information**

**Date of preparation or review****Revision Date:** 30-Sep-2015**Revision Note**

SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50 – Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)**Disclaimer Statement**

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-25005

Revision Date: 30-Sep-2015

Revision Number: 10

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-25005

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM007672

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Gelling Agent  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia  
  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Not classified

##### Label elements, including precautionary statements

##### **Hazard Pictograms**

**Signal Word** Not Hazardous

**Hazard Statements** Not Classified

**Precautionary Statements**

**Prevention** None

**Response** None

**Storage** None

**Disposal** None

**Contains**

**Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

**Australia Classification**

For the full text of the H-phrases mentioned in this Section, see Section 16

**Classification**

Not Classified

**Risk Phrases**

None

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

### 4. First aid measures

**Description of necessary first aid measures**

**Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin**

Wash with soap and water. Get medical attention if irritation persists.

**Ingestion**

Under normal conditions, first aid procedures are not required.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician**

Treat symptomatically

### 5. Fire Fighting Measures

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special Exposure Hazards**

Decomposition in fire may produce harmful gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

**Special protective equipment and precautions for fire fighters****Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

<b>6. Accidental release measures</b>
---------------------------------------

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

<b>7. Handling and storage</b>
--------------------------------

**7.1. Precautions for Safe Handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
---

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area.

**Personal protective equipment (PPE)****Respiratory Protection**

Not normally needed. But if significant exposures are possible then the following respirator is recommended:

Dust/mist respirator. (N95, P2/P3)

**Hand Protection**

Normal work gloves.

**Skin Protection**

Normal work coveralls.

**Eye Protection**

Wear safety glasses or goggles to protect against exposure.

**Other Precautions**

None known.

**Environmental Exposure Controls**

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Solid	<b>Color:</b>	Off white
<b>Odor:</b>	Bean	<b>Odor Threshold:</b>	No information available
<u>Property</u>	<u>Values</u>		
<u>Remarks/ - Method</u>			
<b>pH:</b>	6.5-7.5		
<b>Freezing Point/Range</b>	No data available		
<b>Melting Point/Range</b>	No data available		
<b>Boiling Point/Range</b>	No data available		
<b>Flash Point</b>	> 93 °C / > 200 °F Cleveland Open Cup (COC)		
<b>Evaporation rate</b>	No data available		
<b>Vapor Pressure</b>	No data available		
<b>Vapor Density</b>	No data available		
<b>Specific Gravity</b>	1.42 - 1.47		
<b>Water Solubility</b>	Soluble in water		
<b>Solubility in other solvents</b>	No data available		
<b>Partition coefficient: n-octanol/water</b>	No data available		
<b>Autoignition Temperature</b>	No data available		
<b>Decomposition Temperature</b>	No data available		
<b>Viscosity</b>	No data available		
<b>Explosive Properties</b>	No information available		
<b>Oxidizing Properties</b>	No information available		
 <b><u>9.2. Other information</u></b>			
<b>VOC Content (%)</b>	No data available		

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

None anticipated

### 10.5. Incompatible Materials

Strong oxidizers.

### 10.6. Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

No significant hazards expected.

### Numerical measures of toxicity

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above	NA	No data available	No data available	No data available

cut-off values according to the competent authority				
---	--	--	--	--

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	None known.
<b>Ingestion</b>	None known.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information**

**UN Number:** Not restricted  
**UN Proper Shipping Name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories**

**Australian AICS Inventory** All components listed on inventory or are exempt.

**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.

**EINECS Inventory** This product, and all its components, complies with EINECS

**US TSCA Inventory** All components listed on inventory or are exempt.

**Canadian DSL Inventory** All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**16. Other information****Date of preparation or review**

Revision Date: 30-Sep-2015

Revision Note



SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50 – Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-30001

Revision Date: 05-Jul-2016

Revision Number: 11

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-30001

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007676

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Scale Inhibitor

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton/Baroid Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775

Telephone Number: 61 (08) 9455 8300

Fax Number: 61 (08) 9455 5300

##### **Product Emergency Telephone**

Australia: + 61 1 800 686 951

Papua New Guinea: + 61 1 800 686 951

New Zealand: +64 800 451719

##### **Fire, Police & Ambulance - Emergency Telephone**

Australia: 000

Papua New Guinea: 000

New Zealand: 111

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Not classified

**Label elements, including precautionary statements**

**Hazard pictograms**

**Signal Word** Not Hazardous

**Hazard Statements:** Not Classified

**Precautionary Statements**

**Prevention** None  
**Response** None  
**Storage** None  
**Disposal** None

**Contains**

**Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).  
 This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

**4. First aid measures**

**Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.  
**Eyes** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.  
**Skin** Wash with soap and water. Get medical attention if irritation persists.  
**Ingestion** Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

**5. Fire Fighting Measures**

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

All standard fire fighting media

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical**

**Special exposure hazards in a fire**

Not applicable

**Special protective equipment and precautions for fire fighters**

**Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**6. Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

**7. Handling and storage**

**7.1. Precautions for safe handling**

**Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing mist. Avoid breathing vapors. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities**

**Storage Information**

Store away from oxidizers. Product has a shelf life of 12 months.

**Other Guidelines**

No information available

**8. Exposure Controls/Personal Protection**

**Control parameters - exposure standards, biological monitoring**

**Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

**Appropriate engineering controls**

**Engineering Controls**

Use in a well ventilated area.

**Personal protective equipment (PPE)**

**Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN

149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

<b>Hand Protection</b>	Butyl rubber gloves.
<b>Skin Protection</b>	Normal work coveralls.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	None known.
<b>Environmental Exposure Controls</b>	Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Liquid	<b>Color</b>	Clear to slightly hazy amber
<b>Odor:</b>	Mild	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
<b>pH:</b>	6.49 - 7.49
<b>Freezing Point / Range</b>	-1.1 °C
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	100 °C
<b>Flash Point</b>	> 95 °C / PMCC
<b>Evaporation rate</b>	< 1
<b>Vapor Pressure</b>	18 mmHg
<b>Vapor Density</b>	> 1
<b>Specific Gravity</b>	1.24
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	1.2
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

None anticipated

### 10.5. Incompatible materials

Strong oxidizers.

### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide. Toxic monomer fumes.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye and skin contact.

### Symptoms related to exposure

**Most Important Symptoms/Effects**

No significant hazards expected.

### Numerical measures of toxicity

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

### Immediate, delayed and chronic health effects from exposure

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	May cause mild eye irritation.
<b>Skin Contact</b>	Prolonged or repeated contact may cause slight skin irritation.
<b>Ingestion</b>	In large amounts: Irritation of the mouth, throat, and stomach.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

### Exposure Levels

No data available

### Interactive effects

Skin disorders. Eye ailments. Respiratory disorders.

### Data limitations

No data available

## 12. Ecological Information

### Ecotoxicity

#### **Product Ecotoxicity Data**

No data available

#### **Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

### 12.2. Persistence and degradability

Biodegradable.

Substances	CAS Number	Persistence and Degradability
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Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available
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**12.3. Bioaccumulative potential**

Does not bioaccumulate.

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information****Australia ADG**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IMDG/IMO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**IATA/ICAO**

UN Number	Not restricted
UN proper shipping name:	Not restricted
Transport Hazard Class(es):	Not applicable
Packing Group:	Not applicable
Environmental Hazards:	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

### Safety, health and environmental regulations specific for the product

#### International Inventories

##### **Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

##### **New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

##### **EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

##### **US TSCA Inventory**

All components listed on inventory or are exempt.

##### **Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

#### Poisons Schedule number

None Allocated

#### International Agreements

**Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stolkhom Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

## 16. Other information

### Date of preparation or review

**Revision Date:** 05-Jul-2016

#### **Revision Note**

SDS sections updated: 2

#### **Full text of H-Statements referred to under sections 2 and 3**

None

#### **Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

#### **Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit

PBT – Persistent Bioaccumulative and Toxic

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

vPvB – very Persistent and very Bioaccumulative

h - hour



mg/m<sup>3</sup> - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

w/w - weight/weight

d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-32002

Revision Date: 07-Feb-2018

Revision Number: 19

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-32002

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM007683

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Surfactant

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Acute Oral Toxicity	Category 4 - H302
Skin Corrosion/Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 1 - H318
Acute Aquatic Toxicity	Category 2 - H401

##### Label elements, including precautionary statements

**Hazard Pictograms**

**Signal Word**

DANGER

**Hazard Statements:**

H302 - Harmful if swallowed  
 H315 - Causes skin irritation  
 H318 - Causes serious eye damage  
 H401 - Toxic to aquatic life

**Precautionary Statements****Prevention**

P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P273 - Avoid release to the environment

**Response**

P280 - Wear protective gloves/eye protection/face protection  
 P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell  
 P330 - Rinse mouth  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P332 + P313 - If skin irritation occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor/physician

**Storage**

None

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Alcohols, C6-C12, ethoxylated propoxylated  
 Alcohols, C10-C16, ethoxylated propoxylated

**CAS Number**

68937-66-6  
 69227-22-1

**Other hazards which do not result in classification**

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).  
 This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	60 - 100%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 2 (H401)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	10 - 30%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 2 (H401)

### 4. First aid measures

**Description of necessary first aid measures**

<b>Inhalation</b>	Under normal conditions, first aid procedures are not required.
<b>Eyes</b>	Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Harmful if swallowed.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Wash hands after use. Avoid breathing vapors. Ensure adequate ventilation. Slippery when wet. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Keep container closed when not in use. Keep from heat, sparks, and open flames. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### Exposure Limits

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Not applicable	Not applicable
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Not applicable	Not applicable

### Appropriate engineering controls

**Engineering Controls** None known.

### Personal protective equipment (PPE)

**Personal Protective Equipment** If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection** If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

**Hand Protection** Impervious rubber gloves. Polyvinylchloride gloves.

**Skin Protection** Normal work coveralls.

**Eye Protection** Wear safety glasses or goggles to protect against exposure.

**Other Precautions** None known.

**Environmental Exposure Controls** Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

**Physical State:** Liquid

**Color** Yellow

**Odor:** Mild

**Odor Threshold:** No information available

#### Property

#### Values

Remarks/ - Method

**pH:**

6.5 (1%)

**Freezing Point / Range**

-3 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

No data available

**Flash Point**

240 °C / 464 °F PMCC

**Evaporation rate**

No data available

**Vapor Pressure**

No data available

**Vapor Density**

> 10

**Specific Gravity**

0.98

**Water Solubility**

Soluble in water

**Solubility in other solvents**

No data available

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

No data available

**Autoignition Temperature**

No data available

**Decomposition Temperature**

No data available

**Viscosity**

No data available

**Explosive Properties**

No information available

**Oxidizing Properties**

No information available

### 9.2. Other information

**VOC Content (%)**

No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

#### 10.2. Chemical stability

Stable

#### 10.3. Possibility of hazardous reactions

Will Not Occur

#### 10.4. Conditions to avoid

None anticipated

#### 10.5. Incompatible materials

Strong oxidizers. Strong acids. Strong alkalis.

#### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

#### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

#### Symptoms related to exposure

##### **Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Harmful if swallowed.

#### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	600 mg/kg (Rat) (similar substance)	> 5200 mg/kg (Rabbit) (similar substance)	> 0.22 mg/L (saturated concentration) (Rat) (similar substance)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	600 mg/kg (Rat) (similar substance)	> 5200 mg/kg (Rabbit) (similar substance)	>0.22 mg/L (saturated concentration) (Rat) (similar substance)

#### Immediate, delayed and chronic health effects from exposure

##### **Inhalation**

May cause mild respiratory irritation.

##### **Eye Contact**

Causes severe eye irritation which may damage tissue.

##### **Skin Contact**

Causes skin irritation.

##### **Ingestion**

Harmful if swallowed. Irritation of the mouth, throat, and stomach.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

#### Exposure Levels

No data available

#### Interactive effects

Skin disorders.

#### Data limitations

No data available

Substances	CAS Number	Skin corrosion/irritation
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Causes skin irritation. (Rabbit) (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Causes skin irritation. (Rabbit) (similar substances)

Substances	CAS Number	Serious eye damage/irritation
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Causes severe eye irritation (Rabbit) (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Causes severe eye irritation (Rabbit) (similar substances)

Substances	CAS Number	Skin Sensitization
------------	------------	--------------------

Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)

Substances	CAS Number	Respiratory Sensitization
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	No information available
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	No information available

Substances	CAS Number	Mutagenic Effects
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Did not show carcinogenic effects in animal experiments (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Did not show carcinogenic or teratogenic effects in animal experiments (similar substances)

Substances	CAS Number	Reproductive toxicity
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Animal testing did not show any effects on fertility.
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Animal testing did not show any effects on fertility.

Substances	CAS Number	STOT - single exposure
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	STOT - repeated exposure
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	Aspiration hazard
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	No adverse health effects are expected from swallowing.
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	No adverse health effects are expected from swallowing.

## 12. Ecological Information

### Ecotoxicity

#### Algae Toxicity

ErC50 (72h): 2.58 - 3.44 mg/L (Desmodesmus subspicatus)

#### Acute Crustaceans Toxicity:

EC50(48h): 1.45 - 1.79 mg/L (Daphnia magna)

### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	EC50 (72h) 0.75 mg/L (Pseudokirchnerella subcapitata) (similar substance) EC50 (96h) 0.7 mg/L (Pseudokirchneriella subapitata) (similar substance) CD10 8 mg/L	LC50 (96h) 0.59 mg/L (Pleuronectes platessa) (similar substance) LC50 (96) 1.4 mg/L (Pimephales promelas) (similar substance) NOEC 4.4 mg/L (Pimephales promelas, juvenile)	ErC50 (16.9h) > 10 g/L (growth inhibition) (Pseudomonas putida) (similar substance)	EC50 (48h) 0.14 mg/L (Daphnia magna) (similar substance) EC50 (48h) 0.39 mg/L (Cerodaphnia dubia) (similar substance)

		(Pseudokirchneriella subcapitata) EC10 2 mg/L (Brachionus calyciflorus)			
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	EC50 (72h) 0.75 mg/L (Pseudokirchneriella subcapitata) (similar substance) ErC50 (48h) 0.7 mg/L (Skeletonema costatum) EC10 9.79 mg/L (Selenastrum capricornutum) (similar substance) ErC50 1.1 mg/L (Scenedesmus subspicatus) (similar substance)	LC50 (96h) 0.59 mg/L (Pleuronectes platessa) (similar substance) LC50 (96h) 1.6 mg/L (Pimephales promelas) (similar substance) LC50 (96h) 3 mg/L (Brachydanio rerio) (similar substance)	ErC50 (16.9h) > 10 g/L (Pseudomonas putida) (similar substance)	EC50 (48h) 0.14 mg/L (Daphnia magna) (similar substance) EC50 (48h) 02 mg/L (Daphnia magna) (similar substance)

### 12.2. Persistence and degradability

Readily biodegradable

Substances	CAS Number	Persistence and Degradability
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Readily biodegradable (60% @ 28d) (similar substances)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Readily biodegradable (84% @ 28d) (similar substances)

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	Log Pow: 4.3 - 5.36 (estimated) BCF: 1.1 - 1.8 (fish, estimated)
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	Log Pow: 4.3 - 5.36 (estimated) BCF: 1.1 - 1.8 (fish, estimated)

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Alcohols, C6-C12, ethoxylated propoxylated	68937-66-6	KOC = >4
Alcohols, C10-C16, ethoxylated propoxylated	69227-22-1	KOC = >4

### 12.6. Other adverse effects

#### Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

#### Safe handling and disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

#### Disposal of any contaminated packaging

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

#### Environmental regulations

Not applicable

## 14. Transport Information

#### Transportation Information

##### Australia ADG

UN Number

Not restricted



<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**IMDG/IMO**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**IATA/ICAO**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

•3Z

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements****Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stockholm Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 07-Feb-2018**Revision Note**

SDS sections updated:

2

**Full text of H-Statements referred to under sections 2 and 3**

H302 - Harmful if swallowed

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H315 - Causes skin irritation  
H318 - Causes serious eye damage

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### DCA-32009

Revision Date: 20-Nov-2015

Revision Number: 7

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-32009

##### Other means of Identification

**Synonyms:** None

**Product Code:** HM007719

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Cleaner

**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
fdunexchem@halliburton.com

**E-Mail address:**

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Acute Inhalation Toxicity - Dusts and Mists	Category 4 - H332
Skin Corrosion / irritation	Category 2 - H315
Serious Eye Damage / Eye Irritation	Category 2 - H319
Flammable Liquids.	Category 4 - H227

##### Label elements, including precautionary statements

**Hazard Pictograms**



<b>Signal Word</b>	Warning
<b>Hazard Statements</b>	H227 - Combustible liquid H315 - Causes skin irritation H319 - Causes serious eye irritation H332 - Harmful if inhaled
<b>Precautionary Statements</b>	
<b>Prevention</b>	P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking P261 - Avoid breathing dust/fume/gas/mist/vapors/spray P264 - Wash face, hands and any exposed skin thoroughly after handling P280 - Wear protective gloves/eye protection/face protection
<b>Response</b>	P302 + P352 - IF ON SKIN: Wash with plenty of soap and water P332 + P313 - If skin irritation occurs: Get medical advice/attention P362 - Take off contaminated clothing and wash before reuse P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing P312 - Call a POISON CENTER or doctor/physician if you feel unwell P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337 + P313 - If eye irritation persists: Get medical advice/attention P370 + P378 - In case of fire: Use water spray for extinction
<b>Storage</b>	P403 + P235 - Store in a well-ventilated place. Keep cool
<b>Disposal</b>	P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
<b>Contains Substances</b>	<b>CAS Number</b>
Ethylene glycol monobutyl ether	111-76-2
Oxylated alkylphenols	Proprietary
Alkyl hexanol	Proprietary
Isopropanol	67-63-0
<b><u>Other hazards which do not result in classification</u></b>	
None known	
<b>Australia Classification</b>	
<i>For the full text of the H-phrases mentioned in this Section, see Section 16</i>	
<b>Classification</b>	Xn - Harmful.
<b>Risk Phrases</b>	R20 Harmful by inhalation. R36/38 Irritating to eyes and skin.

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Ethylene glycol monobutyl ether	111-76-2	30 - 60%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Acute Tox. 4 (H332) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Flam. Liq. 4 (H227)
Oxylated alkylphenols	Proprietary	10 - 30%	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319)
Alkyl hexanol	Proprietary	10 - 30%	Acute Tox. 4 (H332) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) STOT SE 3 (H335) Aquatic Acute 3 (H402) Flam. Liq. 4 (H227)
Isopropanol	67-63-0	10 - 30%	Eye Irrit. 2 (H319) STOT SE 3 (H336) Flam. Liq. 2 (H225)

#### 4. First aid measures

##### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
<b>Skin</b>	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse. Destroy or properly dispose of contaminated shoes.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

##### Symptoms caused by exposure

Causes eye irritation Causes skin irritation. May be harmful if inhaled.

##### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

#### 5. Fire Fighting Measures

##### Suitable extinguishing equipment

##### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

##### **Extinguishing media which must not be used for safety reasons**

None known.

##### Specific hazards arising from the chemical

##### **Special Exposure Hazards**

Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce harmful gases.

##### Special protective equipment and precautions for fire fighters

##### **Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

#### 6. Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.

##### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### **6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

## **7. Handling and storage**

### **7.1. Precautions for Safe Handling**

#### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### **7.2. Conditions for safe storage, including any incompatibilities**

#### **Storage Information**

Keep from heat, sparks, and open flames. Store in a cool well ventilated area. Keep container closed when not in use. Store locked up. Product has a shelf life of 24 months.

#### **Other Guidelines**

No information available

## **8. Exposure Controls/Personal Protection**

### **Control parameters - exposure standards, biological monitoring**

#### **Exposure Limits**

<b>Substances</b>	<b>CAS Number</b>	<b>Australia NOHSC</b>	<b>ACGIH TLV-TWA</b>
Ethylene glycol monobutyl ether	111-76-2	TWA: 20 ppm mg/m <sup>3</sup> STEL: 50 ppm mg/m <sup>3</sup>	TWA: 20 ppm Skin
Oxylated alkylphenols	Proprietary	Not applicable	Not applicable
Alkyl hexanol	Proprietary	TWA: 50 ppm mg/m <sup>3</sup>	TWA: 50 ppm
Isopropanol	67-63-0	TWA: 400 ppm mg/m <sup>3</sup> STEL: 500 ppm mg/m <sup>3</sup>	TWA: 200 ppm STEL: 400 ppm

### **Appropriate engineering controls**

#### **Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

### **Personal protective equipment (PPE)**

#### **Respiratory Protection**

Organic vapor respirator.  
In high concentrations, supplied air respirator or a self-contained breathing apparatus.

#### **Hand Protection**

Impervious rubber gloves.

#### **Skin Protection**

Rubber apron.

#### **Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

#### **Other Precautions**

None known.

#### **Environmental Exposure Controls**

No information available

## **9. Physical and Chemical Properties**

### **9.1. Information on basic physical and chemical properties**

**Physical State:** Liquid

**Color:** Clear light amber

**Odor:** Sweet

**Odor Threshold:** No information available

**Property**

**Values**

**Remarks/ - Method**

**pH:**

8

Freezing Point/Range	No data available
Melting Point/Range	No data available
Boiling Point/Range	136 °C / 278 °F
Flash Point	79 °C / 175 °F PMCC
upper flammability limit	10.6%
lower flammability limit	1.5%
Evaporation rate	No data available
Vapor Pressure	0.8 mmHg
Vapor Density	No data available
Specific Gravity	0.92
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

**9.2. Other information**

VOC Content (%) No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical Stability**

Stable

**10.3. Possibility of Hazardous Reactions**

Will Not Occur

**10.4. Conditions to Avoid**

Keep away from heat, sparks and flame.

**10.5. Incompatible Materials**

Strong oxidizers. Strong alkalis. Amphoteric metals such as aluminum, magnesium, lead, tin, or zinc.

**10.6. Hazardous Decomposition Products**

Toxic fumes. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes eye irritation Causes skin irritation. May be harmful if inhaled.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylene glycol monobutyl ether	111-76-2	470 mg/kg (Rat) 1414 mg/kg (Guinea pig) 1746 mg/kg (Rat) 320 mg/kg (Rabbit) 530 mg/kg (Rat) 560 mg/kg (Rat) 3000 mg/kg (Rat) 2400 mg/kg (Rat)	220 mg/kg (Rabbit) 2270 mg/kg (Rat) 200 mg/kg (Guinea pig) >2000 mg/kg (Rabbit) 841 mg/kg (Rabbit) 435 mg/kg (Rabbit) >2000 mg/kg (Guinea pig) >2000 mg/kg (Rat) 100 mg/kg (Rabbit) 207 mg/kg (Guinea pig) 400-500 mg/kg (Rabbit)	450 mg/L (Rat) 4h 2.174 mg/L (Rat) 4h 2.21 mg/L (Rat) 4h 450-486 mg/L (Rat) 4h 925 mg/L (Rat) 4h >633 mg/L (Guinea pig) 1h
Oxylated alkylphenols	Proprietary	No data available	No data available	No data available

Alkyl hexanol	Proprietary	> 2000 mg/kg	1980 mg/kg	1.45 mg/L (Rat) 4h
Isopropanol	67-63-0	4396 mg/kg (Rat) 5840 mg/kg (Rat) 3600 mg/kg (Mouse)	12,800 mg/kg (Rat) 12,870 mg/kg (Rabbit) 6280 mg/kg (Rabbit)	72.6 mg/L (Rat) 4h > 10,000 mg/L (Rat) 6h

**Immediate, delayed and chronic health effects from exposure****Product Information****Inhalation**

Under certain conditions of use, some of the product ingredients may cause the following:  
Harmful if inhaled. May cause mild respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

**Eye Contact**

Causes moderate eye irritation.

**Skin Contact**

Causes moderate skin irritation.

**Ingestion**

May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

Skin disorders. Eye ailments.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Ethylene glycol monobutyl ether	111-76-2	Causes moderate skin irritation. (Rabbit)
Oxylated alkylphenols		Irritating to skin. (Rabbit)
Alkyl hexanol		Causes moderate skin irritation. (Rabbit)
Isopropanol	67-63-0	Non-irritating to the skin (Rabbit)

Substances	CAS Number	Eye damage/irritation
Ethylene glycol monobutyl ether	111-76-2	Causes moderate eye irritation. (Rabbit)
Oxylated alkylphenols		Irritating to eyes. (Rabbit)
Alkyl hexanol		Causes moderate eye irritation. (Rabbit)
Isopropanol	67-63-0	Causes moderate eye irritation. (Rabbit)

Substances	CAS Number	Skin Sensitization
Ethylene glycol monobutyl ether	111-76-2	Did not cause sensitization on laboratory animals (guinea pig)
Oxylated alkylphenols		No information available
Alkyl hexanol		Did not cause sensitization on laboratory animals (guinea pig)
Isopropanol	67-63-0	Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Ethylene glycol monobutyl ether	111-76-2	No information available
Oxylated alkylphenols		No information available
Alkyl hexanol		Not regarded as a sensitizer.
Isopropanol	67-63-0	No information available

Substances	CAS Number	Mutagenic Effects
Ethylene glycol monobutyl ether	111-76-2	In vivo tests did not show mutagenic effects. In vitro tests did not show mutagenic effects
Oxylated alkylphenols		Not regarded as mutagenic.
Alkyl hexanol		In vitro tests did not show mutagenic effects.
Isopropanol	67-63-0	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
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Ethylene glycol monobutyl ether	111-76-2	Not regarded as carcinogenic.
Oxylated alkylphenols		No information available.
Alkyl hexanol		Did not show carcinogenic effects in animal experiments
Isopropanol	67-63-0	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
Ethylene glycol monobutyl ether	111-76-2	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Oxylated alkylphenols		No information available
Alkyl hexanol		Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Isopropanol	67-63-0	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - single exposure
Ethylene glycol monobutyl ether	111-76-2	No data of sufficient quality are available.
Oxylated alkylphenols		No significant toxicity observed in animal studies at concentration requiring classification.
Alkyl hexanol		May cause respiratory irritation.
Isopropanol	67-63-0	May cause headache, dizziness, and other central nervous system effects.

Substances	CAS Number	STOT - repeated exposure
Ethylene glycol monobutyl ether	111-76-2	No data of sufficient quality are available.
Oxylated alkylphenols		No significant toxicity observed in animal studies at concentration requiring classification.
Alkyl hexanol		No significant toxicity observed in animal studies at concentration requiring classification.
Isopropanol	67-63-0	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	Aspiration hazard
Ethylene glycol monobutyl ether	111-76-2	No adverse health effects are expected from swallowing.
Oxylated alkylphenols		Not applicable
Alkyl hexanol		Not applicable
Isopropanol	67-63-0	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

No data available

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Ethylene glycol monobutyl ether	111-76-2	EC50 839.56 mg/L (Skeletonema costatum) EbC50 (72h) 911 mg/L EC50 > 500 mg/L (Scenedesmus subspicatus) NOEC (72h) 88 mg/L (biomass)(Pseudokirchnerella subcapitata)	LC50 > 1000 mg/L (Scophthalmus maximus, juvenile) LC50 (96h) 1474 mg/L (Oncorhynchus mykiss) NOEC (21d) > 100mg/L (Danio rerio)	TT/EC3 (48h) 463 mg/L (Uronema parduzci) TT/EC3 (72h) 73 mg/L (Entosiphon sulcatum) TT/EC3 (16h) 700 mg/L (Pseudomonas putida)	No information available
Oxylated alkylphenols	Proprietary	No information available	EC50 (96h) 1.2 - 9.3 mg/L (Pimephales promelas)	No information available	EC50 (48h) 1.6 - 10 mg/L (Daphnia magna)
Alkyl hexanol	Proprietary	No information available	LC50 (96h) 17.1 mg/L (Leuciscus idus melanotus)	No information available	No information available
Isopropanol	67-63-0	EC50 (72h) > 1000 mg/L (Desmodesmus subspicatus) EC50 (7d) 1800 mg/L (Scenedesmus quadricauda)	LC50 (96h) 9640 mg/L (Pimephales promelas) LC50 (7d) 7060 mg/L (Poecilia reticulata)	TT (16h) 1050 mg/L (Pseudomonas putida)	EC50 (48h) 13,299 mg/L (Daphnia magna) EC50 (24h) > 10,000 mg/L (Daphnia magna)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Ethylene glycol monobutyl ether	111-76-2	Readily biodegradable (75-88% @ 28d)
Oxylated alkylphenols	Proprietary	No information available
Alkyl hexanol	Proprietary	Readily biodegradable (100 @ 14d)
Isopropanol	67-63-0	Readily biodegradable (53% @ 5d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Ethylene glycol monobutyl ether	111-76-2	0.81
Oxylated alkylphenols	Proprietary	No information available
Alkyl hexanol	Proprietary	2.73 BCF = 25.33
Isopropanol	67-63-0	0.05

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Ethylene glycol monobutyl ether	111-76-2	No information available
Oxylated alkylphenols	Proprietary	No information available
Alkyl hexanol	Proprietary	KOC = 26
Isopropanol	67-63-0	KOC = 1.5

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information**

**UN Number:** Not restricted  
**UN Proper Shipping Name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS Inventory</b>	This product does not comply with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian DSL Inventory</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stokholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 20-Nov-2015**Revision Note**

SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

R20 Harmful by inhalation.

R36/38 Irritating to eyes and skin.

**Full text of H-Statements referred to under sections 2 and 3**

H225 - Highly flammable liquid and vapor

H227 - Combustible liquid

H302 - Harmful if swallowed

H312 - Harmful in contact with skin

H315 - Causes skin irritation

H319 - Causes serious eye irritation

H332 - Harmful if inhaled

H335 - May cause respiratory irritation

H336 - May cause drowsiness or dizziness

H402 - Harmful to aquatic life

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
NZ CCID  
Bioaquatics Testing, 1990

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

**SAFETY DATA SHEET****DCA-32014**

Revision Date: 31-Aug-2017

Revision Number: 3

**1. Product Identifier & Identity for the Chemical**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** DCA-32014

**Other means of Identification**

**Synonyms** None  
**Hazardous Material Number:** HM008547

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Surfactant  
**Uses advised against** Consumer use

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951  
Global Incident Response Access Code: 334305  
Contract Number: 14012

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

**2. Hazard Identification**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Aspiration Toxicity	Category 1 - H304
Skin Corrosion/Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 1 - H318
Reproductive Toxicity	Category 1B - H360
Acute Aquatic Toxicity	Category 2 - H401
Flammable liquids.	Category 3 - H226

**Label elements, including precautionary statements**

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**Hazard Pictograms**
**Signal Word**

DANGER

**Hazard Statements:**

H226 - Flammable liquid and vapor  
 H304 - May be fatal if swallowed and enters airways  
 H315 - Causes skin irritation  
 H318 - Causes serious eye damage  
 H360 - May damage fertility or the unborn child  
 H401 - Toxic to aquatic life

**Precautionary Statements****Prevention**

P201 - Obtain special instructions before use  
 P202 - Do not handle until all safety precautions have been read and understood  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P233 - Keep container tightly closed  
 P240 - Ground and bond container and receiving equipment.  
 P241 - Use explosion-proof electrical/ventilating/lighting/equipment  
 P242 - Use only non-sparking tools  
 P243 - Take action to prevent static discharges.  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P273 - Avoid release to the environment  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P281 - Use personal protective equipment as required

**Response**

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician  
 P331 - Do NOT induce vomiting  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P332 + P313 - If skin irritation occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P308 + P313 - IF exposed or concerned: Get medical advice/attention  
 P370 + P378 - In case of fire: Use water spray for extinction

**Storage**

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

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Hydrotreated light petroleum distillate  
 Ethanol  
 Fatty acids, tall-oil, ethoxylated  
 C12-C15 Ethoxylated alcohols  
 Amides, tall-oil fatty, N,N-bis(hydroxyethyl)  
 Butyl alcohol

**CAS Number**

64742-47-8  
 64-17-5  
 61791-00-2  
 68131-39-5  
 68155-20-4  
 71-36-3

Methanol

67-56-1

**Other hazards which do not result in classification**

None known

For the full text of the H-phrases mentioned in this Section, see Section 16

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	Asp. Tox. 1 (H304)
Ethanol	64-17-5	10 - 30%	Eye Irrit. 2A (H319) Flam. Liq. 2 (H225)
Fatty acids, tall-oil, ethoxylated	61791-00-2	10 - 30%	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319)
C12-C15 Ethoxylated alcohols	68131-39-5	10 - 30%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	10 - 30%	Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 2 (H401) Aquatic Chronic 3 (H412)
Butyl alcohol	71-36-3	5 - 10%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) STOT SE 3 (H335) Flam. Liq. 3 (H226)
Methanol	67-56-1	0.1 - 1%	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) Repr. 1B (H360) STOT SE 1 (H370) Flam. Liq. 2 (H225)

**4. First aid measures****Description of necessary first aid measures****Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Seek immediate medical attention/advice. Suitable emergency eye wash facility should be immediately available

**Skin**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention.

**Ingestion**

Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration. Rinse mouth. Never give anything by mouth to an unconscious person. Following ingestion, onset of symptoms may be delayed by 12 to 24 hours. Admission to hospital should be the first priority even if symptoms are absent.

**Symptoms caused by exposure**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. Potential reproductive hazard. May cause birth defects.

**Medical Attention and Special Treatment****Notes to Physician**

Treat symptomatically

## 5. Fire Fighting Measures

### Suitable extinguishing equipment

#### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

#### **Extinguishing media which must not be used for safety reasons**

Do NOT spray pool fires directly with water. A solid stream of water directed into hot burning liquid can cause splattering.

### Specific hazards arising from the chemical

#### **Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

### Special protective equipment and precautions for fire fighters

#### **Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use appropriate protective equipment. Remove sources of ignition. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Avoid contact with skin, eyes and clothing.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Dike far ahead of liquid spill for later disposal. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. Remove ignition sources and work with non-sparking tools.

## 7. Handling and storage

### 7.1. Precautions for safe handling

#### **Handling Precautions**

Ensure adequate ventilation. Use appropriate protective equipment. Remove sources of ignition. Ground and bond containers when transferring from one container to another. Avoid contact with eyes, skin, or clothing.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### **Storage Information**

Store in a cool well ventilated area. Keep from heat, sparks, and open flames.

#### **Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Hydrotreated light petroleum distillate	64742-47-8	Not applicable	Not applicable
Ethanol	64-17-5	TWA: 1000 ppm TWA: 1880 mg/m <sup>3</sup>	STEL: 1000 ppm
Fatty acids, tall-oil, ethoxylated	61791-00-2	Not applicable	Not applicable
C12-C15 Ethoxylated alcohols	68131-39-5	Not applicable	Not applicable
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Not applicable	Not applicable
Butyl alcohol	71-36-3	50 ppm	TWA: 20 ppm



Methanol	67-56-1	TWA: 200 ppm TWA: 262 mg/m <sup>3</sup> STEL: 250 ppm STEL: 328 mg/m <sup>3</sup>	TWA: 200 ppm STEL: 250 ppm
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**Appropriate engineering controls****Engineering Controls**

Ensure adequate ventilation, especially in confined areas

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Organic vapor respirator.

**Hand Protection**

Use gloves which are suitable for the chemicals present in this product as well as other environmental factors in the workplace.

**Skin Protection**

Wear impervious protective clothing, including boots, gloves, lab coat, apron, rain jacket, pants or coverall, as appropriate, to prevent skin contact.

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

**Environmental Exposure Controls**

No information available

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties****Physical State:** Liquid**Color**

Colorless to Light Amber

**Odor:** Mild hydrocarbon**Odor Threshold:**

No information available

PropertyValuesRemarks/ - Method**pH:**

No data available

**Freezing Point / Range**

-44.2 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

No data available

**Flash Point**

34 °C / 93.2 °F

**Evaporation rate**

No data available

**Vapor Pressure**

No data available

**Vapor Density**

No data available

**Specific Gravity**

0.918

**Water Solubility**

No data available

**Solubility in other solvents**

No data available

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

No data available

**Autoignition Temperature**

No data available

**Decomposition Temperature**

No data available

**Viscosity**

No data available

**Explosive Properties**

No information available

**Oxidizing Properties**

No information available

**9.2. Other information****VOC Content (%)**

No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

Keep away from heat, sparks and flame.

**10.5. Incompatible materials**

Strong oxidizers. Strong acids. Strong alkalis.

**10.6. Hazardous decomposition products**

Carbon oxides. Oxides of nitrogen.

**11. Toxicological Information****Information on routes of exposure****Principle Route of Exposure** Skin contact. Eye contact. Inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes skin irritation. Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. Potential reproductive hazard. May cause birth defects.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrotreated light petroleum distillate	64742-47-8	>5000 mg/kg-bw (rat) (similar substance)	>2000 mg/kg-bw (rabbit) (similar substance)	>5.2 mg/L (rat, 4 h, vapor) (similar substance)
Ethanol	64-17-5	7060 mg/kg (Rat) 10,470 mg/kg (Rat)	> 15,800 mg/kg (Rabbit) 17,100 mg/kg (Rabbit)	124.7 mg/L (Rat) 4h
Fatty acids, tall-oil, ethoxylated	61791-00-2	> 6400 mg/kg (Rat)	No data available	No data available
C12-C15 Ethoxylated alcohols	68131-39-5	2 g/kg (Rat) 1600 mg/kg (Rat) > 5000 mg/kg (Rat)	> 2000 mg/kg (Rat) 2500 mg/kg (Rabbit)	No data available
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	3500 mg/kg (Rat) > 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 0.219 mg/L (Mouse) 4h (similar substance)
Butyl alcohol	71-36-3	790 mg/kg (Rat)	3400 mg/kg (Rabbit)	> 17.6 mg/L (Rat) 4h
Methanol	67-56-1	300 mg/kg-bw (human) < 790 to 13,000 mg/kg (rat)	1000 mg/kg-bw (human) 17,100 mg/kg (rabbit)	10 mg/L (human, 4h, vapor)

**Immediate, delayed and chronic health effects from exposure**

**Inhalation** May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

**Eye Contact** Causes severe eye irritation which may damage tissue.

**Skin Contact** Causes skin irritation.

**Ingestion** Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. Ingestion of this product may cause blindness due to the presence of methanol.

**Chronic Effects/Carcinogenicity** Prolonged or repeated exposure may cause reproductive system damage. May cause birth defects.

**Exposure Levels**

No data available

**Interactive effects**

No data available

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Hydrotreated light petroleum distillate	64742-47-8	Non-irritating to the skin (similar substances)
Ethanol	64-17-5	Not irritating to skin in rabbits.
Fatty acids, tall-oil, ethoxylated	61791-00-2	Irritating to skin.
C12-C15 Ethoxylated alcohols	68131-39-5	May cause moderate skin irritation. (Rabbit)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Skin, rabbit: Causes moderate skin irritation. (similar substances)
Butyl alcohol	71-36-3	Causes moderate skin irritation.
Methanol	67-56-1	Non-irritating to the skin (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Hydrotreated light petroleum distillate	64742-47-8	Non-irritating to rabbit's eye (similar substances)
Ethanol	64-17-5	Causes moderate eye irritation (Rabbit)
Fatty acids, tall-oil, ethoxylated	61791-00-2	Irritating to eyes
C12-C15 Ethoxylated alcohols	68131-39-5	Risk of serious damage to eyes (Rabbit) (similar substances)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Causes severe eye irritation (similar substances)
Butyl alcohol	71-36-3	Causes severe eye irritation
Methanol	67-56-1	Non-irritating to the eye (Rabbit)

Substances	CAS Number	Skin Sensitization
Hydrotreated light petroleum distillate	64742-47-8	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Ethanol	64-17-5	Did not cause sensitization on laboratory animals
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	Did not cause sensitization on laboratory animals (guinea pig)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Did not cause sensitization on laboratory animals (similar substances)
Butyl alcohol	71-36-3	Not confirmed to cause skin or respiratory sensitization.
Methanol	67-56-1	Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Hydrotreated light petroleum distillate	64742-47-8	No information available
Ethanol	64-17-5	Did not cause sensitization on laboratory animals
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	No information available
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	No information available
Butyl alcohol	71-36-3	No information available
Methanol	67-56-1	No information available

Substances	CAS Number	Mutagenic Effects
Hydrotreated light petroleum distillate	64742-47-8	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)
Ethanol	64-17-5	Not regarded as mutagenic.
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	In vivo tests did not show mutagenic effects. In vitro tests did not show mutagenic effects.
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)
Butyl alcohol	71-36-3	In vitro tests did not show mutagenic effects.
Methanol	67-56-1	The weight of evidence from available in vitro and in vivo studies indicates that this substance is not expected to be mutagenic.

Substances	CAS Number	Carcinogenic Effects
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Hydrotreated light petroleum distillate	64742-47-8	Did not show carcinogenic effects in animal experiments (similar substances)
Ethanol	64-17-5	Did not show carcinogenic effects in animal experiments
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	Did not show carcinogenic effects in animal experiments
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Not regarded as carcinogenic.
Butyl alcohol	71-36-3	No information available
Methanol	67-56-1	No data of sufficient quality are available.

Substances	CAS Number	Reproductive toxicity
Hydrotreated light petroleum distillate	64742-47-8	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)
Ethanol	64-17-5	Animal testing did not show any effects on fertility.
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	No significant toxicity observed in animal studies at concentration requiring classification.
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Not a confirmed teratogen or embryotoxin.
Butyl alcohol	71-36-3	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Methanol	67-56-1	Experiments have shown reproductive toxicity effects on laboratory animals

Substances	CAS Number	STOT - single exposure
Hydrotreated light petroleum distillate	64742-47-8	No significant toxicity observed in animal studies at concentration requiring classification.
Ethanol	64-17-5	No significant toxicity observed in animal studies at concentration requiring classification.
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	No significant toxicity observed in animal studies at concentration requiring classification.
Butyl alcohol	71-36-3	May cause respiratory irritation.
Methanol	67-56-1	May cause disorder and damage to the Central Nervous System (CNS)

Substances	CAS Number	STOT - repeated exposure
Hydrotreated light petroleum distillate	64742-47-8	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Ethanol	64-17-5	No significant toxicity observed in animal studies at concentration requiring classification.
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	No significant toxicity observed in animal studies at concentration requiring classification.
Butyl alcohol	71-36-3	No significant toxicity observed in animal studies at concentration requiring classification.
Methanol	67-56-1	No data of sufficient quality are available.

Substances	CAS Number	Aspiration hazard
Hydrotreated light petroleum distillate	64742-47-8	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Ethanol	64-17-5	Not applicable
Fatty acids, tall-oil, ethoxylated	61791-00-2	Not applicable
C12-C15 Ethoxylated alcohols	68131-39-5	No adverse health effects are expected from swallowing.
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	No information available
Butyl alcohol	71-36-3	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Methanol	67-56-1	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

Product is not classified as hazardous to the environment.

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Hydrotreated light petroleum distillate	64742-47-8	ErL50(72 h)>10000 mg/L (Skeletonema costatum)	LC50(96 h)>10000 mg/L (Scophthalmus maximus) NOELC(28 d)>1000 mg/L (fish)	No information available	LC50(48 h)>10000 mg/L (Acartia tonsa) NOEC(21 d)=1000 mg/L (Daphnia magna)
Ethanol	64-17-5	No information available	LC50 > 100 mg/L (Pimephales promelas)	No information available	LC50 9268 - 14,221 mg/L (Daphnia magna) LC50 5012 mg/L (Ceriodaphnia dubia) NOEC 9.6 mg/L (Daphnia magna)
Fatty acids, tall-oil, ethoxylated	61791-00-2	EC50 (72h) > 44 mg/L EC50 (72h) 2.5 mg/L (Skeletonema costatum)	LC50 (95h) 7.8 mg/L (Brachydanio rerio) LC50 (96h) 45 mg/L (Cyprinodon variegatus)	EC20 (180m) >1000 mg/L	EC50 (48h) 16 mg/L (Daphnia magna) EC50 (48h) 26.8 mg/L (Acartia tonsa)
C12-C15 Ethoxylated alcohols	68131-39-5	No information available	EC50 (48h) 0.39 mg/L (Ceriodaphnia dubia) NOEC (30d) 0.28 mg/L (Pimephales promelas) NOEC (16d) 0.16 mg/L (Lepomis macrochirus)	No information available	No information available
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	EC50 (72h) 2.2 mg/L (Scenedesmus subspicatus) (similar substance)	LC50 (96h) 6.7 mg/L (Danio rerio) (similar substance)	No information available	LC50 (21d) = 0.1 mg/L (Daphnia magna) LC50 (48h) = 2.15 mg/L
Butyl alcohol	71-36-3	EC50 (96h) 225 mg/L (Pseudokirchnerella subcapitata)	LC50 (96h) 1376 mg/L (Pimephales promelas)	No information available	EC50 (48h) 1328 mg/L (Daphnia magna) NOEC (21d) 4.1 mg/L (Daphnia magna) EC50 (21d) 18 mg/L (Daphnia magna)
Methanol	67-56-1	EC50 (96 h) =22000 mg/L (Pseudokirchnerella subcapitata) NOEC (8 d) =8000 mg/L (Scenedesmus quadricauda)	LC50 (96 h) =15400 mg/L (Lepomis macrochirus) EC50 (200 h) =14536 mg/L (Oryzias latipes)	IC50 (3h) > 1000 mg/L (activated sludge)	EC50 (96 h) =18260 mg/L (Daphnia magna) NOEC (21 d) =208 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Hydrotreated light petroleum distillate	64742-47-8	Readily biodegradable (68.1% @ 28d)
Ethanol	64-17-5	No information available
Fatty acids, tall-oil, ethoxylated	61791-00-2	Readily biodegradable (74% @ 28d)
C12-C15 Ethoxylated alcohols	68131-39-5	Readily biodegradable
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	Readily biodegradable (77% @ 28d)
Butyl alcohol	71-36-3	Biodegradable. (92% @ 20d)
Methanol	67-56-1	Readily biodegradable (95% @ 20d)

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Hydrotreated light petroleum distillate	64742-47-8	No information available
Ethanol	64-17-5	-0.32
Fatty acids, tall-oil, ethoxylated	61791-00-2	MW > 700
C12-C15 Ethoxylated alcohols	68131-39-5	3
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	3.2 (estimated)

Butyl alcohol	71-36-3	1
Methanol	67-56-1	Not Bioaccumulative; BCF=1

#### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Hydrotreated light petroleum distillate	64742-47-8	No information available
Ethanol	64-17-5	No information available
Fatty acids, tall-oil, ethoxylated	61791-00-2	No information available
C12-C15 Ethoxylated alcohols	68131-39-5	No information available
Amides, tall-oil fatty, N,N-bis(hydroxyethyl)	68155-20-4	No information available
Butyl alcohol	71-36-3	KOC = 72
Methanol	67-56-1	No information available

#### 12.6. Other adverse effects

##### **Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

### 13. Disposal Considerations

#### Safe handling and disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

#### Disposal of any contaminated packaging

Follow all applicable national or local regulations.

#### Environmental regulations

Not applicable

### 14. Transport Information

#### Transportation Information

##### Australia ADG

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Ethanol, Butanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable

##### IMDG/IMO

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Ethanol, Butanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable

##### IATA/ICAO

UN Number: UN1993  
 UN proper shipping name: Flammable Liquid, N.O.S. (Contains Ethanol, Butanol)  
 Transport Hazard Class(es): 3  
 Packing Group: III  
 Environmental Hazards: Not applicable

#### Special precautions during transport

None

#### HazChem Code

•3Y

### 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product does not comply with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 31-Aug-2017**Revision Note**

SDS sections updated:

2

**Full text of H-Statements referred to under sections 2 and 3**

H225 - Highly flammable liquid and vapor  
H226 - Flammable liquid and vapor  
H301 - Toxic if swallowed  
H302 - Harmful if swallowed  
H304 - May be fatal if swallowed and enters airways  
H311 - Toxic in contact with skin  
H315 - Causes skin irritation  
H318 - Causes serious eye damage  
H319 - Causes serious eye irritation  
H331 - Toxic if inhaled  
H335 - May cause respiratory irritation  
H360 - May damage fertility or the unborn child  
H370 - Causes damage to organs  
H400 - Very toxic to aquatic life  
H401 - Toxic to aquatic life  
H412 - Harmful to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**



## SAFETY DATA SHEET

### DCA-2120875

Revision Date: 25-Jun-2015

Revision Number: 3

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** DCA-2120875

##### Other means of Identification

**Synonyms:** None

**Product Code:** HM008041

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Diverter

**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton/Baroid Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775

Telephone Number: 61 (08) 9455 8300

Fax Number: 61 (08) 9455 5300

##### **Product Emergency Telephone**

Australia: + 61 1 800 686 951

Papua New Guinea: + 61 1 800 686 951

New Zealand: +64 800 451719

##### **Fire, Police & Ambulance - Emergency Telephone**

Australia: 000

Papua New Guinea: 000

New Zealand: 111

**E-Mail address:** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Not classified

**Label elements, including precautionary statements****Hazard Pictograms**

Signal Word Not Hazardous

Hazard Statements Not Classified

**Precautionary Statements**

Prevention None

Response None

Storage None

Disposal None

**Contains****Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

None known

**Australia Classification***For the full text of the H-phrases mentioned in this Section, see Section 16*

Classification Not Classified

Risk Phrases None

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

**4. First aid measures****Description of necessary first aid measures****Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin**

Wash with soap and water. Get medical attention if irritation persists.

**Ingestion**

Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

No significant hazards expected.

**Medical Attention and Special Treatment****Notes to Physician**

Treat symptomatically

## 5. Fire Fighting Measures

### Suitable extinguishing equipment

#### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

#### **Extinguishing media which must not be used for safety reasons**

None known.

### Specific hazards arising from the chemical

#### **Special Exposure Hazards**

Decomposition in fire may produce harmful gases.

### Special protective equipment and precautions for fire fighters

#### **Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Slippery when wet.

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Scoop up and remove.

## 7. Handling and storage

### 7.1. Precautions for Safe Handling

#### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Avoid dust accumulations.

#### **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

### 7.2. Conditions for safe storage, including any incompatibilities

#### **Storage Information**

Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Store between 40.5 F (4.7 C) and 120.5 F (49 C). Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 12 months.

#### **Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

### Control parameters - exposure standards, biological monitoring

#### **Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

### Appropriate engineering controls

#### **Engineering Controls**

Use in a well ventilated area.

### Personal protective equipment (PPE)

#### **Respiratory Protection**

Not normally needed. But if significant exposures are possible then the following respirator

	is recommended:
<b>Hand Protection</b>	Dust/mist respirator. (N95, P2/P3)
<b>Skin Protection</b>	Normal work gloves.
<b>Eye Protection</b>	Normal work coveralls.
<b>Other Precautions</b>	Wear safety glasses or goggles to protect against exposure.
<b>Environmental Exposure Controls</b>	None known.
	No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Beads	<b>Color:</b>	Green
<b>Odor:</b>	Odorless - Acidic	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	6-8
<b>Freezing Point/Range</b>	150-230 °C
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.16 - 1.20
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	300 °C / 572 °F
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
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## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical Stability

Stable

### 10.3. Possibility of Hazardous Reactions

Will Not Occur

### 10.4. Conditions to Avoid

Temperature over 440 F (240 C).

### 10.5. Incompatible Materials

Strong oxidizers. Strong alkalis.

### 10.6. Hazardous Decomposition Products

Toxic fumes. Aldehydes. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

**Most Important Symptoms/Effects**

No significant hazards expected.

**Numerical measures of toxicity**

**LD50 Oral:** No information available.  
**LD50 Dermal:** No information available.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

**Inhalation** None known.  
**Eye Contact** None known.  
**Skin Contact** None known.  
**Ingestion** May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

**12.2. Persistence and degradability**

Expected to be biodegradable

Substances	CAS Number	Persistence and Degradability
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Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available
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**12.3. Bioaccumulative potential**

Does not bioaccumulate

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>13. Disposal Considerations</b>
------------------------------------

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

<b>14. Transport Information</b>
----------------------------------

**Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

<b>15. Regulatory Information</b>
-----------------------------------

**Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory** All components listed on inventory or are exempt.**New Zealand Inventory of Chemicals** All components listed on inventory or are exempt.**EINECS Inventory** This product, and all its components, complies with EINECS**US TSCA Inventory** All components listed on inventory or are exempt.**Canadian DSL Inventory** All components listed on inventory or are exempt.**Poisons Schedule number**

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None Allocated

<b>16. Other information</b>
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**Date of preparation or review****Revision Date:** 25-Jun-2015**Revision Note**

SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

None

**Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit

PBT – Persistent Bioaccumulative and Toxic

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

vPvB – very Persistent and very Bioaccumulative

h - hour

mg/m<sup>3</sup> - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

w/w - weight/weight

d - day

**Key literature references and sources for data**[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

#### Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : EC9374A ACID CORROSION INHIBITOR

Other means of identification : Not applicable.

Recommended use : ACID CORROSION INHIBITOR

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : ECOLAB PTY LTD  
2 Drake Avenue  
Macquarie Park NSW 2113  
Australia  
A.B.N. 59 000 449 990  
TEL: 1300 654 224  
FAX: +61 2 8870 8680

Emergency telephone number : 1800 205 506  
International: +64 7 958 2372

Issuing date : 10.06.2016

#### Section: 2. HAZARDS IDENTIFICATION

##### GHS Classification

Flammable liquids : Category 2  
Skin corrosion/irritation : Category 1B  
Serious eye damage/eye irritation : Category 1  
Skin sensitization : Category 1

##### GHS Label element

Hazard pictograms : 

Signal Word : Danger

Hazard Statements : Highly flammable liquid and vapour.  
Causes severe skin burns and eye damage.  
May cause an allergic skin reaction.

Precautionary Statements : **Prevention:**  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/ lighting/ equipment. Take precautionary measures against static discharge. Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. Wear protective gloves/ protective clothing/ eye protection/ face protection. Use only non-sparking tools.

**Response:**  
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove



# SAFETY DATA SHEET

## EC9374A ACID CORROSION INHIBITOR

contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.

Specific treatment (see supplemental first aid instructions on this label).

### Storage:

Store locked up. Store in a well-ventilated place. Keep cool.

### Disposal:

Dispose of contents/container to an approved facility in accordance with local, regional, national and international regulations.

**Other hazards** : None known.

### Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture : Mixture

Chemical Name	CAS-No.	Concentration: (%)
Formic Acid	64-18-6	30 - 60
Aromatic aldehyde	Proprietary	10 - 30
Isopropanol	67-63-0	5 - 10
2-Mercaptoethanol	60-24-2	1 - 5
Methanol	67-56-1	1 - 5

### Section: 4. FIRST AID MEASURES

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes. Use a mild soap if available. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

If swallowed : Contact the Poison's Information Centre (eg Australia 13 1126; New Zealand 0800 764 766).

Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

### Section: 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Foam  
Carbon dioxide  
Dry powder  
Other extinguishing agent suitable for Class B fires  
For large fires, use water spray or fog, thoroughly drenching the burning material.

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Fire Hazard  
Keep away from heat and sources of ignition.  
Flash back possible over considerable distance.  
Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
- Hazardous combustion products : Decomposition products may include the following materials: Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
- Hazchem Code : ●3WE

### Section: 6. ACCIDENTAL RELEASE MEASURES

- Initial Emergency Response Guide No : 18
- Personal precautions, protective equipment and emergency procedures : Ensure adequate ventilation. Remove all sources of ignition. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### Section: 7. HANDLING AND STORAGE

- Advice on safe handling : Open drum carefully as content may be under pressure. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Do not ingest. Keep away from fire, sparks and heated surfaces. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Wash hands thoroughly after handling. Use only with adequate ventilation.
- Conditions for safe storage : Keep away from heat and sources of ignition. Keep in a cool, well-ventilated place. Keep away from oxidizing agents. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

# SAFETY DATA SHEET

## EC9374A ACID CORROSION INHIBITOR

Suitable material : The following compatibility data is suggested based on similar product data and/or industry experience: HDPE (high density polyethylene), Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, PTFE, Perfluoroelastomer

Unsuitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Copper, Ethylene propylene, Mild steel, Polypropylene, Polyethylene, Plexiglass, EPDM, Brass, PVC, Buna-N, Polyurethane, Neoprene, Aluminum, Chlorosulfonated polyethylene rubber, Polytetrafluoroethylene/polypropylene copolymer, Fluoroelastomer

### Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Components with workplace control parameters

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Formic Acid	64-18-6	TWA	5 ppm 9.4 mg/m <sup>3</sup>	AU OEL
		VLE	10 ppm 19 mg/m <sup>3</sup>	AU OEL
Formic Acid	64-18-6	WES-STEL	10 ppm 19 mg/m <sup>3</sup>	NZ OEL
		WES-TWA	5 ppm 9.4 mg/m <sup>3</sup>	NZ OEL
Formic Acid	64-18-6	TWA	5 ppm	ACGIH
		STEL	10 ppm	ACGIH
		TWA	5 ppm 9 mg/m <sup>3</sup>	NIOSH REL
		TWA	5 ppm 9 mg/m <sup>3</sup>	OSHA Z1
Isopropanol	67-63-0	TWA	400 ppm 983 mg/m <sup>3</sup>	AU OEL
		VLE	500 ppm 1,230 mg/m <sup>3</sup>	AU OEL
Isopropanol	67-63-0	WES-TWA	400 ppm 983 mg/m <sup>3</sup>	NZ OEL
		WES-STEL	500 ppm 1,230 mg/m <sup>3</sup>	NZ OEL
Isopropanol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m <sup>3</sup>	NIOSH REL
		STEL	500 ppm 1,225 mg/m <sup>3</sup>	NIOSH REL
		TWA	400 ppm 980 mg/m <sup>3</sup>	OSHA Z1
Heavy Aromatic Naphtha	64742-94-5	TWA	500 ppm 2,000 mg/m <sup>3</sup>	OSHA Z1
		TWA	200 mg/m <sup>3</sup> (as total hydrocarbon vapor)	ACGIH
Methanol	67-56-1	TWA	200 ppm 262 mg/m <sup>3</sup>	AU OEL
		VLE	250 ppm 328 mg/m <sup>3</sup>	AU OEL

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

Methanol	67-56-1	WES-TWA	200 ppm 262 mg/m <sup>3</sup>	NZ OEL
		WES-STEL	250 ppm 328 mg/m <sup>3</sup>	NZ OEL
Methanol	67-56-1	TWA	200 ppm	ACGIH
		STEL	250 ppm	ACGIH
		TWA	200 ppm 260 mg/m <sup>3</sup>	NIOSH REL
		STEL	250 ppm 325 mg/m <sup>3</sup>	NIOSH REL
		TWA	200 ppm 260 mg/m <sup>3</sup>	OSHA Z1

Engineering measures : Effective exhaust ventilation system. Maintain air concentrations below occupational exposure standards.

#### Personal protective equipment

Eye protection : Safety goggles  
Face-shield

Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Laminate film  
Nitrile  
Unsupported neoprene  
PVC  
Natural rubber  
Neoprene/natural rubber blend  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling. Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

#### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid  
Colour : dark brown  
Odour : Sharp  
Flash point : 13 °C, Method: ASTM D 93, Pensky-Martens closed cup  
pH : 3.1, 5 %  
Odour Threshold : no data available  
Melting point/freezing point : no data available  
Initial boiling point and boiling range : 64.4 °C

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

Evaporation rate	:	no data available
Flammability (solid, gas)	:	no data available
Upper explosion limit	:	no data available
Lower explosion limit	:	no data available
Vapour pressure	:	92.5 mm Hg, (15.6 °C), 118.4 mm Hg, (37.7 °C),
Relative vapour density	:	1.11
Relative density	:	1.11, (15.6 °C),
Density	:	9.26 lb/gal
Water solubility	:	dispersible
Solubility in other solvents	:	no data available
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition temperature	:	no data available
Viscosity, dynamic	:	no data available
Viscosity, kinematic	:	12 mm <sup>2</sup> /s (40 °C)
Molecular weight	:	no data available
VOC	:	no data available

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No dangerous reaction known under conditions of normal use.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	Decomposition products may include the following materials: Carbon oxides

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	:	Causes serious eye damage.
Skin	:	Causes severe skin burns. May cause allergic skin reaction.
Ingestion	:	Causes digestive tract burns.
Inhalation	:	May cause nose, throat, and lung irritation.

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

Chronic Exposure : Health injuries are not known or expected under normal use.

#### Experience with human exposure

Eye contact : Redness, Pain, Corrosion  
Skin contact : Redness, Pain, Irritation, Corrosion, Allergic reactions  
Ingestion : Corrosion, Abdominal pain  
Inhalation : Respiratory irritation, Cough

#### Toxicity

##### Product

Acute oral toxicity : Acute toxicity estimate: > 2,000 mg/kg  
Acute inhalation toxicity : Acute toxicity estimate: > 20 mg/l  
Exposure time: 4 h  
Acute dermal toxicity : Acute toxicity estimate: > 2,000 mg/kg  
Skin corrosion/irritation : no data available  
Serious eye damage/eye irritation : no data available  
Respiratory or skin sensitization : no data available  
Carcinogenicity : 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.  
Reproductive effects : No toxicity to reproduction  
Germ cell mutagenicity : Contains no ingredient listed as a mutagen  
Teratogenicity : no data available  
STOT - single exposure : no data available  
STOT - repeated exposure : no data available  
Aspiration toxicity : No aspiration toxicity classification

#### Human Hazard Characterization

Based on our hazard characterization, the potential human hazard is: High

### Section: 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Environmental Effects : This product has no known ecotoxicological effects.

#### Product

Toxicity to fish : no data available  
Toxicity to daphnia and other aquatic invertebrates : no data available  
Toxicity to algae : no data available

#### Components

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

Toxicity to fish : Formic Acid  
LC50 : > 100 mg/l  
Exposure time: 96 h

Aromatic aldehyde  
LC50 : 103.085 mg/l  
Exposure time: 96 h

Isopropanol  
LC50 Pimephales promelas (fathead minnow): 9,640 mg/l  
Exposure time: 96 h

Methanol  
LC50 : 15,400 mg/l  
Exposure time: 96 h

#### Components

Toxicity to daphnia and other aquatic invertebrates : Aromatic aldehyde  
EC50 Daphnia magna (Water flea): 119.56 mg/l  
Exposure time: 48 h

Isopropanol  
LC50 Daphnia magna (Water flea): > 10,000 mg/l

2-Mercaptoethanol  
EC50 : 0.89 mg/l  
Exposure time: 48 h

Methanol  
EC50 : > 10,000 mg/l  
Exposure time: 48 h

#### Components

Toxicity to algae : Aromatic aldehyde  
NOEC : 37.2314 mg/l  
Exposure time: 72 h

Methanol  
EC50 : 22,000 mg/l  
Exposure time: 72 h

#### Components

Toxicity to bacteria : Aromatic aldehyde  
8.612 mg/l

Isopropanol  
1,050 mg/l

Methanol  
> 1,000 mg/l

#### Components

Toxicity to fish (Chronic toxicity) : Methanol  
NOEC: 7,900 mg/l  
Exposure time: 8.3 d

#### Persistence and degradability

# SAFETY DATA SHEET

## EC9374A ACID CORROSION INHIBITOR

The organic portion of this preparation is expected to be inherently biodegradable.

### Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	:	<5%
Water	:	10 - 30%
Soil	:	50 - 70%

The portion in water is expected to float on the surface.

### Bioaccumulative potential

Component substances have a low potential to bioconcentrate.

### Other information

no data available

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

## Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods	:	The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.
Disposal considerations	:	Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

## Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

### Land transport

Proper shipping name	:	FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Technical name(s):	:	Isopropanol, Formic Acid
UN/ID No.	:	UN 2924
Transport hazard class(es)	:	3, 8
Packing group	:	II
IERG No	:	18
Hazchem Code	:	●3WE
Special precautions for user	:	Dangerous goods of Class 3 (Flammable Liquid) Subsidiary Class 8 (Alkali) are incompatible in a placard load with any of



## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

the following:  
and are incompatible with food or food packaging in any quantity.

- Class 1 Explosives
- Class 2.1 Flammable gases (where both are in bulk)
- Class 2.3 Poisonous gases
- Class 4.2 Spontaneously combustible substances
- Class 4.3 Dangerous when wet substances
- Class 5.1 Oxidising agents
- Class 5.2 Organic peroxides
- Class 7 Radioactive substances

#### Air transport (IATA)

UN/ID No. : UN 2924  
Proper shipping name : FLAMMABLE LIQUID, CORROSIVE, N.O.S.  
Technical name(s) : Isopropanol, Formic Acid  
Transport hazard class(es) : 3, 8  
Packing group : II

#### Sea transport (IMDG/IMO)

UN/ID No. : UN 2924  
Proper shipping name : FLAMMABLE LIQUID, CORROSIVE, N.O.S.  
Technical name(s) : Isopropanol, Formic Acid  
Transport hazard class(es) : 3, 8  
Packing group : II

### Section: 15. REGULATORY INFORMATION

Standard for the Uniform : Schedule 6  
Scheduling of Medicines and  
Poisons

#### INTERNATIONAL CHEMICAL CONTROL LAWS :

##### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

##### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

##### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

##### CHINA

This product contains substance(s) which are not in compliance with the Provisions on the Environmental Administration of New Chemical Substances and may require additional review.

##### JAPAN

This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Existing and New Chemical Substances list (ENCS).

##### KOREA

This product contains substance(s) which are not in compliance with the Chemical Control Act (CCA) and may require additional review.

## SAFETY DATA SHEET

### EC9374A ACID CORROSION INHIBITOR

#### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

#### Section: 16. OTHER INFORMATION

##### REFERENCES

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,  
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Revision Date	:	10.06.2016
Date of first issue	:	10.06.2016
Version Number	:	1.0
Prepared By	:	Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this 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. For additional copies of an SDS visit [www.nalco.com](http://www.nalco.com) and request access.

## SAFETY DATA SHEET

### FDP-S1246-16

Revision Date: 26-May-2016

Revision Number: 1

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** FDP-S1246-16

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM008363

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Viscosifier

**Uses advised against** Consumer use

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton/Baroid Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: 61 (08) 9455 8300  
Fax Number: 61 (08) 9455 5300

##### **Product Emergency Telephone**

Australia: + 61 1 800 686 951  
Papua New Guinea: + 61 1 800 686 951  
New Zealand: +64 800 451719

##### **Fire, Police & Ambulance - Emergency Telephone**

Australia: 000  
Papua New Guinea: 000  
New Zealand: 111

**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Non-Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Not classified

**Label elements, including precautionary statements****Hazard pictograms**

Signal Word Not Hazardous

Hazard Statements: Not Classified

**Precautionary Statements**

Prevention None  
 Response None  
 Storage None  
 Disposal None

**Contains****Substances**

Contains no hazardous substances in concentrations above cut-off values according to the competent authority

**CAS Number**

NA

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16***3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%	Not Applicable

The specific chemical identity of the composition has been withheld as proprietary. The exact percentage (concentration) of the composition has been withheld as proprietary.

**4. First aid measures****Description of necessary first aid measures**

**Inhalation** If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**Skin** Flush skin with large amounts of water. If irritation persists, get medical attention.

**Ingestion** Rinse mouth with water many times. Get medical attention if symptoms occur

**Symptoms caused by exposure**

No information available

**Medical Attention and Special Treatment**

Notes to Physician Treat symptomatically

**5. Fire Fighting Measures**

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

Avoid creating dust clouds with extinguishers.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Avoid creating and breathing dust. Ensure adequate ventilation. Use appropriate protective equipment. Remove sources of ignition. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Avoid contact with skin, eyes and clothing. Use only competent persons for cleanup.

**6.2. Environmental precautions**

None known.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove. Remove ignition sources and work with non-sparking tools.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Ensure adequate ventilation. Use appropriate protective equipment. Remove sources of ignition. Ground and bond containers when transferring from one container to another.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store in a cool well ventilated area. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Keep from heat, sparks, and open flames.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Localized ventilation should be used to control dust levels. Ensure adequate ventilation, especially in confined areas

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an

	industrial hygienist or other qualified professional based on the specific application of this product.
<b>Respiratory Protection</b>	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Use gloves which are suitable for the chemicals present in this product as well as other environmental factors in the workplace.
<b>Skin Protection</b>	Wear protective clothing appropriate for the work environment.
<b>Eye Protection</b>	Wear safety glasses or goggles to protect against exposure.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.
<b>Environmental Exposure Controls</b>	Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Powder	<b>Color</b>	Clear
<b>Odor:</b>	Sweet	<b>Odor Threshold:</b>	No information available

Property	Values
<u>Remarks/ - Method</u>	
<b>pH:</b>	No data available
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.25
<b>Water Solubility</b>	Insoluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
<b>Bulk Density</b>	54.5 lbs/ft <sup>3</sup>

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

Keep away from heat, sparks and flame.

### 10.5. Incompatible materials

Strong oxidizers. Strong acids. Strong alkalis.

### 10.6. Hazardous decomposition products

Toxic fumes. Aldehydes. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

**Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation. Ingestion.**Symptoms related to exposure****Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

**Inhalation** May cause mild respiratory irritation.  
**Eye Contact** May cause mild eye irritation.  
**Skin Contact** May cause mild skin irritation.  
**Ingestion** May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Serious eye damage/irritation
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Skin Sensitization
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Respiratory Sensitization
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Mutagenic Effects
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Carcinogenic Effects
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Reproductive toxicity
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	STOT - single exposure
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	STOT - repeated exposure
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Substances	CAS Number	Aspiration hazard
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

No data available

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

#### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available



**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Follow all applicable community, national or regional regulations regarding waste management methods.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

**Poisons Schedule number**

---

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stokholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

<b>16. Other information</b>
------------------------------

**Date of preparation or review**

**Revision Date:** 26-May-2016

**Revision Note****Full text of H-Statements referred to under sections 2 and 3**

None

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

## SAFETY DATA SHEET

### FE-2

Revision Date: 16-Apr-2015

Revision Number: 28

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** FE-2

##### Other means of Identification

**Synonyms:** None  
**Product Code:** HM000682

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Iron Control Agent  
**Uses Advised Against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia  
  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
E-Mail address: fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951

##### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Serious Eye Damage / Eye Irritation	Category 2 - H319
-------------------------------------	-------------------

##### Label elements, including precautionary statements

**Hazard Pictograms**



<b>Signal Word</b>	Warning
<b>Hazard Statements</b>	H319 - Causes serious eye irritation
<b>Precautionary Statements</b>	
<b>Prevention</b>	P264 - Wash face, hands and any exposed skin thoroughly after handling P280 - Wear eye protection/face protection
<b>Response</b>	P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337 + P313 - If eye irritation persists: Get medical advice/attention
<b>Storage</b>	None
<b>Disposal</b>	None

**Contains Substances**  
Citric acid

**CAS Number**  
77-92-9

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).  
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

**Australia Classification**

For the full text of the H-phrases mentioned in this Section, see Section 16

<b>Classification</b>	Xi - Irritant.
<b>Risk Phrases</b>	R36 Irritating to eyes.

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Citric acid	77-92-9	60 - 100%	Eye Irrit. 2A (H319)

### 4. First aid measures

**Description of necessary first aid measures**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Ingestion</b>	DO NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

**Symptoms caused by exposure**

Causes eye irritation.

**Medical Attention and Special Treatment**

**Notes to Physician** Treat symptomatically

## 5. Fire Fighting Measures

**Suitable extinguishing equipment****Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special Exposure Hazards**

Decomposition in fire may produce harmful gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

**Special protective equipment and precautions for fire fighters****Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for Safe Handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from alkalis. Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 60 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Citric acid	77-92-9	Not applicable	Not applicable

**Appropriate engineering controls**

**Engineering Controls** Use in a well ventilated area.

**Personal protective equipment (PPE)**

**Respiratory Protection** If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Dust/mist respirator. (N95, P2/P3)

**Hand Protection** Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Nitrile gloves. (>= 0.35 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection** Normal work coveralls.

**Eye Protection** Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions** None known.

**Environmental Exposure Controls** Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties**

**Physical State:** Solid      **Color:** White  
**Odor:** Odorless      **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
pH:	2 - 2.2
Freezing Point/Range	No data available
Melting Point/Range	No data available
Boiling Point/Range	No data available
Flash Point	No data available
upper flammability limit	65
lower flammability limit	8
Evaporation rate	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	1.665
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	1000 °C / 1832 °F
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

**9.2. Other information**

**Molecular Weight** 192.13  
**VOC Content (%)** No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical Stability**

Stable

**10.3. Possibility of Hazardous Reactions**

Will Not Occur

**10.4. Conditions to Avoid**

None anticipated

**10.5. Incompatible Materials**

Strong alkalis. Strong oxidizers.

**10.6. Hazardous Decomposition Products**

Carbon monoxide and carbon dioxide.

<b>11. Toxicological Information</b>
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**Information on routes of exposure****Principle Route of Exposure** Eye or skin contact, inhalation.**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes eye irritation.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Citric acid	77-92-9	5400 mg/kg (Rat) 5790 mg/kg (Mouse) 11,700 mg/kg (Rat)	> 2000 mg/kg	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation**

May cause mild respiratory irritation.

**Eye Contact**

Causes eye irritation.

**Skin Contact**

May cause mild skin irritation.

**Ingestion**

Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Citric acid	77-92-9	Not irritating to skin in rabbits.

Substances	CAS Number	Eye damage/irritation
Citric acid	77-92-9	Causes severe eye irritation.

Substances	CAS Number	Skin Sensitization
Citric acid	77-92-9	Patch test on human volunteers did not demonstrate sensitization properties

Substances	CAS Number	Respiratory Sensitization
Citric acid	77-92-9	No information available

Substances	CAS Number	Mutagenic Effects
Citric acid	77-92-9	Did not show mutagenic effects in animal experiments

Substances	CAS Number	Carcinogenic Effects
Citric acid	77-92-9	Did not show carcinogenic effects in animal experiments
Substances	CAS Number	Reproductive toxicity
Citric acid	77-92-9	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Substances	CAS Number	STOT - single exposure
Citric acid	77-92-9	No data of sufficient quality are available.
Substances	CAS Number	STOT - repeated exposure
Citric acid	77-92-9	No significant toxicity observed in animal studies at concentration requiring classification.
Substances	CAS Number	Aspiration hazard
Citric acid	77-92-9	No adverse health effects are expected from swallowing.

## 12. Ecological Information

### Ecotoxicity

#### Product Ecotoxicity Data

No data available

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Citric acid	77-92-9	NOEC (8d) 425 mg/L (cell density) ( <i>Scenedesmus quadricauda</i> ) LOEC (8d) >80 mg/L ( <i>Microcystis aeruginosa</i> )	LC50 (96h) 1516 mg/L ( <i>Lepomis macrochirus</i> ) LC50 (48h) 440 mg/L ( <i>Leuciscus idus melanotus</i> ) LC50 (96h) >100 mg/L ( <i>Pimephales promelas</i> )	TT (72h) 485 mg/L ( <i>Entosiphon sulcatum</i> )	TLM96 100-330 ppm ( <i>Crangon crangon</i> ) EC50 (24h) 1535 mg/L ( <i>Daphnia magna</i> ) LC50 (48h) 160 mg/L ( <i>Daphnia magna</i> ) EC50 (48h) >50 mg/L ( <i>Daphnia magna</i> )

### 12.2. Persistence and degradability

Biodegradable.

Substances	CAS Number	Persistence and Degradability
Citric acid	77-92-9	Readily biodegradable (97% @ 28d)

### 12.3. Bioaccumulative potential

Does not bioaccumulate

Substances	CAS Number	Log Pow
Citric acid	77-92-9	-1.61 to -1.80

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Citric acid	77-92-9	No information available

### 12.6. Other adverse effects

#### Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

### Safe handling and disposal methods

Bury in a licensed landfill according to federal, state, and local regulations.

### Disposal of any contaminated packaging

Follow all applicable national or local regulations. Contaminated packaging may be disposed of by: rendering packaging incapable of containing any substance, or treating packaging to remove residual contents, or treating packaging to make sure the residual



contents are no longer hazardous, or by disposing of packaging into commercial waste collection.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information**

<b>UN Number:</b>	Not restricted
<b>UN Proper Shipping Name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components listed on inventory or are exempt.
<b>New Zealand Inventory of Chemicals</b>	All components listed on inventory or are exempt.
<b>EINECS Inventory</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian DSL Inventory</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

## 16. Other information

**Date of preparation or review**

**Revision Date:** 16-Apr-2015

**Revision Note** Revision Note  
SDS sections updated: 2

**Full text of R-phrases referred to under Sections 2 and 3**

R36 - Irritating to eyes

**Full text of H-Statements referred to under sections 2 and 3**

H319 - Causes serious eye irritation

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight CAS – Chemical Abstracts Service EC50 – Effective Concentration 50% LC50 – Lethal Concentration 50% LD50

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– Lethal Dose 50% LL50 – Lethal Loading 50% mg/kg – milligram/kilogram mg/L – milligram/liter NOEC – No Observed Effect Concentration OEL – Occupational Exposure Limit PBT – Persistent Bioaccumulative and Toxic ppm – parts per million STEL – Short Term Exposure Limit TWA – Time-Weighted Average vPvB – very Persistent and very Bioaccumulative h - hour mg/m<sup>3</sup> - milligram/cubic meter mm - millimeter mmHg - millimeter mercury w/w - weight/weight d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

NZ CCID

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### HC-2A

Revision Date: 12-Jun-2018

Revision Number: 2

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** HC-2A

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM008835

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Surfactant

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

##### Emergency phone number

+ 61 1 800 686 951  
Global Incident Response Access Code: 334305  
Contract Number: 14012

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Serious Eye Damage/Irritation	Category 1 - H318
Acute Aquatic Toxicity	Category 2 - H401
Chronic Aquatic Toxicity	Category 2 - H411

##### Label elements, including precautionary statements

**Hazard Pictograms**



**Signal Word**

DANGER

**Hazard Statements:**

H318 - Causes serious eye damage  
 H401 - Toxic to aquatic life  
 H411 - Toxic to aquatic life with long lasting effects

**Precautionary Statements**

**Prevention**

P273 - Avoid release to the environment  
 P280 - Wear eye protection/face protection

**Response**

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P391 - Collect spillage

**Storage**

None

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains Substances**

Inner salt of alkyl amines

**CAS Number**

Proprietary

**Other hazards which do not result in classification**

None known

*For the full text of the H-phrases mentioned in this Section, see Section 16*

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Inner salt of alkyl amines	Proprietary	10 - 30%	Eye Corr. 1 (H318) Aquatic Acute 2 (H401) Aquatic Chronic 2 (H411)

**4. First aid measures**

**Description of necessary first aid measures**

**Inhalation**

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

**Eyes**

Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention.

**Skin**

Wash with soap and water. Get medical attention if irritation persists.

**Ingestion**

Rinse mouth with water many times. Get medical attention if symptoms occur

**Symptoms caused by exposure**

Causes severe eye irritation which may damage tissue.

**Medical Attention and Special Treatment**

**Notes to Physician**

Treat symptomatically

**5. Fire Fighting Measures**

**Suitable extinguishing equipment**

**Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical**

**Special exposure hazards in a fire**

Use water spray to cool fire exposed surfaces. Decomposition in fire may produce harmful gases.

**Special protective equipment and precautions for fire fighters**

**Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**6. Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

**7. Handling and storage**

**7.1. Precautions for safe handling**

**Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities**

**Storage Information**

Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 60 months.

**Other Guidelines**

No information available

**8. Exposure Controls/Personal Protection**

**Control parameters - exposure standards, biological monitoring**

**Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Inner salt of alkyl amines	Proprietary	Not applicable	Not applicable

**Appropriate engineering controls**

**Engineering Controls**

Use in a well ventilated area.

**Personal protective equipment (PPE)**

**Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

<b>Respiratory Protection</b>	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Dust/mist respirator. (N95, P2/P3)
<b>Hand Protection</b>	Use gloves which are suitable for the chemicals present in this product as well as other environmental factors in the workplace.
<b>Skin Protection</b>	Wear protective clothing appropriate for the work environment.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.
<b>Environmental Exposure Controls</b>	No information available

<b>9. Physical and Chemical Properties</b>
--

**9.1. Information on basic physical and chemical properties**

<b>Physical State:</b> Liquid	<b>Color:</b> Clear light amber
<b>Odor:</b> Surfactant	<b>Odor Threshold:</b> No information available

Property	Values
Remarks/ - Method	
<b>pH:</b>	6.5-7.5
<b>Freezing Point / Range</b>	0 °C
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	100 °C / 212 °F
<b>Flash Point</b>	> 100 °C / > 212 °F PMCC
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	< 17.5 mmHg
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.12
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

<b>VOC Content (%)</b>	No data available
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<b>10. Stability and Reactivity</b>
-------------------------------------

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

Keep away from heat, sparks and flame.

**10.5. Incompatible materials**

Strong oxidizers.

**10.6. Hazardous decomposition products**

Oxides of nitrogen. Carbon monoxide and carbon dioxide. Hydrogen chloride.

<b>11. Toxicological Information</b>
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**Information on routes of exposure**

<b>Principle Route of Exposure</b>	Eye or skin contact, inhalation.
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**Symptoms related to exposure**

**Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Inner salt of alkyl amines	Proprietary	>5000 mg/kg-bw (rat)	>2000 mg/kg-bw (rat)	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	May cause mild respiratory irritation.
<b>Eye Contact</b>	Causes severe eye irritation which may damage tissue. May cause corneal injury.
<b>Skin Contact</b>	May cause mild skin irritation.
<b>Ingestion</b>	May cause abdominal pain, vomiting, nausea, and diarrhea.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

None known.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Inner salt of alkyl amines		Not irritating to skin in rabbits.

Substances	CAS Number	Serious eye damage/irritation
Inner salt of alkyl amines		Causes severe eye irritation (Rabbit)

Substances	CAS Number	Skin Sensitization
Inner salt of alkyl amines		Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Inner salt of alkyl amines		No information available

Substances	CAS Number	Mutagenic Effects
Inner salt of alkyl amines		In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
Inner salt of alkyl amines		Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
Inner salt of alkyl amines		Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
Inner salt of alkyl amines		No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Inner salt of alkyl amines		No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Inner salt of alkyl amines		Not applicable

**12. Ecological Information**

**Ecotoxicity**

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Inner salt of alkyl amines	Proprietary	EC50 (96 h) 0.55 mg/L (Desmodesmus subspicatus) EC50 (72 h) 17.2 mg/L (Scenedesmus subspicatus) EC50 (72 h) 9.86 mg/L (Scenedesmus subspicatus) EC50 (72 h) 30 mg/L (Scenedesmus subspicatus)	LC50 (96 h) 2 mg/L (Brachydanio rerio) NOEC (28 d) 16 mg/L (Oncorhynchus mykiss)	No information available	EC50 (48 h) 6.5 mg/L (Daphnia magna) NOEC (21 d) 0.9 mg/L (Daphnia magna) NOEC (21 d) 0.932 mg/L (Daphnia magna) NOEC (21 d) 2.98 mg/L (Daphnia magna) NOEC (21 d) 0.03 mg/L (Daphnia magna) NOEC (21 d) 0.065 mg/L (Daphnia magna)

**12.2. Persistence and degradability**

Substances	CAS Number	Persistence and Degradability
Inner salt of alkyl amines	Proprietary	Readily biodegradable (>90% @ 28d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Inner salt of alkyl amines	Proprietary	Log Pow =0.9

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Inner salt of alkyl amines	Proprietary	No information available

**12.6. Other adverse effects**

**Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations**

**Safe handling and disposal methods**

Follow all applicable community, national or regional regulations regarding waste management methods.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information**

**Transportation Information**

**Australia ADG**

<b>UN Number</b>	UN3082
<b>UN proper shipping name:</b>	Environmentally Hazardous Substance, Liquid, N.O.S. (Contains Inner salt of alkyl amines)
<b>Transport Hazard Class(es):</b>	9
<b>Packing Group:</b>	III
<b>Environmental Hazards:</b>	Marine Pollutant

**IMDG/IMO**



<b>UN Number</b>	UN3082
<b>UN proper shipping name:</b>	Environmentally Hazardous Substance, Liquid, N.O.S. (Contains Inner salt of alkyl amines)
<b>Transport Hazard Class(es):</b>	9
<b>Packing Group:</b>	III
<b>Environmental Hazards:</b>	Marine Pollutant
<b>EMS:</b>	EmS F-A, S-F

**IATA/ICAO**

<b>UN Number</b>	UN3082
<b>UN proper shipping name:</b>	Environmentally Hazardous Substance, Liquid, N.O.S. (Contains Inner salt of alkyl amines)
<b>Transport Hazard Class(es):</b>	9
<b>Packing Group:</b>	III
<b>Environmental Hazards:</b>	Marine Pollutant

**Special precautions during transport**

None

**HazChem Code**

None Allocated

**15. Regulatory Information**

**Safety, health and environmental regulations specific for the product**

**International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product does not comply with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply.
<b>Stockholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply.
<b>Basel Convention - Hazardous Waste:</b>	Does not apply.

**16. Other information**

**Date of preparation or review**

**Revision Date:** 12-Jun-2018

**Revision Note**

SDS sections updated:  
2

**Full text of H-Statements referred to under sections 2 and 3**

H318 - Causes serious eye damage  
H401 - Toxic to aquatic life  
H411 - Toxic to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

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For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

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**End of Safety Data Sheet**

# SAFETY DATA SHEET

## HYDROCHLORIC ACID 32%

Revision Date: 01-Sep-2016

Revision Number: 2

### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

#### 1.1. Product Identifier

**Product Name** HYDROCHLORIC ACID 32%

#### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** MC600136

#### Recommended use of the chemical and restrictions on use

**Recommended Use** Solvent

**Uses advised against** No information available

#### Supplier's name, address and phone number

**Manufacturer/Supplier** Multi-Chem Mintech  
1 Ward Road  
East Rockingham  
WA 6168  
Australia

Telephone Number: 61 (08) 9419 5300  
Fax Number: 61 (08) 9439 1055  
Emergency Telephone Number: + 61 1 800 686 951  
fdunexchem@halliburton.com

#### **E-mail Address**

#### Emergency phone number

+ 61 1 800 686 951

#### **Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

#### Classification of the hazardous chemical

Acute inhalation toxicity - vapor	Category 4 - H332
Skin Corrosion/Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Substances/mixtures corrosive to metal	Category 1 - H290

#### Label elements, including precautionary statements

## Hazard pictograms



## Signal Word

Danger

## Hazard Statements:

H290 - May be corrosive to metals  
 H314 - Causes severe skin burns and eye damage  
 H318 - Causes serious eye damage  
 H331 - Toxic if inhaled  
 H335 - May cause respiratory irritation

## Precautionary Statements

## Prevention

P103 - Read label before use  
 P234 - Keep only in original container  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P271 - Use only outdoors or in a well-ventilated area

## Response

P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower  
 P363 - Wash contaminated clothing before reuse  
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

## Storage

P310 - Immediately call a POISON CENTER or doctor/physician  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

## Disposal

P390 - Absorb spillage to prevent material damage  
 P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
 P405 - Store locked up  
 P406 - Store in corrosive resistant container with a resistant inner liner.  
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

## Contains

## Substances

Hydrochloric acid

## CAS Number

7647-01-0

Other hazards which do not result in classification

Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT). This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Hydrochloric acid	7647-01-0	30 - 60%	Acute Tox. 3 (H331) Skin Corr. 1A (H314)

			Eye Corr. 1 (H318) STOT SE 3 (H335) Met. Corr. 1 (H290)
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#### 4. First aid measures

##### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
<b>Skin</b>	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and laundry before reuse.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

##### Symptoms caused by exposure

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause respiratory irritation. Harmful if inhaled.

##### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

#### 5. Fire Fighting Measures

##### Suitable extinguishing equipment

##### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

##### **Extinguishing media which must not be used for safety reasons**

None known.

##### Specific hazards arising from the chemical

##### **Special exposure hazards in a fire**

May form explosive mixtures with strong alkalis. Decomposition in fire may produce harmful gases. Reaction with steel and certain other metals generates flammable hydrogen gas. Do not allow runoff to enter waterways.

##### Special protective equipment and precautions for fire fighters

##### **Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

#### 6. Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Evacuate all persons from the area.

##### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas. Consult local authorities.

##### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

#### 7. Handling and storage

##### 7.1. Precautions for safe handling

##### **Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Ensure adequate ventilation. Wash hands after use. Launder

contaminated clothing before reuse. Use appropriate protective equipment.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from alkalis. Store in a cool well ventilated area. Keep container closed when not in use. Store locked up. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Hydrochloric acid	7647-01-0	5 ppm	TWA: 2 ppm (Ceiling)

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.  
Acid gas respirator.

**Hand Protection**

Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection**

Full protective chemical resistant clothing. Rubber boots

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

**Environmental Exposure Controls**

Do not allow material to contaminate ground water system

## 9. Physical and Chemical Properties

**9.1. Information on basic physical and chemical properties**

**Physical State:** Liquid

**Color**

Clear colorless

**Odor:** Pungent acrid

**Odor Threshold:**

No information available

**Property****Values**

Remarks/ - Method

**pH:**

0.8

**Freezing Point / Range**

-46 °C

**Melting Point / Range**

No data available

**Boiling Point / Range**

110 °C / 230 °F

Flash Point	No data available
Evaporation rate	No data available
Vapor Pressure	26
Vapor Density	No data available
Specific Gravity	1.18
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

**9.2. Other information**

Molecular Weight	36.5
VOC Content (%)	No data available

## 10. Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical stability**

Stable

**10.3. Possibility of hazardous reactions**

Will Not Occur

**10.4. Conditions to avoid**

None anticipated

**10.5. Incompatible materials**

Strong alkalis.

**10.6. Hazardous decomposition products**

Flammable hydrogen gas. Chlorine. Hydrogen sulfide.

## 11. Toxicological Information

**Information on routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause respiratory irritation. Harmful if inhaled.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrochloric acid	7647-01-0	No data available	No data available	No data available

**Immediate, delayed and chronic health effects from exposure**

<b>Inhalation</b>	Harmful if inhaled. Causes severe respiratory irritation.
<b>Eye Contact</b>	Causes eye burns
<b>Skin Contact</b>	Causes severe burns. Did not cause sensitization on laboratory animals (guinea pig)
<b>Ingestion</b>	Causes burns of the mouth, throat and stomach.

**Chronic Effects/Carcinogenicity** Prolonged, excessive exposure may cause erosion of the teeth.

**Exposure Levels**

No data available

**Interactive effects**

Skin disorders.

**Data limitations**

No data available

<b>Substances</b>	<b>CAS Number</b>	<b>Skin corrosion/irritation</b>
Hydrochloric acid	7647-01-0	Causes severe burns Causes severe skin irritation with tissue destruction.
<b>Substances</b>	<b>CAS Number</b>	<b>Serious eye damage/irritation</b>
Hydrochloric acid	7647-01-0	Causes severe burns Causes severe eye irritation. Will damage tissue.
<b>Substances</b>	<b>CAS Number</b>	<b>Skin Sensitization</b>
Hydrochloric acid	7647-01-0	Did not cause sensitization on laboratory animals (guinea pig)
<b>Substances</b>	<b>CAS Number</b>	<b>Respiratory Sensitization</b>
Hydrochloric acid	7647-01-0	No information available
<b>Substances</b>	<b>CAS Number</b>	<b>Mutagenic Effects</b>
Hydrochloric acid	7647-01-0	Not regarded as mutagenic. In vitro tests did not show mutagenic effects.
<b>Substances</b>	<b>CAS Number</b>	<b>Carcinogenic Effects</b>
Hydrochloric acid	7647-01-0	No data of sufficient quality are available.
<b>Substances</b>	<b>CAS Number</b>	<b>Reproductive toxicity</b>
Hydrochloric acid	7647-01-0	Embryo and fetotoxicity has been observed in female rats exposed to maternally toxic levels of hydrogen chloride (450 mg/m <sup>3</sup> , 1hr.). When tested at maternally toxic doses, no adverse effects on fertility, teratogenicity, or development were observed.
<b>Substances</b>	<b>CAS Number</b>	<b>STOT - single exposure</b>
Hydrochloric acid	7647-01-0	May cause respiratory irritation. No information available
<b>Substances</b>	<b>CAS Number</b>	<b>STOT - repeated exposure</b>
Hydrochloric acid	7647-01-0	No significant toxicity observed in animal studies at concentration requiring classification.
<b>Substances</b>	<b>CAS Number</b>	<b>Aspiration hazard</b>
Hydrochloric acid	7647-01-0	Not applicable

## 12. Ecological Information

**Ecotoxicity****Product Ecotoxicity Data**

No data available

**Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Hydrochloric acid	7647-01-0	No information available	LC50 282 mg/L (Gambusia affinis) LC50 20.5 mg/L (Lepomis macrochirus) LC50 (96h) 3.25 – 3.5 (pH) (Lepomis macrochirus)	EC50 (3h) >= 5 and <= 5.5 (pH) (Activated sludge, domestic)	EC50 (48 h) 4.92 mg/L (Daphnia magna)

**12.2. Persistence and degradability**

The methods for determining biodegradability are not applicable to inorganic substances.

Substances	CAS Number	Persistence and Degradability
Hydrochloric acid	7647-01-0	The methods for determining biodegradability are not applicable to inorganic substances.

**12.3. Bioaccumulative potential**

Does not bioaccumulate.



Substances	CAS Number	Log Pow
Hydrochloric acid	7647-01-0	LogKow -2.65

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Hydrochloric acid	7647-01-0	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information****Australia ADG**

UN Number: UN1789  
 UN proper shipping name: Hydrochloric Acid Solution  
 Transport Hazard Class(es): 8  
 Packing Group: II  
 Environmental Hazards: Not applicable

**IMDG/IMO**

UN Number: UN1789  
 UN proper shipping name: Hydrochloric Acid Solution  
 Transport Hazard Class(es): 8  
 Packing Group: II  
 Environmental Hazards: Not applicable  
 EMS: EmS F-A, S-B

**IATA/ICAO**

UN Number: UN1789  
 UN proper shipping name: Hydrochloric Acid Solution  
 Transport Hazard Class(es): 8  
 Packing Group: II  
 Environmental Hazards: Not applicable

**Special precautions during transport**

None

**HazChem Code**

2R

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

S6

**International Agreements**

<b>Montreal Protocol - Ozone Depleting Substances:</b>	Does not apply
<b>Stokholm Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 01-Sep-2016**Revision Note**

SDS sections updated: 2

**Full text of H-Statements referred to under sections 2 and 3**

H290 - May be corrosive to metals  
H314 - Causes severe skin burns and eye damage  
H318 - Causes serious eye damage  
H331 - Toxic if inhaled  
H332 - Harmful if inhaled  
H335 - May cause respiratory irritation

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight  
CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury

w/w - weight/weight  
d - day

**Key literature references and sources for data**

www.ChemADVISOR.com/  
NZ CCID

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

**SAFETY DATA SHEET****MSA-III US**

Revision Date: 25-Jan-2017

Revision Number: 14

**1. Product Identifier & Identity for the Chemical**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** MSA-III US

**Other means of Identification**

**Synonyms** None

**Hazardous Material Number:** HM005253

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Corrosion Inhibitor

**Uses advised against** Consumer use

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300

**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951

Global Incident Response Access Code: 334305

Contract Number: 14012

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

**2. Hazard Identification**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Acute Oral Toxicity	Category 4 - H302
Skin Corrosion/Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H336
Acute Aquatic Toxicity	Category 3 - H402
Chronic Aquatic Toxicity	Category 3 - H412
Flammable liquids.	Category 2 - H225

**Label elements, including precautionary statements**

**Hazard Pictograms**

(Bad file name)

**Signal Word**

DANGER

**Hazard Statements:**

H225 - Highly flammable liquid and vapor  
 H302 - Harmful if swallowed  
 H314 - Causes severe skin burns and eye damage  
 H318 - Causes serious eye damage  
 H336 - May cause drowsiness or dizziness  
 H402 - Harmful to aquatic life  
 H412 - Harmful to aquatic life with long lasting effects

**Precautionary Statements****Prevention**

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P233 - Keep container tightly closed  
 P240 - Ground and bond container and receiving equipment.  
 P241 - Use explosion-proof electrical/ventilating/lighting/equipment  
 P242 - Use only non-sparking tools  
 P243 - Take action to prevent static discharges.  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P271 - Use only outdoors or in a well-ventilated area

**Response**

P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell  
 P330 - Rinse mouth  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].  
 P363 - Wash contaminated clothing before reuse  
 P312 - Call a POISON CENTER or doctor/physician if you feel unwell  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P370 + P378 - In case of fire: Use water spray for extinction  
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

**Storage**

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
 P403 + P235 - Store in a well-ventilated place. Keep cool  
 P405 - Store locked up

**Disposal**

P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Isopropanol  
 Rosin amines  
 Thioglycolic acid  
 Ethoxylated alkyl amines

**CAS Number**

67-63-0  
 61790-47-4  
 68-11-1  
 Proprietary

**Other hazards which do not result in classification**

None known

For the full text of the H-phrases mentioned in this Section, see Section 16

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Isopropanol	67-63-0	30 - 60%	Eye Irrit. 2 (H319) STOT SE 3 (H336) Flam. Liq. 2 (H225)
Rosin amines	61790-47-4	10 - 30%	Acute Tox. 4 (H302) Skin Corr. 1C (H314) Eye Corr. 1 (H318)
Thioglycolic acid	68-11-1	10 - 30%	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 2 (H330) Skin Corr. 1B (H314) Eye Corr. 1 (H318) Skin Sens. 1 (H317) STOT SE 3 (H335) STOT RE 2 (H373) Aquatic Acute 3 (H402)
Ethoxylated alkyl amines	Proprietary	5 - 10%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 2 (H401) Aquatic Chronic 2 (H411)

### 4. First aid measures

#### Description of necessary first aid measures

#### **Inhalation**

If inhaled, move victim to fresh air and seek medical attention.

#### **Eyes**

In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Seek immediate medical attention/advice. Suitable emergency eye wash facility should be immediately available

#### **Skin**

Remove contaminated clothing and launder before reuse. Remove contaminated shoes and discard. In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.

#### **Ingestion**

Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

#### Symptoms caused by exposure

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. Harmful if swallowed. May cause headache, dizziness, and other central nervous system effects.

#### Medical Attention and Special Treatment

#### **Notes to Physician**

Treat symptomatically

### 5. Fire Fighting Measures

#### Suitable extinguishing equipment

#### **Suitable Extinguishing Media**

Water fog, carbon dioxide, foam, dry chemical.

#### **Extinguishing media which must not be used for safety reasons**

None known.

#### Specific hazards arising from the chemical

**Special exposure hazards in a fire**

May be ignited by heat, sparks or flames Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce harmful gases. Fight fire from a safe distance and from a protected location.

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

Remove sources of ignition. Evacuate all persons from the area. Use only competent persons for cleanup. Use appropriate protective equipment. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas. Prevent contamination of soil.

**6.3. Methods and material for containment and cleaning up**

Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Neutralize to pH of 6-8. Contain spill with sand or other inert materials. Scoop up and remove.

## 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Store away from alkalis. Keep from heat, sparks, and open flames. Keep container closed when not in use. Product has a shelf life of 24 months.

**Other Guidelines**

No information available

## 8. Exposure Controls/Personal Protection

**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Isopropanol	67-63-0	TWA: 400 ppm TWA: 983 mg/m <sup>3</sup> STEL: 500 ppm STEL: 1230 mg/m <sup>3</sup>	TWA: 200 ppm STEL: 400 ppm
Rosin amines	61790-47-4	Not applicable	Not applicable
Thioglycolic acid	68-11-1	TWA: 1 ppm TWA: 3.8 mg/m <sup>3</sup>	TWA: 1 ppm
Ethoxylated alkyl amines	Proprietary	Not applicable	Not applicable

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this

<b>Respiratory Protection</b>	product. Organic vapor/acid gas respirator. Positive pressure self-contained breathing apparatus in enclosed areas.
<b>Hand Protection</b>	Impervious rubber gloves.
<b>Skin Protection</b>	Rubber apron.
<b>Eye Protection</b>	Chemical goggles; also wear a face shield if splashing hazard exists.
<b>Other Precautions</b>	Eyewash fountains and safety showers must be easily accessible.
<b>Environmental Exposure Controls</b>	No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b>	Liquid	<b>Color</b>	Light amber
<b>Odor:</b>	Strong	<b>Odor Threshold:</b>	No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	2.1-2.3
<b>Freezing Point / Range</b>	No data available
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	No data available
<b>Flash Point</b>	6 °C / 43 °F Tag Closed Cup (TCC)
<b>Evaporation rate</b>	> 1
<b>Vapor Pressure</b>	83.8 - 102.4 mm Hg
<b>Vapor Density</b>	> 1
<b>Specific Gravity</b>	0.934 - 0.946
<b>Water Solubility</b>	Dispersible
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

### 9.2. Other information

<b>VOC Content (%)</b>	No data available
------------------------	-------------------

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

Keep away from heat, sparks and flame.

### 10.5. Incompatible materials

Strong oxidizers. Strong alkalis.

### 10.6. Hazardous decomposition products

Oxides of nitrogen. Oxides of sulfur. Hydrogen chloride. Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

**Principle Route of Exposure** Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. Harmful



if swallowed. May cause headache, dizziness, and other central nervous system effects.

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isopropanol	67-63-0	5840 mg/kg-bw (rat)	12870 mg/kg-bw (rabbit)	72.6 mg/L (Rat, 4h, vapor)
Rosin amines	61790-47-4	2500 mg/kg (rat) (similar substance) 700 mg/kg (guinea pig) (similar substance)	No data available	No data available
Thioglycolic acid	68-11-1	73 mg/kg-bw (rat)	848 mg/kg-bw (rabbit)	1.388 mg/L (rat, 4 hr, aerosol)
Ethoxylated alkyl amines	Proprietary	1200 mg/kg-bw (rat) (similar substance)	> 1260 mg/kg (rabbits) (similar substance)	No data available

### Immediate, delayed and chronic health effects from exposure

#### **Inhalation**

Massive inhalation immediately dangerous to life and health. Causes severe respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

#### **Eye Contact**

Causes severe eye burns.

#### **Skin Contact**

Causes severe burns. May be absorbed through the skin and produce effects similar to those caused by inhalation and/or ingestion.

#### **Ingestion**

Harmful if swallowed. Causes burns of the mouth, throat and stomach. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

### Exposure Levels

No data available

### Interactive effects

Skin disorders. Lung disorders.

### Data limitations

No data available

Substances	CAS Number	Skin corrosion/irritation
Isopropanol	67-63-0	Non-irritating to the skin (Rabbit)
Rosin amines	61790-47-4	Skin, rabbit: Causes burns
Thioglycolic acid	68-11-1	Corrosive to skin
Ethoxylated alkyl amines		Causes moderate skin irritation. (similar substances)

Substances	CAS Number	Serious eye damage/irritation
Isopropanol	67-63-0	Causes moderate eye irritation (Rabbit)
Rosin amines	61790-47-4	Causes eye burns
Thioglycolic acid	68-11-1	Corrosive to eyes
Ethoxylated alkyl amines		Causes severe eye irritation. Will damage tissue. (similar substances)

Substances	CAS Number	Skin Sensitization
Isopropanol	67-63-0	Did not cause sensitization on laboratory animals (guinea pig)
Rosin amines	61790-47-4	May cause sensitization by skin contact
Thioglycolic acid	68-11-1	Not regarded as a sensitizer.
Ethoxylated alkyl amines		No information available

Substances	CAS Number	Respiratory Sensitization
Isopropanol	67-63-0	No information available
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	No information available
Ethoxylated alkyl amines		No information available

Substances	CAS Number	Mutagenic Effects
Isopropanol	67-63-0	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.
Ethoxylated alkyl amines		In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects. (similar substances)

Substances	CAS Number	Carcinogenic Effects
Isopropanol	67-63-0	Did not show carcinogenic effects in animal experiments
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	Did not show carcinogenic effects in animal experiments
Ethoxylated alkyl amines		No information available

Substances	CAS Number	Reproductive toxicity
Isopropanol	67-63-0	Animal testing did not show any effects on fertility.
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Ethoxylated alkyl amines		No data of sufficient quality are available.

Substances	CAS Number	STOT - single exposure
Isopropanol	67-63-0	May cause headache, dizziness, and other central nervous system effects.
Rosin amines	61790-47-4	May cause respiratory irritation.
Thioglycolic acid	68-11-1	May cause respiratory irritation.
Ethoxylated alkyl amines		No information available

Substances	CAS Number	STOT - repeated exposure
Isopropanol	67-63-0	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	Not applicable due to corrosivity of the substance.
Ethoxylated alkyl amines		No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Isopropanol	67-63-0	Not applicable
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	Not applicable
Ethoxylated alkyl amines		No information available

## 12. Ecological Information

### Ecotoxicity

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Isopropanol	67-63-0	EC50 (72h) > 1000 mg/L (Desmodesmus subspicatus) EC50 (7d) 1800 mg/L (Scenedesmus quadricauda)	LC50 (96h) 9640 mg/L (Pimephales promelas) LC50 (7d) 7060 mg/L (Poecilia reticulata)	TT (16h) 1050 mg/L (Pseudomonas putida)	EC50 (48h) 13,299 mg/L (Daphnia magna) EC50 (24h) > 10,000 mg/L (Daphnia magna)
Rosin amines	61790-47-4	No information available	No information available	No information available	No information available
Thioglycolic acid	68-11-1	EC50 (72h) > 100 mg/L (Scenedesmus subspicatus) (similar substance)	LC50 (96h) > 100 mg/L (Oncorhynchus mykiss)	EC50 (3h) 530 mg/L (Activated sludge) (similar substance)	EC50 (48h) 38 mg/L (Daphnia magna)
Ethoxylated alkyl amines	Proprietary	No information available	LC50 (96h) 4.31 mg/L (Danio rerio)	No information available	LC50 (48h) 12.1 mg/L (Daphnia magna)

#### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Isopropanol	67-63-0	Readily biodegradable (53% @ 5d)

Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	(67% @ 28d)
Ethoxylated alkyl amines	Proprietary	(27% @ 28d)

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Isopropanol	67-63-0	0.05
Rosin amines	61790-47-4	Log Kow = 6.29
Thioglycolic acid	68-11-1	Log Pow <0
Ethoxylated alkyl amines	Proprietary	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Isopropanol	67-63-0	No information available
Rosin amines	61790-47-4	No information available
Thioglycolic acid	68-11-1	No information available
Ethoxylated alkyl amines	Proprietary	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

**13. Disposal Considerations****Safe handling and disposal methods**

Follow all applicable community, national or regional regulations regarding waste management methods.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

**14. Transport Information****Transportation Information****Australia ADG**

UN Number: UN2924  
 UN proper shipping name: Flammable Liquid, Corrosive, N.O.S. (Contains Isopropanol, Thioglycolic Acid)  
 Transport Hazard Class(es): 3 (8)  
 Packing Group: II  
 Environmental Hazards: Not applicable

**IMDG/IMO**

UN Number: UN2924  
 UN proper shipping name: Flammable Liquid, Corrosive, N.O.S. (Contains Isopropanol, Thioglycolic Acid)  
 Transport Hazard Class(es): 3 (8)  
 Packing Group: II  
 Environmental Hazards: Not applicable  
 EMS: EmS F-E, S-C

**IATA/ICAO**

UN Number: UN2924  
 UN proper shipping name: Flammable Liquid, Corrosive, N.O.S. (Contains Isopropanol, Thioglycolic Acid)  
 Transport Hazard Class(es): 3 (8)  
 Packing Group: II  
 Environmental Hazards: Not applicable

**Special precautions during transport**

None

**HazChem Code**

•3W

**15. Regulatory Information****Safety, health and environmental regulations specific for the product****International Inventories****Australian AICS Inventory**

All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.

**New Zealand Inventory of Chemicals**

All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.

**EINECS (European Inventory of Existing Chemical Substances)**

This product, and all its components, complies with EINECS

**US TSCA Inventory**

All components listed on inventory or are exempt.

**Canadian Domestic Substances List (DSL)**

All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements****Montreal Protocol - Ozone Depleting Substances:**

Does not apply

**Stockholm Convention - Persistent Organic Pollutants:**

Does not apply

**Rotterdam Convention - Prior Informed Consent:**

Does not apply

**Basel Convention - Hazardous Waste:**

Does not apply

**16. Other information****Date of preparation or review****Revision Date:** 25-Jan-2017**Revision Note**

SDS sections updated:

2

**Full text of H-Statements referred to under sections 2 and 3**

H225 - Highly flammable liquid and vapor

H301 - Toxic if swallowed

H302 - Harmful if swallowed

H314 - Causes severe skin burns and eye damage

H318 - Causes serious eye damage

H319 - Causes serious eye irritation

H331 - Toxic if inhaled

H336 - May cause drowsiness or dizziness

H401 - Toxic to aquatic life

H411 - Toxic to aquatic life with long lasting effects

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key abbreviations or acronyms used**

bw – body weight

CAS – Chemical Abstracts Service  
EC50 – Effective Concentration 50%  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NOEC – No Observed Effect Concentration  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
vPvB – very Persistent and very Bioaccumulative  
h - hour  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)  
ECHA C&L  
OSHA  
NZ CCID

**Disclaimer Statement**

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**End of Safety Data Sheet**

## SAFETY DATA SHEET

### SAND - COMMON WHITE

Revision Date: 27-Jun-2016

Revision Number: 9

#### 1. Product Identifier & Identity for the Chemical

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### 1.1. Product Identifier

**Product Name** SAND - COMMON WHITE

##### Other means of Identification

**Synonyms** None

**Hazardous Material Number:** HM005278

##### Recommended use of the chemical and restrictions on use

**Recommended Use** Proppant

**Uses advised against** No information available

##### Supplier's name, address and phone number

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road  
Jandakot  
WA 6164  
Australia

ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
fdunexchem@halliburton.com

**E-mail Address**

##### Emergency phone number

+ 61 1 800 686 951

##### Australian Poisons Information Centre

24 Hour Service: - 13 11 26

Police or Fire Brigade: - 000 (exchange): - 1100

#### 2. Hazard Identification

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Non-Dangerous Goods according to the criteria of ADG.

##### Classification of the hazardous chemical

Carcinogenicity	Category 2 - H351
Specific Target Organ Toxicity - (Repeated Exposure)	Category 1 - H372

##### Label elements, including precautionary statements

**Hazard pictograms**



<b>Signal Word</b>	Danger
<b>Hazard Statements:</b>	H351 - Suspected of causing cancer H372 - Causes damage to organs through prolonged or repeated exposure
<b>Precautionary Statements</b>	
<b>Prevention</b>	P201 - Obtain special instructions before use P202 - Do not handle until all safety precautions have been read and understood P260 - Do not breathe dust/fume/gas/mist/vapors/spray P264 - Wash face, hands and any exposed skin thoroughly after handling P270 - Do not eat, drink or smoke when using this product P281 - Use personal protective equipment as required
<b>Response</b>	P308 + P313 - IF exposed or concerned: Get medical advice/attention P314 - Get medical attention/advice if you feel unwell
<b>Storage</b>	P405 - Store locked up
<b>Disposal</b>	P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**Contains****Substances**

Crystalline silica, quartz

**CAS Number**

14808-60-7

**Other hazards which do not result in classification**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

*For the full text of the H-phrases mentioned in this Section, see Section 16*

### 3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Crystalline silica, quartz	14808-60-7	60 - 100%	Carc. 2 (H351) STOT RE 1 (H372)

### 4. First aid measures

**Description of necessary first aid measures**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Skin</b>	Wash with soap and water.
<b>Ingestion</b>	Under normal conditions, first aid procedures are not required.

**Symptoms caused by exposure**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

**Medical Attention and Special Treatment****Notes to Physician** Treat symptomatically**5. Fire Fighting Measures****Suitable extinguishing equipment****Suitable Extinguishing Media**

None - does not burn.

**Extinguishing media which must not be used for safety reasons**

None known.

**Specific hazards arising from the chemical****Special exposure hazards in a fire**

None anticipated

**Special protective equipment and precautions for fire fighters****Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

**6. Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment. Avoid creating and breathing dust. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas.

**6.3. Methods and material for containment and cleaning up**

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

**7. Handling and storage****7.1. Precautions for safe handling****Handling Precautions**

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 36 months.

**Other Guidelines**

No information available

**8. Exposure Controls/Personal Protection****Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Crystalline silica, quartz	14808-60-7	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.025 mg/m <sup>3</sup>

**Appropriate engineering controls**





**10.6. Hazardous decomposition products**

Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

**11. Toxicological Information****Information on routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation.

**Symptoms related to exposure****Most Important Symptoms/Effects**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

**Numerical measures of toxicity****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Crystalline silica, quartz	14808-60-7	> 15000 mg/kg (human)	No information available	No data available

**Immediate, delayed and chronic health effects from exposure****Inhalation**

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

**Eye Contact**  
**Skin Contact**  
**Ingestion**

May cause mechanical irritation to eye.  
None known.  
None known.

**Chronic Effects/Carcinogenicity**

**Silicosis:** Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

**Cancer Status:** The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2). There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

**Exposure Levels**

No data available

### Interactive effects

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

### Data limitations

No data available

Substances	CAS Number	Skin corrosion/irritation
Crystalline silica, quartz	14808-60-7	Non-irritating to the skin

Substances	CAS Number	Serious eye damage/irritation
Crystalline silica, quartz	14808-60-7	Mechanical irritation of the eyes is possible. No information available

Substances	CAS Number	Skin Sensitization
Crystalline silica, quartz	14808-60-7	No information available.

Substances	CAS Number	Respiratory Sensitization
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	Mutagenic Effects
Crystalline silica, quartz	14808-60-7	Not regarded as mutagenic.

Substances	CAS Number	Carcinogenic Effects
Crystalline silica, quartz	14808-60-7	Contains crystalline silica which may cause silicosis, a delayed and progressive lung disease. The IARC and NTP have determined there is sufficient evidence in humans of the carcinogenicity of crystalline silica with repeated respiratory exposure. Based on available scientific evidence, this substance is a threshold carcinogen with a mode of action involving indirect genotoxicity secondary to lung injury.

Substances	CAS Number	Reproductive toxicity
Crystalline silica, quartz	14808-60-7	No information available

Substances	CAS Number	STOT - single exposure
Crystalline silica, quartz	14808-60-7	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Crystalline silica, quartz	14808-60-7	Causes damage to organs through prolonged or repeated exposure if inhaled: (Lungs)

Substances	CAS Number	Aspiration hazard
Crystalline silica, quartz	14808-60-7	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### **Product Ecotoxicity Data**

No data available

#### **Substance Ecotoxicity Data**

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Crystalline silica, quartz	14808-60-7	EC50 (72 h) =440 mg/L (Selenastrum capricornutum)	LL0 (96 h) =10000 mg/L (Danio rerio)	No information available	LL50 (24 h) >10000 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Crystalline silica, quartz	14808-60-7	The methods for determining biodegradability are not applicable to inorganic substances.

**12.3. Bioaccumulative potential**

Substances	CAS Number	Log Pow
Crystalline silica, quartz	14808-60-7	No information available

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Crystalline silica, quartz	14808-60-7	No information available

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

## 13. Disposal Considerations

**Safe handling and disposal methods**

Bury in a licensed landfill according to federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information**

<b>UN Number</b>	Not restricted
<b>UN proper shipping name:</b>	Not restricted
<b>Transport Hazard Class(es):</b>	Not applicable
<b>Packing Group:</b>	Not applicable
<b>Environmental Hazards:</b>	Not applicable

**Special precautions during transport**

None

**HazChem Code**

None Allocated

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

None Allocated

**International Agreements**

**Montreal Protocol - Ozone Depleting Substances:**

Does not apply

<b>Stolkhom Convention - Persistent Organic Pollutants:</b>	Does not apply
<b>Rotterdam Convention - Prior Informed Consent:</b>	Does not apply
<b>Basel Convention - Hazardous Waste:</b>	Does not apply

## 16. Other information

### Date of preparation or review

**Revision Date:** 27-Jun-2016

### **Revision Note**

SDS sections updated: 2

### **Full text of H-Statements referred to under sections 2 and 3**

H351 - Suspected of causing cancer if inhaled

H372 - Causes damage to organs through prolonged or repeated exposure if inhaled

### **Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

### Key abbreviations or acronyms used

bw – body weight

CAS – Chemical Abstracts Service

EC50 – Effective Concentration 50%

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

NOEC – No Observed Effect Concentration

OEL – Occupational Exposure Limit

PBT – Persistent Bioaccumulative and Toxic

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

vPvB – very Persistent and very Bioaccumulative

h - hour

mg/m<sup>3</sup> - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

w/w - weight/weight

d - day

### **Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

### **Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

**SAFETY DATA SHEET****SuperFlo 2000**

Revision Date: 11-Apr-2017

Revision Number: 10

**1. Product Identifier & Identity for the Chemical**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**1.1. Product Identifier**

**Product Name** SuperFlo 2000

**Other means of Identification**

**Synonyms** None  
**Hazardous Material Number:** HM006792

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Surfactant  
**Uses advised against** No information available

**Supplier's name, address and phone number**

**Manufacturer/Supplier** Halliburton Australia Pty. Ltd.  
15 Marriott Road, Jandakot, WA 6164  
Australia  
ACN Number: 009 000 775  
Telephone Number: + 61 1 800 686 951  
Fax Number: 61 (08) 9455 5300  
**E-mail Address** fdunexchem@halliburton.com

**Emergency phone number**

+ 61 1 800 686 951  
Global Incident Response Access Code: 334305  
Contract Number: 14012

**Australian Poisons Information Centre**

24 Hour Service: - 13 11 26  
Police or Fire Brigade: - 000 (exchange): - 1100

**2. Hazard Identification**

**Statement of Hazardous Nature** Hazardous according to the criteria of the 3rd Revised Edition of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), Dangerous Goods according to the criteria of ADG.

**Classification of the hazardous chemical**

Aspiration Toxicity	Category 1 - H304
Acute Oral Toxicity	Category 4 - H302
Skin Corrosion/Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Skin Sensitization	Category 1 - H317
Reproductive Toxicity	Category 1 - H360
Specific Target Organ Toxicity - (Single Exposure)	Category 2 - H371
Flammable liquids.	Category 3 - H226

**Label elements, including precautionary statements****Hazard Pictograms**

(Bad file name)

**Signal Word**

DANGER

**Hazard Statements:**

H226 - Flammable liquid and vapor  
 H302 - Harmful if swallowed  
 H304 - May be fatal if swallowed and enters airways  
 H314 - Causes severe skin burns and eye damage  
 H317 - May cause an allergic skin reaction  
 H318 - Causes serious eye damage  
 H360 - May damage fertility or the unborn child  
 H371 - May cause damage to organs  
 H400 - Very toxic to aquatic life  
 H411 - Toxic to aquatic life with long lasting effects

**Precautionary Statements****Prevention**

P201 - Obtain special instructions before use  
 P202 - Do not handle until all safety precautions have been read and understood  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P233 - Keep container tightly closed  
 P240 - Ground and bond container and receiving equipment.  
 P241 - Use explosion-proof electrical/ventilating/lighting/equipment  
 P243 - Take action to prevent static discharges.  
 P242 - Use only non-sparking tools  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P261 - Avoid breathing dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P272 - Contaminated work clothing should not be allowed out of the workplace  
 P280 - Wear protective gloves/eye protection/face protection  
 P281 - Use personal protective equipment as required

**Response**

P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell  
 P330 - Rinse mouth  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].  
 P363 - Wash contaminated clothing before reuse  
 P310 - Immediately call a POISON CENTER or doctor/physician  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P370 + P378 - In case of fire: Use water spray for extinction  
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
 P308 + P313 - IF exposed or concerned: Get medical advice/attention  
 P403 + P235 - Store in a well-ventilated place. Keep cool  
 P405 - Store locked up  
 P501 - Dispose of contents/container to an approved incineration plant

**Storage****Disposal****Contains****Substances**

Terpene hydrocarbon by-products

**CAS Number**

68956-56-9

Methanol	67-56-1
Coco diethanolamide	Proprietary
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5
Nonylphenol ethoxylate	Proprietary
Linanol	Proprietary
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1
Citronellol	106-22-9
Isopropanol	67-63-0

**Other hazards which do not result in classification**

None known

For the full text of the H-phrases mentioned in this Section, see Section 16

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - Australia
Terpene hydrocarbon by-products	68956-56-9	10 - 30%	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Skin Sens. 1 (H317) Asp. Tox. 1 (H304) Aquatic Acute 2 (H401) Aquatic Chronic 2 (H411) Flam. Liq. 3 (H226)
Methanol	67-56-1	5 - 10%	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) Repr. 1B (H360) STOT SE 1 (H370) Flam. Liq. 2 (H225)
Coco diethanolamide	Proprietary	5 - 10%	Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Aquatic Acute 2 (H401) Aquatic Chronic 2 (H411)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	5 - 10%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Skin Corr. 1 (H314) Eye Corr. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)
Nonylphenol ethoxylate	Proprietary	5 - 10%	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Aquatic Acute 3 (H402) Aquatic Chronic 2 (H411)
Linanol	Proprietary	1 - 5%	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Aquatic Acute 3 (H402) Flam. Liq. 4 (H227)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	1 - 5%	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Skin Sens. 1 (H317) STOT SE 3 (H335) Aquatic Acute 2 (H401)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	1 - 5%	Skin Irrit. 2 (H315) Eye Corr. 1 (H318) Skin Sens. 1 (H317) STOT SE 3 (H335) Aquatic Acute 3 (H402)
Citronellol	106-22-9	1 - 5%	Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Skin Sens. 1 (H317)



Isopropanol	67-63-0	1 - 5%	Aquatic Acute 2 (H401) Eye Irrit. 2 (H319) STOT SE 3 (H336) Flam. Liq. 2 (H225)
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#### 4. First aid measures

##### Description of necessary first aid measures

<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention.
<b>Skin</b>	In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention. Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration. Rinse mouth. Never give anything by mouth to an unconscious person.

##### Symptoms caused by exposure

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause allergic skin reaction. Harmful if swallowed. Potential reproductive hazard. May cause birth defects. May cause damage to internal organs.

##### Medical Attention and Special Treatment

**Notes to Physician** Treat symptomatically

#### 5. Fire Fighting Measures

##### Suitable extinguishing equipment

##### **Suitable Extinguishing Media**

Carbon dioxide, dry chemical, foam.

##### **Extinguishing media which must not be used for safety reasons**

None known.

##### Specific hazards arising from the chemical

##### **Special exposure hazards in a fire**

May be ignited by heat, sparks or flames Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce harmful gases. Runoff to sewer may cause fire or explosion hazard.

##### Special protective equipment and precautions for fire fighters

##### **Special protective equipment for firefighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

#### 6. Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

##### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

##### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

#### 7. Handling and storage

**7.1. Precautions for safe handling****Handling Precautions**

Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another. Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Avoid breathing mist.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**7.2. Conditions for safe storage, including any incompatibilities****Storage Information**

Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use.

**Other Guidelines**

No information available

<b>8. Exposure Controls/Personal Protection</b>
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**Control parameters - exposure standards, biological monitoring****Exposure Limits**

Substances	CAS Number	Australia NOHSC	ACGIH TLV-TWA
Terpene hydrocarbon by-products	68956-56-9	Not applicable	Not applicable
Methanol	67-56-1	TWA: 200 ppm TWA: 262 mg/m <sup>3</sup> STEL: 250 ppm STEL: 328 mg/m <sup>3</sup>	TWA: 200 ppm STEL: 250 ppm
Coco diethanolamide	Proprietary	Not applicable	Not applicable
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Not applicable	Not applicable
Nonylphenol ethoxylate	Proprietary	Not applicable	Not applicable
Linanol	Proprietary	Not applicable	Not applicable
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Not applicable	Not applicable
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Not applicable	Not applicable
Citronellol	106-22-9	Not applicable	Not applicable
Isopropanol	67-63-0	TWA: 400 ppm TWA: 983 mg/m <sup>3</sup> STEL: 500 ppm STEL: 1230 mg/m <sup>3</sup>	TWA: 200 ppm STEL: 400 ppm

**Appropriate engineering controls****Engineering Controls**

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

**Personal protective equipment (PPE)****Personal Protective Equipment**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**Respiratory Protection**

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Positive pressure self-contained breathing apparatus if methanol is released.

**Hand Protection**

Use gloves which are suitable for the chemicals present in this product as well as other environmental factors in the workplace. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection**

Rubber apron.

**Eye Protection**

Chemical goggles; also wear a face shield if splashing hazard exists.

**Other Precautions**

Eyewash fountains and safety showers must be easily accessible.

**Environmental Exposure Controls**

No information available

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

Physical State: Liquid      Color: Straw  
 Odor: Alcohol      Odor Threshold: No information available

Property Remarks/ - Method	Values
pH:	No data available
Freezing Point / Range	-29 °C
Melting Point / Range	No data available
Boiling Point / Range	No data available
Flash Point	30 °C / 86 °F PMCC
Evaporation rate	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	0.99
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

### 9.2. Other information

VOC Content (%)      No data available

## 10. Stability and Reactivity

### 10.1. Reactivity

Not expected to be reactive.

### 10.2. Chemical stability

Stable

### 10.3. Possibility of hazardous reactions

Will Not Occur

### 10.4. Conditions to avoid

Keep away from heat, sparks and flame.

### 10.5. Incompatible materials

Strong oxidizers.

### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide.

## 11. Toxicological Information

### Information on routes of exposure

Principle Route of Exposure      Eye or skin contact, inhalation.

### Symptoms related to exposure

#### **Most Important Symptoms/Effects**

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause allergic skin reaction. Harmful if swallowed. Potential reproductive hazard. May cause birth defects. May cause damage to internal organs.

### Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Terpene hydrocarbon by-products	68956-56-9	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rat)	No data available

Methanol	67-56-1	300 mg/kg-bw (human) < 790 to 13,000 mg/kg (rat)	1000 mg/kg-bw (human) 17,100 mg/kg (rabbit)	10 mg/L (human, 4h, vapor)
Coco diethanolamide	Proprietary	>5000 mg/kg-bw (rat)	>2000 mg/kg-bw (rabbit)	No data available
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	340.5 mg/kg-bw (Rat)	1420 mg/kg-bw (Rat)	No data available
Nonylphenol ethoxylate	Proprietary	1310 mg/kg (Rat)	> 2000 mg/kg (Rabbit) (similar substance)	No data available
Linanool	Proprietary	2790 mg/kg ( Rat )	5610 mg/kg ( Rat )	> 3.2 mg/L (Rat, 4 h, aerosol)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	4500 mg/kg ( Rat )	> 5000 mg/kg (Rabbit)	No data available
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	3600 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	No data available
Citronellol	106-22-9	3450 mg/kg (rat)	2650 mg/kg (rabbits)	No information available
Isopropanol	67-63-0	5840 mg/kg-bw (rat)	12870 mg/kg-bw (rabbit)	72.6 mg/L (Rat, 4h, vapor)

**Immediate, delayed and chronic health effects from exposure****Inhalation**

May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

**Eye Contact**

Causes severe eye irritation

**Skin Contact**

Causes severe skin irritation with tissue destruction. May cause an allergic skin reaction.

**Ingestion**

Harmful if swallowed. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression. Ingestion may result in blindness. Aspiration can be a hazard if this material is swallowed.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**Exposure Levels**

No data available

**Interactive effects**

Eye ailments. Skin disorders.

**Data limitations**

No data available

Substances	CAS Number	Skin corrosion/irritation
Terpene hydrocarbon by-products	68956-56-9	Causes moderate skin irritation. (Rabbit)
Methanol	67-56-1	Non-irritating to the skin (Rabbit)
Coco diethanolamide		Irritating to skin. (Rabbit)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Causes severe skin irritation with tissue destruction. (Rabbit)
Nonylphenol ethoxylate		Irritating to skin. (similar substances)
Linanool		Causes moderate skin irritation. (Rabbit)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Causes skin irritation.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Causes moderate skin irritation.
Citronellol	106-22-9	Causes moderate skin irritation. (Rabbit)
Isopropanol	67-63-0	Non-irritating to the skin (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Terpene hydrocarbon by-products	68956-56-9	Causes moderate eye irritation (Rabbit) (similar substances)
Methanol	67-56-1	Non-irritating to the eye (Rabbit)
Coco diethanolamide		Causes severe eye irritation (Rabbit) (similar substances)
Quaternary ammonium compounds,	68391-01-5	Causes severe eye irritation which may damage tissue. (Rabbit)

benzyl-C12-18-alkyldimethyl, chlorides		
Nonylphenol ethoxylate		Irritating to eyes (similar substances)
Linanool		Causes moderate eye irritation (Rabbit)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Causes severe eye irritation
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Causes severe eye irritation which may damage tissue.
Citronellol	106-22-9	Causes moderate eye irritation (Rabbit)
Isopropanol	67-63-0	Causes moderate eye irritation (Rabbit)

Substances	CAS Number	Skin Sensitization
Terpene hydrocarbon by-products	68956-56-9	May cause an allergic skin reaction. (mouse) (similar substances)
Methanol	67-56-1	Did not cause sensitization on laboratory animals (guinea pig)
Coco diethanolamide		Did not cause sensitization on laboratory animals (guinea pig)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Nonylphenol ethoxylate		Did not cause sensitization on laboratory animals (guinea pig) (similar substances)
Linanool		Patch test on human volunteers did not demonstrate irritating properties
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	May cause sensitization by skin contact (guinea pig) (mouse)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	May cause sensitization by skin contact (mouse)
Citronellol	106-22-9	May cause sensitization by skin contact (mouse)
Isopropanol	67-63-0	Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Terpene hydrocarbon by-products	68956-56-9	No information available
Methanol	67-56-1	No information available
Coco diethanolamide		No information available
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	No information available
Nonylphenol ethoxylate		No information available
Linanool		No information available
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	No information available
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	No information available
Citronellol	106-22-9	No information available
Isopropanol	67-63-0	No information available

Substances	CAS Number	Mutagenic Effects
Terpene hydrocarbon by-products	68956-56-9	In vitro tests did not show mutagenic effects
Methanol	67-56-1	The weight of evidence from available in vitro and in vivo studies indicates that this substance is not expected to be mutagenic.
Coco diethanolamide		In vitro tests did not show mutagenic effects Some in vivo tests have shown mutagenic effects.
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	In vitro tests did not show mutagenic effects (similar substances)
Nonylphenol ethoxylate		In vitro tests did not show mutagenic effects (similar substances)
Linanool		In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects. (similar substances)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects.
Citronellol	106-22-9	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects.
Isopropanol	67-63-0	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
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Terpene hydrocarbon by-products	68956-56-9	Did not show carcinogenic effects in animal experiments (similar substances)
Methanol	67-56-1	No data of sufficient quality are available.
Coco diethanolamide		No data of sufficient quality are available.
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Did not show carcinogenic effects in animal experiments (similar substances)
Nonylphenol ethoxylate		Did not show carcinogenic effects in animal experiments (similar substances)
Linanool		No data of sufficient quality are available.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Did not show carcinogenic effects in animal experiments (similar substances)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Did not show carcinogenic effects in animal experiments (similar substances)
Citronellol	106-22-9	Did not show carcinogenic effects in animal experiments (similar substances)
Isopropanol	67-63-0	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
Terpene hydrocarbon by-products	68956-56-9	Did not show teratogenic effects in animal experiments. (similar substances)
Methanol	67-56-1	Experiments have shown reproductive toxicity effects on laboratory animals
Coco diethanolamide		Did not show teratogenic effects in animal experiments.
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)
Nonylphenol ethoxylate		Not a confirmed teratogen or embryotoxin. (similar substances)
Linanool		Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments. (similar substances)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Animal testing did not show any effects on fertility.
Citronellol	106-22-9	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Isopropanol	67-63-0	Animal testing did not show any effects on fertility.

Substances	CAS Number	STOT - single exposure
Terpene hydrocarbon by-products	68956-56-9	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Methanol	67-56-1	May cause disorder and damage to the Central Nervous System (CNS)
Coco diethanolamide		No significant toxicity observed in animal studies at concentration requiring classification.
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	No data of sufficient quality are available.
Nonylphenol ethoxylate		No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Linanool		No data of sufficient quality are available.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	May cause respiratory irritation.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	May cause respiratory irritation.
Citronellol	106-22-9	No information available
Isopropanol	67-63-0	May cause headache, dizziness, and other central nervous system effects.

Substances	CAS Number	STOT - repeated exposure
Terpene hydrocarbon by-products	68956-56-9	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)
Methanol	67-56-1	No data of sufficient quality are available.
Coco diethanolamide		No data of sufficient quality are available.
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	No data of sufficient quality are available.
Nonylphenol ethoxylate		No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Linanool		No significant toxicity observed in animal studies at concentration requiring classification.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	No significant toxicity observed in animal studies at concentration requiring classification.
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	No significant toxicity observed in animal studies at concentration requiring classification.
Citronellol	106-22-9	No significant toxicity observed in animal studies at concentration requiring classification.
Isopropanol	67-63-0	No significant toxicity observed in animal studies at concentration requiring classification. (similar substances)

Substances	CAS Number	Aspiration hazard
Terpene hydrocarbon by-products	68956-56-9	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Methanol	67-56-1	Not applicable
Coco diethanolamide		Not applicable
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Not applicable
Nonylphenol ethoxylate		Not applicable
Linanool		Not applicable
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Not applicable
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Not applicable
Citronellol	106-22-9	Not applicable
Isopropanol	67-63-0	Not applicable

## 12. Ecological Information

### Ecotoxicity

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Terpene hydrocarbon by-products	68956-56-9	ErC50 (72h) 4.779 mg/L (Pseudokirchnerella subcapitata) EC50 (72h) 63.59 mg/L (Skeletonema costatum)	LC50 (96h) 5.07 mg/L (Danio rerio) LC50 (96h) > 65 mg/L (Cyprinodon variegatus)	No information available	EL50 (48h) 1.4 - 2.7 mg/L (Daphnia magna) EC50 (48h) 155 mg/L (Acartia tonsa)
Methanol	67-56-1	EC50 (96 h) =22000 mg/L (Pseudokirchnerella subcapitata) NOEC (8 d) =8000 mg/L (Scenedesmus quadricauda)	LC50 (96 h) =15400 mg/L (Lepomis macrochirus) EC50 (200 h) =14536 mg/L (Oryzias latipes)	IC50 (3h) > 1000 mg/L (activated sludge)	EC50 (96 h) =18260 mg/L (Daphnia magna) NOEC (21 d) =208 mg/L (Daphnia magna)
Coco diethanolamide	Proprietary	EC50(72h) 2.2 mg/L (Scenedesmus subspicatus)	LC50(96h) 3.6 mg/L (Brachydanio rerio) NOEC(28d)=0.32 mg/L (Oncorhynchus mykiss)	No information available	EC50(48h) 2.25 mg/L (Ceriodaphnia dubia) NOEC(21d) 0.07 mg/L (Daphnia magna)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	No information available	LC50 (96 h) 0.515 mg/L (Lepomis macrochirus)	No information available	EC50 (48 h) 0.092 mg/L (Mysidopsis bahia) NOEC (34 d) 0.032 mg/L (Daphnia magna)
Nonylphenol ethoxylate	Proprietary	EC50 (48h) 15 mg/L (Lemna minor) EC50 (48h) 17 mg/L (Scenedesmus quadricauda)	LC50 (48h) 16.4 mg/L (Poecilia reticulata)	No information available	LC50 (48h) 18.2 mg/L (Daphnia magna)
Linanool	Proprietary	EC50(96h): 88.3 mg/L (Desmodesmus subspicatus)	LC50(96h): 27.8 mg/L (Oncorhynchus mykiss)	EC50(3h): > 100 mg/L (activated sludge, domestic)	No information available
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	ErC50(72h): 9.54 mg/L (Pseudokirchnerella subcapitata)	LC50(96h): 20.3 mg/L (Danio rerio)	EC50(3h): 241 mg/L (activated sludge)	EC50(48h): 32.4 mg/L (Daphnia magna)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	EC50(72h): 13.1 mg/L (Desmodesmus subspicatus)	LC50(96h): 22 mg/L (Danio rerio)	EC50(30m): 70 mg/L (Activated sludge)	EC50(48h): 10.8 mg/L (Daphnia magna)

Citronellol	106-22-9	EC50 (72 h) 2.4 mg/L (Scenedesmus subspicatus)	LC50 (96 h) 14.66 mg/L (Leuciscus idus)	No information available	EC50 (48 h) 17.48 mg/L (Daphnia magna)
Isopropanol	67-63-0	EC50 (72h) > 1000 mg/L (Desmodosmus subspicatus) EC50 (7d) 1800 mg/L (Scenedesmus quadricauda)	LC50 (96h) 9640 mg/L (Pimephales promelas) LC50 (7d) 7060 mg/L (Poecilia reticulata)	TT (16h) 1050 mg/L (Pseudomonas putida)	EC50 (48h) 13,299 mg/L (Daphnia magna) EC50 (24h) > 10,000 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Terpene hydrocarbon by-products	68956-56-9	Readily biodegradable (83% @ 28d)
Methanol	67-56-1	Readily biodegradable (95% @ 20d)
Coco diethanolamide	Proprietary	Readily biodegradable (92.5% @ 28d)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	Readily biodegradable (60% @ 15d)
Nonylphenol ethoxylate	Proprietary	No information available
Linanol	Proprietary	Readily biodegradable (62.4% @ 28d)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	Readily biodegradable (90% @ 28d)
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	Readily biodegradable (94% @ 28d)
Citronellol	106-22-9	Readily biodegradable (80 - 90% @ 28d)
Isopropanol	67-63-0	Readily biodegradable (53% @ 5d)

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Terpene hydrocarbon by-products	68956-56-9	5.7
Methanol	67-56-1	Not Bioaccumulative; BCF=1
Coco diethanolamide	Proprietary	Not Bioaccumulative; BCF=65.4 L/kg (similar substance)
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	LogKow 3.91
Nonylphenol ethoxylate	Proprietary	3.93 BCF: 7.6 - 16 (Oryzias latipes)
Linanol	Proprietary	2.84
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	2.76
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	2.6
Citronellol	106-22-9	log Kow =3.55
Isopropanol	67-63-0	0.05

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Terpene hydrocarbon by-products	68956-56-9	No information available
Methanol	67-56-1	No information available
Coco diethanolamide	Proprietary	No information available
Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides	68391-01-5	No information available
Nonylphenol ethoxylate	Proprietary	No information available
Linanol	Proprietary	No information available
2,6-Octadien-1-ol, 3,7-dimethyl-, (2Z)-	106-25-2	KOC = 94.15 L/kg
2,6-Octadien-1-ol, 3,7-dimethyl-, (2E)-	106-24-1	KOC = 70.79
Citronellol	106-22-9	KOC = 70.79
Isopropanol	67-63-0	No information available

### 12.6. Other adverse effects

#### Endocrine Disruptor Information

This product contains ethoxylated nonylphenols

## 13. Disposal Considerations



**Safe handling and disposal methods**

Disposal should be made in accordance with federal, state, and local regulations.

**Disposal of any contaminated packaging**

Follow all applicable national or local regulations.

**Environmental regulations**

Not applicable

## 14. Transport Information

**Transportation Information****Australia ADG**

UN Number	UN1993
UN proper shipping name:	Flammable Liquid, N.O.S. (Contains Methanol, Terpenes)
Transport Hazard Class(es):	3
Packing Group:	III
Environmental Hazards:	Marine Pollutant

**IMDG/IMO**

UN Number	UN1993
UN proper shipping name:	Flammable Liquid, N.O.S. (Contains Methanol, Terpenes)
Transport Hazard Class(es):	3
Packing Group:	III
Environmental Hazards:	Marine Pollutant
EMS:	EmS F-E, S-E

**IATA/ICAO**

UN Number	UN1993
UN proper shipping name:	Flammable Liquid, N.O.S. (Contains Methanol, Terpenes)
Transport Hazard Class(es):	3
Packing Group:	III
Environmental Hazards:	Marine Pollutant

**Special precautions during transport**

None

**HazChem Code**

•3Y

## 15. Regulatory Information

**Safety, health and environmental regulations specific for the product****International Inventories**

<b>Australian AICS Inventory</b>	All components are listed on the AICS or are subject to a relevant exemption, permit, or assessment certificate.
<b>New Zealand Inventory of Chemicals</b>	All components are listed on the NZIoC or are subject to a relevant exemption, permit, or assessment certificate.
<b>EINECS (European Inventory of Existing Chemical Substances)</b>	This product, and all its components, complies with EINECS
<b>US TSCA Inventory</b>	All components listed on inventory or are exempt.
<b>Canadian Domestic Substances List (DSL)</b>	All components listed on inventory or are exempt.

**Poisons Schedule number**

S6

**International Agreements**

Montreal Protocol - Ozone Depleting Substances:	Does not apply
Stockholm Convention - Persistent Organic Pollutants:	Does not apply

Rotterdam Convention - Prior Informed Consent:  
 Basel Convention - Hazardous Waste:

Does not apply  
 Does not apply

## 16. Other information

### Date of preparation or review

Revision Date: 11-Apr-2017

### Revision Note

Update to Format  
 SECTION:  
 2

### Full text of H-Statements referred to under sections 2 and 3

H225 - Highly flammable liquid and vapor  
 H226 - Flammable liquid and vapor  
 H301 - Toxic if swallowed  
 H302 - Harmful if swallowed  
 H304 - May be fatal if swallowed and enters airways  
 H311 - Toxic in contact with skin  
 H312 - Harmful in contact with skin  
 H314 - Causes severe skin burns and eye damage  
 H315 - Causes skin irritation  
 H317 - May cause an allergic skin reaction  
 H318 - Causes serious eye damage  
 H319 - Causes serious eye irritation  
 H331 - Toxic if inhaled  
 H335 - May cause respiratory irritation  
 H336 - May cause drowsiness or dizziness  
 H360 - May damage fertility or the unborn child  
 H370 - Causes damage to organs  
 H371 - May cause damage to organs  
 H400 - Very toxic to aquatic life  
 H410 - Very toxic to aquatic life with long lasting effects  
 H411 - Toxic to aquatic life with long lasting effects

### Additional information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

### Key abbreviations or acronyms used

bw – body weight  
 CAS – Chemical Abstracts Service  
 EC50 – Effective Concentration 50%  
 LC50 – Lethal Concentration 50%  
 LD50 – Lethal Dose 50%  
 LL50 – Lethal Loading 50%  
 mg/kg – milligram/kilogram  
 mg/L – milligram/liter  
 NOEC – No Observed Effect Concentration  
 OEL – Occupational Exposure Limit  
 PBT – Persistent Bioaccumulative and Toxic  
 ppm – parts per million  
 STEL – Short Term Exposure Limit  
 TWA – Time-Weighted Average  
 vPvB – very Persistent and very Bioaccumulative  
 h - hour  
 mg/m<sup>3</sup> - milligram/cubic meter  
 mm - millimeter

mmHg - millimeter mercury  
w/w - weight/weight  
d - day

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**

**APPENDIX C**

**Tables**





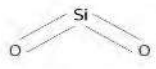






**APPENDIX D**

# Human Health Hazard Summary

Name	Silica gel
Synonyms	Precipitated silica; amorphous silica
CAS number	112926-00-8
Molecular formula	O <sub>2</sub> -Si
Molecular structure	

Overview	References
<p>Silica gel is part of a larger group of chemicals referred to as synthetic amorphous silica (SAS) registered under the overarching CAS No 7631-86-9.</p> <p>SAS (including silica gels) are white, fluffy and/or powdery amorphous forms of silicon dioxide (silica, SiO<sub>2</sub>). It has a molecular weight of 60.08g/mol, a density of 2.2 at 20°C and a melting point of approximately 1700 °C.</p> <p>Commercialised since the 1950s, SAS are used in a wide variety of industrial applications and they are usually tailor-made to meet the users' requirements. Main uses of SAS include reinforcement and thickening agent in various systems such as elastomers, resins, inks and water for instance. Due to their high porosity, SAS is also used as an adsorbing agent. SAS is also used in consumers' products such as cosmetics, pharmaceuticals and foods.</p> <p>SAS have been studied less than crystalline silica. They are generally less toxic than crystalline silica and are cleared more rapidly from the lung. Furthermore, amorphous silica is chemically and biologically inert when ingested in any of its many physical forms such as amorphous siliceous earth (diatomaceous earth, diatomite, kieselguhr) or colloidal <i>silica gels</i>. This explains why overall it is not considered as hazardous to humans. The human health toxicity information discussed below is based on SAS.</p>	<p>ECETOC (2006);</p> <p>IARC (1997);</p> <p>SIDS (2004);</p> <p>Gosselin <i>et al.</i> (1984)</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>IARC rating for silica, amorphous (CAS No 7631-86-9): Group 3 (<i>Amorphous silica is not classifiable as to its carcinogenicity to humans</i>)</p> <p>The evaluations for amorphous silica pertain to inhalation resulting from workplace exposures. Very little epidemiological evidence was available to the Working Group. No association was detected for mesothelioma with biogenic amorphous silica fibres in the three community-based case-control studies. Separate analyses were not performed for cancer risks among a subset of diatomaceous earth industry workers exposed predominantly to amorphous silica.</p> <p>There is inadequate evidence in humans for the carcinogenicity of amorphous silica.</p>	IARC (2018)
<p><b>Mutagenicity/Genotoxicity</b></p> <p>No mutations were observed when SAS was tested in <i>in vitro</i> and <i>in vivo</i> standard methods. No evidence for mutagenic activity was found in an ex-vivo gene-mutation assays on isolated alveolar type-II cells after long-term inhalation exposure of rats to a distinctly noxious/inflammatory SAS concentration of 50 mg/m<sup>3</sup> (13 weeks).</p>	SIDS (2004)
<p><b>Reproductive Toxicity</b></p> <p>The reproductive toxicity properties of SAS were assessed with a one-generation on rats where animals were fed SAS at a dose of 500 mg/kg bw/day for a pre-mating period of 4.5 months with continued exposure up to 6 months. While no adverse effects were observed, however, it was reported that the study had some shortcomings regarding the low number of pregnant animals used and that the mating ratio was too low according to current standards.</p>	SIDS (2004)
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>The potential for developmental effects of SAS were assessed in a comprehensive and reliable testing programme where various animal species (rat, mouse, rabbit, and hamster) were administered SAS orally at doses up to 1600 mg/kg bw/day. No significant signs of maternal or developmental toxic effects were observed in any species tested. Abnormalities noted in soft or skeletal tissues of the test groups were comparable to the frequencies occurring in the control groups. The NOEL for maternal and developmental toxicity was reported as the highest tested dose of 1600 mg/kg bw/d.</p>	FDA (1972, 1973a,b) as cited in SIDS (2004)
<p><b>Endocrine Disruption</b></p> <p>Not listed as an endocrine disruptor.</p>	EC (2000)
<p><b>Neurotoxicity</b></p> <p>NDF</p>	

<p><b>Acute Toxicity (oral, dermal or inhalation)</b></p> <p>SAS (aqueous suspension or gel) administered orally (gavage or in diet) and dermally did not cause mortality at the highest doses tested. LD<sub>50</sub> values ranged from &gt; 3100 to &gt; 20000 mg/kg in rats and mice. One study established an oral LD<sub>50</sub> for rats to be &gt; 10000 mg/kg bw. Based on a rabbit study, a dermal LD<sub>50</sub> &gt; 5000 mg/kg bw was established for rabbits.</p> <p>No clinically or pathologically meaningful effects were observed after 4-hour exposure of rats to either pyrogenic or precipitated SAS. However, in the study where animals were exposed to precipitated SAS, signs of some discomfort and stress were observed and body weight of females was retarded for two days post-exposure.</p>	<p>SIDS (2004)</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p><i>Oral</i></p> <p>The chronic toxic effects of silica gel were assessed in a rat study. In this study, animals received an amorphous silica gel (Syloid 244) at dietary levels of 3.2 and 10% for 6 months, corresponding to average doses of 2170 to 2420 mg/kg bw/day and 7950 to 8980 mg/kg bw/day respectively. No adverse effects were observed. Isolated pathological findings were assessed to be unrelated to dosing and common in untreated rats. The microscopic examination did not show any changes in the kidneys or reproductive organs.</p> <p><i>Dermal</i></p> <p>No information was found regarding the chronic toxicity of silica gel or SAS via the dermal route.</p> <p><i>Inhalation</i></p> <p>No evidence of pneumoconiosis or silicosis was observed in occupational exposures to SAS. Other disorders of the respiratory tract could not be correlated to exposure to SAS alone. However, it is noted that the available epidemiological data base on workers is too limited to be able to draw firm conclusions.</p>	<p>Grace (1975) as cited in SIDS (2004);  SIDS (2004)</p>
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>There are no experimental data available on sensitisation. There is no evidence of skin sensitisation in workers over decades of practical experience.</p>	<p>SIDS (2004)</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p><b>Effects on skin</b></p> <p>Based on experimental data, SAS is not irritating to rabbit skin. However, it is noted that cases of dryness or degenerative eczema of the skin in workers with chronic contact have been reported by occupational physicians.</p> <p>When tested on the rabbit eye as a powder, SAS showed no or only weak and non-permanent irritating effects on the conjunctivae but neither the iris nor the cornea were affected.</p>	<p>SIDS (2004)</p>

Physical Hazards	Reference
<b>Flammable Potential</b> Non flammable solid.	SIDS (2004)
<b>Explosive Potential</b> Not classified as an explosive substance.	SIDS (2004)

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral (gavage)	> 3100 to > 20000 mg/kg (aqueous suspension and gel SAS)	SIDS (2004)
Mouse, oral	> 3100 to > 20000 mg/kg (aqueous suspension and gel SAS)	SIDS (2004)
Rabbit, oral	NDF	
Rat, dermal	NDF	
Rabbit, dermal	> 5000 mg/kg (precipitated SAS)	SIDS (2004)
Mouse, dermal	NDF	
<i>LC<sub>50</sub></i>		
Rat	>0.14 - >2.0 mg/l (pyrogenic and precipitated SAS)	SIDS (2004)

<b><i>High Chronic/Repeat Dose Toxicity</i></b>		
LOAEL	NDF	
LOAEC	5 mg/m <sup>3</sup> (precipitated and gel SAS)	SIDS (2004)

Footnotes:

- LD<sub>50</sub> – lethal dose for 50% of experimental population
- LC<sub>50</sub> – lethal air concentration for 50% of experimental population
- LOAEL – Lowest Observed Adverse Effect Level
- LOAEC – Lowest Observed Adverse Effect Concentration
- NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	IARC Group 3 – inadequate evidence to classify
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	SIDS, 2004
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	Based on a study with some limitations (SIDS, 2004)
Endocrine Disruption <sup>1</sup>	No	EC, 2000
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	
Mutagenicity/Genotoxicity (GHS Category 2)	No	SIDS, 2004
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	Based on a study with some limitations (SIDS, 2004)
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	SIDS, 2004
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	SIDS (2004)
Corrosive (irreversible effect)	No	SIDS (2004)

Human Health Toxicity Ranking		
	Hazard data	Comment
Respiratory sensitiser	No	Based on widespread exposure and few reports of allergic responses.
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	SIDS (2004)
Skin Sensitiser	No	Based on widespread exposure and few reports of allergic responses.
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	SIDS (2004)
Irritant (reversible effect)	No	SIDS (2004)
<b>Hazard Band 0</b>		
<b>All indicators outside criteria listed in Hazards 1-4</b>		
<b>Physical Hazards</b>		
Flammable potential	No	SIDS (2004)
Explosive potential	No	SIDS (2004)
<b>Hazard Evaluation (highest band) not including physical hazards</b>	<b>0</b>	



Human Health Toxicity Ranking		
	Hazard data	Comment
Data confidence (available points out of 12 parameters)	12/12	83%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	10 mg/m <sup>3</sup>	Work Safe Australia (2020)
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	
<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	

<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

## Qualifying Summary Comments

Silica gel is a type of synthetic amorphous silica (SAS). Amorphous silica has been studied less than crystalline silica as they are generally less toxic than crystalline silica and are cleared more rapidly removed from the lung. It is noted that although effects on the lung have been observed at high concentrations these have been reversible following cessation of exposure. Amorphous silica is chemically and biologically inert when ingested in any of its many physical forms such as amorphous siliceous earth (diatomaceous earth, diatomite, kieselguhr) or colloidal silica gels and is not classifiable as to its carcinogenicity to humans. SAS is not considered as having acute or chronic health effects when administered via oral, dermal and inhalation exposure pathways nor as having any reproductive, development/teratogenicity and mutagenicity/genotoxicity effects. SAS is not classified as a skin sensitiser nor does it cause irreversible irritation of the skin or eye. For this reason it is categorized as Hazard Band 0. WorkSafe Australia has listed amorphous silica as a hazardous substance under the respective legislation and developed an exposure standard for amorphous silica dust which is the generic standard for dusts. Due to its low solubility, amorphous silica in aqueous solution and as introduced during chemical stimulation activities would settle into soils and sediments and become indistinguishable from those materials. The principle hazard is subsequently the generation of dusts under occupational settings which require management.

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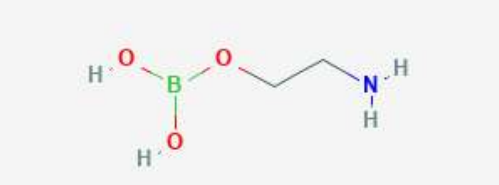
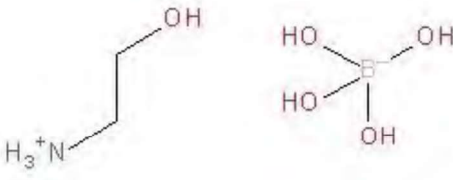
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Created by:	LPA	Date: 18/12/2019
Reviewed by:	CLB	Date and Revision: 23/01/2020

Name	Monoethanolamine borate
Synonyms	Ethanolamine borate; boric acid, 2-aminoethyl ether; 2-Aminoethanol, monoester with boric acid; MEA borate; MEA polyborate
CAS number	26038-87-9
Molecular formula	$C_2H_8BNO_3$
Molecular structure	 <p>(Source: U.S. NLM, 2020)</p>
Surrogate	<p>Limited data was found for monoethanolamine borate. Therefore, Reaction products of monoethanolamine and boric acid (1:1) (CAS RN: 94095-04-2) has been adopted as a surrogate.</p> <p>Molecular formula: <math>C_2H_7NO \cdot xBH_3O_3</math></p>  <p>(Source: ECHA, 2020)</p> <p>In addition, NICNAS provides a group assessment for 'Salts of boric acid'. This group assessment considered 28 different salts of boric acid (metals, ammoniums and amines) of which CAS RN 26038-87-9 is one (NICNAS, 2017). The basis for this grouping outlined by NICNAS is that boric acid is expected to drive the toxicity of these chemicals, even though the individual cations, anions and organic acids may vary in toxicological properties.</p>

Overview	References
<p>Reaction products of monoethanolamine and boric acid (1:1) is a clear, pale yellow solution (at 20°C and 1013 hPa), that only exists in aqueous solution. The freezing/melting point and boiling point are likely to be similar to that of water, noting the presence of the compound in solution would slightly depress the melting point and elevate the boiling point. The relative density was measured to be 1.270 g/cm<sup>3</sup> (at 20°C) and it is considered to be infinitely soluble in water. The vapour pressure is reported to</p>	<p>ECHA, 2020 and NICNAS, 2017</p>

<p>be &lt; 0 Pa at 20°C and 25°C. Reaction products of monoethanolamine and boric acid (1:1) is used in chemical manufacturing and is found in liquid and granular fertilisers, lubricant additives, lubricants and greases, in metal working fluids and hydraulic fluids. NICNAS report uses from CAS RN. 26038-87-9 internationally include cosmetic uses as a buffering agent and commercial uses in metal working fluids.</p> <p>Reaction products of monoethanolamine and boric acid (1:1) is considered readily biodegradable and is considered to have a low potential for adsorb to soil. Based on a logKow of &lt;3, it is also considered to have a low potential for bioaccumulation. Following oral exposure, simple inorganic borates are readily and completely absorbed in humans and animals. Absorption via the dermal route is expected to be very low. As the substance is a liquid and has a negligible vapour pressure, the potential for inhalation exposure of vapours is considered low. However, inhalation absorption is assumed to be high, as a worst-case scenario. If absorbed, the substance will likely be circulated by the blood to the liver and other tissues. Being hydrophilic, it is unlikely to be absorbed by cells of the organs and tissues, except for the kidney. NICNAS outlines that for compounds within the salts of boric acid group, undissociated boric acid is the main species likely present in mammalian blood following exposure. This is based on studies for simple inorganic borates, such as boric acid and borax. Once absorbed, it is likely the substance will be excreted rapidly via the kidneys and non-absorbed substance will be excreted in faeces. Boric acid has a half-life of &lt;24 hours in humans and animals.</p>	
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Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Monoethanolamine borate or reaction products of monoethanolamine and boric acid (1:1) have not been evaluated by the International Agency for Research on Cancer (IARC) as to their carcinogenicity.</p> <p>Although there is limited data to assess carcinogenicity, NICNAS conclude that chemicals in this group are not likely to be carcinogenic based on data for surrogate compounds,</p>	<p>ECHA, 2020</p> <p>NICNAS, 2017</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Reaction products of monoethanolamine and boric acid (1:1) is not classifiable as mutagenic, based on available data.</p> <p>The key study cited by ECHA is an <i>in vitro</i> gene mutation study in bacteria, undertaken in accordance with OECD Guideline 471 and GLP compliant. The test system included <i>Salmonella typhimurium</i> bacteria and <i>Escherichia coli</i> bacteria. Results of this study were negative, and the substance was found to be not mutagenic to the cells tested.</p> <p>NICNAS also conclude that chemicals in this group are not likely to have mutagenic or genotoxic potential, based on available information for surrogate compounds.</p>	<p>ECHA, 2020</p>
<p><b>Reproductive Toxicity</b></p> <p>Data is currently not available to assess reproductive toxicity of Reaction products of monoethanolamine and boric acid (1:1) (or Reaction products of monoethanolamine and boric acid (1:3) as a read-across compound).</p>	<p>ECHA, 2020</p>

<p>Safe Work Australia (2020) has classified Monoethanolamine borate as Category 1B for reproductive and developmental toxicity (H360FD May damage fertility. May damage the unborn child). This is based on the classification of sodium borate, anhydrous (CAS No. 1330-43-4), tetraboron disodium heptaoxide, hydrate (CAS No. 12267-73-1) and orthoboric acid, sodium salt (CAS No. 13840-56-7) as Category 1B and the recommendation by NICNAS to extent this classification to the group ('salts of boric acid').</p> <p>NICNAS outline that the testes and the developing foetus have been identified as the most sensitive targets of boron toxicity in animal studies. Testicular effects reported include reduced organ weight and organ:body ratio, atrophy and degeneration of the spermatogenic epithelium, impaired spermatogenesis and reduced fertility. Two-year and three-year generational studies in rats, determined the NOAEL for fertility of 100 mg/kg bw/day of boric acid (equivalent to 17.5 mg boron/kg bw/day), based on testicular effects.</p>	<p>Safe Work Australia (2020) and NICNAS, 2017.</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Data is currently not available to assess developmental toxicity of Reaction products of monoethanolaimne and boric acid (1:1) (or Reaction products of monoethanolaimne and boric acid (1:3) as a read-across compound).</p> <p>As discussed above, Safe Work Australia (2020) has classified Monoethanolamine borate as Category 1B for reproductive and developmental toxicity (H360FD May damage fertility. May damage the unborn child).</p> <p>NICNAS outline that the testes and the developing foetus have been identified as the most sensitive targets of boron toxicity in animal studies. Developmental effects reported include high prenatal mortality, reduced foetal body weight and malformations and variations of the eyes, CNS, cardiovascular system and axial skeleton. A NOAEL for developmental effects of 55 mg/kg bw/day of boric acid (equivalent to 9.6 mg boron/kg bw/day) was reported for rats.</p>	<p>ECHA, 2020</p> <p>Safe Work Australia (2020)</p>
<p><b>Endocrine Disruption</b></p> <p>Monoethanolamine borate or Reaction products of monoethanolaimne and boric acid (1:1) are not identified in the European Commission (EC)'s report, "Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption" as a substance of interest.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Reaction products of monoethanolaimne and boric acid (1:1) is not classifiable based on its acute oral or dermal toxicity, based on the available data.</p> <p>The key acute <b>oral</b> toxicity study referenced found a LD<sub>50</sub> (female) of &gt; 2000 mg/kg bw for rats. The study was undertaken in accordance with OECD Guideline 423 and was GLP compliant. The study involved female rats being administered a single dose of the test item via gavage, with dose being 5, 50, 300 and 2000 mg/kg body weight.</p> <p>The key acute <b>dermal</b> study referenced found a LD<sub>50</sub> of &gt;2000 mg/kg bw. The study was undertaken in accordance with OECD Guideline 402 and was GLP compliant. The study involved male and female rats being exposure to a single dose of 2000 mg/kg bw, via occlusive coverage.</p>	<p>ECHA, 2020</p>

<p>No study was available to assess acute toxicity via the inhalation route of exposure.</p> <p>NICNAS outlines that these compounds are expected to have low acute oral, dermal and inhalation toxicity. However, this is based on read-across substances due to limited data. NICNAS outlines that free amines (as in compounds with 2-aminoethanol) may be acutely toxic. This is based on studies which suggests free amines can induce acute toxicity by way of their strong alkalinity, which causes corrosive effects such as severe local damage to the gastrointestinal tract. However, the cations of these amines are not basic and do not have corrosive potential, or corresponding acute toxicity.</p>	<p>NICNAS, 2017</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Data is currently not available to assess chronic/ repeat dose toxicity of Reaction products of monoethanolamine and boric acid (1:1) (or Reaction products of monoethanolamine and boric acid (1:3) as a read-across compound).</p> <p>NICNAS also outline that there is no data available to assess the oral, dermal or inhalation repeat dose toxicity of these chemicals. However, based on surrogate compounds, it is considered that chemical in this group are not likely to cause serious damage to health from repeated oral exposure.</p>	<p>ECHA, 2020</p> <p>NICNAS, 2017</p>
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Reaction products of monoethanolamine and boric acid (1:1) is not classifiable based on skin sensitisation, based on a read-across approach and a study available for reaction products of monoethanolamine and boric acid (1:3).</p> <p>The key study references concluded that reaction products of monoethanolamine and boric acid (1:3) was practically devoid of potential to cause sensitisation in a guinea pig skin sensitisation study undertaken in accordance with OECD Guideline 406.</p> <p>No data is available to assess the respiratory system sensitisation.</p> <p>NICNAS concludes that based on the available information for surrogates, chemicals in this group are not likely to be skin sensitisers.</p>	<p>ECHA, 2020</p> <p>NICNAS, 2017</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Reaction products of monoethanolamine and boric acid (1:1) is not classifiable based on <b>skin</b> irritation, as the substance is considered not irritating to the skin, as outline by ECHA.</p> <p>The key skin irritation/corrosion study referenced is a study on rabbits, where the rabbits were exposed to for 4 hours with semiocclusive coverage and observed for 72 hours after patch removal. The substance was found to be not irritating.</p> <p>Reaction products of monoethanolamine and boric acid (1:1) is not classifiable based on <b>eye</b> irritation, as the substance is considered not irritating or corrosive to the eyes, as outlined by ECHA.</p> <p>The key eye irritation study presented is a Bovine Corneal Opacity and Permeability test. The substance was tested by topical application for approximately 10 minutes and study concluded that the substance did not induce ocular irritation under the experimental conditions.</p> <p>NICNAS considered this group unlikely to be specific <b>skin</b> or <b>respiratory</b> irritants, based on the limited data available, Slight <b>eye</b> irritant effects were reported in animal studies for surrogate compounds,</p>	<p>ECHA, 2020</p>

however, the effects were not sufficient to warrant a hazard classification for the chemicals in this group.	NICNAS, 2017.
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Physical Hazards	Reference
<b>Flammable Potential</b> Non flammable. A study reports that the substance did not flash below the boiling temperature of water.	ECHA, 2020
<b>Explosive Potential</b> Non explosive. Reaction products of monoethanolamine and boric acid (1:1) does not contain functional groups associated with explosive properties.	ECHA, 2020

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	LD <sub>50</sub> (female) > 2000 mg/kg bw	Cited by ECHA, 2020
Rat, dermal	LD <sub>50</sub> >2000 mg/kg bw	Cited by ECHA, 2020
<i>LC<sub>50</sub></i>		
Rat	NDF	
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEL	NDF	
LOAEC	NDF	



Toxicity Values	Value	Reference
NOAEL	Developmental effects (rats): 55 mg/kg bw/day boric acid (equivalent to 9.6 mg boron/kg bw/day)  Fertility, testicular effects (rats): 100 mg/kg bw/day boric acid (equivalent to 17.5 mg boron/kg bw/day)	Cited by NICNAS, 2017

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population

LC<sub>50</sub> – lethal air concentration for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

LOAEC – Lowest Observed Adverse Effect Concentration

NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	Yes	Category 1B for reproductive and developmental toxicity (H360FD May damage fertility. May damage the unborn child).
Endocrine Disruption <sup>1</sup>	No	
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	
Mutagenicity/Genotoxicity (GHS Category 2)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	-	See above
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	

Human Health Toxicity Ranking		
	Hazard data	Comment
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL <math>\leq 10</math> mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL <math>\leq 20</math> mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) <math>\leq 50</math> ppm/d for gases, <math>\leq 0.2</math> mg/L/d for vapours or <math>\leq 0.02</math> mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	NDF	
Corrosive (irreversible effect)	No	
Respiratory sensitiser	NDF	
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL <math>&gt; 10</math> mg/kg/d and <math>\leq 100</math> mg/kg/d</li> <li>• dermal LOAEL <math>&gt; 20</math> mg/kg/d and <math>\leq 200</math> mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC <math>&gt; 50</math> mg/L <math>\leq 250</math> mg/L/d for gases, <math>&gt; 0.2</math> mg/L <math>\leq 1.0</math> mg/L/d for vapours or <math>&gt; 0.02</math> mg/L <math>\leq 0.2</math> mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	NDF	
Skin Sensitiser	No	
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> <math>&gt; 300</math> mg/kg <math>\leq 2000</math> mg/kg</li> <li>• dermal LD<sub>50</sub> <math>&gt; 1000</math> mg/kg <math>\leq 2000</math> mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) <math>&gt; 10</math> mg/L <math>\leq 20</math> mg/L for vapours)<sup>3</sup></li> </ul>	No	
Irritant (reversible effect)	No	
<b>Hazard Band 0</b>		
<b>All indicators outside criteria listed in Hazards 1-4</b>		
<b>Physical Hazards</b>		
Flammable potential	No	

Human Health Toxicity Ranking		
	Hazard data	Comment
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	4	Based on potential reproductive and developmental toxicity of salts of boric acid.
<b>Data confidence (available points out of 12 parameters)</b>	10/12	83%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	NDF	
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	

Human Health Guidelines		
Water, potable	NDF	
Water, recreational	NDF	
Soil, residential	NDF	
Soil, commercial/industrial	NDF	
Soil, protection of groundwater	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

### Qualifying Summary Comments

Reaction products of monoethanolamine and boric acid is a clear, pale yellow solution. It is expected to have similar freezing points and boiling points of water. The substance is used in chemical manufacturing and is found in cosmetics, liquid and granular fertilisers, lubricant additives, lubricants and greases, in metal working fluids and hydraulic fluids. It is readily biodegradable and considered to have a low potential for bioaccumulation. Following oral exposure, simple inorganic borates are readily and completely absorbed in humans and animals. Once absorbed, undissociated boric acid is the main species likely present in mammalian blood and it is likely the substance will be excreted rapidly via the kidneys. Boric acid has a half-life of <24 hours in humans and animals.

Reaction products of monoethanolamine and boric acid has been ranked as Hazard Band 4, based on potential reproductive and developmental toxicity, Safe Work Australia (2020) has classified Monoethanolamine borate as Category 1B for reproductive and developmental toxicity (H360FD May damage fertility. May damage the unborn child). This is based on the classification of sodium borate, anhydrous (CAS No. 1330-43-4), tetraboron disodium heptaoxide, hydrate (CAS No. 12267-73-1) and orthoboric acid, sodium salt (CAS No. 13840-56-7) as Category 1B and the recommendation by NICNAS to extend this classification to the group ('salts of boric acid'). Reaction products of monoethanolamine and boric acid are considered to have low acute and repeat dose toxicity, are unlikely to be carcinogenic or mutagenic, and do not appear to be irritating to the skin or eyes.

### References

European Chemicals Agency (ECHA), 2019. *Registration Dossier for Reaction products of monoethanolamine and boric acid (1:1)*. Available at <https://echa.europa.eu/registration-dossier/-/registered-dossier/14325/1>. Last modified 11/12/2019, accessed January 2020.

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International Agency for Research on Cancer (IARC), 2019. Agents Classified by the IARC Monographs, Volumes 1–125, last updated 29 November, 2019. Available at <https://monographs.iarc.fr/agents-classified-by-the-iarc/>, accessed December 2019.

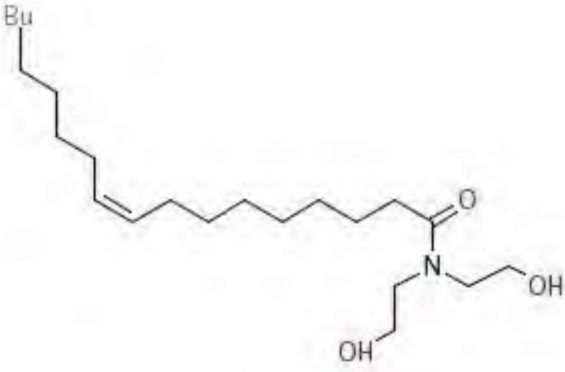
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Safe Work Australia. HCIS (Hazardous Chemical Information System) 2020. *Hazardous Chemical Information System: MEA polyborate*. <http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=4838>, accessed January 2020.

U.S. National Library of Medicine (U.S. NLM), 2020. PubChem Compound Summary dossier for Monoethanolamine borate. Available at <https://pubchem.ncbi.nlm.nih.gov/compound/Monoethanolamine-borate>, accessed January 2020.

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[https://golderassociates.sharepoint.com/sites/117999/project files/6 deliverables/report 014/appendix e - human health summaries/19133367 hh\\_26038-87-9\\_monoethanolamine borate.docx](https://golderassociates.sharepoint.com/sites/117999/project%20files/6%20deliverables/report%20014/appendix%20e%20-%20human%20health%20summaries/19133367%20hh_26038-87-9_monoethanolamine_borate.docx)

Name	Amides, tall-oil fatty, N,N-bis(hydroxyethyl)
Synonyms	Diethanolamine tall oil acid amide; Tall oil fatty acid diethanolamide; Tallamide DEA; N,N-Bis(2-hydroxyethyl)tall oil fatty amides
CAS number	68155-20-4
Molecular formula	Unspecified
Molecular structure	Unspecified
Surrogate	<p>Name: Oleamide, N,N-bis(2-hydroxyethyl)-; Amides, C18-unsatd., N,N-bis(hydroxyethyl). CAS RN: 93-83-4</p> <p>Basis for adoption: Limited information available for CAS RN: 68155-20-4. U.S. EPA's Analog Identification Methodology (AIM) Tool software program identified CAS RN: 93-83-4 as an exact chemical match (U.S. EPA, 2019).</p>
Molecular formula (surrogate)	C <sub>22</sub> H <sub>43</sub> NO <sub>3</sub>
Molecular structure (surrogate)	 <p>(Source: ECHA, 2019)</p>

Overview	References
<p>Amides, C18-unsatd., N,N-bis(hydroxyethyl) is a brown liquid (at 20°C and 1013 hPa) with a density of 0.967 g/cm<sup>3</sup> (at 20°C). It has a freezing point of &lt;-80°C and is reported to decomposes before boiling at &gt; 300°C. Modelling suggests a water solubility between 0.12 mg/L and 2.17 mg/L at 25°C.</p>	ECHA, 2019

Overview	References
<p>Amides, C18-unsatd., N,N-bis(hydroxyethyl) has numerous industrial and consumer uses, including in washing and cleaning products, in polymer manufacturing, textile treatment products and dyes, adhesives and sealants, lubricants and grease, pH regulators and water treatment products, and plant protection products. Household use of products containing this compound include machine wash liquids/detergents, automotive care products, paints and coating or adhesives, fragrances and air fresheners.</p> <p>The ECHA dossier identifies amides, C18-unsatd., N,N-bis(hydroxyethyl) as having low bioaccumulation potential. Studies on a surrogate compound, N,N-bis(2-hydroxyethyl)dodecanamide (C12 DEA) report that the substance is well absorbed via the oral route (approximately 50% oral absorption), then metabolised to polar metabolites and excreted principally in urine. A toxicokinetic study on a surrogate compound, N,N-bis(2-hydroxyethyl)dodecanamide (C12 DEA), reported that this substance was rapidly converted into 11- and 12- hydroxy derivatives in rat liver and kidney microsomes. The ECHA dossier also outlines dermal absorption of approximately 10% and inhalation of as 100% (data lacking).</p>	<p>ECHA, 2019</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Amides, C18-unsatd., N,N-bis(hydroxyethyl) (both CAS RN 93-83-4 and 68155-20-4) has not been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity.</p> <p>The ECHA dossier outlines that no carcinogenic classification is warranted, according to CLP (EC 1272/2008) criteria. This is based on the results of a chronic dermal study in rats, where the absence of neoplastic lesions or carcinogenic activity in a chronic bioassay in rodents suggested that the test substance does not have carcinogenic potential.</p>	<p>IARC, 2019</p> <p>ECHA, 2019</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>The ECHA dossier did not classify amides, C18-unsatd., N,N-bis(hydroxyethyl) (and a surrogate compound) as genotoxic, based on negative results in short-term <i>in vitro</i> and <i>in vivo</i> genotoxicity test.</p> <p>An <i>in vitro</i> gene mutation study in mammalian cells cited on the ECHA dossier was performed in compliance with GLP. The study investigated the potential of the test substance to induce mutations at the mouse lymphoma thymidine kinase locus using the cell line L5178Y. The substance was tested under several conditions and the assess was performed both with and without rat liver microsomal (S9) activation. The results reported no increase in the frequency of mutant colonies of the cells after exposure to the test substance, based on the conditions of the study. Two <i>in vitro</i> gene mutation studies in bacteria were also cited on the ECHA dossier. Both studies report negative results, indicating the test substance is not mutagenic in the Salmonella typhimurium reverse mutation assay and the E.coli reverse mutation assay. An <i>in vivo</i> mammalian germ cell study cited in the ECHA dossier also reported negative results, with the test substance not increasing the frequency of micronucleated normochromatic erythrocytes (NCE) in peripheral blood of both male and female mice at the end of 13 weeks.</p>	<p>ECHA, 2019</p>

<p><b>Reproductive Toxicity</b></p> <p>The ECHA dossier outlines that there were no studies available to assess effects on fertility for exposure to amides, C18-unsatd., N,N-bis(hydroxyethyl) via the oral, dermal, and inhalation routes.</p>	ECHA, 2019
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>The ECHA dossier does not provide a developmental toxicity classification for amides, C18-unsatd., N,N-bis(hydroxyethyl). The ECHA dossier does cite a developmental toxicity study undertaken on a surrogate substance, being amides, C12-18 and C18-unsatd. N,N-bis (hydroxyethyl). The study assessed embryonic and foetal development in pregnant Sprague-Dawley CD rats according to OECD Guideline 414. During gestation days 6 to 15 inclusive, the substance was administered to groups of 30 female rats by gavage at does levels of 0, 100, 300 and 1,000 mg/kg bw/day. Observations were made on days 0, 6, 16 and 20, with all surviving females sacrificed on gestation day 20 and the foetuses removed by caesarean section. The NOAELs for parental toxicity and developmental toxicity were considered to be 1,000 mg/kg bw/day (the highest dose level), under the study conditions.</p>	ECHA, 2019
<p><b>Endocrine Disruption</b></p> <p>Amides, C18-unsatd., N,N-bis(hydroxyethyl) (both CAS RN 93-83-4 and 68155-20-4) is not identified in the European Commission (EC)'s report, "Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption" as a substance of interest.</p>	EC, 2000
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Amides, C18-unsatd., N,N-bis(hydroxyethyl) is reported to have low acute <b>oral</b> toxicity, with a LD<sub>50</sub> reported as 10 000 mg/kg/bw in a rat study. Groups of 6 male rats were administered 0, 5 000, 10 000 and 20 000 mg/kg/bw of the test substance by gavage and the animals were observed for 14 d. The ECHA dossier outlines that GHS criteria were not met by the study.</p> <p>An acute <b>dermal</b> exposure LD<sub>50</sub> of &gt; 2 000 mg/kg/bw was established in a study of male and female rabbits. Information provided by ECHA outlines a 24 h exposure duration, exposure at one dose of 2 000 mg/kg/bw and that 3 animals with abraded skin and 3 animals with intact skin were exposed.</p> <p>No data available for exposure via the <b>inhalation</b> pathway.</p>	ECHA, 2019
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>The ECHA dossier concludes that amides, C18-unsatd., N,N-bis(hydroxyethyl) does not meet the requirement for repeated dose toxicity classification according to CLP (EC1272/2008) criteria. This was based on the NOAEL of &gt; 750 mg/kg bw/day derived from an oral sub-acute study in rats and observed effected in a chronic dermal study in rats, where the NOAEL was 50 mg/kg bw/day for systemic effects and LOAEL of 50 mg/kg bw/day for local effects.</p> <p>The oral 28-day sub-acute study in groups of 10 male and 10 female rats was undertaken with a surrogate substance, amides, C12-18 (even numbered) and C18-unsaturated, N,N-bis(hydroxyethyl). No treatment-related effects were reported at any of the dose levels tested. The dermal 2-year chronic study in groups of 50 male and 50 female rats was undertaken on the test substance.</p>	ECHA, 2019



<p><b>Sensitisation of the skin or respiratory system</b></p> <p>A skin sensitising potential test undertaken on a surrogate compound, amides, C16-18 and C18-unsatd., N,N-bis(hydroxyethyl), cited by the ECHA dossier, found the test substance to not be sensitising to the skin. The test comprised at guinea-pig maximisation test, according to OECD Guideline 406.</p> <p>There was no study available to assess the respiratory sensitisation of the substance.</p>	<p>ECHA, 2019</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>The ECHA dossier concludes that, based on the available data, amides, C18-unsatd., N,N-bis(hydroxyethyl) is considered irritating to both skin and eyes. ECHA classifies the substance as Skin Irrit. 2 H315 (causes skin irritation) and Eye Irrit. 2 H319 (causes serious eye irritation).</p> <p>A skin irritation study is cited, where 0.5 mL of undiluted substance was applied to 6 rabbits (with one abraded area and one area of intact skin), with the exposure period being 24 hours. Observations were made at 24h and 72 h, with moderate to severe erythema and defined edema observed at 24 h and moderate to severe erythema and moderate edema observed at 72 h on the abraded and intact rabbit skin.</p> <p>An eye irritation study is cited, where 0.1 mL of the undiluted substance was applied in a single instillation into one eye of each of the six rabbits, with the other eye acting as the control. Observations were made at 24 hr, 48 hr, 72 hr, 7 d and 14 d. The study cites that irritation (chemosis and discharge) reduced to almost 0 by day 14, with the exception of conjunctival redness, which was the most prominent response and was present in 3/6 animals.</p>	<p>ECHA, 2019</p>

Physical Hazards	Reference
<b>Flammable Potential</b> Flash point of 218°C at 1019 hPa.	ECHA, 2019
<b>Explosive Potential</b> No data available. No chemical groups present in the molecule that are associated with explosive properties.	ECHA, 2019

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	LD <sub>50</sub> : 10 000 mg/kg/bw	Cited by ECHA, 2019
Rabbit, dermal	LD <sub>50</sub> : > 2 000 mg/kg/bw	Cited by ECHA, 2019
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEL	LOAEL (dermal, rats, local effects): 50 mg/kg bw/day	Cited by ECHA, 2019
NOAEL	NOAEL (oral, sub-acute, rats): > 750 mg/kg bw/day	Cited by ECHA, 2019
	NOAEL (dermal, rats, systemic effects): 50 mg/kg bw/day	
	NOAEL (oral, rat, developmental and parental toxicity): 1,000 mg/kg bw/day	

**Footnotes:**

LD<sub>50</sub> – lethal dose for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

NOAEL – No Observed Adverse Effect Level

NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	
Endocrine Disruption <sup>1</sup>	No	
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	
Mutagenicity/Genotoxicity (GHS Category 2)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	
Corrosive (irreversible effect)	No	
Respiratory sensitiser	-	
<b>Hazard Band 2</b>		

Human Health Toxicity Ranking		
	Hazard data	Comment
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	LOAEL (dermal): 50 mg/kg bw/day
Skin Sensitiser	No	
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	
Irritant (reversible effect)	Yes	Irritating to skin and eyes.
<b>Hazard Band 0</b> <b>All indicators outside criteria listed in Hazards 1-4</b>	-	
<b>Physical Hazards</b>		
Flammable potential	No	
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	2	Based on chronic dermal toxicity.
<b>Data confidence (available points out of 12 parameters)</b>	11/12	92%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

<b>Human Health Guidelines</b>		
<b>Media</b>	<b>Concentration (mg/m<sup>3</sup>; mg/L; mg/kg)</b>	<b>Reference</b>
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	NDF	
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	
<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	
<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>	NDF	

Footnotes:

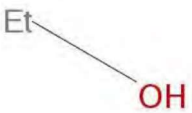
OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

NDF – No data found within the limits of the search strategy



Name	Ethanol
Synonyms	Ethyl alcohol; alcohol
CAS number	64-17-5
Molecular formula	C <sub>2</sub> H <sub>6</sub> O
Molecular structure	 <p>(Source: ECHA, 2020)</p>

Overview	References
<p>Ethanol is a simple alcohol. It is a colourless liquid (at 20°C and 1013 hPa), with a mild but typical alcoholic odour. Ethanol is fully soluble in water (at relevant environmental temperature). The melting/freezing point of ethanol is approximately - 114°C and the boiling point is approximately 78°C. Ethanol is highly flammable, with auto flammability at 363 to 425°C. Ethanol is considered non-explosive. Ethanol has a variety of uses. It is found in alcoholic beverages, is a fuel source, is found in cosmetics and various household products, and it has various industrial uses including as a cleaning solvent, a processing aid and a chemical intermediate in industrial processes such as the protective coating of metal compartments of vehicles, rubber production/processing and chemical production. This review focuses on the use of and potential human exposure to ethanol in industrial uses such as hydraulic fracturing activities. Exposures via consumer products will not be considered further.</p> <p>When released to the environment, modelling indicates that at static equilibrium alcohols will likely be distributed mainly to water and air, with adsorption to soil and sediment being weak. Ethanol is not expected to undergo direct photolysis, but experimental data supported by modelling data predicts that it will likely undergo indirect photolysis through hydroxyl radical reactions at a slow to moderate rate. Based on indirect photolysis, the half-life of ethanol is estimated to be 38 hours. Ethanol is considered readily biodegradable, but resistant to hydrolysis. Ethanol is considered to have a low bioaccumulation potential.</p> <p>Upon human exposure, ethanol is absorbed across the surface of the gastrointestinal tract, the lungs and the skin, due to its low molecular weight and being highly soluble in both water and lipids. Greater than 90% of the ingested dose is absorbed by the GI tract, with absorption beginning immediately following ingestion. Following absorption into the bloodstream, irrespective of the route of exposure, ethanol is distributed throughout the body. Ethanol is metabolised primarily by the liver, in three steps, (i) oxidation of ethanol to acetaldehyde (AcH) (ii) conversion of AcH to acetate and (iii) oxidation of acetate to carbon dioxide and water. The maximum amount of ethanol that can be metabolised per</p>	<p>ECHA, 2020</p>

hour has been estimated to be between 83 – 127 mg/kg bw/hr. Although elimination rates vary for between people, as the rates can be influenced by both environmental and genetic factors.

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Ethanol in alcoholic beverages has been evaluated by the International Agency for Research on Cancer (IARC) as Group 1 indicating carcinogenic to humans, based on epidemiological data in humans and experimental animal studies.</p> <p>Ethanol when not as a component of alcoholic beverages has not been evaluated by IARC as to its carcinogenicity.</p> <p>ECHA summaries two studies considered relevant to the use of ethanol as a chemical substance (rather than consumption of alcoholic beverages). ECHA concludes that there is no significant evidence to warrant a classification of ethanol for cancer in the context of the relevant classification and labelling regulations for chemical substances.</p>	<p>IARC, 2020</p> <p>ECHA, 2020</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Ethanol is not classified as genotoxic under criteria for classification and labelling purposes. Excluding data from studies assessing heavy consumption of alcoholic beverages and considering confounding toxicity due to other toxic effects associated with very high doses, there is no significant evidence for ethanol being a genotoxic hazard.</p> <p>ECHA summaries several <i>in vitro</i> and <i>in vivo</i> mutagenicity/ genotoxicity tests, with the results summarised as follows:</p> <p><i>In vitro</i></p> <p>Based on multiple bacterial reverse mutation studies, overall it was concluded that ethanol is not mutagenic to bacteria. There was little evidence for the clastogenicity of ethanol in a number of assays and using a number of different mammalian cell lines. Results of mammalian cell mutation studies were negative.</p> <p><i>In vivo</i></p> <p>Micronucleus tests showed overall that there was no convincing evidence that ethanol induces micronuclei in the bone marrow of rodents. Chromosome aberration tests in hamsters reported that ethanol had no effect on bone marrow chromosomes. Dominant lethal assay results indicate that ethanol is unlikely to produce a dominant lethal effect up to the maximum tolerated dose (&lt; 1 g/kg/day). In test for the potential to cause DNA damage. The no effect level was 2 g/kg, which was the maximum recommended doses in the guidelines for a single dose experiment.</p>	<p>ECHA, 2020</p>
<p><b>Reproductive Toxicity</b></p> <p>Classification of ethanol for reproductive toxicity was considered not warranted in the context of a chemical substance, because adverse reproductive responses were only observed for repeat dose oral consumption of large amounts of ethanol, at doses normally only associated with problem drinking.</p> <p>ECHA notes that available studies on ethanol use extremely high doses.</p>	<p>ECHA, 2020</p>



<p>ECHA identifies the key reproductive studies as a two-generation drinking-water study in mice and an inhalation study on rats. The two-generation study in mice investigated the effects of 5%, 10% and 15% ethanol in drinking water in reproduction and fertility. This study reported a NOAEL of 13 800 mg/kg for effects on fertility. The inhalation study identifying a NOAEC of 30 400 mg/m<sup>3</sup> for effects on fertility (values close to or exceeding 50% of the lower explosive limit).</p>	
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Classification of ethanol for developmental toxicity was considered not warranted in the context of a chemical substance, because adverse reproductive responses were only observed for repeat dose oral consumption of large amounts of ethanol, at doses normally only associated with problem drinking.</p> <p>Several toxicity studies are presented on the ECHA dossier, with the overall conclusion being that ethanol can clearly cause developmental toxicity. However, the doses required are exceedingly high compared to doses normally use to assess chemical substance hazards. These doses are also associated with maternal toxicity.</p> <p><i>Oral</i></p> <p>In an oral study, pregnant female mice were exposed to ethanol at several doses by gavage. No teratogenic effects were seen even at the highest dose tested (7 800 mg/kg bw/day).</p> <p><i>Inhalation</i></p> <p>An inhalation study assessing pregnant female rats exposed to ethanol reported a NOAEL for teratogenicity of 38 000 mg/m<sup>3</sup> ethanol. The study also reported clear maternal toxicity (necrosis and food intake reduction) at the highest dose and a NOAEL for maternal toxicity of 30 400 mg/m<sup>3</sup> of ethanol was established.</p>	<p>ECHA, 2020</p>
<p><b>Endocrine Disruption</b></p> <p>Ethanol is not identified in the European Commission (EC)'s report, "<i>Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption</i>" as a substance of interest.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Ethanol is not classified as acutely toxic by ECHA (based on LD<sub>50</sub> and LC<sub>50</sub> values being above thresholds for classification for acute toxicity).</p> <p>Numerous studies are provided for assessment of the acute oral, dermal and inhalation toxicity of ethanol. ECHA summarises the toxicity references values as:</p> <p><i>Oral</i></p> <p>Human: LD<sub>50</sub> ~ 2000 mg/kg  Rat: LD<sub>50</sub> of 15 010 mg/kg (female), 10 600 mg/kg (male, young adult), 7 060 mg/kg (male, old adult), 11 500 mg/kg (old adult), 17 750 mg/kg (young adult), 6 160 mg/kg (immature animal), 10 470 mg/kg (male/female), &gt;7 692 mg/kg (female).  Mouse: 8 350 mg/kg.</p> <p><i>Inhalation</i></p> <p>Rat (4 hr): LC<sub>50</sub> 51 mg/L (male) and 55 mg/L (female).</p>	<p>ECHA, 2020</p>

<p><i>Dermal</i></p> <p>No reliable data. Information indicates LD<sub>50</sub> &gt; 15 800 mg/kg.</p>	
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Adverse effects in repeated dose toxicity studies were seen only at extremely high doses, which are well above the concentrations that would trigger classification for repeat dose effects.</p> <p><i>Oral</i></p> <p>Toxicity references values outlined for the oral route of exposure included the following:</p> <p><i>Key study identified by ECHA</i></p> <p>Rat NOAEL (90 day): 1 730 mg/kg bw/day  Rat LOAEL (90 day): 3 160 mg/kg bw/day.</p> <p>The primary study referenced is a 90 day study in rats, fed a mixture containing 16.25% USP ethanol at 3 dose levels. The NOAEL was determined to be 10 mL/kg for the mixture for increased kidney weight and renal tubular epithelial hyperplasia in males (which is equivalent to 1 730 mg/kg bw). The LOAEL was determined to be 4 mL/kg of 100% USP ethanol for the same end points (equivalent to 3 160 mg/kg bw)</p> <p><i>Other studies</i></p> <p>Rat NOAEL (90 day): 3 250 mg/kg bw/day (male), 3900 mg/kg bw/day (male/female), &lt;4 400 mg/kg bw/day (female)</p> <p>Mouse NOAEL (90 day): &gt; 9 400 mg/kg bw/day (female), &lt; 9 700 mg/kg bw/day (male)</p> <p>Monkey NOEL (chronic): &lt; 6 200 mg/kg bw/day.</p> <p><i>Dermal</i></p> <p>Repeat dose toxicity data for the dermal route was not available. However, under non-occlusive conditions, there is sufficient evidence to conclude that dermal exposure would be negligible based on rapid evaporation of ethanol. In addition, skin absorption under practical conditions is considered negligible based on available data.</p> <p><i>Inhalation</i></p> <p>For the inhalation route, there is limited repeat dose toxicity data. The information that is available (sub-acute studies, supplemented by reproductive toxicity data by the inhalation route) indicate that toxicity by the inhalation route is not likely to be of concern.</p>	<p>ECHA, 2020</p>
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>In an ear swelling study, ethanol was found to be not sensitising to the skin.</p> <p>No data is available for assessment of respiratory sensitisation. However, with lacking data on respiratory sensitisation, considering that there are no alerts for respiratory sensitisation and ethanol is not a skin sensitiser, ECHA outlines that no classification for respiratory sensitisation is warranted.</p>	<p>ECHA, 2020</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Ethanol is not classified as a skin irritant by ECHA (based on available data reviewed as a whole). This classification was based on slight responses seen in animal studies and the lack of response in a human study, indicating the substance had minimal acute skin irritation potential. In the human</p>	<p>ECHA, 2020</p>

volunteer study, there was some evidence to suggest the potential for chronic irritation from repeated application under extreme occlusive conditions.

Ethanol is considered an eye irritant by ECHA (based on available data), classified as reversible eye irritant (Category 2) under the EU regulation 1272/2008. Studies indicate that irritancy effect diminishes rapidly with dilution. Results of studies undertaken for ethanol concentrations of 50% or less do not warrant classification. Considering this and the fact that results at 100% only just trigger classification, dilutions up to 70-80% are unlikely to warrant classification.

Physical Hazards	Reference
<b>Flammable Potential</b> Highly flammable.	ECHA, 2020
<b>Explosive Potential</b> Non explosive (based on the composition and no chemical structures being associated with explosive properties).	ECHA, 2020

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<b>Acute Toxicity</b>		
LD <sub>50</sub>	~ 2000 mg/kg	Cited by ECHA, 2020
<b>High Chronic/Repeat Dose Toxicity</b>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<b>Acute Toxicity</b>		
<b>LD<sub>50</sub></b>		
Rat, oral	15 010 mg/kg (female) 10 600 mg/kg (male, young adult) 7 060 mg/kg (male, old adult) 11 500 mg/kg (old adult) 17 750 mg/kg (young adult) 6 160 mg/kg (immature animal) 10 470 mg/kg (male/female) >7 692 mg/kg (female).	Cited by ECHA, 2020
Mouse, oral	8 350 mg/kg	Cited by ECHA, 2020
<b>LC<sub>50</sub></b>		

Rat	51 mg/L (male, 4 hr) 55 mg/L (female, 4 hr)	Cited by ECHA, 2020
<b>High Chronic/Repeat Dose Toxicity</b>		
LOAEL	Oral (rat, male, increased kidney weight and renal tubular epithelial hyperplasia): 3 160 mg/kg bw/day	Cited by ECHA, 2020
NOAEL	Oral (rat, male, increased kidney weight and renal tubular epithelial hyperplasia): 1 730 mg/kg bw/day  Oral (mice, 2-generation, fertility): 13 800 mg/kg	Cited by ECHA, 2020
NOAEC	Inhalation (rats, fertility): 30 400 mg/m <sup>3</sup>  Inhalation (rats, teratogenicity): 38 000 mg/m <sup>3</sup>	Cited by ECHA, 2020

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population  
 LC<sub>50</sub> – lethal air concentration for 50% of experimental population  
 LOAEL – Lowest Observed Adverse Effect Level  
 LOAEC – Lowest Observed Adverse Effect Concentration  
 NDF – No data found within the limits of the search strategy  
 NOAEL – No Observed Adverse Effect Level  
 NOAEC – No Observed Adverse Effect Concentration

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No <sup>^</sup>	
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No <sup>^</sup>	
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No <sup>^</sup>	
Endocrine Disruption <sup>1</sup>	No <sup>^</sup>	
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No <sup>^</sup>	
Mutagenicity/Genotoxicity (GHS Category 2)	No <sup>^</sup>	
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No <sup>^</sup>	
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No <sup>^</sup>	
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No <sup>^</sup>	
Corrosive (irreversible effect)	No	
Respiratory sensitiser	No	
<b>Hazard Band 2</b>		

Human Health Toxicity Ranking		
	Hazard data	Comment
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No <sup>^</sup>	
Skin Sensitiser	No	
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No <sup>^</sup>	Human, oral: LD <sub>50</sub> ~ 2000 mg/kg  Rat, inhalation: LD <sub>50</sub> 51 mg/L
Irritant (reversible effect)	Yes	Eye irritant (Category 2)
<b>Hazard Band 0</b> <b>All indicators outside criteria listed in Hazards 1-4</b>	-	
<b>Physical Hazards</b>		
Flammable potential	Yes	Highly flammable.
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	1	Based on eye irritancy
<b>Data confidence (available points out of 12 parameters)</b>	12/12	100%

<sup>^</sup> Hazard Bank Ranking, when excluding data from human consumption of alcohol.

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

<b>Human Health Guidelines</b>		
<b>Media</b>	<b>Concentration (mg/m<sup>3</sup>; mg/L; mg/kg)</b>	<b>Reference</b>
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	1880 mg/m <sup>3</sup>	Safe Work Australia, 2020
STEL	NDF	-
Peak Limitation	NDF	-
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	
<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	
<b>Water, fresh waters</b>	1 400 µg/L	NEPC, 2013
<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit



### Qualifying Summary Comments

Ethanol is a simple alcohol, that is found as a highly flammable, colourless liquid (at 20°C and 1013 hPa) and is fully soluble in water. Ethanol is a component of alcoholic beverages, is used as a fuel source, is found in cosmetics and other household products, and has various industrial uses. Upon release to the environment, ethanol will likely distribute to water and air. Ethanol is considered readily biodegradable and has a low potential to bioaccumulate.

Ethanol has been ranked in Hazard Band 1, based on being an eye irritant. This ranking is based on the exclusion of data specific to extremely high exposure to ethanol, as observed for consumption of alcoholic beverages. Adverse effects for several endpoints (carcinogenicity, mutagenicity/genotoxicity, reproductive/developmental toxicity and chronic toxicity) were observed at high dose rate. However, these dose rates are not considered relevant when considering industrial uses and potential occupational exposure.

### References

European Commission (EC), 2000. Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption, preparation of a candidate list of substances as a basis for priority setting, Final Report (Incorporating corrigenda to final report dated 21 June 2000).

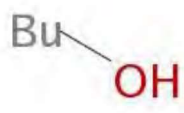
European Chemicals Agency (ECHA), 2020. Registration Dossier for ethanol. Available at <https://echa.europa.eu/registration-dossier/-/registered-dossier/16105>. Last modified 04 January 2020, accessed January 2020.

International Agency for Research on Cancer (IARC), 2019. Agents Classified by the IARC Monographs, Volumes 1–125, last updated 29 November, 2019. Available at <https://monographs.iarc.fr/agents-classified-by-the-iarc/>, accessed December 2019.

National Environment Protection Council (NEPC), 2013. National Environment Protection (Assessment of Site Contamination) Amended Measure 2013 (No.1). Schedule B1: Guidelines on Investigation Levels for soil and groundwater. National Environment Protection Council, Commonwealth Government of Australia.

Safe Work Australia, 2020. Hazardous Chemical Information System (HCIS): Exposure Standard Details for Ethyl alcohol. Available at: <http://hcis.safeworkaustralia.gov.au/ExposureStandards/Details?exposureStandardID=259>, accessed January 2020.

Created by:	MGT	Date: 08/01/2020
Reviewed by:	CLB	Date and Revision: 14/01/20

Name	Butyl alcohol
Synonyms	Butan-1-ol, 1-butanol, butanol, n-butanol
CAS number	71-36-3
Molecular formula	C <sub>4</sub> H <sub>10</sub> O
Molecular structure	 <p>(Source: ECHA, 2020)</p>

Overview	References
<p>Butyl alcohol is a liquid (at 20°C and 1012 hPa), that has a freezing point of -90°C and a boiling point of 119 °C. Its solubility in water is 66 g/L at 20°C, its relative density is 0.81 g/cm<sup>3</sup> at 20°C and it has a vapour pressure of &lt;10 hPa at 20°C. Butyl alcohol is a flammable liquid, with a flash point of 35°C and an auto-flammability temperature of 355°C (at 1013 hPa). Butyl alcohol has many uses including in coatings (paints, inks, toners, adhesives), in lubricants, in metal working fluids and rolling oils, in cleaning agents and as a laboratory agent and a process chemical.</p> <p>Following human exposure, butyl alcohol is rapidly taken up and distributed throughout the body, followed by a fast and complete elimination. Studies have shown butyl alcohol is readily absorbed through the skin, intestinal tract and lungs. Once absorbed, it is distributed almost uniformly through the body. Following metabolism primarily by alcohol and aldehyde dehydrogenases, butyl alcohol is rapidly eliminated. The majority of butyl alcohol is excreted as carbon dioxide.</p> <p>Upon release to the environment, butyl alcohol is most likely to be found in water. It is unlikely to undergo hydrolysis and photochemical degradation in air will likely be slow. Butyl alcohol is readily biodegraded, resulting in a short retention time under natural conditions. Bioaccumulation is not expected.</p>	ECHA, 2020

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b> Butyl alcohol has not been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity.</p>	IARC, 2019

<p>Butyl alcohol is considered by ECHA to be not classified for carcinogenicity under CLP Regulation (EC) No 1272/2008, as amended for the ninth time in Regulation (EC) No 2016/1179. ECHA considered that there was no evidence of carcinogenic potential due to lack of mutagenicity, and because no structural fragments were found in a structure-activity-relationship model (CASE) indicating a carcinogenic potential.</p>	ECHA, 2020
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Butyl alcohol is not considered classifiable for genetic toxicity by ECHA under CLP Regulation (EC) No 1272/2008, as amended for the eighth time in Regulation (EU) No. 2016/218, based on the available data.</p> <p>ECHA cites several <i>in vitro</i> studies including a gene mutation study in mammalian cells, a cytogenicity/micronucleus study and gene mutation studies in bacteria, and an <i>in vivo</i> mammalian somatic cell study. The results of these studies were all reported to be negative.</p>	ECHA, 2020
<p><b>Reproductive Toxicity</b></p> <p>Butyl alcohol is not considered classifiable for fertility or reproductive toxicity by ECHA under CLP Regulations (EC) No 1272/2008, as amended for the eighth time in Regulation (EU) No. 2016/218, based on the available data.</p> <p>They key <b>oral</b> studies cited by ECHA include:</p> <ul style="list-style-type: none"> <li>- A study on female fertility and prenatal development in rats. The NOAEL for maternal toxicity, including fertility was reported as 5 000 mg/kg bw/d.</li> <li>- A 90-day, repeated dose toxicity study (comparable to guideline study under GLP conditions) in rats reported a NOEL for reproductive organs of 500 mg/kg bw.</li> </ul> <p>The key <b>inhalation</b> study cited by ECHA was a behavioural peri-, postnatal developmental (neuro)toxicity rat study. The reported parental NOAEC, including fertility was 18.5 mg/L. An inhalation study for n-Butyl acetate is also provided, as this is considered a read across substance. The two-generation reproduction study in rats involved whole body exposure to vapours. The NOAEC for fertility was reported as 9.7 mg/L butyl acetate (converted to 6.189 mg/L for butyl alcohol). No studies were available to assess effects on fertility via the dermal route of exposure.</p>	ECHA, 2020
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Butyl alcohol is not considered classifiable for teratogenicity or developmental toxicity by ECHA under CLP Regulations (EC) No 1272/2008, as amended for the eighth time in Regulation (EU) No. 2016/218, based on the available data.</p> <p>They key <b>oral</b> studies cited by ECHA include:</p> <ul style="list-style-type: none"> <li>- A prenatal developmental toxicity study in rats. The NOAEL for maternal and developmental toxicity was reported as 1 454 mg/kg bw/d. The study also reported no teratogenicity observed up to the highest dose tested, being 5 654 mg/kg bw/d.</li> <li>- A study on female fertility and prenatal development in rats. The NOAEL for teratogenicity was reported as 5 000 mg/kg bw/d. A NOEL for developmental effects was not established by the study.</li> </ul> <p>The key <b>inhalation</b> studies cited by ECHA include:</p> <ul style="list-style-type: none"> <li>- A prenatal developmental toxicity study in rats. The NOAEC for developmental toxicity including</li> </ul>	ECHA, 2020

<p>morphological fetal alterations was 10.8 mg/L.</p> <ul style="list-style-type: none"> <li>- A behavioural peri-, postnatal developmental (neuro)toxicity rat study. The reported parental NOAEC, including behavioural or teratogenic effects was 18.5 mg/L.</li> </ul> <p>Inhalation studies for n-Butyl acetate are also provided, as this is considered a read across substance.</p> <ul style="list-style-type: none"> <li>- A prenatal developmental toxicity study in rabbits reported a NOAEC for developmental toxicity of 7.2 mg/L.</li> <li>- A prenatal developmental toxicity study in rats reported a LOAEC for maternal and developmental toxicity of 7.2 mg/L. However, it was noted that the developmental effects were associated with clear maternal toxicity and were not considered to be an independent effect.</li> <li>- A prenatal developmental study in rats reported a NOAEC for developmental toxicity of 9.6 mg/L.</li> </ul>	
<p><b>Endocrine Disruption</b></p> <p>Butyl alcohol is not identified in the European Commission (EC)'s report, "<i>Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption</i>" as a substance of interest.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Butyl alcohol is classified for acute <b>oral</b> toxicity as Category 4 (H302: Harmful if swallowed). The key study reference was a rat study, with a LD<sub>50</sub> of approximately 2 290 mg/kg bw (study similar to OECD TG 401).</p> <p>Other Oral LD<sub>50</sub> cited by ECHA include:</p> <ul style="list-style-type: none"> <li>- Rat 2 510 mg/kg bw</li> <li>- Rat (female) 4 360 mg/kg bw</li> <li>- Mouse 2 680 mg/kg bw</li> <li>- Rabbits 3 500 mg/kg bw</li> <li>- Golden hamsters 1 200 mg/kg bw</li> <li>- Dogs, minimum lethal dose 1 782 mg/kg bw</li> </ul> <p>Butyl alcohol was not classifiable for acute <b>dermal</b> toxicity under CLP Regulation (EC) No. 1272/2008, as amended for the ninth time in Regulation (EC) No 2016/1179, based on only slight dermal toxicity. The key study referenced was a rabbit study, with a LD<sub>50</sub> of approximately 3 430 mg/kg bw (study similar to OECD TG 402).</p> <p>Butyl alcohol was not classifiable for acute <b>inhalation</b> toxicity under CLP Regulation (EC) No. 1272/2008, as amended for the ninth time in Regulation (EC) No 2016/1179, based on very low inhalation toxicity. The key study referenced was a rat study, with 4h exposure, and a LC<sub>0</sub> of &gt; 17.76 mg/L (similar to OECD 403).</p> <p>Other toxicity reference doses cited by ECHA include:</p> <ul style="list-style-type: none"> <li>- Rats Inhalation Hazard Test (IHT), LT<sub>0</sub> 21.48 mg/L: no mortality within 7 hrs (similar OECD 403).</li> <li>- Rats LC<sub>0</sub> &gt;24 mg/L, with 4 hr exposure; IHT: No mortality within 8 h (similar to OECD 403).</li> </ul> <p>Butyl alcohol is classified by ECHA for <b>inhalation</b> exposure as specific target organ toxicity (STOT) Single Exposure Category 3 (H335: May cause respiratory irritation/ H336: May cause drowsiness or dizziness) according to CLP Regulations (EC) 1272/2008 requirements. This classification was due to observed local irritant effects on the respiratory system in an inhalation hazard test and transient effects on the central nervous system (CNS) (drowsiness and dizziness).</p> <p>Studies cited by ECHA include:</p>	<p>ECHA, 2020</p>

<ul style="list-style-type: none"> <li>- Human study (3-5 minute exposure): sensory irritating effects on nose and throat.</li> <li>- Rat inhalation hazard test (7 hour exposure): irritating effects on the respiratory system.</li> <li>- Human study (10 year study on workers): No sign of irritation in human at concentrations <math>\leq</math> 310 mg/m<sup>3</sup>.</li> </ul> <p>The ECHA profile provides additional information as follows: The weight of evidence of all data indicated that there is no evidence that butyl alcohol has to be considered as neurotoxic or developmental neurotoxicant as it did not lead to adverse and/or persistent damage to the CNS or peripheral nervous system. Exposure to butyl alcohol led only to transient effects or impairment of neurological functions (drowsiness and dizziness) typical for short chain alcohols.</p>	
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Butyl alcohol is not classified by ECHA for repeated dose systemic toxicity via oral, inhalation or dermal route under CLP Regulation (EC) No 1272/2008, as amended for the ninth time in Regulation (EU) No 2016/1179, based on the data available. ECHA does provide clarifying comments as follows: The CNS effects observed in the repeated dose studies were not centred on a specific organ but considered as general impairments of neurological and behavioural functions (Drowsiness and dizziness) which are classified accordingly (STOT SE 3, H336). Those observations typically occur for alcohols and there is currently no need for classification of butyl alcohol for repeated dose systemic toxicity.</p> <p>For <b>oral</b> exposure, the key study cited by ECHA is a sub-chronic 90-day rat study, which reports a NOEL of 125 mg/kg bw/d. Four groups of male and female rats (30/sex/group) were administered by gavage daily 0, 30, 125 or 500 mg/kg bw/d for either 6 or 13 weeks. General effects on neurological and behavioural functions as typically observed for alcohols were reported at the highest concentration, 500 mg/kg bw/d.</p> <p>For <b>dermal</b> exposure, the key study cited by ECHA is a short-term repeated dose rabbit study where butyl alcohol was applied occlusive to rabbit skin 12 times in 21 days for 5 hours (each exposure). Drying of the skin was observed and slight erythema but effects reversible. From continuous exposure, cracking, furrowing and exfoliation of the epidermis was observed but effects were reversible. No systemic toxicity observed. A NOAEL/LOAEL was not reported.</p> <p>For <b>inhalation</b>, the key study cited by ECHA was a sub-chronic 90-day rat study, with rats exposed to vapours 5 day/week for 5 h per day. The observed effect level was 320 mg/m<sup>3</sup>, but the study was not considered suitable for NOAEL/LOAEL derivation.</p>	ECHA, 2020
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Butyl alcohol is not classified by ECHA as a skin sensitizer, under CLP Regulation (EC) No 1272/2008, as amended for the ninth time in Regulation (EU) No 2016/1179, based on the available data being suitable for classification purposes. The key study cited by ECHA is a mouse Local Lymph Node Assay study (in vivo) (undertaken similar to OECD guideline 429) that showed that the test item does not have a sensitising effect on the skin under the test conditions.</p> <p>No data is available to assess respiratory sensitisation.</p>	ECHA, 2020
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p>	ECHA, 2020

Butyl alcohol is classified by ECHA as a **skin** irritant (Category 2, H315: Causes skin irritation), under Regulation (EC) No 1272/2008, as amended for the ninth time in CLP Regulation (EU) No. 2016/1179, based on studies undertaken with a typical mixture containing butyl alcohol..

It is noted that pure butyl alcohol reportedly causes only slight and reversible skin irritation. For typically produced mixtures, however, the effects on the skin are more distinct.

The key study cited by ECHA is a rabbit study, where two rabbits were exposed to the butyl alcohol (purity unknown; taken directly from the production) for 5 minutes, 1 hour and 2 hours under occlusive conditions, and then observed for 8 days. The study concluded the substance with irritating to the skin. For the exposure duration of 5 minutes effects were completely reversible within 8 days, but for the exposure duration of 1 hour and 2 hours, the effects were not fully reversible within 8 d.

Butyl alcohol is classified by ECHA as a risk for serious **eye** damage (Category 1, H318: "Causes serious eye irritation") according to CLP Regulations (EC) 1272/2008 requirements, as amended for the ninth time in Regulation (EU) No 2016/21179. This classification was due to the irreversible and sever effects on corneal opacity, iritis, conjunctivae redness and chemosis within 7 days.

The key study cited by ECHA is a rabbit study, where three rabbits were exposure for 24 h to 0.1 mL of the test substance (study in according to OECD guideline 405). This study reported observed corneal opacity, iritis, conjunctivae redness and chemosis, with effects not fully reversible within 7 days. An additional study was cited where the same effects were observed to be fully reversible within at least 21 days.

Physical Hazards	Reference
<b>Flammable Potential</b> Flammable liquid	ECHA, 2020
<b>Explosive Potential</b> Non-explosive	ECHA, 2020

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	LD <sub>50</sub> ~ 2 290 mg/kg bw	Cited by ECHA, 2020
Rat, dermal	LD <sub>50</sub> ~ 3 430 mg/kg bw	Cited by ECHA, 2020
<i>LC<sub>50</sub></i>		
Rat	LC <sub>0</sub> of > 17.76 mg/L	Cited by ECHA, 2020
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEL	NDF	
LOAEC	NDF	
NOAEL	Rat (oral, systemic effects): 125 mg/kg bw/d	Cited by ECHA, 2020

	Rat (oral, reproductive organs): 500 mg/kg bw  Rat (oral, maternal and developmental toxicity): 1 454 mg/kg bw/d	
NOAEC	Rat (inhalation, fertility): 6.189 mg/L  Rat (inhalation, developmental toxicity including morphological fetal alterations): 10.8 mg/L	Cited by ECHA, 2020

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population

LC<sub>50</sub> – lethal air concentration for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

LOAEC – Lowest Observed Adverse Effect Concentration

NDF – No data found within the limits of the search strategy



Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	
Endocrine Disruption <sup>1</sup>	No	
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	
Mutagenicity/Genotoxicity (GHS Category 2)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	
Corrosive (irreversible effect)	Yes	Irreversible and severe effects on the eyes
Respiratory sensitiser	NDF	
<b>Hazard Band 2</b>		

Human Health Toxicity Ranking		
	Hazard data	Comment
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	
Skin Sensitiser	No	
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	
Irritant (reversible effect)	Yes	Skin irritant
<b>Hazard Band 0</b> <b>All indicators outside criteria listed in Hazards 1-4</b>		
<b>Physical Hazards</b>		
Flammable potential	Yes	
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	3	Corrosive to the eyes
<b>Data confidence (available points out of 12 parameters)</b>	11/12	92%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	-	
STEL	-	
Peak Limitation	152 mg/m <sup>3</sup>	Safe Work Australia, 2020
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>		
	-	
<b>Air, commercial/industrial</b>		
	-	
<b>Water, potable</b>		
	2 mg/L	US EPA, 2019
<b>Water, recreational</b>		
	-	
<b>Soil, residential</b>		
	7 800 mg/kg	US EPA, 2019
<b>Soil, commercial/industrial</b>		
	120 000 mg/kg	US EPA, 2019
<b>Soil, protection of groundwater</b>		
	0.41 mg/kg	US EPA, 2019

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

**Qualifying Summary Comments**

Butyl alcohol is a flammable liquid (at 20°C and 1012 hPa), with a flash point of 35°C. It has many uses including in coatings (paints, inks, toners, adhesives), in lubricants, in metal working fluids and rolling oils, in cleaning agents and as a laboratory agent and a process chemical. Upon release to the environment, butyl alcohol is most likely to be found in water. Butyl alcohol is readily biodegraded, resulting in a short retention time under natural conditions. Bioaccumulation is not expected. Following human exposure, butyl alcohol is rapidly taken up and distributed throughout the body, followed by a fast and complete elimination.

Butyl alcohol has been ranking in Hazard Band 3 because it is corrosive to the eyes, causing serious and irreversible eye damage (classified as Category 1, H318: "Causes serious eye irritation"). It is also a skin irritant (classified as Category 2, H315: Causes skin irritation). As typical of alcohols, butyl alcohol can result in transient effects on the central nervous systems (CNS) consistent with general impairments of neurological and behavioural functions (drowsiness and dizziness). As such, butyl alcohol is also classified as specific target organ toxicity (STOT) Single Exposure Category 3 (H335: May cause respiratory irritation/ H336: May cause drowsiness or dizziness), and is also classified for acute oral toxicity as Category 4 (H302: Harmful if swallowed).

### References

European Chemicals Agency (ECHA), 2019. Registration Dossier for Butan-1-ol. Available at <https://echa.europa.eu/registration-dossier/-/registered-dossier/15322>. Last modified 04/01/202., accessed January 2020.

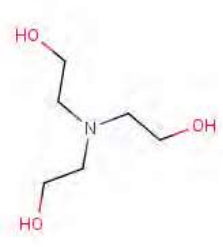
European Commission (EC), 2000. Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption, preparation of a candidate list of substances as a basis for priority setting, Final Report (Incorporating corrigenda to final report dated 21 June 2000).

International Agency for Research on Cancer (IARC), 2019. Agents Classified by the IARC Monographs, Volumes 1–125, last updated 12 December 2019. Available at <https://monographs.iarc.fr/agents-classified-by-the-iarc/>, accessed January 2020.

Safe Work Australia, 2020. Hazardous Chemical Information System (HCIS): Exposure Standard Details for n-Butyl alcohol. Available at: <http://hcis.safeworkaustralia.gov.au/ExposureStandards/Details?exposureStandardID=82>, accessed January 2020.

U.S. Environmental Protection Agency (U.S. EPA), 2019. Regional Screening Levels (RSLs) – Generic Tables (Tables as of November 2019). Available at: <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>, accessed December 2019.

Created by:	MGT	Date: 10/01/2020
Reviewed by:	CLB	Date and Revision: 21/01/2020

Name	Triethanolamine
Synonyms	Trolamine, triethanolamine, sterolamide, nitrilotriethanol, 2,2',2''-nitrilotriethanol
CAS number	102-71-6
Molecular formula	C <sub>6</sub> H <sub>15</sub> NO <sub>3</sub>
Molecular structure	

Overview	References
<p>Triethanolamine is a colourless to slightly liquid which is very hygroscopic and turns brown on exposure to air and light. It is a water-soluble strong base with a pH of 10.3 (concentration 1%) and emits a slight odour of ammonia.</p> <p>Triethanolamine is used commercially and industrially in the manufacture of surfactants and detergents, textiles, waxes, polishes, herbicides, petroleum demulsifiers, toilet goods, cement additives, cutting oils and other products.</p> <p>Kinetic studies in rats and mice using radioactive tracers indicate that triethanolamine identified that the compound distributes to the heart, kidney, liver, lung, and spleen with 40% of an intravenously administered dose excreted within 24 hours.</p> <p>Triethanolamine has a low order of acute and chronic toxicity. The principal route of exposure causing toxicity is through the skin, with some exposure occurring from inhalation of vapour and aerosols. Potential health effects in humans would be acute in nature and due to alkalinity rather than systemic toxicity. It is not genotoxic, carcinogenic, or toxic to development or the reproductive system.</p>	<p>HSDB (2009) ECHA (2020a)</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Not classifiable as to its carcinogenicity to humans (Group 3) based on inadequate evidence in experimental animals and humans.</p> <p>ECHA conclude from review of available data that triethanolamine is not considered carcinogenic for humans. Triethanolamine is not considered to be classified for carcinogenicity under Regulation (EC)</p>	<p>IARC (2000) ECHA (2020a)</p>

<p>No 1272/2008 and the available data are reliable and suitable for classification purposes under this regulation.</p>	
<p><b>Mutagenicity/Genotoxicity</b></p> <ul style="list-style-type: none"> <li>- Not classified as a mutagenic chemical. It is not genotoxic.</li> <li>- Triethanolamine did not induce mutations, DNA damage or other effects on genetic material in a number of non mammalian and mammalian tests both in vitro and in vivo. Based on available experimental information the test substance is not classified for genetic toxicity.</li> </ul>	<p>IARC (2000) ECHA (2020a)</p>
<p><b>Reproductive Toxicity</b></p> <ul style="list-style-type: none"> <li>- Not classified as a reproductive toxicant.</li> <li>- No reproductive or developmental effects were produced when rats and mice were exposed by topical administration. Other routes of exposure have not been studied.</li> </ul> <p>ECHA provide a summary of a screening reproduction/developmental toxicity study (OECD 421) with triethanolamine in rats, the NOAEL for systemic toxicity as well as for reproductive performance and fertility in parental animals was established at 1000 mg/kg bw/day, the highest dose tested. The NOAEL for postnatal toxicity in the offspring was 1000 mg/kg bw/day, whereas the NOAEL for prenatal developmental toxicity was determined to be 300 mg/kg bw/day based on decreased numbers of implants and delivered pups, and an increased postimplantation loss.</p>	<p>IARC (2000), ECHA (2020a)</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <ul style="list-style-type: none"> <li>- Not classified as a developmental toxicant. Teratogenic at maternally toxic doses.</li> <li>- Maternal effects observed among rat dams given 225 mg/kg/day, however reproductive parameters in exposed rats were unaffected at this or lower dose levels (0-75 mg/kg/day). Maternal effects were observed in another rat study at 450 mg/kg/day.</li> <li>-</li> </ul>	<p>HSDB (2020) ECHA (2020a)</p>
<p><b>Endocrine Disruption</b></p> <p>Not listed as an endocrine disruptor on the European Commission List of Endocrine Disruptors.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <ul style="list-style-type: none"> <li>- Large doses produced minimal toxicity when administered orally to laboratory animals.</li> <li>- When heated to decomposition it emits toxic and irritating fumes of nitrogen oxides and hydrogen cyanides.</li> <li>- The probably oral lethal dose in humans is 5-15 g/kg bw. Toxicity is low following single exposures.</li> </ul>	<p>HSDB (2020) OECD (2000)</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <ul style="list-style-type: none"> <li>- Human data are limited. Based on data from animal studies, chemical is anticipated to have low chronic toxicity under typical human exposure conditions.</li> <li>- Skin irritation and ulceration have been reported following repeated, subchronic, and chronic topical exposure in laboratory animals.</li> <li>- Kidney toxicity is reported in a number of experimental animal studies. Aside from nephrotoxicity (the primary effect), side effects reported in laboratory animals following long-term oral administration include hepatic congestion, and demyelination of peripheral and sciatic nerve fibers.</li> <li>- Classified as causing potential organ damage.</li> <li>- Classified as a potential respiratory irritant.</li> </ul>	<p>HSDB (2020) ECHA (2020, b)</p>
<p><b>Sensitisation of the skin or respiratory system</b></p> <ul style="list-style-type: none"> <li>- A skin sensitiser.</li> <li>- Not sensitising in a guinea pig study.</li> <li>- Very low sensitisation potential in humans in a volunteer human study</li> </ul>	<p>Safe Work Australia (2020)</p>

	ECHA (2020a) ECHA (2020b)
<p><b>Corrosion (irreversible and reversible)/irritation of the skin or eye</b></p> <ul style="list-style-type: none"> <li>- Not irritating to skin in rabbit studies.</li> <li>- Not irritating to eyes in three rabbit studies. Irritating to eyes in two rabbit studies.</li> </ul> <p>Conclusive but not sufficient for classification</p>	ECHA (2020a) ECHA (2020b)

Physical Hazards	Reference
<b>Flammable Potential</b> Non flammable. Combustible, when exposed to heat or flame.	ECHA (2020a)
<b>Explosive Potential</b> There are no chemical groups associated with explosive properties in the molecule.	ECHA (2020a)

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>Acute Toxicity</i>		
	NDF	All proposed data sources
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Guinea pig (oral)	2200 mg/kg	PubChem (2020)
Mouse (intraperitoneal)	1450 mg/kg	PubChem (2020)
Mouse (oral)	5846 mg/kg	PubChem (2020)
Rabbit (oral)	2200 mg/kg	PubChem (2020)
Rabbit (skin)	>20 mL/kg	PubChem (2020)
Rat (intraperitoneal)	1510 mg/kg	PubChem (2020)



Rat (oral)	4920 uL/kg	PubChem (2020)
Rat (skin)	> 16 mL/kg	PubChem (2020)
Rabbit (dermal)	> 2,000 mg/kg	ECHA (2020a)
Rats (oral)	6400 mg/kg	ECHA (2020a)
<b>LC0</b>		
Rat (inhalation, 8h)	Saturated atmosphere (approximately 1.8 mg/m <sup>3</sup> )	ECHA (2020a)
<b>High Chronic/Repeat Dose Toxicity</b>		
NOAEL, rat , oral	1000 mg/kg bw	ECHA (2020a)
NOAEL (local effects), mouse	250 mg/kg bw/day	ECHA (2020a)
NOAEC (local effects), rat (inhalation)	0.02 mg/L air	ECHA (2020a)
NOAEL (local effects) male rat (dermal)	125 mg/kg bw/day	ECHA (2020a)
NOAEL (local effects) female rat (dermal)	250 mg/kg bw/day	ECHA (2020a)

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population  
 LC<sub>50</sub> – lethal air concentration for 50% of experimental population  
 LOAEL – Lowest Observed Adverse Effect Level  
 LOAEC – Lowest Observed Adverse Effect Concentration  
 NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking*		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	IARC (2000) Group 3 - Not classifiable based on inadequate evidence.
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	ECHA (2020a)
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	ECHA (2020a); IARC (2000)
Endocrine Disruption <sup>1</sup>	No	Not listed as an endocrine disruptor by European Commission.
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	IARC 2000
Mutagenicity/Genotoxicity (GHS Category 2)	No	Not classified as a germ cell mutagen by ECHA (2020a)
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>oral LD<sub>50</sub> ≤ 300 mg/kg<sup>3</sup></li> <li>dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> </ul> inhalation LC <sub>50</sub> ≤ 10 mg/L <sup>4</sup> (or mg/m <sup>3</sup> ) (vapour)	No	-
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>oral LOAEL ≤ 10 mg/kg/d<sup>3</sup>;</li> <li>dermal LOAEL ≤ 2 0 mg/kg/d;</li> <li>inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>4</sup></li> </ul>	No	-

Human Health Toxicity Ranking*		
	Hazard data	Comment
Corrosive (irreversible effect)	No	Not classified as corrosive to skin or eyes by ECHA (2020)
Respiratory sensitiser	No	Not classified as a respiratory system sensitiser by ECHA (2020)
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>4</sup></li> </ul>	Yes	Potential local effects (irritation) in the respiratory tract.
Skin Sensitiser	Yes	Safe Work Australia (2020) - Skin irritation – category 2
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> </ul> inhalation LC <sub>50</sub> (6 h/d) > 10 mg/L ≤ 20 mg/L for vapours <sup>4</sup>	No	-
Irritant (reversible effect)	Yes	Safe Work Australia (2020) - Eye irritation – category 2A
<b>Hazard Band 0</b> All indicators outside criteria listed in Hazards 1-4		
<b>Physical Hazards</b>		
Flammable potential	No	-

Human Health Toxicity Ranking*		
	Hazard data	Comment
Explosive potential	No	-
<b>Hazard Evaluation (highest band) not including physical hazards</b>	<b>Band 2</b>	
<b>Data confidence (available points out of 12 parameters)</b>	12/12 = 100%	

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> Based on list of neurotoxic chemicals from US Agency for Toxic Substances and Disease Registry (ATSDR).

<sup>3</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>4</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed"). (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air</b>		
8-h TWA	5 mg/m <sup>3</sup>	Safe Work Australia (2020)
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	

<b>Water</b> , potable	NDF	
<b>Water</b> , recreational	NDF	
<b>Soil</b> , residential	NDF	
<b>Soil</b> , commercial/industrial	NDF	
<b>Soil</b> , protection of groundwater	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

## Qualifying Summary Comments

Triethanolamine is a colourless to slightly liquid which is very hygroscopic and turns brown on exposure to air and light. It is a water-soluble strong base with a pH of 10.3 (concentration 1%) and emits a slight odour of ammonia. Triethanolamine is used commercially and industrially in the manufacture of surfactants and detergents, textiles, waxes, polishes, herbicides, petroleum demulsifiers, toilet goods, cement additives, cutting oils and other products. Triethanolamine has a low order of acute and chronic toxicity. It is classified as a skin sensitiser and eye irritant. It is not genotoxic, carcinogenic, or toxic to development or the reproductive system. Given the relatively low to moderate hazard it is categorised in Hazard Band 2.

## References

European Chemicals Agency. Registered Chemical Substances Search. Available at <http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances>. [Accessed 6 January 2020] (ECHA 2020a)

European Chemicals Agency. Classification and Labelling Inventory database Search. Available at <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>. [Accessed 6 January 2020] (ECHA 2020b)

HSDB (Hazardous Substances Data Bank) 2020. National Center for Biotechnology Information. U.S. National Library of Medicine. *Compound Summary for Triethanolamine*. Toxicology Data Network (PUBCHEM). Available at <https://pubchem.ncbi.nlm.nih.gov/compound/7618>, [Accessed 6 January 2020].

International Agency for Research on Cancer (IARC), 2020. Agents Classified by the *IARC Monographs*, Volumes 1–125, last updated 12 December 2019. Available at <http://monographs.iarc.fr/ENG/Classification/index.php>. [Accessed 6 January 2020]

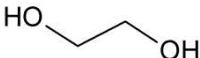
National Environment Protection (Assessment of Site Contamination) Amended Measure 2013 (No.1). *Schedule B1: Guidelines on Investigation Levels for soil and groundwater*. National Environment Protection Council, Commonwealth Government of Australia.

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OECD (2000). Triethanolamine.: SIDS initial assessment report. From INCHEM. Available at <http://www.inchem.org/documents/icsc/icsc/eics1034.htm>

Safe Work Australia. Hazardous Chemical Information System (HCIS). Available at <http://hcis.safeworkaustralia.gov.au/HazardousChemical>. [Accessed 6 January 2020]

Created by:	LPA	Date: 18/12/2019
Reviewed by:	CLB	Date and Revision: 20/01/20

yesName	Ethylene glycol
Synonyms	Ethane-1,2-diol, 1,2-ethanediol, glycol, ethylene alcohol, hypo-dicarbonous acid, mono-ethylene glycol, 1,2-dihydroxyethane, ethylene hydrate, MEG, Lutrol-9, Dowtherm Sr 1, Fridex, Norkool, Ramp, Tescol; Ucar 17
CAS number	107-21-1
Molecular formula	C <sub>2</sub> H <sub>6</sub> O <sub>2</sub>
Molecular structure	

Overview	References
<p>Ethylene glycol is a colourless, odourless, sweet tasting, relatively non-volatile liquid with high water solubility. It is a small molecular-weight alcohol which readily passes through biological membranes and is absorbed from the gastro-intestinal tract (GI) tract and in the lung.</p> <p>Ethylene glycol has numerous commercial and industrial applications such as in chemical manufacturing, natural gas processing and as an engine coolant. It is commonly used in antifreeze and hydraulic break fluids in both the automotive and aviation industry. It is also present in inks used in stamp pads, ballpoint pens and print shops.</p> <p>Ethylene glycol is considered highly toxic with multiple metabolites contributing to the toxic effects. The metabolites of ethylene glycol that have been typically detected are carbon dioxide, glycolic acid, and oxalic acid. Oxalic acid is converted to harmful calcium oxalate crystals, which are deposited in various tissues. Target organ cellular damage is seen in the kidney, brain, myocardium, pancreas, and blood vessel walls. Numerous human case studies and controlled experiments on animals are available to provide data on the toxic effects of ethylene glycol. Ethylene glycol is quickly and extensively absorbed through the GI tract of many species, but dermal absorption is slow in rodents and is slow and poorly absorbed through the skin in humans.</p>	<p>ATSDR 2010</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Ethylene glycol has not been evaluated by the International Agency for Research on Cancer.</p> <p>Ethylene glycol exhibited no evidence of carcinogenicity based on a two year bioassay with rats and mice. In several animal studies, there was no evidence of carcinogenicity in animals.</p>	<p>IARC 2019; ATSDR 2010</p>

<p><b>Mutagenicity/Genotoxicity</b></p> <p>Ethylene glycol is not classified as a mutagen by the European Chemicals Agency (ECHA).</p> <p>An ATSDR study reported that available <i>in vivo</i> and <i>in vitro</i> laboratory studies provided consistently negative genotoxicity results. No significant mutagenic activity was observed using the Ames test. <i>In vitro</i> mutagenicity studies in bacterial cells have consistently reported negative results.</p>	<p>ECHA 2020; ATSDR 2010</p>
<p><b>Reproductive Toxicity</b></p> <p>Ethylene glycol is not classified as reproductively toxic by ECHA on the basis that the data are sufficient and do not support classification under the GHS (Rev4) thresholds. This fact contrasts with the ATSDR (2010) animal data on developmental toxicity (see section below). While the GHS classification includes both reproductive and developmental toxicity these data have been presented separately in this profile to differentiate the nature of the toxicological response.</p> <p>There have been equivocal studies of reproductive toxicity. There has been no evidence of an adverse impact on reproductive organs observed in repeated dose toxicity studies in animals while other contradictory reports suggest reproductive effects such as decreased number of litters per pair, number of live pups per pair, and live pup weight, pup facial deformities and abnormal skeletons following long-term exposure to high doses. While the latter was observed in mice the effect was not observed in rats or rabbits under the same conditions. A further study in rats reported embryotoxicity following administration of ethylene glycol.</p>	<p>ECHA 2020</p> <p>ATSDR 2010</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>While there are insufficient human data on developmental toxicity / teratogenicity of ethyl glycol. There are animal data as presented in ATSDR (2010) and summarized below.</p> <p>Several acute-durational studies have been undertaken to assess developmental toxicity of ethylene glycol in mice, rats and rabbits. The studies indicate that malformations occur in both mice and rats exposure during gestations. Skeletal malformations were most apparent and mice appeared more sensitive than the other animals. Reduction in foetal body weight was also observed in laboratory animals exposed to ethylene glycol.</p> <p>ATSDR (2010) consider ethylene glycol to be teratogenic, more so in mice than in rats, rabbits and chickens. It induces primarily skeletal and external malformations. Teratogenic effects in mice were seen at all dose levels (750-3000 mg/kg/day) and in rats at 2500 and 5000 mg/kg/day. Animals given less than the limit dose (1000 mg/kg/day) only by the oral route and only when rapidly ingested (bolus) exhibited developmental toxicity.</p>	<p>ATSDR 2010</p>
<p><b>Endocrine Disruption</b></p> <p>Ethylene glycol is listed on the European Commission Priority List for endocrine disruptors as Category 3C. A classification of 3 indicates that the review found no scientific basis for inclusion in the priority list. The classification of C indicates that data were available on wildlife/relevant and/or mammal relevant endocrine effects for assessment.</p>	<p>EC 2000</p>



<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p><b>Oral</b></p> <p>Ethyl glycol is classified as acutely toxic via the oral route by ECHA based on its classification thresholds.</p> <p>ATSDR reports that in humans, the lethal dose of ethylene glycol is estimated to be in the range of 1,400–1,600 mg/kg. However, there are difficulties in quantifying the amounts consumed by persons who have succumbed to the toxic effects, which has led to uncertainty in the human lethal dose estimates. In laboratory animals (rats, mice, monkeys), oral doses of <math>\geq 4,000</math> mg/kg were required to cause death.</p> <p>Available information on the effects of acute accidental or intentional ingestion of ethylene glycol in humans suggests that acute oral toxicity in humans occurs in three stages within 72 hours of ingestion. Initially central nervous system depression, metabolic changes (hyper-osmolality) and gastrointestinal upset occurs and lasts from 30 minutes to 12 hours. These effects are followed by a second stage of symptoms which includes metabolic acidosis and associated cardio-pulmonary symptoms (tachypnea, hyperpnea, tachycardia, cyanosis, pulmonary oedema, and/or cardiac failure). The second stage of effects has been observed to last 12 – 24 hours after ingestion. The third stage (24 – 72 hours after ingestion) is characterized by renal involvement (flank pain and oliguria/anuria). There is also limited information suggesting a fourth stage, where cranial nerves (evident through deafness, facial paralysis, and other sequelae) may occur 6 or more days after exposure.</p> <p>Renal effects in orally exposed animals are consistent with those observed in humans. In acute-duration studies, effects occurred in the kidneys of rats exposed to 1,250–2,500 mg/kg/day by gavage or 2, 615– 5,270 mg/kg/day in drinking water for 9–29 days, and rabbits exposed to 2,000 mg/kg/day by gavage for 13 days.</p> <p><b>Inhalation</b></p> <p>A human inhalation study of short-term, high-exposure periods found that ethylene glycol was tolerated for only 15 minutes at 188 mg/m<sup>3</sup>; 2 minutes at 244 mg/m<sup>3</sup>; and one or two breaths at 308 mg/m<sup>3</sup>. The study reports that irritation of the respiratory tract became common at an ethylene glycol concentration of approximately 140 mg/m<sup>3</sup> (further data not provided), with concentration of <math>\geq 200</math> mg/m<sup>3</sup> being intolerable due to strong irritation of the upper respiratory tract. Reported effects included a burning sensation in the trachea and a burning cough.</p> <p><b>Dermal</b></p> <p>Information on the acute dermal toxicity of ethylene glycol is limited. ATSDR note one study in rabbits that found minimal skin and eye irritation following single applications and one negative developmental toxicity study in mice.</p>	<p>ECHA 2020; ATSDR 2010</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Ethylene glycol is classified as chronically toxic via the oral route by ECHA. Prolonged or repeat exposure may cause damage to the kidney (GHS Category 2).</p> <p>A 90-day study of rats exposed to ethylene glycol in drinking water found that renal effects were observed in males at <math>&gt; 947</math> mg/kg/day and females at 3, 087 mg/kg/day. The effects included renal tubular oxalate crystal deposition, dilation and degeneration of the kidney.</p>	<p>ECHA 2020; ATSDR 2010</p>

<p>Renal effects in rats and mice exposed to ethylene glycol in the diet for up to 2 years have also been studied. The studies showed males were more sensitive than females and rats were more sensitive than mice. At concentrations of <math>\geq 300</math> mg/kg/day, renal effects, including oxalate nephrosis, were observed in male rats. Oxalate crystal deposition and apparent tubular degenerative changes in male rats was observed at <math>\geq 375</math> mg/kg/day and in female rats at <math>\geq 750</math> mg/kg/day.</p> <p>A 30-day human study reported that inhalation exposure to ethylene glycol vapour was well tolerated at an average concentration of <math>30 \text{ mg/m}^3</math> for 20-22 hours/day. The effects reported were essentially limited to the occasional complaint about mild irritation of the upper respiratory tract.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Ethylene glycol is not classified as a skin or respiratory system sensitiser by ECHA (considered conclusive data for not classifying the substance by ECHA).</p>	ECHA 2020
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Ethylene glycol is not reported as causing corrosion or irritation effects on the skin or eyes by ECHA.</p>	ECHA 2020

Physical Hazards	Reference
<b>Flammable Potential</b> Not considered flammable by ECHA. Flashpoint of 127°C, Auto-ignition temperature of 398°C.	ECHA 2020; ATSDR 2010
<b>Explosive Potential</b> Not considered explosive by ECHA. Explosive limits are reported as 3.20 – 53%	ECHA 2020; ATSDR 2010

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LD <sub>Lo</sub> (lowest lethal dose), male, lethal dose 48 hrs after single ingestion	4071 mg/kg	ATSDR 2010
LD <sub>Lo</sub> , lethal dose in 6/11 after single exposure	2379 mg/kg	ATSDR 2010
LOAEL, humans, inhalation, respiratory tract irritation	140 mg/m <sup>3</sup>	ATSDR 2010
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<b>LD<sub>50</sub></b>		
Rat, oral, female	4000 mg/kg /day	ATSDR 2010
Rat, oral	7712 mg/ kg	ECHA 2020
Mouse, dermal	> 3500 mg/kg	ECHA 2020
<b>LC<sub>50</sub></b>		

Rat, 6 hr exposure	> 2.5 mg/L air (> 2500 mg/m <sup>3</sup> )	ECHA 2020
<b>High Chronic/Repeat Dose Toxicity</b>		
LOAEL, rats, 10 d, drinking water, renal toxicity	2615 mg/kg/day	ATSDR 2010
LOAEL, rats, male, 90 d drinking water, renal toxicity	947 mg/kg/day	ATSDR 2010
LOAEL, rats, female, 90 d drinking water, renal toxicity	3 087 mg/kg/day	ATSDR 2010
LOAEL, rats, male, 16 w dietary study, renal toxicity	180 mg/kg/day	ATSDR 2010
LOAEL, mice, oral, developmental toxicity	500 mg/kg/day	ATSDR 2010
LOAEL, rats, oral, developmental toxicity	750 mg/kg/day	ATSDR 2010
LOAEL, rabbit, 14 d GW, female, renal toxicity	2000 mg/kg/day	ATSDR 2010

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population

LC<sub>50</sub> – lethal air concentration for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

LOAEC – Lowest Observed Adverse Effect Concentration

NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	ATSDR 2010, Not classified by IARC
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	ATSDR 2010
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	See below
Endocrine Disruption <sup>1</sup>	No	Listed as Category 3C on priority by EC (EC 2000)
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	ATSDR 2010
Mutagenicity/Genotoxicity (GHS Category 2)	No	ATSDR 2010
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	Yes	Development toxicity observed in animal studies, ATSDR 2010.
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	See below
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 2 0 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	See below
Corrosive (irreversible effect)	No	ECHA 2020
Respiratory sensitiser	No	ECHA 2020

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	Prolonged or repeat does exposure may cause damage to the kidney (ATSDR 2010), GHS Category 2 (ECHA 2020)
Skin Sensitiser	No	ECHA 2020
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	LD <sub>50</sub> , rat, oral – 4 000 mg/kg/day (ATSDR 2010)
Irritant (reversible effect)	Yes	Respiratory tract irritation (ATSDR 2010)
<b>Hazard Band 0</b> All indicators outside criteria listed in Hazards 1-4	No	
<b>Physical Hazards</b>		
Flammable potential	No	
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	3	<b>Reproductive, developmental, teratogenic and neurological effects in animals.</b>
<b>Data confidence (available points out of 12 parameters)</b>	12/12	<b>100%</b>

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>3</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)<sup>9</sup>. (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	52 mg/ m <sup>3</sup> (vapour) 10 mg/ m <sup>3</sup> (particulate)	Safe Work Australia 2020
STEL	104 mg/ m <sup>3</sup> (vapour)	Safe Work Australia 2020
Peak Limitation	NDF	
<b>Minimal Risk Levels (MRLs)</b>		
Inhalation (acute exposure, 14 days or less)	2 mg/m <sup>3</sup>	ATSDR 2010
Oral (acute exposure, 14 days or less)	0.8 mg/kg/day	ATSDR 2010
<b>Environmental Exposure</b>		
<b>Air</b> , ambient, residential	0.42 mg/m <sup>3</sup>	US EPA 2019
<b>Air</b> , commercial/industrial	1.8 mg/m <sup>3</sup>	US EPA 2019
<b>Water</b> , potable	40 mg/L	USEPA 2019
<b>Water</b> , recreational	NDF	

<b>Soil, residential</b>	130 000 mg/kg	USEPA 2019
<b>Soil, commercial/industrial</b>	1 600 000*mg/kg	USEPA 2019
<b>Soil, protection of groundwater</b>		

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

\* Above limit of practicality



## Qualifying Summary Comments

Ethylene glycol exhibits a diverse range of adverse toxicological outcomes in animal studies including reproductive, developmental and teratogenic effects and renal effects after chronic exposure, although it is not considered highly acutely toxic via the oral, dermal and inhalation pathways. In humans it is considered to be acutely toxic. Furthermore, while ECHA has not classified ethylene glycol as a reproductive toxicant, ATSDR (2010) highlight the developmental toxicity of ethylene glycol in animals. Taking these concerns into account and subject to further evaluations of the animal data by regulatory agencies a Hazard Band 3 rating has been allocated. It is not flammable or explosive and burns with difficulty. While these properties warrant management for the occupational setting and where large scale emergency spills may result in local population exposure, data from river die-away tests suggest degradation is complete within 3 days at 20 deg C and 5-14 days at 8 deg C (HSDB, 2012). This implies rapid degradation of ethylene glycol in surface water. This limits its ability for accumulation and sustained environmental presence even though its mobility characteristics are high.

## References

ATSDR (Agency for Toxic Substances and Disease Registry), 2010. *Toxicological Profile for Ethylene Glycol.*, Division of Toxicology and Environmental Medicine/Applied Toxicology Branch, Public Health Service, US Department of Health and Human Services. Available at <http://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=86&tid=21>, Accessed January 2020.

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Created by:	LPA	Date: 18/12/2019
Reviewed by:	CLB	Date and Revision: 23/01/2020

Name	Glutaraldehyde
Synonyms	Glutaral; 1,5-pentanedial Pentanedial; 1,5-pentanedione; 1,3-diformylpropane; Glutaric dialdehyde; Glutaral Glutardialdehyde; Potentiated Acid Glutaraldehyde
CAS number	111-30-8
Molecular formula	C <sub>5</sub> H <sub>8</sub> O <sub>2</sub>
Molecular structure	

Overview	References
<p>Glutaraldehyde is a colourless oily liquid which has a variety of uses. In Australia, it's primarily used as a cold disinfectant by the health care industry. Other uses include as a hardener in x-ray film processing, as a fixative in tanning, as a disinfectant of animal housing, aircraft and portable toilets, as a preservative in industrial oils and as a biocide in aquaculture. Glutaraldehyde is primarily used as an aqueous solution, ranging in concentration from 50% w/w to less than 1% w/w. It is not manufactured as a pure chemical in Australia (based on the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (1994) review) but is imported by a number of companies (usually as a 25, 45 or 50 % w/w aqueous solution).</p> <p>Glutaraldehyde was declared a Priority Existing Chemical (PEC) in 1993 under the <i>Industrial Chemicals (Notification and Assessment) Act, 1989</i> due to adverse health concerns, which could result from individuals being exposed through the production, handling, use and disposal of glutaraldehyde. Occupational exposure to glutaraldehyde has resulted in occupational asthma, significant skin, respirator and eye irritation, as well as skin sensitisation in some cases.</p> <p>The Hazardous Chemical Information System (HCIS) provided by Safe Work Australia, lists the following hazard statements glutaraldehyde:</p> <ul style="list-style-type: none"> <li>• H330 (Fatal if inhaled)</li> <li>• H301 (Toxic if swallowed)</li> <li>• H335 (May cause respiratory irritation)</li> <li>• H314 (Causes severe skin burns and eye damage)</li> <li>• H334 (May cause allergy or asthma symptoms or breathing difficulties if inhaled)</li> <li>• H317 (May cause an allergic skin reaction)</li> <li>• H400 (Very toxic to aquatic life)</li> <li>• H411 (Toxic to aquatic life with long-lasting effects)</li> </ul>	<p>NICNAS 1994</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Glutaraldehyde has not been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity.</p> <p>Glutaraldehyde is not classified as carcinogenic by ECHA, as no carcinogenic potential was evident from its review of oral and inhalative long-term animal studies. . ECHA presents a 2 year oral feeding study of rats which reported that neoplastic findings were spontaneous in origin and showed no treatment-relationship. The animals were fed glutaraldehyde (in water) daily ranging from 6.1 mg/kg bw/day to 176.4 mg/kg bw/day.</p> <p>In a second 2 years drinking water study rats receiving daily glutaraldehyde in water (between 4 mg/kg bw/day and 86 mg/kg bw/day) reported that overall there was a statistically significant increased incidence of large granular lymphocytic leukaemia (LGLL) in the liver and spleen only in female rats in both dose groups The finding was not conclusive as the strain of rats used in the study has a high natural susceptibility to LGLL and variation in control data existed within the study laboratory.</p>	<p>IARC 2020</p> <p>ECHA 2020</p> <p>OECD SIDS 2017</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Glutaraldehyde is not classified as a mutagen by ECHA. From a review of available information, ECHA concluded that no classification is warranted according to EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008.</p> <p>An in vivo cytogenicity study indicates that for rats who received 200 mg/kg bw or 400 mg/kg bw glutaraldehyde by oral gavage, the test was negative for genotoxicity.</p> <p>However, studies have indicated the glutaraldehyde is mutagenic in bacterial assays (in vitro studies).</p>	<p>ECHA 2020</p> <p>ECHA 2020</p>
<p><b>Reproductive Toxicity</b></p> <p>Glutaraldehyde is not classified as reproductive toxicant by ECHA. From a review of available information, ECHA conclude that glutaraldehyde does not affect the reproductive performance and fertility, and neither possesses an embryo/fetotoxic nor a teratogenic potential. Therefore, no classification is warranted according to EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008).</p> <p>A summary of a reproductive study states a NOAEL of 68 mg/kg bw/day for embryotoxicity. This was the highest dose group. Female rats were exposed to glutaraldehyde in their drinking water from day 6 to day 16 of gestation. Another similar study lists a LOAEL for maternal toxicity of 51 mg/kg bw/day (highest dose tested) based on reduction in food and water consumption and on the presence of foci in the glandular stomach of 2 animals.</p>	<p>ECHA 2020</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Glutaraldehyde is not classified as a developmental toxicant by ECHA (ECHA states conclusive data has been reviewed, indicating low toxicity which doesn't support classification under the GHS).</p> <p>Two studies cited by ECHA indicated there was no evidence of teratogenicity in female rats fed glutaraldehyde in water during gestation. The highest dose was 68 mg/kg bw/day.</p>	<p>ECHA 2020</p>

<p><b>Endocrine Disruption</b></p> <p>Glutaraldehyde is not identified in the European Commission (EC)'s report, "<i>Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption</i>" as a substance of interest.</p>	<p>EC 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Glutaraldehyde is classified as acutely toxic via the oral and inhalation route by ECHA based on its classification thresholds (Acute Tox 3: H301: Toxic if swallowed and Acute Tox 2: H330: Fatal if inhaled.).</p> <p><i>Oral</i></p> <p>ECHA reports an oral LD<sub>50</sub> of 77 mg/kg bw for female rats (pure glutaraldehyde, based on a LD<sub>50</sub> of 154 mg/kg bw of the test substance) from the key study. The glutaraldehyde was administered orally (by gavage) at doses of 100, 200, 400 mg/kg bw (test material) for male rats and 100, 141, 200 mg/kg bw (test material 50%) for female rats. Other clinical signs of toxicity were seen in all treated groups and included sluggishness, lacrimation, piloerection, diarrhea, trace amount of blood in the urine of two rats, a red crust on the perinasal fur and a brown stain on the perineal fur (of 1 rat).</p> <p><i>Inhalation</i></p> <p>ECHA cites a study which reports an inhalation LC<sub>50</sub> of 0.48 mg/ L air (480 mg/m<sup>3</sup>) for male and female rats. The test was conducted in general accordance with OECD Guidelines 403 (Acute Inhalation Toxicity). The exposure duration was 4 hours and the rats were exposed to the test substance as liquid aerosol at the following nominal concentrations: 0.35, 0.58 and 0.72 mg/L.</p> <p>ECHA reports an inhalation LC<sub>50</sub> range between 0.28 and 0.39 mg/L air (50% glutaraldehyde). The test was conducted in general accordance with OECD Guidelines 403 (Acute Inhalation Toxicity). The exposure duration was 4 hours and the rats were exposed to the test substance as liquid aerosol.</p> <p><i>Dermal</i></p> <p>ECHA cites a study which reports a dermal LD<sub>50</sub> of &gt; 2000 mg/kg bw for male and female rabbits. Glutaraldehyde was applied semiocclusively at the one dose and the exposure period was 24 hours. Animals were observed for mortality, body weights, clinical signs or toxicity and local skin changes for 14 days after exposure. Limited clinical signs of mucoid faeces and wet brown urogenital staining were observed in the first 3 days of observation. Necropsy revealed thickening and scabbing of the application sites in all animals. No further treatment-related abnormalities were reported.</p>	<p>ECHA 2020</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Glutaraldehyde is not classified based on serious effects to organ systems following repeat dose exposure by the oral, dermal or inhalation route.</p> <p>ECHA presents summarise of a number of key studies including three <b>oral</b> studies where NOAELs determined ranged from 14.6 to 23.0 mg/kg bw pure glutaraldehyde. ECHA adopts a NOAEL for oral exposure of 15 mg/kg bw/day.</p> <p>Several <b>inhalation</b> studies indicate that glutaraldehyde affects primarily the respiratory tract. The NOAECs for local and systemic effects were determined to be 0.25 and 0.5 mg/m<sup>3</sup>, respectively.</p>	<p>ECHA 2020</p>

<p>A <b>dermal</b> exposure study conducted in accordance with OECD Guideline 411 (Subchronic Dermal Toxicity: 90-Day Study) examined doses of 0, 50, 100 and 150 mg/kg bw/day (active ingredient) applied to rats for 5 days a week over a period of 13 weeks. The NOAEL for systemic toxicity was established at 150 mg/kg/day.</p> <p>ECHA conclude that systemic toxicity of glutaraldehyde under repeated oral or dermal exposure is not expected, Under repeated inhalation exposure conditions, the upper respiratory tract was identified as target for the toxicity of glutaraldehyde vapours. Therefore, according to Annex VI of EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008 and based on the available data, glutaraldehyde does not have to be classified.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Glutaraldehyde is classified as potentially causing an allergic <b>skin</b> reaction by ECHA based on its classification thresholds. According to Annex VI of EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008) and based on the available data, glutaraldehyde has to be classified as Skin Sens. 1A: H317 and Resp. Sens. 1: H334.</p> <p>ECHA based the above conclusion on a number of key studies, including tested with an open cutaneous test, LLNA, Guinea Pig Maximisation Test, Buehler test, and the mouse ear swelling test and human sensitising studies. Besides a Buehler test and one guinea pig maximisation test, all animal studies indicate that glutaraldehyde is sensitising to skin. Human sensitisation was reported in studies using patch tests on volunteers, and in clinical case reports of contact dermatitis, particularly in occupation settings.</p> <p>Animal studies of <b>respiratory sensitisation</b> are not available. However, several studies have indicated occupational asthma and/or rhinitis have been linked with exposure to glutaraldehyde in the workplace.</p> <p>Glutaraldehyde is classified by Safe Work Australia (2020) as potentially causing allergy or asthma symptoms or breathing difficulties if inhaled.</p>	<p>ECHA 2020</p> <p>Safe Work Australia 2020</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Glutaraldehyde is classified as causing severe skin burns and eye damage by ECHA based on its classification thresholds.</p> <p>According to Annex VI of EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008 and based on the available data, glutaraldehyde has to be classified as Skin Corr. 1B: H314; Causes severe skin burns and eye damage and STOT SE 3: H335: May cause respiratory irritation.</p> <p>A skin corrosion/irritation study of white rabbits was presented by ECHA, which reported erythema and edema were observed after occlusive application of undiluted glutaraldehyde. The effects were observed to not be reversible after 4-hour exposure.</p> <p>ECHA provides a study which found that glutaraldehyde was found to cause eye damage which was not reversible. 0.1 mL of the test substance (~50% glutaraldehyde) was applied into the conjunctival sac of the right eye and the rabbits were observed for 8 days.</p>	<p>ECHA 2020</p>

Physical Hazards	Reference
<b>Flammable Potential</b> Non flammable liquid	ECHA 2020
<b>Explosive Potential</b> Non explosive	ECHA 2020

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	77 mg/kg bw (pure GA)	ECHA 2020
Mouse, oral	27 mg/kg bw (pure GA)	ECHA 2020
Rabbit, oral	133 mg/kg bw (pure GA)	ECHA 2020
Rat, dermal	> 2000 mg/kg bw (50% GA)	ECHA 2020
Rabbit, dermal	> 2000 mg/kg bw (50% GA)	ECHA 2020
Mouse, dermal	> 2000 mg/kg bw (50% GA)	ECHA 2020
<i>LC<sub>50</sub></i>		
Rat	0.28 mg/L (280 mg/m <sup>3</sup> ) (50% GA)	ECHA 2020
<i>High Chronic/Repeat Dose Toxicity</i>		

LOAEL (rats, oral, maternal toxicity, 50% GA)	51 mg/ kg bw/day	ECHA 2020
NOAEL (rats, oral, non-neoplastic effects, pure GA)	15 mg/kg bw/day	ECHA 2020
NOAEL (rats, oral, reproductive toxicity, embryotoxicity, 50% GA)	68 mg/kg bw/day	ECHA 2020

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population

LC<sub>50</sub> – lethal air concentration for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

LOAEC – Lowest Observed Adverse Effect Concentration

NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	IARC 2020 ECHA 2020
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	ECHA 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	ECHA 2020
Endocrine Disruption <sup>1</sup>	No	EC 2000
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	IARC 2020 ECHA 2020
Mutagenicity/Genotoxicity (GHS Category 2)	No	ECHA 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	ECHA 2020
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	Yes	Oral LD <sub>50</sub> : 77 mg/kg bw (pure GA)  ECHA 2020, see below
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	ECHA 2020, see below
Corrosive (irreversible effect)	Yes	ECHA 2020
Respiratory sensitiser	Yes	ECHA 2020



Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	Oral LOAEL, rats, of 51 mg/kg bw/day (50% GA) ECHA 2020
Skin Sensitiser	Yes	ECHA 2020
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	Yes	oral LD <sub>50</sub> , rat, of 316 mg/kg bw, ECHA 2020
Irritant (reversible effect)	Yes	
<b>Hazard Band 0</b> All indicators outside criteria listed in Hazards 1-4		
<b>Physical Hazards</b>		
Flammable potential	No	
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	Hazard Band 3	<b>Corrosive to skin and respiratory sensitiser, and acute oral toxicity</b>
<b>Data confidence (available points out of 12 parameters)</b>	12/12	<b>100%</b>

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	NDF	
STEL	NDF	
Peak Limitation	0.41 mg/m <sup>3</sup> (0.1 ppm)	Safe Work Australia 2020
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	
<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	
<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>		

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

## Qualifying Summary Comments

Glutaraldehyde is a colourless oily liquid which has a variety of uses. In Australia, it's primarily used as a cold disinfectant by the health care industry. Glutaraldehyde was declared a Priority Existing Chemical (PEC) in 1993 under the *Industrial Chemicals (Notification and Assessment) Act, 1989* due to adverse health concerns, which could result from individuals being exposed through the production, handling, use and disposal of glutaraldehyde. Glutaraldehyde is considered acutely toxic via the oral and inhalation route and is corrosive to the skin and eyes. Occupational exposure to glutaraldehyde has resulted in occupational asthma from inhalation, significant skin, respiratory system and eye irritation, as well as skin sensitisation in some cases from skin exposure. The inhalation hazards associated with use of glutaraldehyde need to be managed in an occupational setting as it can cause asthma. Glutaraldehyde has been ranked in Hazard Band 3, based on the potential for it to be corrosive to the skin and eyes, a respiratory sensitiser and acutely toxic via the oral route of exposure. These effects were observed for both undiluted and diluted solutions of glutaraldehyde. It is noted that the rapid metabolism of glutaraldehyde in soil and the rapid biodegradation of glutaraldehyde in the aquatic environment, along with the fact that it is not expected to bioaccumulate (see the Ecotoxicology section of the cover addendum), limits the potential for glutaraldehyde to persist under general environmental conditions.

## References

EC (European Commission) 2000. *European Commission Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption, preparation of a candidate list of substances as a basis for priority setting, Final Report (Incorporating corrigenda to final report dated 21 June 2000)*. BKH Consulting Engineers, Delft, The Netherlands in association with TNO Nutrition and Food Research, Zeist, The Netherlands Available at [http://ec.europa.eu/environment/chemicals/endocrine/strategy/substances\\_en.htm#priority\\_list](http://ec.europa.eu/environment/chemicals/endocrine/strategy/substances_en.htm#priority_list), Accessed January 2020

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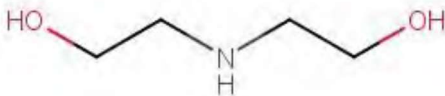
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OECD SIDS (2017). Screening Information Data Set, initial assessment report for glutaraldehyde. Inchem Database available at <http://www.inchem.org/documents/icsc/icsc/eics0158.htm>, Date accessed January 2020

Safe Work Australia 2020. Hazardous Chemical Information System (HCIS): *Dossier for Glutaraldehyde*. Available at <http://hcis.safeworkaustralia.gov.au/ExposureStandards/Document?exposureStandardID=297>, Accessed January 2020.

Created by:	LP	Date: 18/12/2019
Reviewed by:	CLB	Date of Revision: 13/02/2020



Name	Diethanolamine
Synonyms	2,2'-iminodiethanol 2-[(2-hydroxyethyl)amino]ethan-1-ol DEA
CAS number	111-42-2
Molecular formula	C <sub>4</sub> H <sub>11</sub> NO <sub>2</sub>
Molecular Structure	 <p>(Source: ECHA, 2019)</p>

Overview	References
<p>Diethanolamine is a colourless solid, sometimes found as a syrupy liquid (at 20°C and 1013 hPa), with an ammonia-like odour. It has a molecular weight of 105.136. It has melting point of 27-28°C and a boiling point of 269.9°C at 1013.25 hPa, with decomposing likely at temperatures over 200°C. It has a density of 1.1 g/cm<sup>3</sup> and is considered miscible with water (solubility of 1000 g/L) at 20°C.</p> <p>Diethanolamine has numerous industrial uses, including as a chemical intermediate and as a corrosive inhibitor and surface-active agent in metal working fluids, leather, fuels, cosmetic formulations, papers and textiles, paints and inks, as well as a dispensing agent for agricultural chemicals and in gas treatment.</p> <p>Once in the environment, diethanolamine is considered readily biodegrade according to OECD criteria. Diethanolamine will rapidly degrade by photochemical processes (half-life of 4.2 hours) following evaporation or exposure to air. However, based on Henry's Law Constant, diethanolamine is not expected to evaporate into the atmosphere. Hydrolysis is also not expected based on structural properties. Diethanolamine has a low potential for bioaccumulation (a log k<sub>ow</sub> &lt;= 3) or bioconcentration, and adsorption to solid soil phase is not expected.</p>	<p>ECHA, 2019 U.S. EPA, 2012</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Diethanolamine has been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity. Diethanolamine was assigned Group 2B (assessment in 2013) indicating it is possibly carcinogenic to humans.</p>	<p>IARC, 2019</p>

<p><b>Mutagenicity/Genotoxicity</b></p> <p>The ECHA dossier, based on the available data, considered that diethanolamine does not need to be classified for genotoxicity.</p> <p>The ECHA dossier cites several in vitro tests and an in vivo test observing no mutagenic, clastogenic or genotoxic effects. Diethanolamine did not induce reverse mutations in <i>Salmonella typhimurium</i> or <i>Escherichia coli</i>. Diethanolamine did not induce chromosomal aberrations in rat hepatocytes, sister chromatid exchange or chromosomal aberrations in Chinese hamster ovary cells or gene mutation in mouse lymphoma cells. Diethanolamine (formulated in ethanol) did not induce micronuclei in vivo peripheral blood erythrocytes of mice after repeated unoccluded dermal application for 13 weeks at doses clearly showing systemic availability.</p>	ECHA, 2019
<p><b>Reproductive Toxicity</b></p> <p>The ECHA dossier, based on the available data, classified diethanolamine for effects on fertility and developmental toxicity. ECHA states that “classification with category 2 for reproductive toxicity (H361) is considered the most appropriate in line with the criteria laid down in Regulation EC 1272/2008 (CLP)”.</p> <p>The ECHA dossier describes several reproductive toxicity tests. Details are provided for a key extended one-generation reproductive toxicity study in rats exposed to diethanolamine in drinking water. The LOAEL for general toxicity was 300 ppm based on evidence for distinct kidney toxicity and stomach irritation, as well as corresponding effects on water consumption, food consumption, body weights and clinical pathological parameters. The LOEAL for fertility and reproductive performance was 1000 ppm based on a lower number of implants, prolonged/irregular estrous cycles as well as pathological changes in sexual organs, pituitary and mammary glands of both genders. Although eosinophilic cysts in the pituitary gland were present in the F1 animals down to the 100 ppm dose level, but no assessment on adversity of this finding was possible.</p> <p>In summary, ECHA states that reproductive toxicity was substance- and dose relate but occurred in the presence of distinct general systemic toxicity in the mothers and in the offspring.</p>	ECHA, 2019
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>The ECHA dossier, based on the available data, classified diethanolamine for effects on fertility and developmental toxicity. ECHA states that “classification with category 2 for reproductive toxicity (H361) is considered the most appropriate in line with the criteria laid down in Regulation EC 1272/2008 (CLP)”.</p> <p>The ECHA dossier concluded that diethanolamine only caused developmental toxicity in the presence of clear maternal toxicity and at dose levels considered as high, based on the available studies with rats and rabbits for the inhalation, dermal and oral route of exposure. ECHA also noted that maternal toxicity was observed at levels higher/comparable to general toxic effects in the repeated dose toxicity studies.</p>	ECHA, 2019
<p><b>Endocrine Disruption</b></p> <p>Diethanolamine is not identified in the European Commission (EC)’s report, “<i>Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption</i>” as a substance of interest.</p>	EC, 2000

<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>The ECHA dossier, based on the available data, classified diethanolamine for acute oral toxicity (classification Xn; R22). Diethanolamine is considered to have moderate acute oral toxicity and low toxicity following inhalation exposure.</p> <p>In the key study for <b>oral</b> exposure, the LD50 for males and females combined was 1 600 mg/kg bw. This study was performed to a comparable protocol as OECD guideline 401. Five rats per sex were dosed with 200 – 3200 mg/kg bw and observed up to 14 days. In their summary, ECHA reported that no deaths occurred up to 1000 mg/kg bw dosing group. Reported clinical signs were tumbling, staggering gait, twitches, convulsions, dyspnoea, abdominal lateral position and scrubby coat. Gross pathology revealed hydrothorax, local adhesions of the gut and signs of irritation on the gastrointestinal tract. Two additional acute oral studies were considered by ECHA as supporting studies. One study reported an LD<sub>50</sub> of 1 820 mg/kg bw in female Wistar rats. The second study reported that for male rats receiving a single oral dose of aqueous diethanolamine solutions in the range of 100 – 6400 mg/kg bw, at the top dose 7/8 rats died. At &gt; 100 mg/kg bw onwards increased liver weight was reported, and an increase in the relative kidney weight was reported at &gt;1600 mg/kg.</p> <p>Acute <b>inhalation</b> tests showed no mortality in rats after 8-hour exposure to an atmosphere enriched with diethanolamine vapour. The highest concentration attainable was approximately 1.9 mg/m<sup>3</sup>. Another study reported that after exposure of 3.35 mg/L for up to 4 hours no rats died. Toxicological signs consisted predominantly of lethargy and irregular respiration.</p> <p>For the <b>dermal</b> route of exposure, no reliable data was available.</p>	<p>ECHA, 2019</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>The ECHA dossier, based on the available data, classified diethanolamine for chronic (repeated dose) oral toxicity, Classified as Xn, R48/22).</p> <p>The ECHA dossier cites two sub-chronic <b>oral</b> studies, with diethanolamine administered via drinking water (protocols similar to OECD TG 408). Mortality was observed in males at ≥ 5000 ppm and in females at ≥ 2 500 ppm. In the first study on rats, impaired body weight gains were observed at concentrations ≥ 320 ppm in females and 630 ppm in males. Systemic effects observed included anaemia, nephrotoxicity, cortical vacuolization of adrenal glands and demyelination of brain/spinal cord without any neurofunctional finding. Based on anaemia, a LOAEL of 25 mg/kg bw/day (equal to 320 ppm) male and of 14 mg/kg bw/day (equal to 160 ppm) for females was reported. In the second study on mice, body weight gain was decreased in both species at concentrations of 1250 ppm for females and 2500 ppm for males. Systemic effects consisted of hepato- and nephrotoxicity and myocardial degeneration. Based on necrotic liver damages, a LOAEL of 104 mg/kg bw/day (equal to 630 ppm) for males and a LOAEL of 142 mg/kg bw/day for females was reported (equal to 630 ppm).</p> <p><b>Dermal</b> exposure of rats and mice lead to mortality at high dose levels (&gt; 500 mg/kg bw in rats and &gt; 1000 mg/kg bw in mice). The study involved repeated unoccluded dermal application of ethanolic diethanolamine solution in subacute (14 days) and subchronic (13 weeks, protocol similar to OECD TP 411). Systemic effects observed in rats included signs of toxicity predominantly of anaemia and nephropathy. In mice, these effects were mainly in the form of liver and kidney damage. The study reported a LOAEL of 32 mg/kg bw/day in rats and a LOAEL of 80 mg/kg bw/day in mice.</p> <p>In a 2-year dermal study with rats and mice, non-carcinogenic effects were also observed. Critical effects were reported to be kidney (nephropathy) and liver toxicity, anaemia and dermal hyperkeratosis/acanthosis, with effects observed at the lowest tested dermal dose. The dermal LOAEL from this study was 8 mg/kg bw/day.</p> <p>Following <b>inhalation</b> (nose-only) exposure of rats to diethanolamine aerosols for 3 months, systemic and local effects were observed. Studies followed OECD TG 413. Systemic effects included kidney effects, adaptive liver effects and mild normochromic microcytic anaemia and some influences on the male reproductive system. Local effects observed included respiratory tract irritation, squamous</p>	<p>ECHA, 2019</p>

<p>metaplasia of the laryngeal epithelium and inflammatory responses. The NOAEC for systematic effects was 15 mg/m<sup>3</sup> and the NOAEC for local respiratory tract effects was 3 mg/m<sup>3</sup>.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>The ECHA dossier lists diethanolamine as not sensitising to the skin and states that based on the available data, diethanolamine does not need to be classified for skin sensitisation.</p> <p>In a Guinea pig Maximisation test according to OECD TG 406, no skin sensitising potential of Diethanolamine was noted. The test involved 40 female Himalayan Guinea pigs.</p> <p>The ECHA dossier identifies occupational sensitisation in the industrial use of diethanolamine in water-based metalworking fluids. However sensitisation was considered likely due to regular exposure to these fluids and secondary skin conditions not attributable to diethanolamine. .</p>	<p>ECHA, 2019</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>The ECHA dossier lists diethanolamine as irritating to the skin and highly irritating to the eyes. Based on this, ECHA classifies diethanolamine as Xi; R38 (irritating to the skin) and R41 (risk of serious damage to eyes).</p> <p>The key experimental study cited by ECHA reported both pure and technical diethanolamine (concentration reported as undiluted) applied via a patch test induced slight skin irritation after 1 – 15 minutes, while distinct irritation was noted after 20 hours. The test was undertaken in either equivalent or similar to OECD Guideline 404. The mean erythema and edema scores for 24, 48 and 72 hours in case of 20 h exposure were 2 and 1.33, respectively (noting that erythema was present at 72 hours, while edema was absent at 72 hours). Comparable results were observed in another study.</p>	<p>ECHA, 2019</p>



Physical Hazards	Reference
<b>Flammable Potential</b> The ECHA dossier lists diethanolamine as non-flammable upon ignition. Diethanolamine has no pyrophoric properties and does not liberate flammable gases in contact with water and the substance is not a self-heating substance or mixture.	ECHA, 2019.
<b>Explosive Potential</b> The ECHA dossier lists diethanolamine as non-explosive.	ECHA, 2019.

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	LD <sub>50</sub> : 1 820 mg/kg bw	ECHA, 2019
<i>LC<sub>50</sub></i>		
Rat	LC <sub>0</sub> (8 h, rat, male/female): 200 mg/m <sup>3</sup> LC <sub>0</sub> (4 h, rat, male) 3 350 mg/m <sup>3</sup>	ECHA, 2019
<i>High Chronic/Repeat Dose Toxicity</i>		
NOAEL/ LOAEL	LOAEL (rat, oral (drinking water), male): 25 mg/kg bw/day LOAEL (rat, oral (drinking water), female): 14 mg/kg bw/day  LOAEL (mouse, oral (drinking water), male): 104 mg/kg bw/day LOAEL (mouse, oral (drinking water), female): 142 mg/kg bw/day  LOAEL (rat and mouse, dermal): 8 mg/kg bw/day	ECHA, 2019

NOAEC/ LOAEC	NOAEC (rat, inhalation (nose-only), systemic): 15 mg/m <sup>3</sup> NOAEC (rat, inhalation (nose-only), local respiratory tract): 3 mg/m <sup>3</sup>	ECHA, 2019
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Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population  
 LC<sub>50</sub> – lethal air concentration for 50% of experimental population  
 LOAEL – Lowest Observed Adverse Effect Level  
 LOAEC – Lowest Observed Adverse Effect Concentration  
 NOAEL – No Observed Adverse Effect Level  
 NOAEC – No Observed Adverse Effect Concentration  
 NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	
Endocrine Disruption <sup>1</sup>	No	Not listed by EC.
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	Yes	IARC classification
Mutagenicity/Genotoxicity (GHS Category 2)	No	Not classifiable according to ECHA.
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	Yes	ECHA classification
Acute Toxicity (oral, dermal or inhalation) Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	Oral LD <sub>50</sub> of 1820 mg/kg bw
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 20 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	Dermal LOAEL of 8 mg/kg/d
Corrosive (irreversible effect)	No	
Respiratory sensitiser	No	
<b>Hazard Band 2</b>		

Human Health Toxicity Ranking		
	Hazard data	Comment
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	Oral LOAEL of 14 mg/kg/d
Skin Sensitiser	No	
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	Yes	Oral LD <sub>50</sub> of 1820 mg/kg bw
Irritant (reversible effect)	Yes	
<b>Hazard Band 0</b> <b>All indicators outside criteria listed in Hazards 1-4</b>	No	
<b>Physical Hazards</b>		
Flammable potential	No	
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	3	Based on carcinogenic and reproductive toxicity potential.
<b>Data confidence (available points out of 12 parameters)</b>	12/12	100%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup>Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

<b>Human Health Guidelines</b>		
<b>Media</b>	<b>Concentration (mg/m<sup>3</sup>; mg/L; mg/kg)</b>	<b>Reference</b>
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	13 mg/m <sup>3</sup>	Safe Work Australia, 2019
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	0.21 µg/m <sup>3</sup>	U.S. EPA, 2019
<b>Air, commercial/industrial</b>	0.88 µg/m <sup>3</sup>	U.S. EPA, 2019
<b>Water, potable</b>	40 µg/L	U.S. EPA, 2019
<b>Soil, residential</b>	130 mg/kg	U.S. EPA, 2019
<b>Soil, commercial/industrial</b>	1600 mg/kg	U.S. EPA, 2019
<b>Soil, protection of groundwater</b>	0.0081 mg/kg	U.S. EPA, 2019

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

### Qualifying Summary Comments

Diethanolamine is a colourless solid, with an ammonia-like odour. It has numerous industrial uses, including as a chemical intermediate and as a corrosive inhibitor and surface-active agent in metal working fluids, leather, fuels, cosmetic formulations, papers and textiles, paints and inks, as well as a dispensing agent for agricultural chemicals and in gas treatment. Once in the environment, diethanolamine will likely breakdown as it is readily biodegradable.

Diethanolamine was ranked in Hazard Band 3, based on carcinogenic and reproductive toxicity potential. Diethanolamine was assigned Group 2B by IARC indicating it is possibly carcinogenic to humans and it is classified by the ECHA dossier as Category 2 for reproductive toxicity (H361). The ECHA dossier also classifies diethanolamine for chronic (repeated dose) oral toxicity and as irritating to the skin and highly irritating to the eyes. Diethanolamine is considered to have moderate acute oral toxicity and low toxicity following inhalation exposure. It is considered to be not sensitising to the skin.

### References

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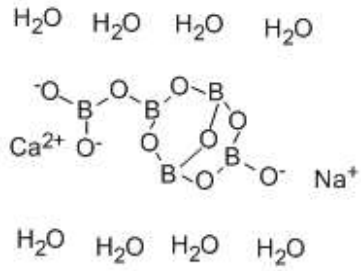
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[https://golderassociates.sharepoint.com/sites/117999/project files/6 deliverables/report 014/appendix e - human health summaries/19133367\\_hh\\_111-42-2 diethanolamine.docx](https://golderassociates.sharepoint.com/sites/117999/project%20files/6%20deliverables/report%20014/appendix%20e%20-%20human%20health%20summaries/19133367_hh_111-42-2_diethanolamine.docx)

Name	Ulexite
Synonyms	Boronatocalcite, sodium calcium borate
CAS number	1319-33-1
Molecular formula	$(\text{NaCaB}_5\text{O}_6(\text{OH})_6 \cdot 5(\text{H}_2\text{O}))$
Molecular structure	 <p>The diagram illustrates the molecular structure of Ulexite. It features a central boron-oxygen network where boron atoms are tetrahedrally coordinated to oxygen atoms. This network is surrounded by calcium ions (<math>\text{Ca}^{2+}</math>) and sodium ions (<math>\text{Na}^+</math>). Five water molecules (<math>\text{H}_2\text{O}</math>) are also shown, two above and three below the central boron-oxygen structure.</p>

Overview	References
<p>Boronatocalcite is the mineral ulexite. Ulexite is a hydrated sodium calcium borate hydroxide mineral. Ulexite is slightly soluble, decomposes and contains approximately 13% boron.</p> <p>Ulexite is mined to produce borate products for uses such as insulation, textile grade fiberglass, bleach, fire retardants, agricultural fertilisers and herbicides (as a trace element), and enamels. A study of the thermal degradation of ulexite has shown under increased temperature (around 600°C) the crystalline structure will break down to eventually release <math>\text{NaB}_3\text{O}_5</math> and <math>\text{NaCaBO}_3</math>.</p> <p>Limited toxicology data are available for ulexite; however, the assessment of boron salts was undertaken by WHO (1998) and ECHA (2015). Disodium octaborate tetrahydrate is converted to boric acid (<math>\text{B}(\text{OH})_3</math>) and disodium borate (<math>2\text{NaB}(\text{OH})_4</math>) upon dissolution in water. Low concentrations of simple inorganic borates (e.g. boric acid, disodium tetraborate pentahydrate, boric oxide and disodium octaborate tetrahydrate) will predominately exist as undissociated boric acid in aqueous solutions at physiological and acidic pH. At about pH 11 the metaborate anion (<math>\text{B}(\text{OH})_4^-</math>) becomes the main species in solution. In between pH 7 and 11, both un-dissociated boric acid and metaborate ions will be present. This leads to the conclusion that the main species in the plasma of mammals and in the environment is un-dissociated boric acid. Since other borates (such as potassium borate) dissociate to form boric acid in aqueous solutions, they too can be considered to exist as un-dissociated boric acid under the same conditions. Boron oxide /boric acid salts are used in this profile to describe the toxicity of ulexite.</p> <p>Boric acid and borax are absorbed from the gastrointestinal tract and the respiratory tract, as indicated by increased levels of boron in the blood, tissues, or urine or by systemic toxic effects of exposed individuals or laboratory animals. Clearance of boron compounds is similar in humans and animals. Elimination of borates from the blood is largely by excretion; 90% or more of the administered dose is eliminated via the urine, regardless of the route of administration. Excretion is relatively rapid, occurring over a period of a few, or possibly several, days.</p>	<p>WHO 1998; ECHA 2020; Stoch &amp; Waclawska, 1990</p> <p>WHO, 1998; ECHA, 2020</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b>            Ulexite has not been classified as carcinogenic. The data that the classification is based on is categorised as 'conclusive'.</p> <p>No treatment related increase in tumour incidence was reported for a dietary, lifetime carcinogenicity study in B6C3F1 mice (test conducted according to OECD guidelines 451) with concentrations of boric acid up to 5000 ppm.</p> <p>Ulexite has not been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity.</p>	<p>ECHA, 2020</p> <p>IARC, 2016</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Ulexite is not classified as a germ cell mutagen (the data that the classification is based on is categorised as 'conclusive').</p>	<p>ECHA, 2020</p>
<p><b>Reproductive Toxicity</b></p> <p>Suspected of damaging fertility or the unborn child (via oral route). ECHA lists disodium octaborate as having a GHS group of 1B and a class of H360FD. ECHA note that the classification and labelling of disodium octaborate tetrahydrate for reproductive toxicity is based on read-across from other tested borates (e.g. boric acid) and borate salts (borax or disodium tetraborate decahydrate) because its hydrolysis results in the formation of the same substances.</p> <p>In a multigenerational study with rats, boric acid was administered via the oral route at four doses, with a maximum of 336 mg/kg/d (boron equivalent of 58.5 mg/kg/d). The authors reported that male rats were sterile and evidence of decreased ovulation in about half of the ovaries examined from the females exposed to boric acid at 336 mg/kg/d. In addition, 1/16 high dose females produced a litter when mated with control male animals. The authors concluded that the boric acid LOAEL for reproductive effects was 336 mg/kg/d.</p> <p>Short- and long-term oral exposures to boric acid or borax in laboratory animals have demonstrated that the male reproductive tract is a consistent target of toxicity. Testicular lesions have been observed in rats, mice, and dogs given boric acid or borax in food or drinking-water.</p>	<p>ECHA, 2020</p> <p>WHO, 1998</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Evidence of developmental toxicity in offspring of rats fed boric acid (dose of 76 mg/kg bw/d) in their diet throughout gestation. The clinical observations included reduced foetal body mass, short and wavy ribs. These effects disappeared during the postnatal period. Similar but more marked effects were observed at the highest dose of 143 mg/kg and apart from a short 13th rib, they also disappeared during the postnatal period. The boric acid NOAEL for developmental effects was 55 mg/kg bw/d.</p>	<p>ECHA, 2020</p>
<p><b>Endocrine Disruption</b></p>	



<p>Ulexite is not identified in the European Commission (EC)'s report, "<i>Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption</i>" as a substance of interest.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Not classified as acutely toxic via oral, dermal or inhalation exposure. The data that the classification is based on is categorised as 'conclusive'</p> <p><i>Oral</i> The oral LD<sub>50</sub> of boric acid in male albino rats was 3690 mg/kg with 95 % confidence limits of 2710 - 5010 mg/kg (exposure by gavage). There were no control subjects in this experiment.</p> <p>ECHA summarises a number of key study findings:</p> <ul style="list-style-type: none"> <li>- The oral LD<sub>50</sub> of boric acid in male albino rats was 3450 mg/kg (Boron equivalent of 604 mg B/kg bw). In female albino rats the oral LD<sub>50</sub> of boric acid was 4080 mg/kg (Boron equivalent of 714 mg B/kg bw).</li> <li>- The oral LD<sub>50</sub> of boric acid in rats ranged from 2 660 mg/kg to 5140 mg/kg (Boron equivalent of 465 mg/kg to 899 mg/kg).</li> <li>- The oral LD<sub>50</sub> of disodium octaborate in rats was 2550 mg/kg bw.</li> <li>- The oral LD<sub>50</sub> of anhydrous boric acid was &gt;2000 mg/kg bw as single oral administration of boric acid at dose levels 1540 or 2600 mg/kg/ bw resulted in no deaths.</li> <li>- The oral LD<sub>50</sub> for male rats was &gt;2500 mg/kg/bw.</li> </ul> <p><i>Dermal</i> Acute dermal limit study of sodium tetraborate pentahydrate was carried out on New Zealand White rabbits (US EPA-FIFRA guidelines at the time, 1985). The exposure duration was 24 h. There were no control animals. The LD<sub>50</sub> was &gt; 2 000 mg/kg. Clinical changes included anorexia and decreased activity in four rabbits, diarrhoea and soft stools in 3 rabbits and nasal discharge in three rabbits, indicating low acute dermal toxicity.</p> <p><i>Inhalation</i> The inhalation LC<sub>50</sub> of disodium tetraborate pentahydrate in rats was &gt; 2.04 mg/L (2.04 g/m<sup>3</sup>) after exposure to dust for 4 h. During the first hour of exposure, ocular discharge, hypoactivity and hunched posture were noted. A few animals exhibited nasal discharge and/or hunched position. All animals recovered by day six after removal from chamber.</p> <p>ECHA also summarises other key study findings:</p> <p>The inhalation LC<sub>50</sub> of disodium octaborate tetrahydrate in rats was 2.01 mg/L after exposure for 4 h.</p> <p>The inhalation LC<sub>50</sub> of boric acid in rats was 2.12 mg/L after exposure to dust for 4 h.</p> <p>The inhalation LC<sub>50</sub> of boric acid in rats was &gt; 2.03 mg/L after exposure to aerosol for 4 h.</p>	<p>ECHA, 2020</p> <p>WHO, 1998</p> <p>ECHA, 2020</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p><i>Oral</i> The ECHA dossier for disodium octaborate notes a number of sub-chronic and chronic studies on boric acid and disodium tetraborate decahydrate were carried out in rats, mice and dogs. Most support</p>	<p>ECHA, 2020</p>

<p>that boron can cause adverse haematological effects and that the main target organ of boron toxicity is the testis.</p> <p>Male and female rats were exposed to oral doses to boric acid of 5.9 mg/kg/d, 17.5 mg/kg/d and 58.5 mg/kg/d in a two year dietary study.</p> <p>The NOAEL for boron was 17.5 mg/kg/d and the LOAEL 58.5 mg/kg/d.</p> <p>Testicular atrophy and seminiferous tubule degeneration were observed at (6, 12 and 24) months at the high boron dose of 58.5 mg/kg/d (body weight)</p> <p><i>Inhalation</i></p> <p>Albino rats and dogs were exposed to aerosols of boron oxide, showing no evident toxic signs. NOAEC for systemic toxicity in rats was 470 mg/m<sup>3</sup>. NOAEC for local effects due to irritation of noses of rats is 175 mg/m<sup>3</sup>. NOAEC for dogs is 57 mg/m<sup>3</sup>.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Not classified as a skin or respiratory system sensitiser by ECHA. The data that the classification is based on is categorised as 'conclusive'.</p> <p>The exposure period was 0, 7 and 21 days. No irritation was observed in guinea pigs exposed to 95 % w/w (0.4 g) disodium tetraborate pentahydrate moistened with distilled water to enhance skin contact (OECD Guideline 406 "Skin Sensitisation" method [Buehler] test). ECHA interpretation of the results was not sensitising.</p> <p>Disodium octaborate tetrahydrate was determined to be not sensitising in guinea pigs according to OECD Guideline 406.</p> <p>Boric acid moistened with distilled water to enhance skin contact is considered a non-sensitiser for guinea pig according to OECD Guideline 406.</p>	ECHA, 2020
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Not classified as corrosive to skin or eyes. The data that the classification is based on is categorised as 'conclusive'.</p> <p>Disodium octaborate tetrahydrate was not classified for skin irritation under criteria defined in directive 67/548/EEC, based on no irritating effects observed on application to the skin of test animals. It is also not considered an eye or respiratory irritant.</p> <p>Several studies are presented on the ECHA dossier, as follows:</p> <p>An in vivo skin corrosion test was carried out on rabbits exposed to potassium tetraborate powder for 4 h. No control animals were included. Potassium tetraborate was not corrosive.</p> <p>Potassium tetraborate was not irritating to the eyes of New Zealand White Rabbits in an OECD compliant study.</p> <p>Disodium tetraborate pentahydrate showed no irritancy for New Zealand White rabbit in compliance with US EPA-FIFRA guidelines.</p>	ECHA, 2020

<p>Disodium octaborate tetrahydrate produced iritis and conjunctival irritation persisting for less than 72 h when applied without rinsing to the eyes of six New Zealand white rabbits. However, no animals met irritation criteria based on average scores. No evidence of corrosion was noted.</p> <p>Boric acid was classified as not irritant under US CPS (16 CFR 15000.42) with minor effects on the iris and conjunctivae in New Zealand White rabbit.</p>	
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Physical Hazards	Reference
<p><b>Flammable Potential</b></p> <p>Not classified as flammable. The data that the classification is based on is categorised as 'conclusive'.</p>	ECHA, 2020
<p><b>Explosive Potential</b></p> <p>Not classified as explosive. The data that the classification is based on is categorised as 'conclusive'.</p>	ECHA, 2020

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	2 550 to 5 140 mg/kg	WHO, 1998 & ECHA, 2020
Rabbit, dermal	> 2 000 mg/kg	ECHA, 2020
<i>LC<sub>50</sub></i>		
Rat	> 2040 mg/m <sup>3</sup>	ECHA, 2020

Toxicity Values	Value	Reference
<b><i>High Chronic/Repeat Dose Toxicity</i></b>		
LOAEL, rat, oral	58.5 mg B/kg/d	ECHA, 2020
NOAEL, rat, oral	17.5 mg B/kg/d	ECHA, 2020
NOEAC, rat, inhalation	470 mg/m <sup>3</sup>	ECHA, 2020
NOAEC, dog, inhalation	57 mg/m <sup>3</sup>	ECHA, 2020

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population  
 LC<sub>50</sub> – lethal air concentration for 50% of experimental population  
 LOAEL – Lowest Observed Adverse Effect Level  
 LOAEC – Lowest Observed Adverse Effect Concentration  
 NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking*		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	IARC 2016
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	Not classified as a germ cell mutagen by ECHA 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	Yes	ECHA 2020. May damage fertility or the unborn child - GHS Category 1B
Endocrine Disruption <sup>1</sup>	No	Not listed as an endocrine disruptor by European Commission.
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	IARC 2016
Mutagenicity/Genotoxicity (GHS Category 2)	No	Not classified as a germ cell mutagen by ECHA 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	GHS Category 1B
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	See below.
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>dermal LOAEL ≤ 20 mg/kg/d;</li> <li>inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	See below.

Human Health Toxicity Ranking*		
	Hazard data	Comment
Corrosive (irreversible effect)	No	Not classified as corrosive to skin or eyes by ECHA (2020)
Respiratory sensitiser	No	Not classified as a respiratory system sensitiser by ECHA (2020)
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	LOAEL, rat, oral of 58.5 mg/kg/d
Skin Sensitiser	No	Not classified as a skin sensitiser by ECHA (2020)
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	LD50, Rat oral of 2550 to 5 140 mg/kg ECHA (2020)
Irritant (reversible effect)	No	Potassium tetraborate is classified as a non-irritant to the eyes of New Zealand White rabbits ECHA (2020)
<b>Hazard Band 0</b>		
<b>All indicators outside criteria listed in Hazards 1-4</b>		
<b>Physical Hazards</b>		
Flammable potential	No	

Human Health Toxicity Ranking*		
	Hazard data	Comment
Explosive potential	No	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	4	Based on Reproductive Toxicity/Developmental toxicity
<b>Data confidence (available points out of 12 parameters)</b>	12/12 = 100 %	

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air</b>		
8-h TWA	1 mg/m <sup>3</sup>	Exposure Standard for Disodium tetraborate pentahydrate, Safe Work Australia (2020)
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	

<b>Water, potable</b>	4 mg /L (boron)	NHMRC, 2011
<b>Soil, residential</b>	4 500 mg/kg (boron)	NEPM, 2013
<b>Soil, commercial/industrial</b>	300 000 mg/kg (boron)	NEPM, 2013
<b>Soil, protection of groundwater</b>	13 mg/kg	US EPA (2019)

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

NDF – No data found within the limits of the search strategy



## Qualifying Summary Comments

Ulexite has been assigned to Hazard Band 4 because of its potential to cause reproductive toxicity (infertility) and its potential for damaging the unborn child.

Ulexite is a hydrated sodium calcium borate hydroxide mineral. Ulexite is slightly soluble, decomposes and contains approximately 13% boron. Ulexite is mined to produce borate products. A study of the thermal degradation of ulexite has shown under increased temperature (around 600°C) the crystalline structure will break down to eventually release  $\text{NaB}_3\text{O}_5$  and  $\text{NaCaBO}_3$ . In aqueous solutions sodium borates are likely to convert to boric acid/borate and at physiological and acidic pH, predominately exist as un-dissociated boric acid. Based on this, the potential human toxicity of ulexite can be based on boric acid.

The reproductive toxicity of boric acid and its salts occurs at high doses via the oral route. It is unlikely to present a reproductive toxicity hazard via skin contact and when inhaled as dust below the occupational exposure limit.

## References

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Safe Work Australia (2020) Hazardous Chemical Information System (HCIS), 2020. *Exposure Standard Documentation: Borates, tetra, sodium salts (pentahydrates)*. Safe Work Australia. Available at <http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=5359>, Accessed January 2020.

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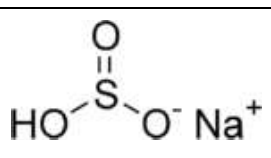
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[https://golderassociates.sharepoint.com/sites/117999/project files/6 deliverables/report 014/appendix e - human health summaries/19133367\\_hh\\_1319-33-1\\_ulexite\\_dec2019.docx](https://golderassociates.sharepoint.com/sites/117999/project%20files/6%20deliverables/report%20014/appendix%20e%20-%20human%20health%20summaries/19133367_hh_1319-33-1_ulexite_dec2019.docx)

Name	Sodium Bisulphite
Synonyms	Sodium hydrogensulphite, E222 (food additive)
CAS number	7631-90-5
Molecular formula	NaHSO <sub>3</sub>
Molecular structure	

Overview	References
<p>Sodium bisulphite occurs as a white crystal or crystalline powder. In many cases it is presented as an aqueous solution of varying strength. It has a disagreeable taste and slightly sulphurous odour. It is very soluble in water (&gt; 10 000 mg/L).</p> <p>The commercial uses of sodium bisulphite include as a disinfectant and bleach, in dyeing and paper-making, as a stripper (reducer) in laundering, and as a preservative and antiseptic. It is present as an antioxidant in some eye drops.</p> <p>It is “generally recognized as safe” (GRAS) and used as a food additive by the United States Food and Drug Administration (US FDA), with a few exceptions (for example, it is not used in meats or in food recognized as a source of vitamin B1).</p>	<p>HSDB, 2020; ECHA, 2020</p> <p>U.S. FDA, 2019</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>Bisulphites have been evaluated by the International Agency for Research on Cancer (IARC) as to its carcinogenicity and were assigned Group 3 (not classifiable as to its carcinogenicity to humans based on inadequate evidence for the carcinogenicity in experimental animals).</p>	<p>IARC, 2019</p>
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Sodium bisulphite is not classifiable as a mutagen according to GHS classification criteria (as listed by ECHA).</p>	<p>ECHA, 2020</p>

<p>ECHA provides two genetic toxicity in vitro studies which were used to determine the classification listed above. Both studies assessed disodium disulphite (<math>S_2O_5Na_2</math>) and concluded that the test substance did not appear to be mutagenic under the given test conditions.</p>	
<p><b>Reproductive Toxicity</b></p> <p>Sodium bisulphite is not classified by ECHA as a reproductive toxicant according to GHS classification criteria.</p> <p>ECHA cites a three-generation feeding study, where groups of 20 male and 20 female Wistar rats received 0, 0.125, 0.25, 0.5, 1.0 and 2.0% <math>S_2O_5Na_2</math> (which was calculated to be equivalent to 49, 108, 220, 460, and 955 milligram/kilogram body weight/day (mg/kg bw/day) as actual dose) in a thiamine-containing diet over periods of 2 years. Rats in the F0 generation were mated at about 21 weeks and half also at 34 weeks, the F1a generation were mated at wk 12 and wk 30 to produce the F2a and F2b litters, and then 10 males and 15 females were mated at wk 14 and wk 22 to produce the F3 generation. Based on the results of this study, no evidence of a treatment-related effect on reproduction and fertility was seen. Thus, the No Observed Adverse Effect Level (NOAEL) for fertility can be expected above a dose level of 2% disodium disulphite, corresponding to a dose of 955 mg/kg bw/d <math>Na_2S_2O_5</math> or 640 mg <math>SO_2</math>/kg bw/day. However, ECHA noted that there was a slight growth retardation during lactation in offspring of the 2% group.</p> <p>A drinking study is also provided which reported that continuous treatment of rats with <math>S_2O_5Na_2</math> (up to 750 ppm as <math>SO_2</math>) in drinking water for 2 years and in 3 successive generations was very well tolerated, with no signs of systematic toxicity observed. ECHA reports that there was no significant difference in the number of offspring for each generation and the proportion surviving the end of lactation did not differ. Based on these results, the NOAEL for systemic toxicity and effects on reproduction was expected to be above the highest dose level investigated, corresponding to 53 mg/kg bw/day.</p>	<p>ECHA, 2020</p>
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Sodium bisulphite is not classified by ECHA as a developmental toxicant according to GHS classification criteria.</p> <p>Several developmental toxicity studies are listed by ECHA, with the following oral exposures:</p> <ul style="list-style-type: none"> <li>- Up to 100 mg/kg bw/d of sodium bisulphite to pregnant rabbits for 13 consecutive days</li> <li>- Up to 120 mg/kg bw/d of sodium bisulphite to pregnant hamsters for 5 consecutive days</li> <li>- Up to 150 mg/kg bw/d of sodium bisulphite to pregnant mice for 10 consecutive days</li> <li>- Up to 110 mg/kg bw/d of sodium bisulphite to pregnant rats for 10 consecutive days.</li> </ul> <p>In all cases the studies reported no clearly discernible effects on nidation or on maternal or foetal survival. There was no difference in the number of abnormalities seen in either soft or skeletal tissues of the test groups compared to the number occurring spontaneously in the sham-treated controls. Therefore, the NOAELs for maternal and developmental toxicity are expected to be above the exposure dose for each of the experiments listed above.</p>	<p>ECHA, 2020</p>

<p><b>Endocrine Disruption</b></p> <p>Sodium bisulphite (or bisulphites) is not identified in the European Commission (EC)'s report, "Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption" as a substance of interest.</p>	<p>EC, 2000</p>
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Based on the GHS classification, sodium bisulphite is classified as having acute oral effects and has been assigned an 'Acute Tox. 4 H302: Harmful if swallowed' classification. It is not classified as having acute dermal or inhalation effects. The classification appears at odds with the LD<sub>50</sub> data and the reason for this is unknown although it is likely due to the production of sulphur dioxide and the low pH when administered in a non-aqueous form. When tested as an aqueous solution (38%) the oral LD<sub>50</sub> was greater than 2000 mg/kg.</p> <p>The Safe Work Australia Hazardous Chemical Information System (HCIS) also classifies sodium bisulphite (sodium hydrogensulphite) as Category 4 for acute toxicity (H302 - Harmful if swallowed)</p> <p>ECHA provides summaries of a number of studies including the following key results:</p> <p><b>Oral</b></p> <p>Sodium sulphite (SO<sub>3</sub>Na<sub>2</sub>) was administered orally to male and female rats at doses of 2150 mg/kg, 2610 mg/kg and 3160 mg/kg. The rats were observed during the 14 days following administration. A Lethal Dose (LD)<sub>50</sub> of approximately 2610 mg/kg bw was reported.</p> <p><b>Dermal</b></p> <p>In a rat study the LD<sub>50</sub> for the dermal route was reported to be &gt; 2,000 mg/kg bw for SO<sub>3</sub>Na<sub>2</sub> in male and female rats. ECHA reports the test item is not classified as acute toxic via the dermal route.</p> <p><b>Inhalation</b></p> <p>In a rat study the LC<sub>50</sub> for the inhalation route was &gt; 5.5 mg/L after 4 hours of exposure to SO<sub>3</sub>Na<sub>2</sub>, the maximum aerosol concentration tested. The animals were observed for a 14 day period following exposure and no mortality occurred. ECHA reports the test item is not classified as acute toxic via the inhalation route.</p> <p>The substance can be absorbed into the body by ingestion. Ingestion could cause asthma-like reactions or urticaria in sensitive persons.</p>	<p>ECHA, 2020</p> <p>Safe Work Australia, 2020</p> <p>ECHA, 2020</p> <p>IPCS, 2018</p>
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>Based on the GHS classification criteria sodium bisulphite is not classified by ECHA as causing repeat dose toxicity.</p> <p>ECHA cites three repeat dose studies where a NOAEL could not be derived. A fourth oral, feeding study in rats involved three experiments with varying timeframes; 1, 1.5 and 2 years. The study concluded no significant effects on growth were observed at dietary levels of 0.05% NaHSO<sub>3</sub>. At dietary levels of 0.1% or above, toxic effects were observed, e.g. growth retardation, clinical (polyneuritis, bleached teeth, spectacle eyes) and pathological/histopathological changes (brown uteri,</p>	<p>ECHA, 2020</p>

<p>testicular atrophy, gastric epithelial hyperplasia, and calcified renal tubular casts). At a dietary level of 2.0%, the majority of testes showed oedema. ECHA reports that taking all information from the different experiments together, the dose level of 0.05% NaHSO<sub>3</sub> can be regarded as the NOAEL based on the results of these studies, corresponding to 25 mg/kg bw/d NaHSO<sub>3</sub>.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Based on the GHS classification criteria sodium bisulphite is not classified by ECHA as a skin sensitiser.</p> <p>ECHA presents a skin sensitising study (in vivo mouse local lymphnode assay) assessing SO<sub>3</sub>Na<sub>2</sub>, with the study concluding the test substance was not sensitising. Six female mice were exposed to sodium sulphite at concentrations of 10%, 25% and 50% (w/w) in aqua ad injectabilia (water for injection).</p> <p>Dermatitis has been observed from exposure of restaurant workers to preservatives in meat. Adverse reactions in humans have been reported while challenge tests have reported decrements in lung function associated with inhalation exposures.</p>	<p>ECHA, 2020</p> <p>HSDB, 2020</p>
<p><b>Corrosion (irreversible)/irritation (reversible) effects on the skin or eye</b></p> <p>Sodium bisulphite is not classified by ECHA as causing skin corrosion/irritation or eye damage/irritation based on the GHS classification criteria.</p> <p>ECHA list a skin irritation/corrosion study for SO<sub>3</sub>Na<sub>2</sub> on 2 male and 2 female rabbits. An approximate 0.5 mm thick layer of a 50% solution of SO<sub>3</sub>Na<sub>2</sub> was applied (comparable to 0.5 g of the test substance), with occlusive coverage. The observation period was 8 days, with readings at 30 – 60 minutes after application, as well as at 24 hours and 8 days. The study concluded the test substance was not irritating.</p> <p>ECHA presents an eye irritation study of six rabbits (2 males/ 4 females), again using SO<sub>3</sub>Na<sub>2</sub>, which concludes that the test substance is not an eye irritant. 162 mg of the test substance (Sodium sulphite + 0.5% cobalt sulfate) was applied and observations were taken at 1 h, 24 h, 8 h, 72 h and 8 days after application.</p> <p>IPCS (2018) notes that Sodium bisulphite is irritating to the skin, eyes, respiratory tract and gastrointestinal tract. Exposure could cause asthma-like reactions or urticaria in sensitive persons.</p> <p>Safe Work Australia (2020) classifies sodium bisulphite (sodium hydrogensulphite) as Category 1 for serious eye damage/irreversible affects on the eye (H318 - Causes serious eye damage).</p>	<p>ECHA, 2020</p> <p>IPCS, 2018</p> <p>Safe Work Australia, 2020</p>

Physical Hazards	Reference
<p><b>Flammable Potential</b></p> <p>Considered non-flammable</p> <p>Sodium bisulphite can decompose on heating and on contact with acids. This reaction can produce sulfuret oxides, which generates fire and explosive hazards.</p>	<p>ECHA, 2020</p> <p>IPCS, 2018</p>
<p><b>Explosive Potential</b></p> <p>Considered non-explosive</p>	<p>ECHA, 2020</p>

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral, SO <sub>3</sub> Na <sub>2</sub>	2610 mg/kg	ECHA, 2020
Rat, dermal, SO <sub>3</sub> Na <sub>2</sub>	> 2,000 mg/kg	ECHA, 2020
<i>LC<sub>50</sub></i>		
Rat, SO <sub>3</sub> Na <sub>2</sub>	> 5.5 mg/L	ECHA, 2020
<i>High Chronic/Repeat Dose Toxicity</i>		
NOAEL, rats, oral, growth, NaHSO <sub>3</sub>	25 mg/kg bw/day	ECHA, 2015

Toxicity Values	Value	Reference
NOAEL, rabbits, oral, maternal and developmental toxicity, NaHSO <sub>3</sub>	> 100 mg/kg bw/d	ECHA, 2020
NOAEL, hamsters, oral, maternal and developmental toxicity, NaHSO <sub>3</sub>	> 120 mg/kg bw/d	ECHA, 2020
NOAEL, mice, oral, maternal and developmental toxicity, NaHSO <sub>3</sub>	> 150 mg/kg bw/d	ECHA, 2020
NOAEL, rats, oral, maternal and developmental toxicity, NaHSO <sub>3</sub>	> 110 mg/kg bw/d	ECHA, 2020
NOAEL, rats, oral, fertility, Na <sub>2</sub> S <sub>2</sub> O <sub>5</sub>	> 955 mg/kg bw/d	ECHA, 2015
NOAEL, rats, oral, systemic toxicity and effects on reproduction	> 53 mg/kg bw/day	ECHA, 2015

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population

LC<sub>50</sub> – lethal air concentration for 50% of experimental population

LOAEL – Lowest Observed Adverse Effect Level

LOAEC – Lowest Observed Adverse Effect Concentration

NDF – No data found within the limits of the search strategy



Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	IARC, 2019
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	ECHA, 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	ECHA, 2020
Endocrine Disruption <sup>1</sup>	No	EC, 2000
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	IARC, 2019
Mutagenicity/Genotoxicity (GHS Category 2)	No	ECHA, 2020
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	ECHA, 2020
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	Oral LD <sub>50</sub> of 2,620 mg/kg, Dermal LD <sub>50</sub> of > 2,000 mg/kg, LC <sub>50</sub> of > 5.5 mg/L (ECHA, 2020)
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 2 0 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	Oral NOAEL of 25 mg/kg bw/day (ECHA, 2020)
Corrosive (irreversible effect)	Yes	Safe Work Australia (2020) Category 1 - serious eye damage/irreversible effects on the eye (H318 - Causes serious eye damage)

Human Health Toxicity Ranking		
	Hazard data	Comment
Respiratory sensitiser	No	ECHA, 2020
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>• dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>• inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	Yes	Oral LOAEL for organ toxicity of approximately 50 mg/kg bw/day in a chronic rat study (ECHA, 2020)
Skin Sensitiser	No	ECHA, 2020
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>• dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>• inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	Yes	Although the oral LD <sub>50</sub> of 2,620 mg/kg, Dermal LD <sub>50</sub> of > 2,000 mg/kg, LC <sub>50</sub> of > 5.5 mg/L are reported, the hazard classification published by regulatory agencies reflects a classification as harmful for acute oral toxicity (ECHA, 2020 and Safe Work Australia 2020)
Irritant (reversible effect)	No	ECHA, 2020
<b>Hazard Band 0</b> All indicators outside criteria listed in Hazards 1-4		
<b>Physical Hazards</b>		
Flammable potential	Non-flammable	ECHA 2020
Explosive potential	Non-explosive	ECHA 2020

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Evaluation (highest band) not including physical hazards</b>	3	Based potential for serious eye damage (Safe Work Australia, 2020)
<b>Data confidence (available points out of 12 parameters)</b>	12/12	100%

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	5 mg/m <sup>3</sup>	Safe Work Australia 2020
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	

<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	
<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

## Qualifying Summary Comments

Sodium bisulphite exhibits an overall low order of toxicity across toxicological parameters such as carcinogenicity, developmental, reproductive and neurotoxicity with acute toxicity considered to be low as reflected in its use as a preservative in the food and allied industries. At concentration of > 25% is it considered harmful if swallowed (acute oral toxicity). In an oral rat study organ toxicity (kidney, stomach, teste, uterus) was noted at approximately 50 mg/kg bw/d. Although ECHA (2020) do not classify sodium bisulphite, Safe Work Australia has classified it as category 1 serious eye damage. Based on this, it has been ranked in Hazard Band 3.

## References

EC (European Commission) 2000. *Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption*. M0355008/1786Q/10/11/00. Report dated 10 November 2000.

ECHA (European Chemicals Agency), 2020. Dossier for sodium hydrogensulphite. Available at [http://apps.echa.europa.eu/registered/data/dossiers/DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031/DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031\\_DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031.html](http://apps.echa.europa.eu/registered/data/dossiers/DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031/DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031_DISS-9eb5bf0a-f2e8-36c3-e044-00144f67d031.html), accessed January 2020.

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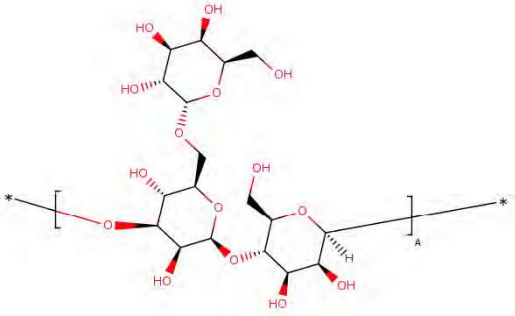
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IPCS (2018). *Sodium sulphite*. International Chemical Safety Card 1134 (sodium bisulphite 38-40% aqueous solution). Available at <http://www.inchem.org/documents/icsc/icsc/eics1134.htm>, accessed January 2020.

Safe Work Australia (2020). HCIS (Hazardous Chemical Information System), 2020. *Hazardous Chemical Information System: Sodium hydrogensulphite....%*. Safe Work Australia. Available at <http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=4176>, accessed January 2020.

U.S. FDA (U.S. Food and Drug Administration), 2015. Listing for Sodium bisulfite, revised as of April 1, 2019. Available at <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=182.3739> & [https://www.ecfr.gov/cgi-bin/text-idx?SID=e8fca02f2a6bd2da41a6b3a54b7d75f1&mc=true&node=se21.3.182\\_13739&rgn=div8](https://www.ecfr.gov/cgi-bin/text-idx?SID=e8fca02f2a6bd2da41a6b3a54b7d75f1&mc=true&node=se21.3.182_13739&rgn=div8), accessed January 2020.

Created by:	LPA	Date: 18/12/2019
Reviewed by:	CLB	Date and Revision: 23/01/2020

Name	Guar Gum
Synonyms	Guar gum, carboxymethyl 2-hydroxypropyl ether, sodium salt
CAS number	9000-30-0
Molecular formula	Not available
Surrogates	Carboxymethyl guar gum sodium salt (CAS Reg. No. 39346-76-4) Carboxymethyl-hydroxypropyl guar (CAS Reg. No. 68130-15-4)
Molecular structure	 <p>Guar Gum (ChemIDplus, 2020)</p>

Overview	References
<p>Carboxymethyl guar and carboxymethyl-hydroxypropyl guar are slightly modified forms of guar gum (CAS 9000-30-0), a natural polymer that has been affirmed as generally recognized as safe (GRAS) by the US Food and Drug Administration (FDA) and a substance of low toxicity. Carboxymethyl guar and carboxymethyl-hydroxypropyl guar are also structurally similar to hydroxypropyl guar, another slightly modified form of guar gum. They all have same toxicity pattern but the exact mode of action is not known.</p> <p>Based upon the structural similarities between carboxymethyl guar gum, carboxymethyl-hydroxypropyl guar, guar gum, and hydroxypropyl guar, the risk assessment for carboxymethyl guar and carboxymethyl-hydroxypropyl guar relies upon available data on all four substances.</p> <p>Sub-chronic, reproductive and developmental, and carcinogenicity studies with guar gum showed no long term, reproductive/developmental, or carcinogenic effects. Overall, a low toxicity profile is expected with both carboxymethyl guar and carboxymethyl-hydroxypropyl guar because of likelihood of low absorption via any route of exposure due to their high molecular weights.</p>	<p>FR, 2011</p> <p>FDA, 2020</p>

Human Health Toxicity Summary	Reference
<p><b>Carcinogenicity</b></p> <p>No evidence of carcinogenicity was found in male and female F344 rats and B6C3F1 mice administered diets containing 25,000 or 50,000 ppm (approximately 3,570 or 7,140 mg/kg/day) guar gum for 103 weeks. A reduction in the mean body weight of the higher dose females and of the feed consumption was observed, as compared with the controls. No compound-related clinical signs of adverse effects on survival were observed. There was no increase in the incidence of tumors that could be related to the test substance.</p>	FR, 2011
<p><b>Mutagenicity/Genotoxicity</b></p> <p>Results of mutagenicity studies performed with guar gum, hydroxypropyl guar, and carboxymethyl-hydroxypropyl guar were all negative.</p>	FR, 2011
<p><b>Reproductive Toxicity</b></p> <p>The NOAEL for developmental and reproductive toxicity is 7,500 mg/kg/day for Osborne-Mendel rats fed guar gum.</p>	FR, 2011
<p><b>Developmental Toxicity/Teratogenicity</b></p> <p>Teratogenicity studies with guar gum in mice, rats, and hamsters did not indicate that guar gum is a teratogen; in mice at doses up to 800 mg/kg/day, in rats up to 900 mg/kg/day and in hamsters up to 600 mg/kg/day. Male and female Osborne-Mendel rats were fed guar gum at 0, 1, 2, 4, 5, 7, or 15% (approximately 0, 500, 1,000, 2,000, 3,750 or 7,500 mg/kg/day) in the diet for 13 weeks before mating, during mating, and throughout gestation. No effects on parental fertility, fetal development, sex distribution, and no malformations of the pups were observed.</p>	FR, 2011
<p><b>Endocrine Disruption</b></p> <p>Not listed as an endocrine disruptor by the European Commission.</p>	EC, 2000
<p><b>Acute Toxicity (oral, dermal, inhalation)</b></p> <p>Acute oral toxicity studies conducted with guar, hydroxypropyl guar, and carboxymethyl guar resulted in oral LD<sub>50</sub> values ranging from 7,060 milligrams per kilogram of body weight (mg/kg bw) to 17,800 mg/kg bw.</p>	FR, 2011
<p><b>Chronic/repeat dose toxicity (oral, dermal, inhalation)</b></p> <p>There are three 90-day toxicity studies available for guar gums:</p> <ol style="list-style-type: none"> <li>1. A LOAEL for guar gum in a diet was reported to be 1% (equivalent to 580 mg/kg/day) based on effects on body weight gains, and dose related decrease in kidney weights. A NOAEL was not established.</li> <li>2. Rats received doses up to 6% (equivalent to 3,000 mg/kg/day), no effects were observed.</li> </ol>	FR, 2011

<p>3. Rats were exposed to a dietary concentration of 2 and 5%. Observations included decreases in body weight gains, decreases in food efficiency, increases in blood urea nitrogen and thyroid toxicity (males only). A NOAEL was reported as 1% (equivalent to 500 mg/kg/day).</p> <p>In other studies, no adverse effects were reported in dogs that were fed 0, 1, 5, or 10% (approximately 0, 250, 1,250, or 2,500 mg/kg/day) of a precooked mixture of guar and carob bean for 30 weeks. No effects were observed in monkeys that were fed 1 gram (equal to 10 mg/kg/day) of guar flour for 2 months.</p>	
<p><b>Sensitisation of the skin or respiratory system</b></p> <p>Results of skin sensitization studies performed with guar gum, hydroxypropyl guar, and carboxymethyl-hydroxypropyl guar were all negative.</p> <p>Occupational asthma has been reported in subjects working with industrial production of guar gum.</p>	<p>FR, 2011</p> <p>NLM, 2020</p>
<p><b>Corrosion (irreversible)/irritation (reversible) of the skin or eye</b></p> <p>Dermal irritation studies conducted with guar, hydroxypropyl guar, and carboxymethyl guar resulted in no irritation to slight irritation. Eye irritation studies conducted with guar, hydroxypropyl guar, and carboxymethyl-hydroxypropyl guar demonstrated a range of results from non-irritation to severe irritation.</p> <p>ECHA classify Guar Gum as a Category 2 eye irritant (H319: causes serious eye irritation).</p>	<p>FR, 2011</p> <p>ECHA, 2020</p>



Physical Hazards	Reference
<b>Flammable Potential</b> NDF	
<b>Explosive Potential</b> NDF	

Toxicity Values	Value	Reference
<b>Human Toxicity Data</b>		
<i>Acute Toxicity</i>		
	NDF	
	NDF	
<i>High Chronic/Repeat Dose Toxicity</i>		
LOAEC	NDF	
LOAEL	NDF	
<b>Animal Toxicity Data</b>		
<i>Acute Toxicity</i>		
<i>LD<sub>50</sub></i>		
Rat, oral	6770 mg/kg	NLM, 2020 (Guar Gum)
Mouse, oral	8100 mg/kg	NLM, 2020 (Guar Gum)
Rabbit, oral	7000 mg/kg	NLM, 2020 (Guar Gum)
Rat, dermal	NDF	

Rabbit, dermal	NDF	
Mouse, dermal	NDF	
<b>LC<sub>50</sub></b>		
Rat	NDF	
<b>High Chronic/Repeat Dose Toxicity</b>		
LOAEL, decrease kidney weight	580 mg/kg/day	FR, 2011 (Guar Gum)
LOAEC	NDF	
NOAEL, rats, parental, developmental and reproductive	7,500 mg/kg/day	FR, 2011 (Guar Gum)

Footnotes:

LD<sub>50</sub> – lethal dose for 50% of experimental population  
 LC<sub>50</sub> – lethal air concentration for 50% of experimental population  
 LOAEL – Lowest Observed Adverse Effect Level  
 LOAEC – Lowest Observed Adverse Effect Concentration  
 NDF – No data found within the limits of the search strategy

Human Health Toxicity Ranking		
	Hazard data	Comment
<b>Hazard Band 4</b>		
Carcinogenicity (IARC Group 1 or 2A)	No	FR, 2011
Mutagenicity/Genotoxicity (GHS Category 1A and 1B)	No	FR, 2011
Reproductive Toxicity/Developmental toxicity (GHS Category 1, 1A and 1B)	No	FR, 2011
Endocrine Disruption <sup>1</sup>	No	EC, 2000
<b>Hazard Band 3</b>		
Carcinogenicity (IARC Group 2B)	No	FR, 2011
Mutagenicity/Genotoxicity (GHS Category 2)	No	FR, 2011
Reproductive Toxicity/Developmental toxicity (GHS Category 2)	No	FR, 2011
Acute Toxicity (oral, dermal or inhalation)  Very Toxic/Toxic <ul style="list-style-type: none"> <li>• oral LD<sub>50</sub> ≤ 300 mg/kg<sup>2</sup></li> <li>• dermal LD<sub>50</sub> ≤ 1000 mg/kg</li> <li>• inhalation LC<sub>50</sub> ≤ 10 mg/L<sup>3</sup> (or mg/m<sup>3</sup>) (vapour)</li> </ul>	No	NLM, 2020
High Chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>• oral LOAEL ≤ 10 mg/kg/d<sup>2</sup>;</li> <li>• dermal LOAEL ≤ 2.0 mg/kg/d;</li> <li>• inhalation LOAEC (6 h/d) ≤ 50 ppm/d for gases, ≤ 0.2 mg/L/d for vapours or ≤ 0.02 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	NLM, 2020
Corrosive (irreversible effect)	No	FR, 2011

Human Health Toxicity Ranking		
	Hazard data	Comment
Respiratory sensitiser	Yes	Occupational asthma has been reported in subject working with industrial production of guar gum
<b>Hazard Band 2</b>		
Harmful chronic/repeat dose toxicity <ul style="list-style-type: none"> <li>oral LOAEL &gt; 10 mg/kg/d and ≤ 100 mg/kg/d</li> <li>dermal LOAEL &gt; 20 mg/kg/d and ≤ 200 mg/kg/d</li> <li>inhalation (6-h/d) LOAEC &gt; 50 mg/L ≤ 250 mg/L/d for gases, &gt; 0.2 mg/L ≤ 1.0 mg/L/d for vapours or &gt; 0.02 mg/L ≤ 0.2 mg/L/d for dust/mists/fumes<sup>3</sup></li> </ul>	No	NLM, 2020
Skin Sensitiser	No	FR, 2011
<b>Hazard Band 1</b>		
Acute Toxicity-Harmful <ul style="list-style-type: none"> <li>oral LD<sub>50</sub> &gt; 300 mg/kg ≤ 2000 mg/kg</li> <li>dermal LD<sub>50</sub> &gt; 1 000 mg/kg ≤ 2000 mg/kg;</li> <li>inhalation LC<sub>50</sub> (6 h/d) &gt; 10 mg/L ≤ 20 mg/L for vapours)<sup>3</sup></li> </ul>	No	NLM, 2020
Irritant (reversible effect)	Yes	FR, 2011 ECHA, 2020
<b>Hazard Band 0</b> All indicators outside criteria listed in Hazards 1-4		
<b>Physical Hazards</b>		
Flammable potential	NDF	
Explosive potential	NDF	
<b>Hazard Evaluation (highest band) not including physical hazards</b>	3	

Human Health Toxicity Ranking		
	Hazard data	Comment
Data confidence (available points out of 12 parameters)	10/12	83% Data based on surrogate compounds

\* Based on IMAP Framework [NICNAS (2013) Inventory Multi-tiered Assessment and Prioritisation (IMAP) Framework. National Industrial Chemicals Notification and Assessment Scheme. Department of Health and Aging, Canberra].

<sup>1</sup> Based on list of endocrine disrupting chemicals from the European Commission's Endocrine Disruptors website.

<sup>2</sup> milligrams per kilogram body mass (mg/kg) or milligrams per kilogram body mass per day (mg/kg/d)

<sup>3</sup> Based on GHS cut-offs for hazard classification. For chronic/repeat dose toxicity, GHS cut-offs are provided as guidance values (i.e. the dose/concentration at or below which significant health effects are observed)". (p 18, NICNAS 2013).

Human Health Guidelines		
Media	Concentration (mg/m <sup>3</sup> ; mg/L; mg/kg)	Reference
<b>Occupational Exposure Limits</b>		
<b>Air (OEL)</b>		
8-h TWA	NDF	
STEL	NDF	
Peak Limitation	NDF	
<b>Environmental Exposure</b>		
<b>Air, ambient, residential</b>	NDF	
<b>Air, commercial/industrial</b>	NDF	
<b>Water, potable</b>	NDF	
<b>Water, recreational</b>	NDF	

<b>Soil, residential</b>	NDF	
<b>Soil, commercial/industrial</b>	NDF	
<b>Soil, protection of groundwater</b>	NDF	

Footnotes:

OEL = Occupational Exposure Limit

TWA = 8 h Time-Weighted Average

STEL = (15 min) Short-term Exposure Limit

## Qualifying Summary Comments

Sodium carboxymethyl-hydroxypropyl guar and related guar gums exhibit limited human health hazards across a diverse range of toxicological parameters and subsequently have been excepted in the US from the need for tolerance thresholds as additives in pesticides used for crop protection. The Hazard Band 3 rating is a reflection of reported occupational asthma suggestive of Type 1 hypersensitivity responses while dermal and eye irritancy is the other main consideration. The potential for dust generation with such a product may result in both of these adverse outcomes under conditions of occupational exposure and subsequently warrant management measures. In addition, as the product is an organic dust, ignition and explosion are further concerns related to worker safety during on-site use of this product during chemical stimulation activities.

## References

EC, 2000. Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption, preparation of a candidate list of substances as a basis for priority setting, Final Report (Incorporating corrigenda to final report dated 21 June 2000). European Commission.

ECHA (European Chemicals Agency) 2020. Summary of Classification and Labelling: Guar Gum. Available at <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/54495>, Accessed January 2020

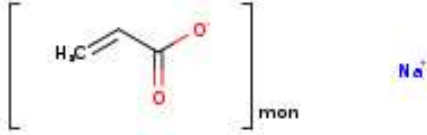
FR, 2011. Carboxymethyl Guar Gum Sodium Salt and Carboxymethyl-Hydroxypropyl Guar; Exemption From the Requirement of a Tolerance - A Rule by the Environmental Protection Agency on 07/27/2011. The Daily Journal of the United States Government – Federal Register, United States Government. Available at <https://www.federalregister.gov/articles/2011/07/27/2011-18588/carboxymethyl-guar-gum-sodium-salt-and-carboxymethyl-hydroxypropyl-guar-exemption-from-the#h-13> [Accessed 7 January 2020]

National Center for Biotechnology Information, PubChem Database. Guar gum, CID=44134661, <https://pubchem.ncbi.nlm.nih.gov/compound/Guar-gum> Accessed January 2020

U.S. Food and Drug Administration (FDA) 2020. *SCOGS (Select Committee on GRAS Substances) Database*. Available at: <https://www.accessdata.fda.gov/scripts/fdcc/?set=SCOGS> accessed January 2020.

U.S National Library of Medicine (NLM) 2020. ChemIDplus: Guar Gum. Available at: <https://chem.nlm.nih.gov/chemidplus/rn/9000-30-0> accessed January 2020.

Created by:	LPA	Date: 18/12/2019
Reviewed by:	CLB	Date and Revision: 28/01/2020

Name	Sodium polyacrylate
Synonyms	2-Propenoic acid, homopolymer, sodium salt
CAS number	9003-04-7
Molecular formula	$(C_3H_4O_2)_x \cdot xNa$
Molecular Structure	 <p>Source: ChemIDplus, 2019)</p>

Overview	References
<p>Sodium polyacrylate is part of a family of various polycarboxylates, distinguished by the monomer used for their preparation, acrylic acid and their molecular weight (MW). The family of linear homopolymers of acrylic acid and their sodium salts covers polymers with a broad molecular weight ranging from 1,000 to 78,000 g/mol. The polymer mostly used in detergents has a molecular weight of approximately 4,500 g/mol. These polymers are present in many commonly used low-phosphate and phosphate-free household, industrial and institutional detergents, for avoiding incrustation and soil redeposition. They are primarily used in automatic dishwashing detergents but are also used in laundry detergents. Typical average concentrations are approximately 0.5% in automatic dishwashing detergents. Based on a typical molecular weight polymer of 4,500 g/mol, the melting (decomposition) point is &gt; 150°C and a water solubility of &gt; 400 g/L.</p> <p>Due to the primary use being detergents, polycarboxylates can enter the environment via domestic wastewater and sewage treatment to surface waters. Once in the environment, lower molecular weight polymers (MW &lt; 2000 g/mol) are partly biodegraded. However, high MW polymers are considered poorly biodegradable. In soils, insoluble salts will likely form in the presence of calcium cations, leading to adsorption or precipitation. Abiotic degradation photolytic and hydrolytic processing are considered to not significantly influence the environmental fate of polycarboxylates. In addition, bioaccumulation is considered not significant based on potential uptake paths.</p>	<p>HERA, 2014</p>