

# Sydney Water Raw Sewage

## Sydney Water

Chemwatch Hazard Alert Code: 2

Chemwatch: 24-8163

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Safety data sheet according to REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758

L.REACH.GB.EN

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

#### 1.1. Product Identifier

Product name	Sydney Water Raw Sewage
Chemical Name	Not Applicable
Synonyms	influent; sewage; wastewater
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Raw Sewage is not recycled for use as drinking water. Raw Sewage is a mixture of mostly water containing numerous known and unknown ingredients. Gases, vapours and aerosols are by-products formed during ageing, transport and treatment processes. It is mostly treated for disposal into oceans, rivers or wetlands but can also be treated and used for: - recycled non-potable water for industrial use, parks/ gardens and environmental flows, - biosolids for land application as soil conditioner and fertilizer, - methane gas for electricity generation. Raw Sewage must be treated in accordance with the EPA's Environmental Protection Licences. Use according to manufacturer's directions.
Uses advised against	Not Applicable

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

Registered company name	Sydney Water
Address	1 Smith Street Parramatta NSW 2150 Australia
Telephone	13 20 92
Fax	Not Available
Website	Not Available
Email	Not Available

#### 1.4. Emergency telephone number

Association / Organisation	Sydney Water
Emergency telephone numbers	Sydney Water Service Centre 132 090 – general information, 24 hours, 7 days
Other emergency telephone numbers	Monitoring Services 9800 6935 – technical information, 8 am to 5 pm weekdays


### SECTION 2 Hazards identification

#### 2.1. Classification of the substance or mixture

Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567 [1]	H312 - Acute Toxicity (Dermal) Category 4, H332 - Acute Toxicity (Inhalation) Category 4, H302 - Acute Toxicity (Oral) Category 4
Legend:	1. Classified by Chemwatch; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567

#### 2.2. Label elements

Sydney Water Raw Sewage

<b>Hazard pictogram(s)</b>	
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<b>Signal word</b>	<b>Warning</b>
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**Hazard statement(s)**

<b>H312</b>	Harmful in contact with skin.
<b>H332</b>	Harmful if inhaled.
<b>H302</b>	Harmful if swallowed.

**Supplementary statement(s)**

Not Applicable

**Precautionary statement(s) Prevention**

<b>P271</b>	Use only outdoors or in a well-ventilated area.
<b>P261</b>	Avoid breathing mist/vapours/spray.
<b>P264</b>	Wash all exposed external body areas thoroughly after handling.
<b>P270</b>	Do not eat, drink or smoke when using this product.
<b>P280</b>	Wear protective gloves and protective clothing.

**Precautionary statement(s) Response**

<b>P301+P312</b>	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
<b>P302+P352</b>	IF ON SKIN: Wash with plenty of water.
<b>P304+P340</b>	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
<b>P330</b>	Rinse mouth.
<b>P362+P364</b>	Take off contaminated clothing and wash it before reuse.

**Precautionary statement(s) Storage**

Not Applicable

**Precautionary statement(s) Disposal**

<b>P501</b>	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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**2.3. Other hazards**

Cumulative effects may result following exposure\*.

May produce discomfort of the eyes, respiratory tract and skin\*.

Possible cancer-causing agent\*.

<b>arsenic</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>benzene</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>formaldehyde.</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>mercury (elemental)</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>nickel</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>cadmium</b>	Listed in the European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation
<b>cadmium</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>lead</b>	Listed in the European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation
<b>lead</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>hydrogen sulfide</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
<b>methane</b>	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)

**SECTION 3 Composition / information on ingredients**

Sydney Water Raw Sewage

3.1.Substances

See 'Composition on ingredients' in Section 3.2

3.2.Mixtures

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567	Nanoform Particle Characteristics
1.7732-18-5 2.231-791-2 3.Not Available 4.Not Available	>60	<u>water</u>	Not Applicable	Not Available
Not Available		may contain	Not Applicable	
1.1336-21-6 2.215-647-6 3.007-001-01-2 4.01-2119982985-14-XXXX		<u>ammonia</u>	Corrosive to Metals Category 1, Acute Toxicity (Inhalation) Category 4, Skin Corrosion/Irritation Category 1B, Serious Eye Damage/Eye Irritation Category 1, Acute Aquatic Hazard Category 1; H290, H332, H314, H318, H400 [1]	Not Available
1.7440-38-2 2.231-148-6 3.033-001-00-X 4.01-2120757350-59-XXXX 01-2119502457-43-XXXX		<u>arsenic</u>	Acute Toxicity (Oral) Category 3, Acute Toxicity (Inhalation) Category 3, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1; H301, H331, H400, H410 [2]	Not Available
1.71-43-2 2.200-753-7 3.601-020-00-8 4.01-2119447106-44-XXXX 01-2119456975-22-XXXX		<u>benzene</u>	Flammable Liquid Category 2, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Germ cell mutagenicity Category 1B, Carcinogenicity Category 1A, Specific target organ toxicity - repeated exposure Category 1, Aspiration Hazard Category 1; H225, H315, H319, H340, H350, H372 **, H304 [2]	Not Available
1.7726-95-6 2.231-778-1 3.035-001-00-5 4.01-2119461714-37-XXXX 01-2120763152-61-XXXX		<u>bromine</u> *	Acute Toxicity (Inhalation) Category 2, Skin Corrosion/Irritation Category 1A, Acute Aquatic Hazard Category 1; H330, H314, H400 [2]	Not Available
1.10124-37-5 2.233-332-1 3.Not Available 4.01-2119495093-35-XXXX		<u>calcium nitrate</u>	Oxidizing Solid Category 3, Acute Toxicity (Oral) Category 4, Eye Irritation Category 2; H272, H302, H319 [1]	Not Available
1.7782-50-5 2.231-959-5 3.017-001-00-7 4.01-2119486560-35-XXXX 01-2119896635-20-XXXX 01-2119444722-41-XXXX 01-2120770754-46-XXXX		<u>chlorine</u> *	Oxidizing Gas Category 1, Gas under Pressure, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), Acute Aquatic Hazard Category 1; H270, H280, H331, H315, H319, H335, H400 [2]	Not Available
Not Available		chlorinated hydrocarbons	Not Applicable	
Not Available		chlorinated phenolics	Not Applicable	
1.1746-01-6 2.217-122-7 3.Not Available 4.Not Available		<u>2,3,7,8-tetrachlorodibenzo-p-dioxin</u>	Acute Toxicity (Oral and Dermal) Category 1, Carcinogenicity Category 1A, Specific target organ toxicity - repeated exposure Category 2, Chronic Aquatic Hazard Category 1; H300+H310, H350, H373, H410 [1]	Not Available
1.57-12-5 2.Not Available 3.Not Available 4.Not Available		<u>cyanide ion</u>	Acute Toxicity (Oral) Category 2, Acute Toxicity (Dermal) Category 1, Acute Toxicity (Inhalation) Category 2, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1; H300, H310, H330, H400, H410, EUH032 [1]	Not Available
1.50-00-0 2.200-001-8 3.605-001-00-5 4.01-2119488953-20-XXXX 01-2120762098-48-XXXX		<u>formaldehyde.</u>	Acute Toxicity (Oral) Category 3, Acute Toxicity (Dermal) Category 3, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 1B, Skin Sensitizer Category 1, Germ cell mutagenicity Category 2, Carcinogenicity Category 1B; H301, H311, H331, H314, H317, H341, H350 [2]	Not Available
Not Available		herbicides and defoliant	Not Applicable	
Not Available		infectious substances	Not Applicable	

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567	Nanoform Particle Characteristics
1.7439-93-2 2.231-102-5 3.003-001-00-4 4.01-2119966143-38-XXXX 01-2120775463-48-XXXX		<u>lithium</u>	Emit Flammable Gases with Water Category 1, Skin Corrosion/Irritation Category 1B, Serious Eye Damage/Eye Irritation Category 1; H260, H314, H318, EUH014 <sup>[1]</sup>	Not Available
1.7439-96-5 2.231-105-1 3.Not Available 4.01-2120762797-36-XXXX 01-2119449803-34-XXXX		<u>manganese</u> *	Flammable Solid Category 1, Emit Flammable Gases with Water Category 2; H228, H261 <sup>[1]</sup>	Not Available
Not Available		mercaptans	Not Applicable	
1.7439-97-6 2.231-106-7 3.080-001-00-0 4.01-2119548380-42-XXXX 01-2120767624-46-XXXX		<u>mercury (elemental)</u> *	Acute Toxicity (Inhalation) Category 2, Reproductive Toxicity Category 1B, Specific target organ toxicity - repeated exposure Category 1, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1; H330, H360D, H372, H400, H410 <sup>[2]</sup>	Not Available
1.7440-02-0 2.231-111-4 3.028-002-00-7 028-002-01-4 4.01-2119438727-29-XXXX		<u>nickel</u>	Skin Sensitizer Category 1, Carcinogenicity Category 2, Specific target organ toxicity - repeated exposure Category 1, Chronic Aquatic Hazard Category 3; H317, H351, H372**, H412 <sup>[2]</sup>	Not Available
1.7782-49-2 2.231-957-4 3.034-001-00-2 4.01-2119981706-25-XXXX 01-2120767631-51-XXXX		<u>selenium</u>	Acute Toxicity (Oral) Category 3, Acute Toxicity (Inhalation) Category 3, Specific target organ toxicity - repeated exposure Category 2, Chronic Aquatic Hazard Category 4; H301, H331, H373 **, H413 <sup>[2]</sup>	Not Available
1.7440-61-1 2.231-170-6 3.092-001-00-8 4.Not Available		<u>uranium depleted</u>	Acute Toxicity (Oral) Category 2, Acute Toxicity (Inhalation) Category 2, Specific target organ toxicity - repeated exposure Category 2, Chronic Aquatic Hazard Category 4; H300, H330, H373 **, H413 <sup>[2]</sup>	Not Available
1.7440-66-6 2.231-175-3 3.030-001-00-1 030-001-01-9 4.01-2119467174-37-XXXX 01-2119459210-49-XXXX		<u>zinc</u>	Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1; H400, H410 <sup>[2]</sup>	Not Available
1.7440-43-9 2.231-152-8 3.048-002-00-0 048-011-00-X 4.01-2119489023-40-XXXX		<u>cadmium</u>	Pyrophoric Solid Category 1, Acute Toxicity (Inhalation) Category 2, Germ cell mutagenicity Category 2, Carcinogenicity Category 1B, Reproductive Toxicity Category 2, Specific target organ toxicity - repeated exposure Category 1, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1; H250, H330, H341, H350, H361fd, H372 **, H400, H410 <sup>[2]</sup>	Not Available
1.7440-47-3 2.231-157-5 3.Not Available 4.01-2119485652-31-XXXX		<u>chromium</u> *	Carcinogenicity Category 2; H351 <sup>[1]</sup>	Not Available
1.7440-48-4 2.231-158-0 3.027-001-00-9 4.01-2119517392-44-XXXX		<u>cobalt</u>	Skin Sensitizer Category 1, Respiratory Sensitizer Category 1, Chronic Aquatic Hazard Category 4; H317, H334, H413 <sup>[2]</sup>	Not Available
1.7440-50-8 2.231-159-6 3.Not Available 4.01-2119475516-31-XXXX 01-2119480154-42-XXXX 01-2119480184-39-XXXX 01-2120762783-45-XXXX		<u>copper</u>	Chronic Aquatic Hazard Category 2; H411 <sup>[2]</sup>	Not Available
1.16984-48-8 2.Not Available 3.Not Available 4.Not Available		<u>fluorides as F-</u> *	EUH210 <sup>[1]</sup>	Not Available
1.74869-21-9. 2.278-011-7		<u>lubricating oils.petroleum C&gt;25.</u>	Not Applicable	Not Available

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1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classified according to GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567	Nanoform Particle Characteristics
3.649-243-00-X 4.Not Available		<u>hydrotreated bright stock</u>		
1.7439-89-6 2.231-096-4 3.Not Available 4.01-2119462838-24-XXXX		<u>iron</u>	Not Applicable	Not Available
1.7439-92-1 2.231-100-4 3.082-013-00-1 082-014-00-7 4.01-2119513221-59-XXXX 01-2120762789-33-XXXX		<u>lead</u>	Reproductive Toxicity Category 1A, Lactation Effects; H360FD, H362 [2]	Not Available
Not Available		other metal and organic compounds	Not Applicable	
Not Available		during transport, treatment and ageing, may release	Not Applicable	
1.7783-06-4 2.231-977-3 3.016-001-00-4 4.01-2119445737-29-XXXX		<u>hydrogen sulfide</u> *	Flammable Gas Category 1, Gas under Pressure (Liquefied gas), Acute Toxicity (Inhalation) Category 2, Acute Aquatic Hazard Category 1; H220, H280, H330, H400 [2]	Not Available
1.74-82-8 2.200-812-7 3.601-001-00-4 4.01-2119474442-39-XXXX		<u>methane</u>	Flammable Gas Category 1, Gas under Pressure; H220, H280 [2]	Not Available
Not Available		volatile organic compounds and moulds	Not Applicable	
<b>Legend:</b>		1. Classified by Chemwatch; 2. Classification drawn from GB-CLP Regulation, UK SI 2019/720 and UK SI 2020/1567; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties		

## SECTION 4 First aid measures

### 4.1. Description of first aid measures

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

### 4.2 Most important symptoms and effects, both acute and delayed

See Section 11

#### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

### SECTION 5 Firefighting measures

#### 5.1. Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

#### 5.2. Special hazards arising from the substrate or mixture

<b>Fire Incompatibility</b>	None known.
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#### 5.3. Advice for firefighters

<b>Fire Fighting</b>	<ul style="list-style-type: none"> <li>▸ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▸ Wear breathing apparatus plus protective gloves in the event of a fire.</li> <li>▸ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▸ Use fire fighting procedures suitable for surrounding area.</li> <li>▸ <b>DO NOT</b> approach containers suspected to be hot.</li> <li>▸ Cool fire exposed containers with water spray from a protected location.</li> <li>▸ If safe to do so, remove containers from path of fire.</li> <li>▸ Equipment should be thoroughly decontaminated after use.</li> </ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▸ Non combustible.</li> <li>▸ Not considered a significant fire risk, however containers may burn.</li> </ul> <p>May emit poisonous fumes. May emit corrosive fumes.</p>

### SECTION 6 Accidental release measures

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

See section 8

#### 6.2. Environmental precautions

See section 12

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

<b>Minor Spills</b>	<ul style="list-style-type: none"> <li>▸ Generally not applicable.</li> </ul>
<b>Major Spills</b>	<p>Wet weather sewage overflows occur through designed emergency relief structures to route sewage away from habitation when flows exceed the sewer hydraulic capacity. The sewage is usually highly dilute and routes to waterways. Uncontrolled sewage overflow can occur from any opening that is a low point in the system and usually occurs due to blockage or asset damage. To stop overflow: Unblock the sewer is able to do so. [Sydney Water]</p> <ul style="list-style-type: none"> <li>▸ Generally not applicable.</li> </ul>

#### 6.4. Reference to other sections

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

### SECTION 7 Handling and storage

#### 7.1. Precautions for safe handling

<b>Safe handling</b>	<p>After contact with sewage, immediately wash hands with antiseptic, rinse with warm water and dry thoroughly with disposable towel.</p> <ul style="list-style-type: none"> <li>▸ <b>DO NOT</b> allow clothing wet with material to stay in contact with skin</li> <li>▸ Avoid all personal contact, including inhalation.</li> <li>▸ Wear protective clothing when risk of exposure occurs.</li> <li>▸ Use in a well-ventilated area.</li> <li>▸ Prevent concentration in hollows and sumps.</li> <li>▸ <b>DO NOT</b> enter confined spaces until atmosphere has been checked.</li> <li>▸ <b>DO NOT</b> allow material to contact humans, exposed food or food utensils.</li> <li>▸ Avoid contact with incompatible materials.</li> <li>▸ <b>When handling, DO NOT</b> eat, drink or smoke.</li> <li>▸ Keep containers securely sealed when not in use.</li> <li>▸ Avoid physical damage to containers.</li> </ul>
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	<ul style="list-style-type: none"> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> </ul>
<b>Fire and explosion protection</b>	See section 5
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Check regularly for spills and leaks.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Keep locked up, special regulatory requirement may apply.</li> </ul>

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

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ Polyethylene or polypropylene container.</li> <li>▶ Packing as recommended by manufacturer.</li> <li>▶ Check all containers are clearly labelled and free from leaks.</li> </ul>
<b>Storage incompatibility</b>	Incompatible with any substance not permitted in Sydney Water's Trade Waste Requirements.

## 7.3. Specific end use(s)

See section 1.2

## SECTION 8 Exposure controls / personal protection

### 8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
arsenic	Dermal 85 µg/kg bw/day (Systemic, Chronic) Inhalation 4 µg/m <sup>3</sup> (Systemic, Chronic) <i>Dermal 85 µg/kg bw/day (Systemic, Chronic) *</i> <i>Inhalation 2 µg/m<sup>3</sup> (Systemic, Chronic) *</i> <i>Oral 1.7 µg/kg bw/day (Systemic, Chronic) *</i>	13 µg/L (Water (Fresh)) 0.8 µg/L (Water - Intermittent release) 13 µg/L (Water (Marine)) 130 mg/kg sediment dw (Sediment (Fresh Water)) 8 mg/kg sediment dw (Sediment (Marine)) 0.5 mg/kg soil dw (Soil) 61 µg/L (STP) 1 mg/kg food (Oral)
benzene	Not Available	1.9 mg/L (Water (Fresh)) 1.9 mg/L (Water - Intermittent release) 1.9 mg/L (Water (Marine)) 33 mg/kg sediment dw (Sediment (Fresh Water)) 33 mg/kg sediment dw (Sediment (Marine)) 4.8 mg/kg soil dw (Soil) 39 mg/L (STP)
bromine	Inhalation 0.7 mg/m <sup>3</sup> (Systemic, Chronic) Inhalation 0.7 mg/m <sup>3</sup> (Local, Chronic) Inhalation 0.7 mg/m <sup>3</sup> (Systemic, Acute) Inhalation 0.7 mg/m <sup>3</sup> (Local, Acute)	1 µg/L (Water (Fresh)) 1 µg/L (Water - Intermittent release)
calcium nitrate	<i>Oral 10 mg/kg bw/day (Systemic, Acute) *</i>	18 mg/L (STP)
chlorine	Inhalation 0.75 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 0.5 % in mixture (weight basis) (Local, Chronic) Inhalation 0.75 mg/m <sup>3</sup> (Local, Chronic) Inhalation 1.5 mg/m <sup>3</sup> (Systemic, Acute) Inhalation 1.5 mg/m <sup>3</sup> (Local, Acute) <i>Inhalation 0.75 mg/m<sup>3</sup> (Systemic, Chronic) *</i> <i>Oral 0.25 mg/kg bw/day (Systemic, Chronic) *</i> <i>Dermal 0.5 % in mixture (weight basis) (Local, Chronic) *</i> <i>Inhalation 0.75 mg/m<sup>3</sup> (Local, Chronic) *</i> <i>Inhalation 1.5 mg/m<sup>3</sup> (Systemic, Acute) *</i> <i>Inhalation 1.5 mg/m<sup>3</sup> (Local, Acute) *</i>	0.21 µg/L (Water (Fresh)) 0.042 µg/L (Water - Intermittent release) 0.26 µg/L (Water (Marine)) 0.03 mg/L (STP) 11.1 mg/kg food (Oral)
formaldehyde.	Dermal 240 mg/kg bw/day (Systemic, Chronic) Inhalation 9 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 37 µg/cm <sup>2</sup> (Local, Chronic) Inhalation 0.375 mg/m <sup>3</sup> (Local, Chronic) Inhalation 0.75 mg/m <sup>3</sup> (Local, Acute) <i>Dermal 102 mg/kg bw/day (Systemic, Chronic) *</i> <i>Inhalation 3.2 mg/m<sup>3</sup> (Systemic, Chronic) *</i>	0.44 mg/L (Water (Fresh)) 0.44 mg/L (Water - Intermittent release) 4.44 mg/L (Water (Marine)) 2.3 mg/kg sediment dw (Sediment (Fresh Water)) 2.3 mg/kg sediment dw (Sediment (Marine)) 0.2 mg/kg soil dw (Soil) 0.19 mg/L (STP)

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
	Oral 4.1 mg/kg bw/day (Systemic, Chronic) * Dermal 12 µg/cm <sup>2</sup> (Local, Chronic) * Inhalation 0.1 mg/m <sup>3</sup> (Local, Chronic) *	
lithium	Dermal 12 mg/kg bw/day (Systemic, Chronic) Inhalation 4.2 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 12 mg/kg bw/day (Systemic, Chronic) * Inhalation 1.8 mg/m <sup>3</sup> (Systemic, Chronic) * Oral 1.2 mg/kg bw/day (Systemic, Chronic) *	1.65 mg/L (Water (Fresh)) 0.165 mg/L (Water - Intermittent release) 1.65 mg/L (Water (Marine)) 6.6 mg/kg sediment dw (Sediment (Fresh Water)) 0.66 mg/kg sediment dw (Sediment (Marine)) 0.26 mg/kg soil dw (Soil) 22.94 mg/L (STP)
manganese	Dermal 0.004 mg/kg bw/day (Systemic, Chronic) Inhalation 0.2 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 0.002 mg/kg bw/day (Systemic, Chronic) * Inhalation 0.041 mg/m <sup>3</sup> (Systemic, Chronic) * Oral 91.4 µg/kg bw/day (Systemic, Chronic) * Inhalation 0.041 mg/m <sup>3</sup> (Local, Chronic) *	0.034 mg/L (Water (Fresh)) 0.003 mg/L (Water - Intermittent release) 0.028 mg/L (Water (Marine)) 0.108 mg/kg sediment dw (Sediment (Fresh Water)) 0.34 mg/kg sediment dw (Sediment (Marine)) 3.4 mg/kg soil dw (Soil) 100 mg/L (STP)
mercury (elemental)	Inhalation 0.02 mg/m <sup>3</sup> (Systemic, Chronic) Inhalation 0.004 mg/m <sup>3</sup> (Systemic, Chronic) * Oral 7.39 µg/kg bw/day (Systemic, Chronic) *	0.057 µg/L (Water (Fresh)) 0.067 µg/L (Water - Intermittent release) 9.3 mg/kg sediment dw (Sediment (Fresh Water)) 9.3 mg/kg sediment dw (Sediment (Marine)) 22 µg/kg soil dw (Soil) 2.25 µg/L (STP)
nickel	Inhalation 0.05 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 0.035 mg/cm <sup>2</sup> (Local, Chronic) Inhalation 0.05 mg/m <sup>3</sup> (Local, Chronic) Inhalation 11.9 mg/m <sup>3</sup> (Local, Acute) Inhalation 60 ng/m <sup>3</sup> (Systemic, Chronic) * Oral 0.011 mg/kg bw/day (Systemic, Chronic) * Dermal 0.035 mg/cm <sup>2</sup> (Local, Chronic) * Inhalation 60 ng/m <sup>3</sup> (Local, Chronic) * Oral 0.37 mg/kg bw/day (Systemic, Acute) * Inhalation 0.8 mg/m <sup>3</sup> (Local, Acute) *	7.1 µg/L (Water (Fresh)) 8.6 µg/L (Water - Intermittent release) 0 µg/L (Water (Marine)) 109 mg/kg sediment dw (Sediment (Fresh Water)) 109 mg/kg sediment dw (Sediment (Marine)) 29.9 mg/kg soil dw (Soil) 0.33 mg/L (STP) 0.12 mg/kg food (Oral)
selenium	Dermal 7 mg/kg bw/day (Systemic, Chronic) Inhalation 0.05 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 4.3 mg/kg bw/day (Systemic, Chronic) * Inhalation 0.015 mg/m <sup>3</sup> (Systemic, Chronic) * Oral 4.3 µg/kg bw/day (Systemic, Chronic) *	2.67 µg/L (Water (Fresh)) 2 µg/L (Water - Intermittent release) 5.5 µg/L (Water (Marine)) 8.2 mg/kg sediment dw (Sediment (Fresh Water)) 6.2 mg/kg sediment dw (Sediment (Marine)) 0.044 mg/kg soil dw (Soil) 1500 µg/L (STP) 1 mg/kg food (Oral)
zinc	Dermal 83 mg/kg bw/day (Systemic, Chronic) Inhalation 5 mg/m <sup>3</sup> (Systemic, Chronic) Dermal 83 mg/kg bw/day (Systemic, Chronic) * Inhalation 2.5 mg/m <sup>3</sup> (Systemic, Chronic) * Oral 0.83 mg/kg bw/day (Systemic, Chronic) *	20.6 µg/L (Water (Fresh)) 6.1 µg/L (Water - Intermittent release) 235.6 mg/kg sediment dw (Sediment (Fresh Water)) 121 mg/kg sediment dw (Sediment (Marine)) 106.8 mg/kg soil dw (Soil) 100 µg/L (STP)
cadmium	Inhalation 4 µg/m <sup>3</sup> (Local, Chronic) Oral 1 µg/kg bw/day (Systemic, Chronic) *	0.19 µg/L (Water (Fresh)) 1.14 µg/L (Water - Intermittent release) 1.8 mg/kg sediment dw (Sediment (Fresh Water)) 0.64 mg/kg sediment dw (Sediment (Marine)) 0.9 mg/kg soil dw (Soil) 20 µg/L (STP) 0.16 mg/kg food (Oral)
chromium	Inhalation 0.5 mg/m <sup>3</sup> (Local, Chronic) Inhalation 0.027 mg/m <sup>3</sup> (Local, Chronic) *	6.5 µg/L (Water (Fresh)) 205.7 mg/kg sediment dw (Sediment (Fresh Water)) 21.1 mg/kg soil dw (Soil)
cobalt	Inhalation 40 µg/m <sup>3</sup> (Local, Chronic) Oral 29.8 µg/kg bw/day (Systemic, Chronic) * Inhalation 6.3 µg/m <sup>3</sup> (Local, Chronic) *	0.62 µg/L (Water (Fresh)) 2.36 µg/L (Water - Intermittent release) 53.8 mg/kg sediment dw (Sediment (Fresh Water)) 69.8 mg/kg sediment dw (Sediment (Marine)) 10.9 mg/kg soil dw (Soil) 0.37 mg/L (STP)
copper	Dermal 137 mg/kg bw/day (Systemic, Chronic) Dermal 273 mg/kg bw/day (Systemic, Acute) Dermal 137 mg/kg bw/day (Systemic, Chronic) *	3.1 µg/L (Water (Fresh)) 1.2 µg/L (Water - Intermittent release) 0 µg/L (Water (Marine))



Sydney Water Raw Sewage

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
	Oral 0.041 mg/kg bw/day (Systemic, Chronic) * Inhalation 1 mg/m <sup>3</sup> (Local, Chronic) * Dermal 273 mg/kg bw/day (Systemic, Acute) * Inhalation 1 mg/m <sup>3</sup> (Local, Acute) *	87 mg/kg sediment dw (Sediment (Fresh Water)) 12 mg/kg sediment dw (Sediment (Marine)) 0.7 mg/kg soil dw (Soil) 0.33 mg/L (STP) 0.12 mg/kg food (Oral)
iron	Inhalation 3 mg/m <sup>3</sup> (Local, Chronic) Oral 0.71 mg/kg bw/day (Systemic, Chronic) * Inhalation 1.5 mg/m <sup>3</sup> (Local, Chronic) *	Not Available
lead	Not Available	2.4 µg/L (Water (Fresh)) 3.3 µg/L (Water - Intermittent release) 186 mg/kg sediment dw (Sediment (Fresh Water)) 168 mg/kg sediment dw (Sediment (Marine)) 212 mg/kg soil dw (Soil) 100 µg/L (STP) 10.9 mg/kg food (Oral)
hydrogen sulfide	Inhalation 7 mg/m <sup>3</sup> (Systemic, Chronic) Inhalation 7 mg/m <sup>3</sup> (Local, Chronic) Inhalation 14 mg/m <sup>3</sup> (Systemic, Acute) Inhalation 14 mg/m <sup>3</sup> (Local, Acute)	0.05 µg/L (Water (Fresh)) 14.9 µg/L (Water - Intermittent release) 0.5 µg/L (Water (Marine)) 1.33 mg/L (STP)

\* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs)	arsenic	Arsenic and arsenic compounds except arsine (as As)	0.1 mg/m <sup>3</sup>	Not Available	Not Available	Carc
European Union Directive (EU) 2017/2398 amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work	benzene	Not Available	1 ppm / 3,25 mg/m <sup>3</sup>	Not Available	Not Available	(Notation (9) Substantial contribution to the total body burden via dermal exposure possible.)
UK Workplace Exposure Limits (WELs)	benzene	Benzene	1 ppm / 3.25 mg/m <sup>3</sup>	Not Available	Not Available	Carc, Sk
Europe ECHA Occupational exposure limits - Activity list	benzene	Not Available	Not Available	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	bromine	Bromine	0.1 ppm / 0.66 mg/m <sup>3</sup>	1.3 mg/m <sup>3</sup> / 0.2 ppm	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	bromine	Bromine	0.1 ppm / 0.7 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	chlorine	Chlorine	Not Available	1.5 mg/m <sup>3</sup> / 0.5 ppm	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	chlorine	Chlorine	Not Available	1.5 mg/m <sup>3</sup> / 0.5 ppm	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	cyanide ion	Cyanides, except HCN, cyanogen and cyanogen chloride (as Cn)	5 mg/m <sup>3</sup>	Not Available	Not Available	Sk
UK Workplace Exposure Limits (WELs)	formaldehyde.	Formaldehyde	2 ppm / 2.5 mg/m <sup>3</sup>	2.5 mg/m <sup>3</sup> / 2 ppm	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	manganese	Manganese and its inorganic compounds (as Mn)	0.05 mg/m <sup>3</sup>	Not Available	Not Available	Respirable fraction
UK Workplace Exposure Limits (WELs)	manganese	Manganese and its inorganic compounds (as Mn)	0.2 mg/m <sup>3</sup>	Not Available	Not Available	Inhalable fraction

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	manganese	Manganese and inorganic manganese compounds (as manganese)	0,2; 0,05 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	mercury (elemental)	Mercury and divalent inorganic compounds including mercuric oxide and mercuric chloride (measured as mercury)	0.02 mg/m3	Not Available	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	mercury (elemental)	Mercury and divalent inorganic mercury compounds including mercuric oxide and mercuric chloride (measured as mercury)	0,02 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	nickel	Nickel and its inorganic compounds (except nickel tetracarbonyl): nickel and water-insoluble nickel compounds (as Ni)	0.5 mg/m3	Not Available	Not Available	Sk, Carc (nickel oxides and sulphides) Sen (nickel sulphate)
Europe ECHA Occupational exposure limits - Activity list	nickel	Not Available	Not Available	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	selenium	Selenium and compounds, except hydrogen selenide (as Se)	0.1 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	cadmium	Cadmium and cadmium compounds except cadmium oxide fume, cadmium sulphide and cadmium sulphide pigments (as Cd)	0.025 mg/m3	Not Available	Not Available	Carc (cadmium metal, cadmium chloride, fluoride and sulphate)
UK Workplace Exposure Limits (WELs)	chromium	Chromium	0.5 mg/m3	Not Available	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	chromium	Chromium Metal, Inorganic Chromium (II) Compounds and Inorganic Chromium (III) Compounds (insoluble)	2 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	cobalt	Cobalt and Cobalt compounds (as Co)	0.1 mg/m3	Not Available	Not Available	Carc (cobalt dichloride and sulphate), Sen
UK Workplace Exposure Limits (WELs)	copper	Copper fume (as Cu)	0.2 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	fluorides as F-	Fluoride (inorganic as F)	2.5 mg/m3	Not Available	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	fluorides as F-	Inorganic Fluorides	2.5 mg/m3	Not Available	Not Available	Skin
UK Workplace Exposure Limits (WELs)	iron	Iron salts (as Fe)	1 mg/m3	2 mg/m3	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	hydrogen sulfide	Hydrogen sulphide	5 ppm / 7 mg/m3	14 mg/m3 / 10 ppm	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	hydrogen sulfide	Hydrogen sulphide	5 ppm / 7 mg/m3	14 mg/m3 / 10 ppm	Not Available	Not Available

**Emergency Limits**

Ingredient	TEEL-1	TEEL-2	TEEL-3
ammonia	61 ppm	330 ppm	2,300 ppm
arsenic	1.5 mg/m3	17 mg/m3	100 mg/m3
benzene	Not Available	Not Available	Not Available
bromine	Not Available	Not Available	Not Available
calcium nitrate	1.2 mg/m3	13 mg/m3	79 mg/m3
calcium nitrate	12 mg/m3	130 mg/m3	770 mg/m3
chlorine	Not Available	Not Available	Not Available

Sydney Water Raw Sewage

Ingredient	TEEL-1	TEEL-2	TEEL-3
2,3,7,8-tetrachlorodibenzo-p-dioxin	1.30E-04 mg/m3	0.0014 mg/m3	0.0085 mg/m3
cyanide ion	6 mg/m3	8.3 mg/m3	50 mg/m3
formaldehyde.	Not Available	Not Available	Not Available
lithium	3.3 mg/m3	36 mg/m3	220 mg/m3
manganese	3 mg/m3	5 mg/m3	1,800 mg/m3
mercury (elemental)	0.15 mg/m3	Not Available	Not Available
nickel	4.5 mg/m3	50 mg/m3	99 mg/m3
selenium	0.6 mg/m3	6.6 mg/m3	40 mg/m3
uranium depleted	0.6 mg/m3	5 mg/m3	30 mg/m3
zinc	6 mg/m3	21 mg/m3	120 mg/m3
cadmium	Not Available	Not Available	Not Available
chromium	1.5 mg/m3	17 mg/m3	99 mg/m3
cobalt	0.18 mg/m3	2 mg/m3	20 mg/m3
copper	3 mg/m3	33 mg/m3	200 mg/m3
fluorides as F-	7.5 mg/m3	83 mg/m3	500 mg/m3
iron	3.2 mg/m3	35 mg/m3	150 mg/m3
lead	0.15 mg/m3	120 mg/m3	700 mg/m3
hydrogen sulfide	Not Available	Not Available	Not Available
methane	65000*** ppm	230000*** ppm	400000*** ppm

Ingredient	Original IDLH	Revised IDLH
water	Not Available	Not Available
ammonia	Not Available	Not Available
arsenic	5 mg/m3	Not Available
benzene	500 ppm	Not Available
bromine	3 ppm	Not Available
calcium nitrate	Not Available	Not Available
chlorine	10 ppm	Not Available
2,3,7,8-tetrachlorodibenzo-p-dioxin	Not Available	Not Available
cyanide ion	25 mg/m3	Not Available
formaldehyde.	20 ppm	Not Available
lithium	Not Available	Not Available
manganese	500 mg/m3	Not Available
mercury (elemental)	10 mg/m3	Not Available
nickel	10 mg/m3	Not Available
selenium	Not Available	Not Available
uranium depleted	10 mg/m3	Not Available
zinc	Not Available	Not Available
cadmium	9 mg/m3	Not Available
chromium	250 mg/m3	Not Available
cobalt	20 mg/m3	Not Available
copper	100 mg/m3	Not Available
fluorides as F-	Not Available	Not Available
lubricating oils,petroleum C>25, hydrotreated bright stock	Not Available	Not Available
iron	Not Available	Not Available
lead	Not Available	Not Available
hydrogen sulfide	100 ppm	Not Available
methane	Not Available	Not Available

**Occupational Exposure Banding**

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
ammonia	E	≤ 0.1 ppm
calcium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
2,3,7,8-tetrachlorodibenzo-p-dioxin	E	≤ 0.01 mg/m <sup>3</sup>
lithium	C	> 0.1 to ≤ milligrams per cubic meter of air (mg/m <sup>3</sup> )
uranium depleted	E	≤ 0.01 mg/m <sup>3</sup>
lead	C	> 0.1 to ≤ milligrams per cubic meter of air (mg/m <sup>3</sup> )
<b>Notes:</b>	<i>Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.</i>	

**MATERIAL DATA**

Ceiling values were recommended for manganese and compounds in earlier publications. As manganese is a chronic toxin a TWA is considered more appropriate. Because workers exposed to fume exhibited manganism at air-borne concentrations below those that affect workers exposed to dust a lower value has been proposed to provide an extra margin of safety. This value is still above that experienced by two workers exposed to manganese fume in the course of one study.

OSHA concluded that levels below the OSHA-PEL protected workers exposed to uranium from significant risks of kidney and blood disorders and radiological damage. ACGIH based the TLV values on industrial experience in which there is no evidence linking chronic occupational exposure to both soluble and insoluble uranium compounds at levels well above 0.05 mg/m<sup>3</sup> with either renal or haematopoietic injury. Current reviews examine uranium disposition and carcinogenic potential.

Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

Exposure at or below the recommended TLV-TWA is thought to provide reasonably good protection against systemic intoxication but may NOT guarantee complete freedom from chloracne. NIOSH adopts a much lower value because it considers all PCBs to be carcinogens.

ES TWA: 1 mg/m<sup>3</sup>, STEL: 2 mg/m<sup>3</sup> SKIN (42% chlorine) [53469-21-9]

ES TWA: 0.5 mg/m<sup>3</sup>, STEL: 1 mg/m<sup>3</sup> SKIN (54% chlorine) [11097-69-1]

Use strict occupational hygiene practices to minimise all personal contact.

TLV TWA: 1 mg/m<sup>3</sup> SKIN (42% Chlorine) [53469-21-9]

TLV TWA: 0.5 mg/m<sup>3</sup> SKIN (54% Chlorine) [11097-69-1]

PEL TWA: 0.001 mg/m<sup>3</sup> (all grades) NIOSH

IDLH Level: 10 mg/m<sup>3</sup>

Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

A number of studies have shown that susceptibility to the effects of manganese at or about 1 - 5 mg/m<sup>3</sup> (TWA) can lead to clinical manifestations of manganism or more commonly to the development of indicators of sub-clinical manganism (e.g. hand tremor, exaggerated reflexes, short-term memory deficits, poor psychomotor performance). Controlling long-term exposure to the recommended ES TWA level or below should provide protection for those individuals susceptible to neurological effects of prolonged exposure.

for benzene

Odour Threshold Value: 34 ppm (detection), 97 ppm (recognition)

NOTE: Detector tubes for benzene, measuring in excess of 0.5 ppm, are commercially available. The relative quality of epidemiological data and quantitative health risk assessments related to documented and theoretical leukaemic deaths constitute the basis of the TLV-recommendation.

One study [Dow Chemical] demonstrates a significant fourfold increase in myelogenous leukaemia for workers exposed to average benzene concentrations of about 5 ppm for an average of 9 years and that 2 out of four individuals in the study who died from leukaemia were characterised as having been exposed to average benzene levels below 2 ppm. Based on such findings the estimated risk of leukaemia in workers exposed at daily benzene concentrations of 10 ppm for 40 years is 155 times that of unexposed workers; at 1 ppm the risk falls to 1.7 times whilst at 0.1 ppm the risk is about the same in the two groups. A revision of the TLV-TWA to 0.1 ppm was proposed in 1990 but this has been revised upwards as result of industry initiatives.

Typical toxicities displayed following inhalation:

- At 25 ppm (8 hours): no effect
- 50-150 ppm: signs of intoxication within 5 hours
- 500-1500 ppm: signs of intoxication within 1 hour
- 7500 ppm: severe intoxication within 30-60 minutes
- 20000 ppm: fatal within 5-10 minutes

Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. Some surveillance should emphasise (i) demography, occupational and medical history and health advice (ii) baseline blood sample for haematological profile (iii) records of personal exposure.

for chlorine:

Odour Threshold Value: 0.08 ppm (detection) - olfactory fatigue may develop

NOTE: Detector tubes for chlorine, measuring in excess of 0.2 ppm, are commercially available. Long-term measurements (8 hrs) may be conducted to detect concentrations exceeding 0.13 ppm.

Smell is not a good indicator of severity of exposure in the range 0.5 to 2 ppm. In this range subjects found exposure unpleasant with itching and burning of the throat reported and occasionally an urge to cough. Significant differences in the responses of males and females were also recorded with females often reporting headache and drowsiness.

Exposure at 1 ppm chlorine for 8 hours produced significant changes in pulmonary function and increased subjective irritation. Similar 8 hour exposures at 0.5

ppm produced no significant pulmonary function changes and less severe subjective irritation. Exposures for 2 hours at 2 ppm chlorine produced no significant changes in pulmonary irritation.

An 8 hour exposure at 1.5 ppm produced increased mucous secretion from the nose and increased mucous in the hypopharynx. Exposure at or below the TLV-TWA and STEL is thought to protect the worker against annoying symptoms in nose, throat and conjunctiva and declines in pulmonary function.

Odour Safety Factor(OSF)

OSF=1.6 (CHLORINE)

for exposure to ammonia gas/ vapours:

Odour Threshold Value: Varies reported as 0.019 ppm and 55 ppm; AIHA Value 16.7 ppm (detection)

NOTE: Detector tubes for ammonia, measuring in excess of 1 ppm, are commercially available.

The TLV-TWA is thought to be protective against irritation of the eyes and respiratory tract and minimise discomfort among workers that are not inured to its effects and systemic damage. Acclimatised persons are able to tolerate prolonged exposures of up to 100 ppm without symptoms. Marked irritation has been seen in persons exposed to ammonia concentrations between 50 and 100 ppm only when the exposures involved sudden concentration peaks which do not permit short-term acclimatisation. The detoxification capacity of the liver is significant since the amount of ammonia formed endogenously in the intestines markedly exceeds that from external sources.

Human exposure effects, at vapour concentrations of about:

Concentration (ppm)	Possible Effects
5	minimal irritation
9-50	nasal dryness, olfactory fatigue and moderate irritation
125-137	definite nose, throat and chest irritation
140	slight eye irritation
150	laryngeal spasm
500	30 minute exposures may produce cyclic hypernea, increased blood pressure and pulse rate, and upper respiratory tract irritation which may persist for 24 hours
700	immediate eye irritation
1,500-10,000	dyspnea, convulsive coughing, chest pain, respiratory spasm, pink frothy sputum, rapid asphyxia and delayed pulmonary oedema which may be fatal. Other effects include runny nose, swelling of the lips, restlessness, headache, salivation, nausea, vomiting, glottal oedema, pharyngitis, tracheitis, and speech difficulties. Bronchopneumonia, asphyxiation due to spasms, inflammation, and oedema of the larynx, may be fatal. Residual effects include hoarseness, productive cough, and decreased respiratory function
>2,500	severe eye irritation, with swelling of the eyelids, lachrymation, blepharospasm, palpebral oedema, increased intraocular pressure, oval semi-dilated, fixed pupils, corneal ulceration (often severe) and temporary blindness. Depending on duration of exposure, there may be destruction of the epithelium, corneal and lenticular opacification, and iritis accompanied by hypopyon or haemorrhage and possible loss of pigment from the posterior layer of the iris. Less severe damage is often resolved. In the case of severe damage, symptoms may be delayed; late complications including persistent oedema, vascularisation and corneal scarring, permanent opacity, acute angle glaucoma, staphyloma, cataract, and atrophy of the retina, iris, and symblepharon. Long-term exposure to sub-acute concentrations or single exposures to high concentrations may produce chronic airway dysfunction, alveolar disease, bronchiolitis, bronchiectasis, emphysema and anxiety neuroses

Odour Safety Factor(OSF)

OSF=3.8 (AMMONIA)

for formaldehyde:

Odour Threshold Value for formaldehyde: 0.98 ppm (recognition)

NOTE: Detector tubes for formaldehyde, measuring in excess of 0.2 ppm are available commercially.

Formaldehyde vapour exposure:

Primary irritation is dependent on duration of exposure and individual susceptibility.

The following are typical symptoms encountered at various exposure levels.

0.1 ppm - Lower level of mucous eye, nose and throat irritation

0.8 ppm - Typical threshold of perception

1-2 ppm - Typical threshold of irritation

2-3 ppm - Irritation of eyes, nose and throat

4-5 ppm - Increased irritation, tearing, headache, pungent odour

10-20 ppm - Profuse tearing, severe burning, coughing

50 ppm - Serious bronchial and alveolar damage

100 ppm - Formaldehyde induced chemical pneumonia and death

Despite the intent of the TLV Ceiling recommendation it is believed that 0.3 ppm will not protect that portion of the workforce (up to 20%) reported to be responsive to low ambient concentrations. Because of the dose-related carcinogenic activity for rat and mouse inhalation of formaldehyde, the report of macromolecular adducts in the upper and lower respiratory tracts of nonhuman primates following inhalation of formaldehyde, the human case reports of upper respiratory tract malignant melanoma associated with

formaldehyde inhalation and the suggestive epidemiologic data on human cancer risk, the TLV Committee recommends that workplace formaldehyde air concentrations be reduced to the lowest possible levels that can be achieved using engineering controls.

Odour Safety Factor(OSF)

OSF=0.36 (FORMALDEHYDE)

For bromine:

Odour Threshold Value: 0.046 ppm (recognition)

Toxic effects of bromine are concentration dependent, viz:

0.2-0.5 ppm: Eye irritation and lachrymation

10.0 ppm: Intolerable, severe irritation of the upper respiratory tract.

40-60 ppm: Brief exposure dangerous to life.

1000 ppm: Choking, glottal and pulmonary oedema, rapid death.

Physiological response to various levels suggests the following:

0.1-0.15 ppm: maximal concentration allowable for prolonged exposure.

4.0 ppm: maximal concentration allowable for short exposure (0.5-1hr)

40-60 ppm: dangerous for short exposures

1000 ppm: rapidly fatal for short exposure

Exposure at the TLV-TWA and STEL is thought to prevent injury of the respiratory passages and injury to the lung.

Odour Safety Factor (OSF)

OSF=2 (BROMINE)

Odour Threshold Value for hydrogen sulfide: 0.0011 ppm (detection), 0.0045 ppm (recognition)

NOTE: Detector tubes for hydrogen sulfide, measuring in excess of 0.5 ppm are available commercially.

The TLV-TWA is protective against sudden death, eye irritation, neurasthenic symptoms such as fatigue, headache, dizziness, and irritability, or permanent central nervous system effects that may result from acute, subchronic, or acute exposure to hydrogen sulfide. The offensive odour of hydrogen sulfide does not give a reliable warning signal because olfactory fatigue occurs at concentrations of 150 to 200 ppm.

Hydrogen sulfide is probably the leading cause of sudden death in the workplace. Lethal hydrogen sulfide toxicity following inhalation of 1000-2000 ppm paralyses the respiratory centre and causes breathing to stop. At concentrations between 500 to 1000 ppm, the carotid bodies are stimulated causing hypernea which is followed by apnea. Low concentrations

(50-1500 ppm) produce eye and respiratory tract irritation. Prolonged exposure to concentrations of the order of 250-500 ppm may produce pulmonary oedema although 50 ppm has also reportedly produced this effect.

Concentrations in excess of 50 ppm produce acute conjunctivitis with pain, lachrymation and photophobia. These acute changes may progress to keratoconjunctivitis and vesiculation of the corneal epithelium.

Concentrations between 5 and 30 ppm produce ocular toxicity.

The inherent toxic and olfactory (sense of smell) fatiguing properties of hydrogen sulfide require that air monitoring alarms be used if concentrations are expected to reach harmful levels such as in enclosed spaces, heated transport vessels

and spill or leak situations. If the air concentration exceeds 10 ppm, the area should be evacuated unless respiratory

protection is in use. In areas where hydrogen sulfide vapours may accumulate, a positive-pressure air-supplied respirator is advised.

Odour Safety Factor(OSF)

OSF=1.2E3 (HYDROGEN SULFIDE)

NOTE D: Certain substances which are susceptible to spontaneous polymerisation or decomposition are generally placed on the market in a stabilised form. It is in this form that they are listed on Annex I

When they are placed on the market in a non-stabilised form, the label must state the name of the substance followed by the words "non-stabilised"

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

NOTE E: Substances with specific effects on human health that are classified as carcinogenic, mutagenic and/ or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68, R48 and R65 and all combinations of these risk phrases shall be preceded by the word "Also".

R45-23: May cause cancer. Also toxic by inhalation

This note applies only to certain complex oil-derived substances in Annex VI.

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

NOTE N: The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Annex VI.

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

## 8.2. Exposure controls

### 8.2.1. 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. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

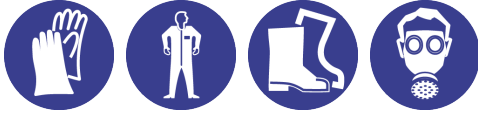
Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:

Air Speed:

	<p>solvent, vapours, degreasing etc., evaporating from tank (in still air).</p> <p>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</p> <p>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</p> <p>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</p> <p>Within each range the appropriate value depends on:</p> <table border="1"> <thead> <tr> <th>Lower end of the range</th> <th>Upper end of the range</th> </tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td> <td>1: Disturbing room air currents</td> </tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only.</td> <td>2: Contaminants of high toxicity</td> </tr> <tr> <td>3: Intermittent, low production.</td> <td>3: High production, heavy use</td> </tr> <tr> <td>4: Large hood or large air mass in motion</td> <td>4: Small hood-local control only</td> </tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	Lower end of the range	Upper end of the range	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents	2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity	3: Intermittent, low production.	3: High production, heavy use	4: Large hood or large air mass in motion	4: Small hood-local control only	<p>0.25-0.5 m/s (50-100 f/min.)</p> <p>0.5-1 m/s (100-200 f/min.)</p> <p>1-2.5 m/s (200-500 f/min.)</p> <p>2.5-10 m/s (500-2000 f/min.)</p>
Lower end of the range	Upper end of the range											
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents											
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity											
3: Intermittent, low production.	3: High production, heavy use											
4: Large hood or large air mass in motion	4: Small hood-local control only											
<b>8.2.2. Personal protection</b>												
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▶ Safety glasses with side shields.</li> <li>▶ Chemical goggles.</li> <li>▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. 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. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]</li> </ul>											
<b>Skin protection</b>	See Hand protection below											
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Wear chemical protective gloves, e.g. PVC.</li> <li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li> </ul> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> <li>· frequency and duration of contact,</li> <li>· chemical resistance of glove material,</li> <li>· glove thickness and</li> <li>· dexterity</li> </ul> <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> <li>· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.</li> <li>· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.</li> <li>· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.</li> <li>· Contaminated gloves should be replaced.</li> </ul> <p>As defined in ASTM F-739-96 in any application, gloves are rated as:</p> <ul style="list-style-type: none"> <li>· Excellent when breakthrough time &gt; 480 min</li> <li>· Good when breakthrough time &gt; 20 min</li> <li>· Fair when breakthrough time &lt; 20 min</li> <li>· Poor when glove material degrades</li> </ul> <p>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.</p> <p>It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection</p>											

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	<p>should also be based on consideration of the task requirements and knowledge of breakthrough times.</p> <p>Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.</p> <p>Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:</p> <ul style="list-style-type: none"> <li>Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.</li> <li>Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential</li> </ul> <p>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>Overalls.</li> <li>P.V.C apron.</li> <li>Barrier cream.</li> <li>Skin cleansing cream.</li> <li>Eye wash unit.</li> </ul>

**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:  
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Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

\* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

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

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

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

**Respiratory protection**

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

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	BKAXHG-AUS P2	-	BKAXHG-PAPR-AUS / Class 1 P2
up to 50 x ES	-	BKAXHG-AUS / Class 1 P2	-
up to 100 x ES	-	BKAXHG-2 P2	BKAXHG-PAPR-2 P2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

**8.2.3. Environmental exposure controls**

See section 12

**SECTION 9 Physical and chemical properties**

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

<b>Appearance</b>	Brownish grey liquid with suspended matter, unpleasant septic smell. Gases, vapours and aerosols are formed during decomposition treatment & transport processes.		
<b>Physical state</b>	Liquid	<b>Relative density (Water = 1)</b>	>1
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	Not Available
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	Not Applicable
<b>pH (as supplied)</b>	Not Available	<b>Decomposition temperature</b>	Not Available
<b>Melting point / freezing point (°C)</b>	Not Available	<b>Viscosity (cSt)</b>	Not Available





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	<p>dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
<b>Eye</b>	<p>Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p>
<b>Chronic</b>	<p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>On the basis, primarily, of animal experiments, the material may be regarded as carcinogenic to humans. At least one classification body considers that there is sufficient evidence to provide a strong presumption that human exposure to the material may result in cancer on the basis of:</p> <ul style="list-style-type: none"> <li>- appropriate long-term animal studies</li> <li>- other relevant information</li> </ul> <p>Exposure to the material may cause concerns for human fertility, on the basis that similar materials provide some evidence of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.</p> <p>.</p> <p>Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, on the basis that similar materials tested in appropriate animal studies provide some suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.</p>

11.2.1. Endocrine Disruption Properties

Not Available

Sydney Water Raw Sewage	TOXICITY	IRRITATION
	Not Available	Not Available
<b>water</b>	TOXICITY Oral(Rat) LD50; >90000 mg/kg <sup>[2]</sup>	IRRITATION Not Available
<b>ammonia</b>	TOXICITY Inhalation(Rat) LC50; 2000 ppm4h <sup>[2]</sup> Oral(Rat) LD50; ~350-370 mg/kg <sup>[2]</sup>	IRRITATION Eye (rabbit): 0.25 mg SEVERE Eye (rabbit): 1 mg/30s SEVERE
<b>arsenic</b>	TOXICITY Oral(Mouse) LD50; 144 mg/kg <sup>[2]</sup>	IRRITATION Eye: adverse effect observed (irreversible damage) <sup>[1]</sup> Skin: adverse effect observed (irritating) <sup>[1]</sup>
<b>benzene</b>	TOXICITY dermal (mouse) LD50: 48 mg/kg <sup>[2]</sup> Inhalation(Rat) LC50; 43.767 mg/L4h <sup>[1]</sup> Oral(Rat) LD50; 690-1230 mg/kg <sup>[2]</sup>	IRRITATION Eye (rabbit): 2 mg/24h - SEVERE Eye: adverse effect observed (irritating) <sup>[1]</sup> SKIN (rabbit):20 mg/24h - moderate Skin: adverse effect observed (irritating) <sup>[1]</sup>
<b>bromine</b>	TOXICITY Inhalation(Rat) LC50; 2.7 mg/L4h <sup>[2]</sup> Oral(Mammal) LD50; 440 mg/kg <sup>[2]</sup>	IRRITATION Not Available
<b>calcium nitrate</b>	TOXICITY dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Oral(Rat) LD50; >300<2000 mg/kg <sup>[1]</sup>	IRRITATION Eye (rabbit): 500 mg/24 h - SEVERE Skin (rabbit): 500 mg/24 h moderate
<b>chlorine</b>	TOXICITY Dermal (rabbit) LD50: >10000 mg/kg <sup>[1]</sup>	IRRITATION Eye: adverse effect observed (irritating) <sup>[1]</sup>

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	Inhalation(Rat) LC50; 143.803 ppm4h <sup>[1]</sup> Oral(Rat) LD50; >237 mg/kg <sup>[1]</sup>	Skin: adverse effect observed (irritating) <sup>[1]</sup>
2,3,7,8-tetrachlorodibenzo-p-dioxin	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 0.275 mg/kg <sup>[2]</sup> Oral(Guinea) LD50; 0.001 mg/kg <sup>[2]</sup>	Eye (rabbit): 2 mg - moderate
cyanide ion	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
formaldehyde.	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 270 mg/kg <sup>[2]</sup> Inhalation(Rat) LC50; <463 ppm4h <sup>[1]</sup> Oral(Mouse) LD50; 42 mg/kg <sup>[2]</sup>	Eye (human): 4 ppm/5m Eye (rabbit): 0.75 mg/24H SEVERE Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (human): 0.15 mg/3d-I mild Skin (rabbit): 2 mg/24H SEVERE Skin: adverse effect observed (corrosive) <sup>[1]</sup>
lithium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin: adverse effect observed (corrosive) <sup>[1]</sup>
manganese	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50; >5.14 mg/l4h <sup>[1]</sup> Oral(Rat) LD50; >2000 mg/kg <sup>[1]</sup>	Eye (rabbit): 500 mg/24h - mild Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (rabbit): 500 mg/24h - mild Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
mercury (elemental)	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50; >0.007 mg/L4h <sup>[1]</sup> Oral(Rat) LD50; >2000 mg/kg <sup>[1]</sup>	Not Available
nickel	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral(Rat) LD50; >9000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
selenium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50; >0.052<=0.51 mg/l4h <sup>[1]</sup> Oral(Rat) LD50; >=50<=500 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
uranium depleted	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral(Human) LD50; 1.63 mg/kg <sup>[2]</sup>	Not Available
zinc	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 1130 mg/kg <sup>[2]</sup> Oral(Rat) LD50; >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
cadmium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rabbit) LC50; 0.028 mg/L4h <sup>[1]</sup> Oral(Rat) LD50; >63<259 mg/kg <sup>[1]</sup>	Not Available
chromium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50; >5.41 mg/l4h <sup>[1]</sup> Oral(Rat) LD50; >5000 mg/kg <sup>[1]</sup>	Not Available

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<b>cobalt</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Inhalation(Rat) LC50; <=0.05 mg/4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral(Rat) LD50; ~550 mg/kg <sup>[1]</sup>	
<b>copper</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Inhalation(Rat) LC50; 0.733 mg/4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral(Mouse) LD50; 0.7 mg/kg <sup>[2]</sup>	
<b>fluorides as F-</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>lubricating oils,petroleum C&gt;25, hydrotreated bright stock</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral(Rat) LD50; 2280 mg/kg <sup>[2]</sup>	Not Available
<b>iron</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral(Human) LD50; 200 mg/kg <sup>[2]</sup>	Not Available
<b>lead</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation(Rat) LC50; >5.05 mg/4h <sup>[1]</sup>	
	Oral(Rat) LD50; >2000 mg/kg <sup>[1]</sup>	
<b>hydrogen sulfide</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Mouse) LC50; 316.028 ppm4h <sup>[2]</sup>	Not Available
<b>methane</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50; >13023 ppm4h <sup>[1]</sup>	Not Available
<b>Legend:</b>	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

<b>ARSENIC</b>	<p>Arsenic compounds are classified by the European Union as toxic by inhalation and ingestion and toxic to aquatic life and long lasting in the environment. IARC classify arsenic in drinking water as a confirmed human carcinogen (IARC 1).</p> <p>The main inorganic forms of arsenic relevant for human exposures are pentavalent arsenic (also called arsenate, As(V), or As+5) and trivalent arsenic (also called arsenite, As(III), or As+3). These inorganic species undergoes a series of reduction and oxidative/methylation steps in human liver and other tissues to form tri- and pentavalent methylated metabolites of methylarsonate [MA(III)], methylarsonate [MA(V)], dimethylarsinite [DMA(III)], and dimethylarsinate [DMA(V)]. Some mammalian species also produce trimethylated metabolites, trimethylarsine oxide</p> <p>The distinction between inorganic and organic forms is important because it is generally accepted that the organic species are excreted more quickly from the body and generally considered less toxic, with a relative rank order of As(III) &gt; As(V) &gt;&gt; MA(V), DMA(V) &gt;&gt; arsenobetaine. However, the methylated trivalent metabolites, MA(III) and DMA(III), are significantly more toxic than their pentavalent counterpart and either As(III) or As(V) . In many cases, biomonitoring or environmental occurrence data are reported as total arsenic and do not distinguish between the different species. In those situations, understanding the relevant sources of arsenic is essential to evaluate potential arsenic related health effects, especially those related to inorganic arsenic exposure.</p> <p>Tumorigenic - Carcinogenic by RTECS criteria.</p>
<b>BENZENE</b>	<p>Inhalation (man) TClO: 150 ppm/1y - I</p> <p>Data demonstrate that during inhalation exposure,aromatic hydrocarbons undergo substantial partitioning into adipose tissues. Following cessation of exposure, the level of aromatic hydrocarbons in body fats rapidly declines. Thus, the aromatic hydrocarbons are unlikely to bioaccumulate in the body. Selective partitioning of the aromatic hydrocarbons into the non-adipose tissues is unlikely. No data is available regarding distribution following dermal absorption. However, distribution following this route of exposure is likely to resemble the pattern occurring with inhalation exposure.</p> <p>Aromatics hydrocarbons may undergo several different Phase I dealkylation, hydroxylation and oxidation reactions which may or may not be followed by Phase II conjugation to glycine, sulfation or glucuronidation. However, the major predominant biotransformation pathway is typical of that of the alkylbenzenes and consists of: (1) oxidation of one of the alkyl groups to an alcohol moiety; (2) oxidation of the hydroxyl group to a carboxylic acid; (3) the carboxylic acid is then conjugated with glycine to form a hippuric acid. The minor metabolites can be expected to consist of a complex mixture of isomeric triphenols, the sulfate and glucuronide conjugates of dimethylbenzyl alcohols, dimethylbenzoic acids and dimethylhippuric acids. Consistent with the</p>

low propensity for bioaccumulation of aromatic hydrocarbons, these substances are likely to be significant inducers of their own metabolism.

The predominant route of excretion of aromatic hydrocarbons following inhalation exposure involves either exhalation of the unmetabolized parent compound, or urinary excretion of its metabolites. When oral administration occurs, there is little exhalation of unmetabolized these hydrocarbons, presumably due to the first pass effect in the liver. Under these circumstances, urinary excretion of metabolites is the dominant route of excretion.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

Side-reactions during manufacture of the parent compound may result in the production of trace amounts of polyhalogenated aromatic hydrocarbon(s). Halogenated phenols, and especially their alkali salts, can condense above 300 deg. C. to form polyphenoxyphenols or, in a very specific reaction, to form dibenzo-p-dioxins

Polyhalogenated aromatic hydrocarbons (PHAHs) comprise two major groups. The first group represented by the halogenated derivatives of dibenzodioxins (the chlorinated form is PCDD), dibenzofurans (PCDF) and biphenyls (PCB) exert their toxic effect (as hepatotoxicants, reproductive toxicants, immunotoxicants and procarcinogens) by interaction with a cytosolic protein known as the Ah receptor. In guinea pigs the Ah receptor is active in a mechanism which "pumps" PHAH into the cell whilst in humans the reverse appears to true. This, in part, may account for species differences often cited in the literature. This receptor exhibits an affinity for the planar members of this group and carries these to the cellular nucleus where they bind, reversibly, to specific genomes on DNA. This results in the regulation of the production of certain proteins which elicit the toxic response. The potency of the effect is dependent on the strength of the original interaction with the Ah receptor and is influenced by the degree of substitution by the halogen and the position of such substitutions on the parent compound.

The most potent molecule is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) while the coplanar PCBs (including mono-ortho coplanars) possess approximately 1% of this potency. Nevertheless, all are said to exhibit "dioxin-like" behaviour and in environmental and health assessments it has been the practice to assign each a TCDD-equivalence value.

The most subtle and important biological effects of the PHAHs are the effects on endocrine hormones and vitamin homeostasis. TCDD mimics the effect of thyroxin (a key metamorphosis signal during maturation) and may disrupt patterns of embryonic development at critical stages. Individuals from exposed wildlife populations have been observed to have altered sexual development, sexual dysfunction as adults and immune system suppression. Immunotoxic effects of the PHAHs (including the brominated congener, PBB) have been the subject of several studies. No clear pattern emerges in human studies however with T-cell numbers and function (a blood marker for immunological response) increasing in some and decreasing in others.

Developmental toxicity (e.g. cleft palate, hydronephrosis) occurs in relatively few species; functional alterations following TCDD exposure leads to deficits in cognitive functions in monkeys and to adverse effects in the male reproductive system of rats.

Three incidences have occurred which have introduced abnormally high levels of dioxin or dioxin-like congeners to humans. The explosion at a trichlorophenol-manufacturing plant in Seveso, Italy distributed TCDD across a large area of the country-side, whilst rice-oil contaminated with heat-transfer PCBs (and dioxin-like contaminants) has been consumed by two groups, on separate occasions (one in Yusho, Japan and another in Yu-cheng, Taiwan). The only symptom which can unequivocally be related to all these exposures is the development of chloracne, a disfiguring skin condition, following each incident. Contaminated oil poisonings also produced eye-discharge, swelling of eyelids and visual disturbances. The Babies born up to 3 years after maternal exposure (so-called "Yusho-babies") were characteristically brown skinned, coloured gums and nails and (frequently) produced eye-discharges. Delays in intellectual development have been noted. It has been estimated that Yu-cheng patients consumed an average level of 0.06 mg/kg body weight/day total PCB and 0.0002 mg/kg/day of PCDF before the onset of symptoms after 3 months. When the oil was withdrawn after 6 months they had consumed 1 gm total PCB containing 3.8 mg PCDF. Taiwanese patients consumed 10 times as much contaminated oil as the Japanese patients (because of later withdrawal); however since PCB/PCDF concentration in the Japanese oil was 10 times that consumed in Taiwan, patients from both countries consumed about the same amount of PCBs/PCDFs. Preliminary data from the Yusho cohort suggests a six-fold excess of liver cancer mortality in males and a three-fold excess in women.

Recent findings from Seveso indicate that the biological effects of low level exposure (BELLEs), experienced by a cohort located at a great distance from the plant, may be hormetic, i.e. may be protective AGAINST the development of cancer. The PHAHs do not appear to be genotoxic - they do not alter the integrity of DNA. This contrasts with the effects of the many polycyclic aromatic hydrocarbons (PAHs) (or more properly, their reactive metabolites). TCDD induces carcinogenic effects in the laboratory in all species, strains and sexes tested. These effects are dose-related and occur in many organs. Exposures as low as 0.001 ug/kg body weight/day produce carcinoma. Several studies implicate PCBs in the development of liver cancer in workers as well as multi-site cancers in animals. The second major group of PHAH consists of the non-planar PCB congeners which possess two or more ortho-substituted halogens. These have been shown to produce neurotoxic effects which are thought to reduce the concentration of the brain neurotransmitter, dopamine, by inhibiting certain enzyme-mediated processes. The specific effect elicited by both classes of PHAH seems to depend on the as much on the developmental status of the organism at the time of the exposure as on the level of exposure over a lifetime.

**NOTE:** Some jurisdictions require that health surveillance be conducted on workers occupationally exposed to polycyclic aromatic hydrocarbons. Such surveillance should emphasise

- demography, occupational and medical history
- health advice, including recognition of photosensitivity and skin changes
- physical examination if indicated
- records of personal exposure including photosensitivity

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may

### 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN

	<p>produce conjunctivitis. Use control measures and full personal protective equipment to prevent all personal contact.</p>
<b>MANGANESE</b>	<p>The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p>
<b>MERCURY (ELEMENTAL)</b>	<p>Animal studies have shown that mercury may be a reproductive effector.</p>
<b>NICKEL</b>	<p>Oral (rat) TDLo: 500 mg/kg/5D-I Inhalation (rat) TCLo: 0.1 mg/m<sup>3</sup>/24H/17W-C</p>
<b>CHROMIUM</b>	<p>Gastrointestinal tumours, lymphoma, musculoskeletal tumours and tumours at site of application recorded. For chrome(III) and other valence states (except hexavalent): For inhalation exposure, all trivalent and other chromium compounds are treated as particulates, not gases. The mechanisms of chromium toxicity are very complex, and although many studies on chromium are available, there is a great deal of uncertainty about how chromium exerts its toxic influence. Much more is known about the mechanisms of hexavalent chromium toxicity than trivalent chromium toxicity. There is an abundance of information available on the carcinogenic potential of chromium compounds and on the genotoxicity and mutagenicity of chromium compounds in experimental systems. The consensus from various reviews and agencies is that evidence of carcinogenicity of elemental, divalent, or trivalent chromium compounds is lacking. Epidemiological studies of workers in a number of industries (chromate production, chromate pigment production and use, and chrome plating) conclude that while occupational exposure to hexavalent chromium compounds is associated with an increased risk of respiratory system cancers (primarily bronchogenic and nasal), results from occupational exposure studies to mixtures that were mainly elemental and trivalent (ferrochromium alloy worker) were inconclusive. Studies in leather tanners, who were exposed to trivalent chromium were consistently negative. In addition to the lack of direct evidence of carcinogenicity of trivalent or elemental chromium and its compounds, the genotoxic evidence is overwhelmingly negative. The lesser potency of trivalent chromium relative to hexavalent chromium is likely related to the higher redox potential of hexavalent chromium and its greater ability to enter cells. The general inability of trivalent chromium to traverse membranes and thus be absorbed or reach peripheral tissue in significant amounts is generally accepted as a probable explanation for the overall absence of systemic trivalent chromium toxicity. Elemental and divalent forms of chromium are not able to traverse membranes readily either. This is not to say that elemental, divalent, or trivalent chromium compounds cannot traverse membranes and reach peripheral tissue, the mechanism of absorption is simply less efficient in comparison to absorption of hexavalent chromium compounds. Hexavalent chromium compounds exist as tetrahedral chromate anions, resembling the forms of other natural anions like sulfate and phosphate which are permeable across nonselective membranes. Trivalent chromium forms octahedral complexes which cannot easily enter through these channels, instead being absorbed via passive diffusion and phagocytosis. Although trivalent chromium is less well absorbed than hexavalent chromium, workers exposed to trivalent compounds have had detectable levels of chromium in the urine at the end of a workday. Absorbed chromium is widely distributed throughout the body via the bloodstream, and can reach the foetus. Although there is ample in vivo evidence that hexavalent chromium is efficiently reduced to trivalent chromium in the gastrointestinal tract and can be reduced to the trivalent form by ascorbate and glutathione in the lungs, there is no evidence that trivalent chromium is converted to hexavalent chromium in biological systems. In general, trivalent chromium compounds are cleared rapidly from the blood and more slowly from the tissues. Although not fully characterized, the biologically active trivalent chromium molecule appears to be chromodulin, also referred to as (GTF). Chromodulin is an oligopeptide complex containing four chromic ions. Chromodulin may facilitate interactions of insulin with its receptor site, influencing protein, glucose, and lipid metabolism. Inorganic trivalent chromium compounds, which do not appear to have insulin-potentiating properties, are capable of being converted into biologically active forms by humans and animals Chromium can be a potent sensitiser in a small minority of humans, both from dermal and inhalation exposures. The most sensitive endpoint identified in animal studies of acute exposure to trivalent chromium appears to involve the respiratory system. Specifically, acute exposure to trivalent chromium is associated with impaired lung function and lung damage. Based on what is known about absorption of chromium in the human body, its potential mechanism of action in cells, and occupational data indicating that valence states other than hexavalent exhibit a relative lack of toxicity the toxicity of elemental and divalent chromium compounds is expected to be similar to or less than common trivalent forms. Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic [National Toxicology Program: U.S. Dep. of Health and Human Services 2002]</p>
<b>COBALT</b>	<p>Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy. They may be genetically determined or acquired, for example, during infections or exposure to irritant substances. Immunologically the low molecular weight substances become complete allergens in the organism either by binding to peptides or proteins (haptens) or after metabolism (prohaptens). Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.</p>
<b>COPPER</b>	<p>WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever. for copper and its compounds (typically copper chloride): <b>Acute toxicity:</b> There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw. Symptom of the hardness of skin, an exudation of hardness site, the formation of scar and reddish changes were observed on application sites in all treated animals. Skin inflammation and injury were also noted. In addition, a reddish or black urine was observed in females at 2,000, 1,500 and 1,000 mg/kg bw. Female rats appeared to be more sensitive than male based on mortality and clinical signs. No reliable skin/eye irritation studies were available. The acute dermal study with copper monochloride suggests that it has a</p>

	<p>potential to cause skin irritation.</p> <p><b>Repeat dose toxicity:</b> In repeated dose toxicity study performed according to OECD TG 422, copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39 - 51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL value was 5 and 1.3 mg/kg bw/day for male and female rats, respectively. No deaths were observed in male rats. One treatment-related death was observed in female rats in the high dose group. Erythropoietic toxicity (anaemia) was seen in both sexes at the 80 mg/kg bw/day. The frequency of squamous cell hyperplasia of the forestomach was increased in a dose-dependent manner in male and female rats at all treatment groups, and was statistically significant in males at doses of =20 mg/kg bw/day and in females at doses of =5 mg/kg bw/day doses. The observed effects are considered to be local, non-systemic effect on the forestomach which result from oral (gavage) administration of copper monochloride.</p> <p><b>Genotoxicity:</b> An in vitro genotoxicity study with copper monochloride showed negative results in a bacterial reverse mutation test with Salmonella typhimurium strains (TA 98, TA 100, TA 1535, and TA 1537) with and without S9 mix at concentrations of up to 1,000 ug/plate. An in vitro test for chromosome aberration in Chinese hamster lung (CHL) cells showed that copper monochloride induced structural and numerical aberrations at the concentration of 50, 70 and 100 ug/mL without S9 mix. In the presence of the metabolic activation system, significant increases of structural aberrations were observed at 50 and 70 ug/mL and significant increases of numerical aberrations were observed at 70 ug/mL. In an in vivo mammalian erythrocyte micronucleus assay, all animals dosed (15 - 60 mg/kg bw) with copper monochloride exhibited similar PCE/(PCE+NCE) ratios and MNPCE frequencies compared to those of the negative control animals. Therefore copper monochloride is not an in vivo mutagen.</p> <p><b>Carcinogenicity:</b> there was insufficient information to evaluate the carcinogenic activity of copper monochloride.</p> <p>Reproductive and developmental toxicity: In the combined repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD TG 422), copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39-51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL of copper monochloride for fertility toxicity was 80 mg/kg bw/day for the parental animals. No treatment-related effects were observed on the reproductive organs and the fertility parameters assessed. For developmental toxicity the NOAEL was 20 mg/kg bw/day. Three of 120 pups appeared to have icterus at birth; 4 of 120 pups appeared runted at the highest dose tested (80 mg/kg bw/day).</p>
<b>LEAD</b>	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.
<b>WATER &amp; AMMONIA &amp; LITHIUM &amp; ZINC &amp; CHROMIUM &amp; LUBRICATING OILS,PETROLEUM C&gt;25, HYDROTREATED BRIGHT STOCK &amp; METHANE</b>	No significant acute toxicological data identified in literature search.
<b>AMMONIA &amp; BROMINE &amp; FORMALDEHYDE.</b>	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
<b>AMMONIA &amp; BROMINE &amp; CHLORINE &amp; FORMALDEHYDE. &amp; LITHIUM &amp; MERCURY (ELEMENTAL)</b>	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. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
<b>ARSENIC &amp; BENZENE &amp; 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN &amp; FORMALDEHYDE.</b>	<b>WARNING:</b> This substance has been classified by the IARC as Group 1: <b>CARCINOGENIC TO HUMANS.</b>
<b>BROMINE &amp; FORMALDEHYDE.</b>	The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.
<b>FORMALDEHYDE. &amp; NICKEL &amp; COBALT</b>	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.
<b>FORMALDEHYDE. &amp; NICKEL</b>	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002]

Sydney Water Raw Sewage

<b>MANGANESE &amp; ZINC</b>	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.		
<b>NICKEL &amp; COBALT</b>	<b>WARNING:</b> This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.		
<b>SELENIUM &amp; CHROMIUM</b>	The substance is classified by IARC as Group 3: <b>NOT</b> classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.		
<b>Acute Toxicity</b>	✓	<b>Carcinogenicity</b>	✗
<b>Skin Irritation/Corrosion</b>	✗	<b>Reproductivity</b>	✗
<b>Serious Eye Damage/Irritation</b>	✗	<b>STOT - Single Exposure</b>	✗
<b>Respiratory or Skin sensitisation</b>	✗	<b>STOT - Repeated Exposure</b>	✗
<b>Mutagenicity</b>	✗	<b>Aspiration Hazard</b>	✗

**Legend:** ✗ – Data either not available or does not fill the criteria for classification  
✓ – Data available to make classification

SECTION 12 Ecological information

12.1. Toxicity

Sydney Water Raw Sewage	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
water	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
ammonia	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	33.3mg/L	4
	EC50(ECx)	96h	Crustacea	0.83mg/L	5
arsenic	Endpoint	Test Duration (hr)	Species	Value	Source
	EC10(ECx)	48h	Crustacea	0.006mg/l	2
	LC50	96h	Fish	3.38mg/l	2
	EC50	48h	Crustacea	0.85mg/l	2
benzene	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	24h	Algae or other aquatic plants	<0.001mg/L	4
	ErC50	72h	Algae or other aquatic plants	>1360mg/l	1
	EC50	72h	Algae or other aquatic plants	29mg/l	1
	LC50	96h	Fish	2.54-7.217mg/L	4
	EC50	48h	Crustacea	7.578-13.983mg/L	4
bromine	Endpoint	Test Duration (hr)	Species	Value	Source
	EC100(ECx)	Not Available	Algae or other aquatic plants	0.2-1mg/l	1
	LC50	96h	Fish	0.54mg/l	4
calcium nitrate	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>100mg/l	2
	EC50	48h	Crustacea	490mg/l	2
	EC50(ECx)	96h	Crustacea	39mg/l	2
chlorine	Endpoint	Test Duration (hr)	Species	Value	Source



Sydney Water Raw Sewage

	NOEC(ECx)	72h	Algae or other aquatic plants	0.005mg/l	2
	EC50	72h	Algae or other aquatic plants	0.018mg/l	2
	LC50	96h	Fish	0.037mg/l	2
	EC50	96h	Algae or other aquatic plants	~0.1-0.4mg/l	2
<b>2,3,7,8-tetrachlorodibenzo-p-dioxin</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	4800h	Fish	<0.001mg/L	4
<b>cyanide ion</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	48h	Algae or other aquatic plants	0.382mg/l	4
	LC50	96h	Fish	0.13mg/l	4
	EC50	48h	Crustacea	2.52mg/l	4
<b>formaldehyde.</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	96h	Algae or other aquatic plants	0.005mg/l	4
	EC50	72h	Algae or other aquatic plants	1.034-1.984mg/l	4
	LC50	96h	Fish	1.607mg/L	4
	EC50	48h	Crustacea	3.26mg/l	4
	EC50	96h	Algae or other aquatic plants	0.67-1.113mg/l	4
<b>lithium</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	1.65mg/l	2
	EC50	72h	Algae or other aquatic plants	25.6mg/l	2
	LC50	96h	Fish	18mg/l	2
	EC50	48h	Crustacea	19.1mg/l	2
<b>manganese</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	504h	Algae or other aquatic plants	0.05-3.7mg/l	4
	EC50	72h	Algae or other aquatic plants	2.8mg/l	2
	LC50	96h	Fish	>3.6mg/l	2
	EC50	48h	Crustacea	>1.6mg/l	2
<b>mercury (elemental)</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	504h	Algae or other aquatic plants	0.001-1.052mg/l	4
	EC50	72h	Algae or other aquatic plants	0.034mg/L	4
	LC50	96h	Fish	0.033mg/l	4
	EC50	96h	Algae or other aquatic plants	0.677mg/L	4
<b>nickel</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	72h	Algae or other aquatic plants	0.18mg/l	1
	EC50	72h	Algae or other aquatic plants	0.18mg/l	1
	LC50	96h	Fish	0.168mg/L	4
	EC50	48h	Crustacea	>100mg/l	1
	EC50	96h	Algae or other aquatic plants	0.36mg/l	2
<b>selenium</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC01(ECx)	6480h	Fish	0.001-1.728mg/L	4
	LC50	96h	Fish	0.93mg/l	4
	EC50	48h	Crustacea	12.41-17.66mg/l	4
<b>uranium depleted</b>	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	504h	Algae or other aquatic plants	0.765-2mg/l	4
	LC50	96h	Fish	6.2mg/l	4

zinc	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	72h	Algae or other aquatic plants	0.005mg/l	4
	EC50	72h	Algae or other aquatic plants	0.005mg/l	4
	LC50	96h	Fish	0.16mg/L	4
	EC50	48h	Crustacea	1.4mg/l	2
EC50	96h	Algae or other aquatic plants	0.264-0.881mg/l	4	
cadmium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	24h	Algae or other aquatic plants	0.001-0.003mg/L	4
	EC50	72h	Algae or other aquatic plants	>6mg/l	4
	LC50	96h	Fish	0.003mg/l	4
	EC50	48h	Crustacea	0.54-0.62mg/l	4
EC50	96h	Algae or other aquatic plants	0.049-0.162mg/l	4	
chromium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	48h	Crustacea	<0.001mg/l	2
	EC50	72h	Algae or other aquatic plants	0.026-0.208mg/L	4
	LC50	96h	Fish	0.106mg/L	4
	EC50	48h	Crustacea	<0.001mg/l	2
EC50	96h	Algae or other aquatic plants	36mg/L	4	
cobalt	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	0.01-0.015mg/l	1
	LC50	96h	Fish	1.512mg/l	2
	EC50	48h	Crustacea	5.89mg/l	2
EC50	96h	Algae or other aquatic plants	23.8mg/l	2	
copper	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	24h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	72h	Algae or other aquatic plants	0.011-0.017mg/L	4
	LC50	96h	Fish	~0.005mg/L	4
	EC50	48h	Crustacea	<0.001mg/L	4
EC50	96h	Algae or other aquatic plants	0.03-0.058mg/l	4	
fluorides as F-	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	24.00h	Crustacea	155.4mg/L	5
lubricating oils,petroleum C>25, hydrotreated bright stock	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	Not Available	Not Available	Not Available	Not Available	Not Available
iron	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	48h	Algae or other aquatic plants	0.1-4mg/l	4
	EC50	72h	Algae or other aquatic plants	18mg/l	2
	LC50	96h	Fish	0.05mg/l	2
EC50	48h	Crustacea	>100mg/l	2	
lead	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	Not Available	Crustacea	0.051mg/L	5
	EC50	72h	Algae or other aquatic plants	1.191mg/L	4
	LC50	96h	Fish	1.17mg/l	4
EC50	96h	Algae or other aquatic plants	0.282-0.864mg/l	4	
hydrogen sulfide	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	3960h	Fish	<0.001mg/L	5

Continued...

Sydney Water Raw Sewage

	LC50	96h	Fish	<0.007mg/l	2
	EC50	48h	Crustacea	0.12mg/l	2
methane	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2
<b>Legend:</b>	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Raw sewage that is not sufficiently diluted by stormwater has a high biological oxygen demand and ammonia levels that may be detrimental to ecological health. Where discharges occur to the environment, contact should be made with Sydney Water's Emergency Service on 132090. An appropriate response will be initiated to monitor and clean-up the affected area to minimise environmental harm. [Sydney Water]

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

### 12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW
benzene	HIGH (Half-life = 720 days)	LOW (Half-life = 20.88 days)
2,3,7,8-tetrachlorodibenzo-p-dioxin	HIGH (Half-life = 1180 days)	LOW (Half-life = 9.29 days)
formaldehyde.	LOW (Half-life = 14 days)	LOW (Half-life = 2.97 days)
fluorides as F-	LOW	LOW
hydrogen sulfide	LOW	LOW

### 12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
benzene	HIGH (BCF = 4360)
formaldehyde.	LOW (LogKOW = 0.35)
fluorides as F-	LOW (LogKOW = 0.2259)
hydrogen sulfide	LOW (LogKOW = 0.229)
methane	LOW (LogKOW = 1.09)

### 12.4. Mobility in soil

Ingredient	Mobility
benzene	LOW (KOC = 165.5)
formaldehyde.	HIGH (KOC = 1)
fluorides as F-	LOW (KOC = 14.3)
hydrogen sulfide	LOW (KOC = 14.3)

### 12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT	✘	✘	✘
vPvB	✘	✘	✘
PBT Criteria fulfilled?	No		
vPvB	No		

### 12.6. Endocrine Disruption Properties

Not Available

## 12.7. Other adverse effects

One or more ingredients within this SDS has the potential of causing ozone depletion and/or photochemical ozone creation.

## SECTION 13 Disposal considerations

### 13.1. Waste treatment methods

<b>Product / Packaging disposal</b>	<ul style="list-style-type: none"> <li>▸ Containers may still present a chemical hazard/ danger when empty.</li> <li>▸ Return to supplier for reuse/ recycling if possible.</li> </ul> <p>Otherwise:</p> <ul style="list-style-type: none"> <li>▸ 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.</li> <li>▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> </ul> <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> <li>▸ Reduction</li> <li>▸ Reuse</li> <li>▸ Recycling</li> <li>▸ Disposal (if all else fails)</li> </ul> <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.</p> <ul style="list-style-type: none"> <li>▸ <b>DO NOT allow wash water from cleaning or process equipment to enter drains.</b></li> <li>▸ It may be necessary to collect all wash water for treatment before disposal.</li> <li>▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li> <li>▸ Where in doubt contact the responsible authority.</li> <li>▸ Due to their environmental persistence and potential health hazards, PCBs, PBBs, dioxins and their derivatives or congeners (including chlorinated diphenyl ethers), cannot be disposed of in landfills or dumped at sea.</li> <li>▸ Environmentally acceptable method of disposal include high temperature incineration. However this option is costly and uncertain.</li> <li>▸ Other acceptable disposal technologies include base-catalysed dechlorination in the BCD (Base-Catalyzed Decomposition) Process.</li> <li>▸ Currently, most wastes must be stored in an approved manner until satisfactory arrangements can be made for their disposal. All wastes and residues containing these substances (e.g. wiping clothes, absorbent materials, used disposable protective gloves, contaminated clothing, etc.) should be collected, placed in proper containers, labelled and disposed of in the manner prescribed by government regulations.</li> <li>▸ Regulations may require the compulsory reporting of all spills.</li> <li>▸ Recycle wherever possible.</li> <li>▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.</li> <li>▸ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material).</li> <li>▸ Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.</li> </ul>
<b>Waste treatment options</b>	Not Available
<b>Sewage disposal options</b>	Not Available

## SECTION 14 Transport information

### Labels Required

<b>Marine Pollutant</b>	NO
<b>HAZCHEM</b>	Not Applicable

### Land transport (ADR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.1. <b>UN number</b>	Not Applicable				
14.2. <b>UN proper shipping name</b>	Not Applicable				
14.3. <b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>Class</td> <td>Not Applicable</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	Not Applicable	Subrisk	Not Applicable
Class	Not Applicable				
Subrisk	Not Applicable				
14.4. <b>Packing group</b>	Not Applicable				
14.5. <b>Environmental hazard</b>	Not Applicable				

Sydney Water Raw Sewage

14.6. Special precautions for user	Hazard identification (Kemler)	Not Applicable
	Classification code	Not Applicable
	Hazard Label	Not Applicable
	Special provisions	Not Applicable
	Limited quantity	Not Applicable
	Tunnel Restriction Code	Not Applicable

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

14.1. UN number	Not Applicable	
14.2. UN proper shipping name	Not Applicable	
14.3. Transport hazard class(es)	ICAO/IATA Class	Not Applicable
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	Not Applicable
14.4. Packing group	Not Applicable	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Special provisions	Not Applicable
	Cargo Only Packing Instructions	Not Applicable
	Cargo Only Maximum Qty / Pack	Not Applicable
	Passenger and Cargo Packing Instructions	Not Applicable
	Passenger and Cargo Maximum Qty / Pack	Not Applicable
	Passenger and Cargo Limited Quantity Packing Instructions	Not Applicable
	Passenger and Cargo Limited Maximum Qty / Pack	Not Applicable

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

14.1. UN number	Not Applicable	
14.2. UN proper shipping name	Not Applicable	
14.3. Transport hazard class(es)	IMDG Class	Not Applicable
	IMDG Subrisk	Not Applicable
14.4. Packing group	Not Applicable	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	EMS Number	Not Applicable
	Special provisions	Not Applicable
	Limited Quantities	Not Applicable

**Inland waterways transport (ADN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS**

14.1. UN number	Not Applicable	
14.2. UN proper shipping name	Not Applicable	
14.3. Transport hazard class(es)	Not Applicable	Not Applicable
14.4. Packing group	Not Applicable	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Classification code	Not Applicable
	Special provisions	Not Applicable
	Limited quantity	Not Applicable

Sydney Water Raw Sewage

Equipment required	Not Applicable
Fire cones number	Not Applicable

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

Not Applicable

**14.8. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code**

Product name	Group
water	Not Available
ammonia	Not Available
arsenic	Not Available
benzene	Not Available
bromine	Not Available
calcium nitrate	Not Available
chlorine	Not Available
2,3,7,8-tetrachlorodibenzo-p-dioxin	Not Available
cyanide ion	Not Available
formaldehyde.	Not Available
lithium	Not Available
manganese	Not Available
mercury (elemental)	Not Available
nickel	Not Available
selenium	Not Available
uranium depleted	Not Available
zinc	Not Available
cadmium	Not Available
chromium	Not Available
cobalt	Not Available
copper	Not Available
fluorides as F-	Not Available
lubricating oils,petroleum C>25, hydrotreated bright stock	Not Available
iron	Not Available
lead	Not Available
hydrogen sulfide	Not Available
methane	Not Available

**14.9. Transport in bulk in accordance with the ICG Code**

Product name	Ship Type
water	Not Available
ammonia	Not Available
arsenic	Not Available
benzene	Not Available
bromine	Not Available
calcium nitrate	Not Available
chlorine	Not Available
2,3,7,8-tetrachlorodibenzo-p-dioxin	Not Available
cyanide ion	Not Available
formaldehyde.	Not Available
lithium	Not Available

Sydney Water Raw Sewage

Product name	Ship Type
manganese	Not Available
mercury (elemental)	Not Available
nickel	Not Available
selenium	Not Available
uranium depleted	Not Available
zinc	Not Available
cadmium	Not Available
chromium	Not Available
cobalt	Not Available
copper	Not Available
fluorides as F-	Not Available
lubricating oils,petroleum C>25, hydrotreated bright stock	Not Available
iron	Not Available
lead	Not Available
hydrogen sulfide	Not Available
methane	Not Available

**SECTION 15 Regulatory information**

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

**water is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**ammonia is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

**arsenic is found on the following regulatory lists**

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 12) Restricted substances and maximum concentration limits by weight in homogeneous materials

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

UK Workplace Exposure Limits (WELs)

**benzene is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: category 1A (Table 3.1)/category 1 (Table 3.2)

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 12) Restricted substances and maximum concentration limits by weight in homogeneous materials

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Mutagens: category 1B (Table 3.1)/category 2 (Table 3.2)

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

European Union Directive (EU) 2017/2398 amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

UK Workplace Exposure Limits (WELs)

**bromine is found on the following regulatory lists**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**calcium nitrate is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**chlorine is found on the following regulatory lists**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**2,3,7,8-tetrachlorodibenzo-p-dioxin is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**cyanide ion is found on the following regulatory lists**

UK Workplace Exposure Limits (WELs)

**formaldehyde. is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 12) Restricted substances and maximum concentration limits by weight in homogeneous materials

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 2) Carcinogens: category 1B (Table 3.1)/category 2 (Table 3.2)

Europe EC Inventory

**lithium is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

**manganese is found on the following regulatory lists**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

Europe EC Inventory

**mercury (elemental) is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 6) Toxic to reproduction: category 1B (Table 3.1)/category 2 (Table 3.2)

Europe EC Inventory

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

UK Workplace Exposure Limits (WELs)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

UK Workplace Exposure Limits (WELs)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

Stockholm Convention on Persistent Organic Pollutants (POPs) - Annex C: Unintentional Production

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

UK Workplace Exposure Limits (WELs)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

UK Workplace Exposure Limits (WELs)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

UK Workplace Exposure Limits (WELs)



**nickel is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

UK Workplace Exposure Limits (WELs)

**selenium is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

UK Workplace Exposure Limits (WELs)

**uranium depleted is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

**zinc is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

**cadmium is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 12) Restricted substances and maximum concentration limits by weight in homogeneous materials

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 2) Carcinogens: category 1B (Table 3.1)/category 2 (Table 3.2)

EU REACH Regulation (EC) No 1907/2006 - Proposals to identify Substances of Very High Concern: Annex XV reports for commenting by Interested Parties previous consultation

Europe EC Inventory

Europe European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

UK Workplace Exposure Limits (WELs)

**chromium is found on the following regulatory lists**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

UK Workplace Exposure Limits (WELs)

**cobalt is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

UK Workplace Exposure Limits (WELs)

**copper is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

UK Workplace Exposure Limits (WELs)

**fluorides as F- is found on the following regulatory lists**

**EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

**UK Workplace Exposure Limits (WELs)****lubricating oils,petroleum C>25, hydrotreated bright stock is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 2)  
Carcinogens: category 1B (Table 3.1)/category 2 (Table 3.2)

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

**iron is found on the following regulatory lists**

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

UK Workplace Exposure Limits (WELs)

**lead is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 5) Toxic to reproduction: category 1A (Table 3.1)/category 1 (Table 3.2)

EU REACH Regulation (EC) No 1907/2006 - Proposals to identify Substances of Very High Concern: Annex XV reports for commenting by Interested Parties previous consultation

Europe EC Inventory

Europe European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern for Authorisation

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

**hydrogen sulfide is found on the following regulatory lists**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

UK Workplace Exposure Limits (WELs)

**methane is found on the following regulatory lists**

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

**15.2. Chemical safety assessment**

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

**ECHA SUMMARY**

Ingredient	CAS number	Index No	ECHA Dossier
water	7732-18-5	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Not Classified	Not Available	Not Available
2	Flam. Liq. 3; Acute Tox. 3; Skin Corr. 1A; Acute Tox. 2	GHS05; GHS07; Dgr; GHS02; Wng; GHS06	H318; H226; H314; H301; H411

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
ammonia	1336-21-6	007-001-01-2	01-2119982985-14-XXXX

Harmonisation (C&L)	Hazard Class and Category Code(s)	Pictograms Signal Word	Hazard Statement Code(s)
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Continued...

Sydney Water Raw Sewage

Inventory)		Code(s)	
1	Skin Corr. 1B; Aquatic Acute 1	GHS09; GHS05; Dgr	H314; H400
2	Aquatic Acute 1; Acute Tox. 3; Acute Tox. 4; Eye Dam. 1; Resp. STOT SE 3; Met. Corr. 1; Acute Tox. 2; Skin Corr. 1A; STOT SE 2; STOT RE 2; Aquatic Chronic 1; Muta. 1A	GHS09; GHS05; Dgr; GHS07; GHS06; Wng; GHS08; None Specified	H400; H301; H312; H318; H335; H410; H290; H330; H314; H371; H373

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
arsenic	7440-38-2	033-001-00-X	01-2120757350-59-XXXX 01-2119502457-43-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 3; Acute Tox. 3; Aquatic Acute 1; Aquatic Chronic 1; Eye Irrit. 2; Skin Corr. 1B; Carc. 1A	GHS09; GHS06; Dgr; GHS07; Wng; GHS08; GHS05	H301; H331; H410; H319; H314; H350
2	Acute Tox. 3; Acute Tox. 3; Aquatic Acute 1; Aquatic Chronic 1; Eye Dam. 1; Carc. 1A; STOT RE 2; Skin Corr. 1B	GHS09; GHS06; Dgr; GHS08; GHS05; GHS07; Wng	H301; H331; H410; H318; H350; H400; H373; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
benzene	71-43-2	601-020-00-8	01-2119447106-44-XXXX 01-2119456975-22-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
2	Flam. Liq. 2; Asp. Tox. 1; Skin Irrit. 2; Eye Irrit. 2; Carc. 1A; STOT RE 1; Aquatic Chronic 3; Narc. STOT SE 3; Muta. 1A; Acute Tox. 4; Acute Tox. 4; Comp.	GHS02; GHS08; GHS07; Dgr; Wng; GHS09; GHS06; GHS04	H225; H304; H315; H319; H372; H412; H350; H336; H340; H400; H302; H332; H280; H335

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
bromine	7726-95-6	035-001-00-5	01-2119461714-37-XXXX 01-2120763152-61-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Corr. 1A; Acute Tox. 2; Aquatic Acute 1	GHS09; GHS05; GHS06; Dgr	H314; H330; H400
2	Skin Corr. 1A; Acute Tox. 1; Aquatic Acute 1; Eye Dam. 1; Acute Tox. 1; Met. Corr. 1; STOT SE 1; STOT RE 1; Aquatic Chronic 1	GHS09; GHS05; GHS06; Dgr	H314; H330; H400; H318; H300; H290; H370; H372; H410

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
calcium nitrate	10124-37-5	Not Available	01-2119495093-35-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Eye Irrit. 2	GHS07; Wng	H315; H319
2	Skin Irrit. 2; Acute Tox. 4; Eye Dam. 1; Ox. Sol. 1; Ox. Liq. 1; Acute Tox. 4; Acute Tox. 4; Resp. STOT SE 3; Resp. Sens. 1B; Aquatic Acute 1	GHS07; Wng; GHS03; GHS05; Dgr; GHS02	H315; H302; H318; H271; H312; H332; H335; H334; H400
1	Ox. Sol. 3; STOT SE 2; STOT RE 2	GHS03; GHS08; Wng	H272; H371; H373
2	STOT SE 2; STOT RE 2; Acute Tox. 4; Eye Dam. 1; Skin Irrit. 2; Resp. STOT SE 3; Ox. Sol. 1; Ox. Liq. 1	GHS03; GHS08; Wng; GHS05; GHS07; Dgr	H371; H373; H302; H318; H315; H335; H271
1	Ox. Sol. 3	GHS03; Wng	H272
2	Ox. Sol. 3; Skin Irrit. 2; Eye Irrit. 2; Resp. STOT SE 3	GHS03; Wng; GHS07; Dgr	H272; H315; H319; H335

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
chlorine	7782-50-5	017-001-00-7	01-2119486560-35-XXXX 01-2119896635-20-XXXX 01-2119444722-41-

Sydney Water Raw Sewage

Ingredient	CAS number	Index No	ECHA Dossier
			XXXX 01-2120770754-46-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Ox. Gas 1; Comp.; Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 1; Resp. STOT SE 3; Aquatic Acute 1	GHS09; GHS03; GHS04; GHS06; GHS07; Dgr	H270; H280; H315; H319; H330; H335; H400
2	Ox. Gas 1; Comp.; Skin Irrit. 2; Eye Irrit. 2; Resp. STOT SE 3; Aquatic Acute 1; Liq.; Aquatic Chronic 1; Acute Tox. 1; Acute Tox. 4; STOT RE 2	GHS03; GHS09; GHS04; GHS06; Dgr; GHS07; GHS05; GHS08	H270; H280; H315; H319; H335; H400; H410; H330; H302; H373

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746-01-6	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 1; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1	GHS09; GHS06; Dgr	H300; H319; H410
2	Acute Tox. 1; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1	GHS09; GHS06; Dgr	H300; H319; H410

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
cyanide ion	57-12-5	Not Available	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 4; Skin Corr. 1B; Aquatic Chronic 3	GHS05; GHS07; Dgr	H312; H314; H412
2	Acute Tox. 4; Skin Corr. 1B; Aquatic Chronic 3	GHS05; GHS07; Dgr	H312; H314; H412

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
formaldehyde.	50-00-0	605-001-00-5	01-2119488953-20-XXXX 01-2120762098-48-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 3; Acute Tox. 3; Skin Corr. 1B; Skin Sens. 1; Eye Dam. 1; Acute Tox. 3; Carc. 2	GHS08; GHS05; GHS06; Dgr	H301; H311; H314; H317; H331; H351
2	Acute Tox. 3; Skin Sens. 1; Eye Dam. 1; Muta. 2; Acute Tox. 2; Resp. STOT SE 3; Aquatic Chronic 2; Skin Corr. 1; Flam. Gas 1; Liq.; Resp. Sens. 1; Carc. 1A; STOT SE 1; STOT RE 1; Met. Corr. 1; Aquatic Acute 1; Flam. Liq. 3; Acute Tox. 2	GHS08; GHS05; GHS06; Dgr; GHS07; GHS09; Wng; None Specified; GHS02	H301; H317; H341; H330; H318; H335; H411; H314; H220; H280; H334; H350; H370; H372; H336; H290; H400; H226; H310

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
lithium	7439-93-2	003-001-00-4	01-2119966143-38-XXXX 01-2120775463-48-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Water-react. 1; Skin Corr. 1B; Eye Irrit. 2	GHS02; GHS05; Dgr; GHS07; Wng	H260; H314; H319
2	Water-react. 1; Skin Corr. 1B; Acute Tox. 3; Eye Dam. 1; Flam. Sol. 1; Aquatic Chronic 4	GHS02; GHS05; Dgr; GHS06; GHS07; Wng	H260; H314; H301; H318; H413

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
manganese	7439-96-5	Not Available	01-2120762797-36-XXXX 01-2119449803-34-XXXX

Sydney Water Raw Sewage

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Not Classified	Not Available	Not Available
2	Aquatic Chronic 2; Eye Irrit. 2; Flam. Sol. 2; Water-react. 1; Repr. 1B; Muta. 1B; STOT SE 1; STOT RE 1; Resp. STOT SE 3	GHS09; GHS07; Wng; GHS03; GHS08; GHS02; Dgr	H411; H319; H228; H260; H360; H340; H370; H372; H335; H302; H312; H332; H315

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
mercury (elemental)	7439-97-6	080-001-00-0	01-2119548380-42-XXXX 01-2120767624-46-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Corr. 1B; Ox. Sol. 2; Acute Tox. 3; Acute Tox. 4; Skin Sens. 1; Acute Tox. 2; Resp. Sens. 1; Muta. 1B; Carc. 1B; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1	GHS05; Dgr; GHS03; GHS09; GHS08; GHS06; GHS07	H314; H272; H301; H312; H317; H330; H334; H340; H350; H360; H372; H410; H400
2	STOT RE 1; Aquatic Chronic 1; Aquatic Acute 1; Met. Corr. 1; Acute Tox. 1; Acute Tox. 2; Acute Tox. 3; Repr. 1A; Skin Sens. 1; STOT SE 1; Skin Corr. 1B; Ox. Sol. 2; Resp. Sens. 1; Muta. 1B; Carc. 1B	GHS09; GHS08; GHS06; Dgr; GHS05; GHS03; GHS07	H372; H410; H290; H330; H400; H311; H250; H300; H317; H360; H371; H314; H272; H334; H340; H350

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
nickel	7440-02-0	028-002-00-7 028-002-01-4	01-2119438727-29-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
2	Skin Sens. 1; STOT RE 1; Aquatic Chronic 3; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; Aquatic Acute 3; Flam. Sol. 1; Carc. 2; Pyr. Sol. 1; Resp. Sens. 1; Skin Corr. 1B	GHS07; Wng; GHS08; Dgr; GHS09; GHS02; GHS05	H372; H350; H341; H317; H400; H250; H251; H228; H410; H334; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
selenium	7782-49-2	034-001-00-2	01-2119981706-25-XXXX 01-2120767631-51-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 3; Acute Tox. 3; STOT RE 2; Aquatic Chronic 4; Skin Irrit. 2; Eye Irrit. 2	GHS08; GHS06; Dgr; GHS07; Wng	H301; H331; H373; H413; H315; H319
2	Acute Tox. 3; Acute Tox. 3; Skin Sens. 1B; Carc. 1A; Repr. 1A; Lact.; Aquatic Chronic 3; Aquatic Acute 1; STOT SE 1; STOT RE 1; Skin Irrit. 2; Eye Irrit. 2	GHS08; GHS06; Dgr; GHS07; GHS09; Wng	H301; H331; H317; H350; H360; H362; H412; H400; H370; H372; H315; H319

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
uranium depleted	7440-61-1	092-001-00-8	Not Available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 2; Acute Tox. 2; STOT RE 2; Aquatic Chronic 4; Skin Corr. 1B	GHS08; GHS06; Dgr; GHS05	H300; H330; H373; H413; H314
2	Acute Tox. 2; Acute Tox. 2; STOT RE 2; Aquatic Chronic 4; Skin Corr. 1B; Eye Irrit. 2	GHS08; GHS06; Dgr; GHS05; GHS07; Wng	H300; H330; H373; H413; H314; H319

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
zinc	7440-66-6	030-001-00-1 030-001-01-9	01-2119467174-37-XXXX 01-2119459210-49-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Aquatic Acute 1; Aquatic Chronic 1; Skin Irrit. 2; Eye Irrit. 2; Water-react. 2	GHS09; Wng; GHS07; GHS02; Dgr	H410; H315; H319; H261
2	Aquatic Acute 1; Aquatic Chronic 1; Pyr. Sol. 1; Water-react. 1; Flam. Sol. 1; Pyr. Liq. 1; Self-heat. 1; Eye Irrit. 2; Resp. STOT SE 3; Skin Corr. 1C	GHS09; Wng; GHS02; Dgr; GHS01; GHS03; GHS05; GHS06; GHS07	H410; H250; H260; H400; H302; H311; H331; H228; H251; H319; H335; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
cadmium	7440-43-9	048-002-00-0 048-011-00-X	01-2119489023-40-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Eye Irrit. 2; Carc. 1B	GHS08; GHS07; Dgr	H315; H319; H350
2	Aquatic Acute 1; Aquatic Chronic 1; Acute Tox. 2; Muta. 2; Carc. 1B; Repr. 2; STOT RE 1; Pyr. Sol. 1; Resp. STOT SE 3; Acute Tox. 3; Eye Irrit. 2; Skin Corr. 1B	GHS09; Wng; GHS08; GHS06; Dgr; GHS02; GHS07; GHS05	H400; H410; H330; H341; H350; H361; H372; H250; H335; H301; H319; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
chromium	7440-47-3	Not Available	01-2119485652-31-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Not Classified	Not Available	Not Available
2	Skin Sens. 1; Resp. Sens. 1; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1; STOT SE 2; Ox. Liq. 2; Flam. Sol. 1; Muta. 2; Resp. STOT SE 3; Carc. 1B; STOT RE 2; Skin Corr. 1B	GHS08; Dgr; GHS07; Wng; GHS09; GHS02; GHS03; GHS05	H317; H334; H319; H400; H410; H371; H272; H228; H341; H335; H350; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
cobalt	7440-48-4	027-001-00-9	01-2119517392-44-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Sens. 1; Resp. Sens. 1; Acute Tox. 4; Eye Irrit. 2; Aquatic Chronic 1; Skin Corr. 1B	GHS08; Dgr; GHS09; GHS07; Wng; GHS05	H317; H334; H302; H319; H400; H410; H314
2	Acute Tox. 4; Acute Tox. 1; Skin Sens. 1; Resp. Sens. 1; Carc. 1B; Eye Irrit. 2; Muta. 2; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; Flam. Sol. 1; Pyr. Sol. 1; Water-react. 1; Skin Corr. 1B	GHS09; GHS08; GHS06; GHS07; Dgr; GHS02; Wng; GHS05	H302; H319; H330; H400; H410; H317; H334; H350; H341; H360; H372; H228; H250; H260; H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
copper	7440-50-8	Not Available	01-2119475516-31-XXXX 01-2119480154-42-XXXX 01-2119480184-39-XXXX 01-2120762783-45-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Not Classified	Not Available	Not Available
2	Aquatic Acute 1; Aquatic Chronic 1; Skin Irrit. 2; Eye Irrit. 2; Resp. STOT SE 3; STOT SE 2; Flam. Sol. 1; Acute Tox. 2; Skin Sens. 1; Acute Tox. 2; STOT RE 1; Carc. 2; Repr. 1A	GHS09; GHS06; Dgr; Wng; GHS07; GHS08; GHS02	H319; H410; H400; H315; H335; H371; H228; H300; H317; H330; H372; H351; H360

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
lubricating oils,petroleum C>25, hydrotreated bright stock	74869-21-9.	649-243-00-X	Not Available

Sydney Water Raw Sewage

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Carc. 1B	GHS08; Dgr	H350
2	Carc. 1B	GHS08; Dgr	H350

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
iron	7439-89-6	Not Available	01-2119462838-24-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Sol. 1; Eye Irrit. 2; Resp. STOT SE 3	GHS02; GHS07; Dgr	H228; H319; H335
2	Flam. Sol. 1; Eye Irrit. 2; Resp. STOT SE 3	GHS02; GHS07; Dgr	H228; H319; H335
1	Not Classified	Not Available	Not Available
2	Flam. Sol. 1; Self-heat. 1; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1; Resp. STOT SE 3; STOT SE 3; STOT RE 2; Pyr. Sol. 1	GHS02; Dgr; GHS09; GHS07; Wng; GHS08	H228; H251; H302; H315; H319; H400; H410; H335; H370; H372; H250

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
lead	7439-92-1	082-013-00-1 082-014-00-7	01-2119513221-59-XXXX 01-2120762789-33-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 4; Acute Tox. 4; Carc. 2; Repr. 1A; STOT RE 1; Aquatic Chronic 3; Skin Irrit. 2; Eye Irrit. 2	GHS08; GHS07; Dgr; Wng	H302; H332; H351; H360; H372; H412; H315; H319
2	Acute Tox. 4; Acute Tox. 4; Repr. 1A; STOT RE 1; Aquatic Acute 1; Carc. 1A; Aquatic Chronic 1; Skin Irrit. 2; Eye Irrit. 2	GHS08; GHS07; Dgr; GHS09; Wng	H302; H332; H360; H372; H400; H350; H410; H315; H319

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
hydrogen sulfide	7783-06-4	016-001-00-4	01-2119445737-29-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Gas 1; Acute Tox. 2; Aquatic Acute 1	GHS02; GHS09; GHS06; GHS04; Dgr	H220; H330; H400
2	Flam. Gas 1; Liq.; Aquatic Acute 1; Comp.; Eye Irrit. 2; Resp. STOT SE 3; Narc. STOT SE 3; Acute Tox. 1; Resp. STOT SE 1; STOT SE 1; Skin Irrit. 2; Aquatic Chronic 1	GHS02; GHS09; GHS04; GHS06; Dgr; GHS07; GHS03; GHS08	H220; H280; H400; H335; H336; H330; H315; H318; H410

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
methane	74-82-8	601-001-00-4	01-2119474442-39-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Gas 1; Comp.	GHS02; GHS04; Dgr	H220; H280
2	Flam. Gas 1; Ref. Liq.; Liq.; Comp.	GHS02; GHS04; Dgr	H220; H280; H281

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (2,3,7,8-tetrachlorodibenzo-p-dioxin; cyanide ion; fluorides as F-; lubricating oils,petroleum C>25, hydrotreated bright stock)
Canada - DSL	No (2,3,7,8-tetrachlorodibenzo-p-dioxin; lubricating oils,petroleum C>25, hydrotreated bright stock)
Canada - NDSL	No (water; ammonia; arsenic; benzene; bromine; calcium nitrate; chlorine; 2,3,7,8-tetrachlorodibenzo-p-dioxin; cyanide ion; formaldehyde.; lithium; manganese; mercury (elemental); nickel; selenium; uranium depleted; zinc; cadmium; chromium; cobalt; copper; fluorides as F-; lubricating oils,petroleum C>25, hydrotreated bright stock; iron; lead; hydrogen sulfide; methane)

Sydney Water Raw Sewage

National Inventory	Status
China - IECSC	No (uranium depleted)
Europe - EINEC / ELINCS / NLP	No (cyanide ion; fluorides as F-)
Japan - ENCS	No (arsenic; bromine; chlorine; 2,3,7,8-tetrachlorodibenzo-p-dioxin; cyanide ion; lithium; manganese; mercury (elemental); nickel; selenium; uranium depleted; zinc; cadmium; chromium; cobalt; copper; fluorides as F-; lubricating oils,petroleum C>25, hydrotreated bright stock; iron; lead)
Korea - KECI	No (2,3,7,8-tetrachlorodibenzo-p-dioxin; cyanide ion; fluorides as F-; lubricating oils,petroleum C>25, hydrotreated bright stock)
New Zealand - NZIoC	No (2,3,7,8-tetrachlorodibenzo-p-dioxin)
Philippines - PICCS	No (2,3,7,8-tetrachlorodibenzo-p-dioxin)
USA - TSCA	No (2,3,7,8-tetrachlorodibenzo-p-dioxin; fluorides as F-; lubricating oils,petroleum C>25, hydrotreated bright stock)
Taiwan - TCSI	Yes
Mexico - INSQ	No (2,3,7,8-tetrachlorodibenzo-p-dioxin; lubricating oils,petroleum C>25, hydrotreated bright stock)
Vietnam - NCI	No (cyanide ion; lubricating oils,petroleum C>25, hydrotreated bright stock)
Russia - FBEPH	No (cyanide ion; fluorides as F-)
<b>Legend:</b>	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	01/11/2009

Full text Risk and Hazard codes

H220	Extremely flammable gas.
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H228	Flammable solid.
H250	Catches fire spontaneously if exposed to air.
H251	Self-heating; may catch fire.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H261	In contact with water releases flammable gases.
H270	May cause or intensify fire; oxidiser.
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
H281	Contains refrigerated gas; may cause cryogenic burns or injury.
H290	May be corrosive to metals.
H300	Fatal if swallowed.
H300+H310	Fatal if swallowed or in contact with skin.
H301	Toxic if swallowed.
H304	May be fatal if swallowed and enters airways.
H310	Fatal in contact with skin.
H311	Toxic 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.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.



H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H360D	May damage the unborn child.
H360FD	May damage fertility. May damage the unborn child.
H361	Suspected of damaging fertility or the unborn child.
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.
H362	May cause harm to breast-fed children.
H370	Causes damage to organs.
H371	May cause damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause 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.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.

## SDS Version Summary

Version	Date of Update	Sections Updated
3.1.1.1	16/11/2012	Name
5.1.1.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification
5.1.3.1	22/04/2021	Regulation Change
5.1.4.1	29/04/2021	Regulation Change
5.1.5.1	10/05/2021	Regulation Change
5.1.6.1	13/05/2021	Regulation Change
5.1.7.1	17/05/2021	Regulation Change
5.1.8.1	20/05/2021	Regulation Change
5.1.9.1	24/05/2021	Regulation Change
5.1.10.1	27/05/2021	Regulation Change
5.1.10.2	30/05/2021	Template Change
5.1.10.3	04/06/2021	Template Change
5.1.10.4	05/06/2021	Template Change
5.1.11.4	07/06/2021	Regulation Change
5.1.11.5	09/06/2021	Template Change
5.1.11.6	11/06/2021	Template Change
5.1.11.7	15/06/2021	Template Change

## Other information

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

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

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection  
EN 340 Protective clothing  
EN 374 Protective gloves against chemicals and micro-organisms  
EN 13832 Footwear protecting against chemicals  
EN 133 Respiratory protective devices

### Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average  
PC—STEL: Permissible Concentration-Short Term Exposure Limit  
IARC: International Agency for Research on Cancer  
ACGIH: American Conference of Governmental Industrial Hygienists  
STEL: Short Term Exposure Limit  
TEEL: Temporary Emergency Exposure Limit,  
IDLH: Immediately Dangerous to Life or Health Concentrations  
ES: Exposure Standard  
OSF: Odour Safety Factor  
NOAEL :No Observed Adverse Effect Level  
LOAEL: Lowest Observed Adverse Effect Level  
TLV: Threshold Limit Value  
LOD: Limit Of Detection  
OTV: Odour Threshold Value  
BCF: BioConcentration Factors  
BEI: Biological Exposure Index  
AII: Australian Inventory of Industrial Chemicals  
DSL: Domestic Substances List  
NDSL: Non-Domestic Substances List  
IECSC: Inventory of Existing Chemical Substance in China  
EINECS: European INventory of Existing Commercial chemical Substances  
ELINCS: European List of Notified Chemical Substances  
NLP: No-Longer Polymers  
ENCS: Existing and New Chemical Substances Inventory  
KECI: Korea Existing Chemicals Inventory  
NZIoC: New Zealand Inventory of Chemicals  
PICCS: Philippine Inventory of Chemicals and Chemical Substances  
TSCA: Toxic Substances Control Act  
TCSI: Taiwan Chemical Substance Inventory  
INSQ: Inventario Nacional de Sustancias Químicas  
NCI: National Chemical Inventory  
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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