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

Product Identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>1,4-BUTANEDIOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>Not Available</td>
</tr>
<tr>
<td>Other means of identification</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

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

| Relevant identified uses | Polyurethane curative |

Details of the manufacturer/importer

<table>
<thead>
<tr>
<th>Registered company name</th>
<th>Era Polymers Pty Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>25-27 Green Street 2019 NSW Australia</td>
</tr>
<tr>
<td>Telephone</td>
<td>+61 (0)2 9666 3788</td>
</tr>
<tr>
<td>Fax</td>
<td>+61 (0)2 9666 4805</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.erapol.com.au">www.erapol.com.au</a></td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:erapol@erapol.com.au">erapol@erapol.com.au</a></td>
</tr>
</tbody>
</table>

Emergency telephone number

<table>
<thead>
<tr>
<th>Association / Organisation</th>
<th>CHEMWATCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency telephone numbers</td>
<td>Not Available</td>
</tr>
<tr>
<td>Other emergency telephone numbers</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

CHEMWATCH EMERGENCY RESPONSE

<table>
<thead>
<tr>
<th>Primary Number</th>
<th>Alternative Number 1</th>
<th>Alternative Number 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

<table>
<thead>
<tr>
<th>CHEMWATCH HAZARD RATINGS</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Toxicity</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Body Contact</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

GHS Classification | Acute Toxicity (Oral) Category 4, STOT - SE (Narcosis) Category 3

Label elements

Continued...
GHS label elements

SIGNAL WORD | WARNING

Hazard statement(s)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H302</td>
<td>Harmful if swallowed</td>
</tr>
<tr>
<td>H336</td>
<td>May cause drowsiness or dizziness</td>
</tr>
</tbody>
</table>

Precautionary statement(s) Prevention

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P271</td>
<td>Use only outdoors or in a well-ventilated area.</td>
</tr>
<tr>
<td>P261</td>
<td>Avoid breathing dust/fume/gas/mist/vapours/spray.</td>
</tr>
<tr>
<td>P264</td>
<td>Wash all exposed external body areas thoroughly after handling.</td>
</tr>
<tr>
<td>P270</td>
<td>Do not eat, drink or smoke when using this product.</td>
</tr>
</tbody>
</table>

Precautionary statement(s) Response

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P301+P312</td>
<td>IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.</td>
</tr>
<tr>
<td>P304+P340</td>
<td>IF INHALED: Remove person to fresh air and keep comfortable for breathing.</td>
</tr>
<tr>
<td>P330</td>
<td>Rinse mouth.</td>
</tr>
</tbody>
</table>

Precautionary statement(s) Storage

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P405</td>
<td>Store locked up.</td>
</tr>
<tr>
<td>P403+P233</td>
<td>Store in a well-ventilated place. Keep container tightly closed.</td>
</tr>
</tbody>
</table>

Precautionary statement(s) Disposal

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P501</td>
<td>Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration</td>
</tr>
</tbody>
</table>

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% [weight]</th>
<th>Name</th>
<th>GHS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-63-4</td>
<td>100</td>
<td>1,4-butylenediol</td>
<td>Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Germ Cell Mutagen Category 2, STOT - SE (Resp. In.) Category 3; H302, H315, H319, H341, H335</td>
</tr>
</tbody>
</table>

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact

- If this product comes in contact with the eyes:
  - Wash out immediately with fresh running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Seek medical attention without delay; if pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact

If skin or hair contact occurs:

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation

- If fumes, aerosols or combustion products are inhaled, remove from contaminated area.
- Other measures are usually unnecessary.

Ingestion

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient’s condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

Continued...
Indication of any immediate medical attention and special treatment needed

To treat poisoning by the higher aliphatic alcohols (up to C7):
- Gastric lavage with copious amounts of water.
- It may be beneficial to instill 60 ml of mineral oil into the stomach.
- Oxygen and artificial respiration as needed.
- Electrolyte balance: it may be useful to start 500 ml M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.
- To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- Haemodialysis if coma is deep and persistent. (GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5)

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for shock.
- Monitor and treat, where necessary, for pulmonary oedema.
- Anticipate and treat, where necessary, for seizures.
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- Give activated charcoal.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Acidosis may respond to hyperventilation and bicarbonate therapy.
- Haemodialysis might be considered in patients with severe intoxication.
- Consult a toxicologist as necessary. BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For C8 alcohols and above.
Symptomatic and supportive therapy is advised in managing patients.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

Special hazards arising from the substrate or mixture

Fire Incompatibility

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.

Fire/Explosion Hazard

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
- May emit acid smoke.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills

- Slippery when spilt.
- Remove all ignition sources.
Clean up all spills immediately.
Avoid breathing vapours and contact with skin and eyes.
Control personal contact with the substance, by using protective equipment.

**Major Spills**

- Slippery when spilt.
- Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.

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

### SECTION 7 HANDLING AND STORAGE

#### Precautions for safe handling

**Safe handling**

- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.

**Other information**

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

### Conditions for safe storage, including any incompatibilities

**Suitable container**

- Metal can or drum
- Packaging as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

**Storage incompatibility**

- Alcohols
  - Are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents.
  - React, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen.
  - React with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dicyclogem, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithio tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, trisobutylaluminium.
- Should not be heated above 49 deg. C. when in contact with aluminium equipment.

### SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Control parameters

**OCCUPATIONAL EXPOSURE LIMITS (OEL)**

**INGREDIENT DATA**

Not Available

**EMERGENCY LIMITS**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-butylene glycol</td>
<td>0.22 mg/m³</td>
<td>2.5 mg/m³</td>
<td>150 mg/m³</td>
</tr>
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</table>

**Ingredient**

<table>
<thead>
<tr>
<th>Original IDLH</th>
<th>Revised IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

#### Exposure controls

**Appropriate engineering controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

- Process controls which involve changing the way a job activity or process is done to reduce the risk.
- Enclosure and/or isolation of emission source which keeps a selected hazard 'physically' away from the worker and ventilation that strategically 'adds' and 'removes' air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly.

**Personal protection**

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available.

**Eye and face protection**

See Hand protection below.
Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber.

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Suitability and durability of glove type is dependent on usage.

Body protection

See Other protection below.

Other protection

- Overalls.
- PVC apron.
- Barrier cream.
- Skin cleansing cream.

Recommended material(s)

### GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the 'Forsberg Clothing Performance Index'. The effect(s) of the following substance(s) are taken into account in the computer-generated selection:

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUTYL</td>
<td>A</td>
</tr>
<tr>
<td>NITRILE</td>
<td>A</td>
</tr>
</tbody>
</table>

| * CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion

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

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

Respiratory protection


Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Colourless liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>Not Available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Not Available</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Melting point / freezing point (°C)</td>
<td>19.8</td>
</tr>
<tr>
<td>Initial boiling point and boiling range (°C)</td>
<td>228</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>155</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flammability</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Vapour pressure (kPa)</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
<tr>
<td>Vapour pressure (Air = 1)</td>
<td>3.1</td>
</tr>
</tbody>
</table>

### SECTION 10 STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Reactivity</th>
<th>See section 7</th>
</tr>
</thead>
</table>
| Chemical stability | - Unstable in the presence of incompatible materials.
|                 | - Product is considered stable.
|                 | - Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
### 1,4-BUTANEDIOL

**Acute lethal toxicity of 1,4-butylene glycol** is low via all administration routes. Major toxicity by oral administration is respiratory failure and

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Not normally a hazard due to non-volatile nature of product.

**Ingestion**

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

Swallowing 1,4-butylene glycol may cause central nervous system depression characterised by headache, dizziness, drowsiness, nausea, vomiting, abdominal pain and inco-ordination. Severe over-exposure may lead to coma and possible death, due to failure of breathing. Ingestion may also cause kidney damage and peripheral neuropathy, a progressive disorder of the nervous system characterised by sensory and motor abnormalities, muscle spasms, weakness and pain in the arms and legs, numbness and tingling of the fingers and toes and paralysis.

Gamma-hydroxybutyric acid readily crosses the blood-brain barrier and may cause relaxation, loss of muscle tone and reduced inhibition at low doses, then at higher levels, drowsiness, speech and motor interference, increased libido and reduced rate of breathing, heart rate and blood pressure.

Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models), Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

Open cuts, abraded or irritated skin should not be exposed to this material and ensure that any external damage is suitably protected.

Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

**Eye**

Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).

Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

Gamma-butyrolactone is rapidly converted to gamma-hydroxybutyric acid by enzymes in the blood and liver. It has been linked with increasing incidence of kidney and adrenal gland tumors.

There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

**Chronic**

The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Not normally a hazard due to non-volatile nature of product.

**Incompatible materials**

See section 7

**Hazardous decomposition products**

See section 5

### SECTION 11 TOXICOLOGICAL INFORMATION

**Information on toxicological effects**

<table>
<thead>
<tr>
<th><strong>Inhaled</strong></th>
<th><strong>IRRITATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>1,4-BUTANEDIOL</strong></th>
<th><strong>TOXICITY</strong></th>
<th><strong>IRRITATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>dermal (rat) LD50: &gt;2000 mg/kg&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 1500 mg/kg&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**

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

### 1,4-BUTENE GLYCOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

**Carcinogenicity:**

There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

### 1,4-BUTANEDIOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTYLENE GLYCOL

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance.

### 1,4-BUTANEDIOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTYLENE GLYCOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTANEDIOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTYLENE GLYCOL

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### 1,4-BUTYLENE GLYCOL

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### 1,4-BUTANEDIOL

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Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTYLENE GLYCOL

**Acute toxicity:**

Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.

### 1,4-BUTANEDIOL

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### 1,4-BUTYLENE GLYCOL

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Mice, rats, and rabbits tolerating 1,4-butylene glycol relatively well. It has a lower lethal dose than ethylene glycol.
SECTION 12 ECOLOGICAL INFORMATION

Toxicity
for 1,4-butanediol (syn: 1,4-butanediol)

Environmental fate:
1,4-Butylene glycol is a liquid at 20 deg C, and this chemical is classified as a readily biodegradable chemical (OECD 301C: 100 % after 14-day). Bioconcentration factor may be low judging from a low Pow value (0.50 at 25 deg C).

Ecotoxicity:
Fish LC50 (96 h): medaka (Oryzias latipes) >100 mg/l (OECD TG 203)
Fish LC50 (14 d): medaka (Oryzias latipes) >100 mg/l
Daphnia magna EC50 (48 h): >1000 mg/l (OECD TG 202)
Daphnia magna NOEC (21 d): >85 mg/l
Algae EC50 (72 h): Selenastrum capricornutum >1000 mg/l; NOEC >1000 mg/l

An assessment factor of 100 was used to chronic toxicity data to determine PNEC, because chronic toxicity data for fish were not available. Thus, PNEC of this chemical is >0.85 mg/l. Toxicity of this chemical to aquatic organisms is low, because all toxicity data are higher than 85 mg/l.

Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
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<tbody>
<tr>
<td>1,4-butanediol</td>
<td>LOW</td>
<td>LOW</td>
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</table>

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-butanediol</td>
<td>LOW (LogKOW = -0.83)</td>
</tr>
</tbody>
</table>

Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-butanediol</td>
<td>HIGH (KOC = 1)</td>
</tr>
</tbody>
</table>

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.
- Otherwise:
  - If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
  - Where possible retain label warnings and MSDS and observe all notices pertaining to the product.
- Legislation addressing waste disposal requirements may differ by country, state and/or territory.

SECTION 14 TRANSPORT INFORMATION

Labels Required

- Marine Pollutant: NO

Land transport (Not Applicable): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

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

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

SECTION 15 REGULATORY INFORMATION

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

1,4-BUTYLENE GLYCOL(110-63-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

<table>
<thead>
<tr>
<th>National Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia - AICS</td>
<td>Y</td>
</tr>
<tr>
<td>Canada - DSI</td>
<td>Y</td>
</tr>
<tr>
<td>China - IEGSC</td>
<td>Y</td>
</tr>
<tr>
<td>Europe - EINEC / ELINCS / NLP</td>
<td>Y</td>
</tr>
<tr>
<td>Japan - ENCS</td>
<td>Y</td>
</tr>
<tr>
<td>Korea - KECI</td>
<td>Y</td>
</tr>
<tr>
<td>New Zealand - NZIoC</td>
<td>Y</td>
</tr>
</tbody>
</table>
SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-butyleneglycol</td>
<td>110-63-4, 38274-25-8, 74829-49-5</td>
</tr>
</tbody>
</table>

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

A list of reference resources used to assist the committee may be found at: www.chemwatch.net

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

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