



Ethylenediamine

Novachem Pty Ltd

Version No: 1.2

Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Chemwatch Hazard Alert Code: 4

Issue Date: 13/02/2024

Print Date: 13/02/2024

S.GHS.AUS.EN

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

Product Identifier

| | |
|-------------------------------|-------------------------------|
| Product name | Ethylenediamine |
| Chemical Name | ethylenediamine |
| Synonyms | Not Available |
| Proper shipping name | ETHYLENEDIAMINE |
| Other means of identification | 059-00933,053-00936,057-00939 |

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

| | |
|--------------------------|-----------------------|
| Relevant identified uses | For research use only |
|--------------------------|-----------------------|

Details of the manufacturer or supplier of the safety data sheet

| | | |
|-------------------------|--|--|
| Registered company name | Novachem Pty Ltd | Novachem Pty Ltd |
| Address | 25 Crissane Road, Heidelberg West Victoria 3081 Australia | 25 Crissane Road, Heidelberg West Victoria 3081 Australia |
| Telephone | +61384151255 | +61384151255 |
| Fax | +61386250088 | +61386250088 |
| Website | www.novachem.com.au | www.novachem.com.au |
| Email | novachem@novachem.com.au | novachem@novachem.com.au |

Emergency telephone number

| | | |
|-----------------------------------|--------------------------------------|--------------------------------------|
| Association / Organisation | Victorian Poisons Information Centre | Victorian Poisons Information Centre |
| Emergency telephone numbers | 13 11 26 | 13 11 26 |
| Other emergency telephone numbers | Not Available | Not Available |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|--------------------|--|
| Poisons Schedule | Not Applicable |
| Classification [1] | Flammable Liquids Category 2, Acute Toxicity (Oral) Category 4, Acute Toxicity (Dermal) Category 3, Skin Corrosion/Irritation Category 1A, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Inhalation) Category 4, Sensitisation (Respiratory) Category 1, Reproductive Toxicity Category 2, Specific Target Organ Toxicity - Single Exposure Category 1, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Acute Hazard Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 3 |
| Legend: | 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI |

Label elements

| | |
|---------------------|--------|
| Hazard pictogram(s) | |
| Signal word | Danger |

Hazard statement(s)

| | |
|------|-------------------------------------|
| H225 | Highly flammable liquid and vapour. |
| H302 | Harmful if swallowed. |

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| H311 | Toxic in contact with skin. |
| H314 | Causes severe skin burns and eye damage. |
| H317 | May cause an allergic skin reaction. |
| H332 | Harmful if inhaled. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H361 | Suspected of damaging fertility or the unborn child. |
| H370 | Causes damage to organs. (Respiratory system) |
| H373 | May cause damage to organs through prolonged or repeated exposure. (Kidneys, Liver, Visual Organ) |
| H401 | Toxic to aquatic life. |
| H412 | Harmful to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P201 | Obtain special instructions before use. |
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P233 | Keep container tightly closed. |
| P260 | Do not breathe mist/vapours/spray. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P301+P330+P331 | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious). |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. |
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |

Precautionary statement(s) Storage

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| P403+P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |

Precautionary statement(s) Disposal

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| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|----------|-----------|-----------------|
| 107-15-3 | 99 | ethylenediamine |

Legend: 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available

SECTION 4 First aid measures

Description of first aid measures

| | |
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| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ 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. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. |

Ethylenediamine

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| | This must definitely be left to a doctor or person authorised by him/her. (ICSC13719) |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. |

Indication of any immediate medical attention and special treatment needed

For acute or short-term repeated exposures to highly alkaline materials:

- ▶ Respiratory stress is uncommon but present occasionally because of soft tissue edema.
- ▶ Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
- ▶ Oxygen is given as indicated.
- ▶ The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
- ▶ Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.

Alkalis continue to cause damage after exposure.

INGESTION:

- ▶ Milk and water are the preferred diluents
- No more than 2 glasses of water should be given to an adult.
- ▶ Neutralising agents should never be given since exothermic heat reaction may compound injury.
- * Catharsis and emesis are absolutely contra-indicated.
- * Activated charcoal does not absorb alkali.
- * Gastric lavage should not be used.

Supportive care involves the following:

- ▶ Withhold oral feedings initially.
- ▶ If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
- ▶ Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
- ▶ Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

SKIN AND EYE:

- ▶ Injury should be irrigated for 20-30 minutes.
- Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Alcohol stable foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

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

Advice for firefighters

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|------------------------------|--|
| Fire Fighting | |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Liquid and vapour are highly flammable. ▶ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▶ Vapour may travel a considerable distance to source of ignition. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>Combustion products include: carbon dioxide (CO₂) nitrogen oxides (NO_x) other pyrolysis products typical of burning organic material. May emit corrosive fumes.</p> |
| HAZCHEM | •2W |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

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|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. |
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Ethylenediamine

Major Spills

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

SECTION 7 Handling and storage

Precautions for safe handling

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| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. ▶ DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | <ul style="list-style-type: none"> ▶ Store in approved flammable liquid storage area. ▶ No smoking, naked lights/ignition sources. ▶ Keep containers securely sealed. ▶ Store away from incompatible materials in a cool, dry, well-ventilated area. ▶ DO NOT store near acids, or oxidising agents |

Conditions for safe storage, including any incompatibilities

| | |
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| Suitable container | <ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ Packing as recommended by manufacturer. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> ▶ Removable head packaging; ▶ Cans with friction closures and ▶ low pressure tubes and cartridges <p>may be used.</p> |
| Storage incompatibility | <p>Ethylenediamine:</p> <ul style="list-style-type: none"> ▶ Reacts violently with strong acids, strong oxidisers, chlorinated organics, acetic anhydride, acrolein, acrylic acid, acrylonitrile, allyl chloride, carbon disulfide, cellulose nitrate, chlorosulfonic acid, diisopropyl peroxydicarbonate, epichlorohydrin, ethylene chlorohydrin, oleum, methyl oxide, nitromethane, silver perchlorate, vinyl acetate. ▶ Is incompatible with 3-propiolactone, mesityl oxide, ethylene dichloride, organic anhydrides, isocyanates, acrylates, substituted allyls, alkylene oxides, ketones, aldehydes, alcohols, glycols, phenols, cresols, caprolactam solution. ▶ Causes spontaneous decomposition of nitrogen containing compounds; isolate from explosives: ammonium nitrate, ammonium sulfate, picric acid, nitrobenzene etc. ▶ Reacts with carbon dioxide (CO₂) to form insoluble carbamates. ▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates. ▶ Avoid contact with copper, aluminium and their alloys. ▶ Avoid reaction with oxidising agents |

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA


| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|------------------------------|-----------------|-----------------|-------------------------------|---------------|---------------|---------------|
| Australia Exposure Standards | ethylenediamine | Ethylenediamine | 10 ppm / 25 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-----------------|----------|---------------|---------------|
| ethylenediamine | 0.88 ppm | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|-----------------|---------------|---------------|
| ethylenediamine | 1,000 ppm | Not Available |

Exposure controls

| | |
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| Appropriate engineering controls | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard 'physically' away from the worker and ventilation that strategically 'adds' and 'removes' air in the work environment.</p> |
| Individual protection measures, such as personal protective equipment |  |

Ethylenediamine

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| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▶ Chemical goggles. Whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. [AS/NZS 1337.1, EN166 or national equivalent] ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Elbow length PVC gloves ▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Eyewash unit. |

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:

Ethylenediamine

| Material | CPI |
|------------|-----|
| BUTYL | A |
| SARANEX-23 | A |
| TEFLON | A |
| NEOPRENE | C |
| PE | C |
| PVC | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

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

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

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

Ansell Glove Selection

| Glove — In order of recommendation |
|------------------------------------|
| AlphaTec 02-100 |
| AlphaTec® 15-554 |
| AlphaTec® Solvex® 37-185 |
| AlphaTec® 38-612 |
| AlphaTec® 53-001 |
| AlphaTec® 58-005 |
| AlphaTec® 58-008 |
| AlphaTec® 58-530B |
| AlphaTec® 58-530W |
| AlphaTec® 58-735 |

The suggested gloves for use should be confirmed with the glove supplier.

Respiratory protection

Type AK-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 | AK-AUS P2 | - | AK-PAPR-AUS / Class 1 P2 |
| up to 50 x ES | - | AK-AUS / Class 1 P2 | - |
| up to 100 x ES | - | AK-2 P2 | AK-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)

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

Ethylenediamine

| | | | |
|---|-------------------------|--|---------------|
| Appearance | Colourless Clear Liquid | | |
| Physical state | Liquid | Relative density (Water = 1) | 0.890-0.900 |
| Odour | Characteristic | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | 385 |
| pH (as supplied) | Not Available | Decomposition temperature (°C) | Not Available |
| Melting point / freezing point (°C) | 8 | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 116 | Molecular weight (g/mol) | 60.10 |
| Flash point (°C) | 40 | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Flammable. | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | 16.6 | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | 2.7 | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | 1.2 | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (1%) | Not Available |
| Vapour density (Air = 1) | 2.1 | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

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

SECTION 11 Toxicological information

Information on toxicological effects

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|---------------------|---|
| Inhaled | <p>There is strong evidence to suggest that this material can cause, if inhaled once, very serious, irreversible damage of organs. The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhaling corrosive bases may irritate the respiratory tract. Symptoms include cough, choking, pain and damage to the mucous membrane. Inhalation of amine vapours may cause irritation of the mucous membrane of the nose and throat, and lung irritation with respiratory distress and cough. Swelling and inflammation of the respiratory tract is seen in serious cases; with headache, nausea, faintness and anxiety. Inhalation hazard is increased at higher temperatures.</p> <p>Inhalation of ethylenediamine mists or vapour can cause intolerable nasal irritation, headache, dizziness, nausea, catarrh, chest heaviness, wheezing, severe asthma and skin rashes. Repeated administration may cause lung, liver and kidney disease. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce serious damage to the health of the individual.</p> |
| Ingestion | <p>There is strong evidence to suggest that this material can cause, if swallowed once, very serious, irreversible damage of organs. Ingestion of alkaline corrosives may produce burns around the mouth, ulcerations and swellings of the mucous membranes, profuse saliva production, with an inability to speak or swallow. Both the oesophagus and stomach may experience burning pain; vomiting and diarrhoea may follow.</p> <p>The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum.</p> <p>Amines without benzene rings when swallowed are absorbed throughout the gut. Corrosive action may cause damage throughout the gastrointestinal tract.</p> <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> |
| Skin Contact | <p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p> <p>The material can produce severe chemical burns following direct contact with the skin.</p> <p>There is strong evidence to suggest that this material, on a single contact with skin, can cause very serious, irreversible damage of organs.</p> |

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| | <p>Skin contact with alkaline corrosives may produce severe pain and burns; brownish stains may develop. The corroded area may be soft, gelatinous and necrotic; tissue destruction may be deep.</p> <p>Volatile amine vapours produce irritation and inflammation of the skin. Direct contact can cause burns.</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 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> <p>Skin contact with liquid ethylenediamine may result in pain and second degree burns (comparable to 50% caustic soda) after a few minutes contact. Allergic reaction to EDA in hair and nail products has been observed among beauty operators, patrons and their husbands.</p> |
| Eye | <p>If applied to the eyes, this material causes severe eye damage.</p> <p>Direct eye contact with corrosive bases can cause pain and burns. There may be swelling, epithelium destruction, clouding of the cornea and inflammation of the iris. Mild cases often resolve; severe cases can be prolonged with complications such as persistent swelling, scarring, permanent cloudiness, bulging of the eye, cataracts, eyelids glued to the eyeball and blindness.</p> <p>Vapours of volatile amines irritate the eyes, causing excessive secretion of tears, inflammation of the conjunctiva and slight swelling of the cornea, resulting in 'halos' around lights. This effect is temporary, lasting only for a few hours. However this condition can reduce the efficiency of undertaking skilled tasks, such as driving a car. Direct eye contact with liquid volatile amines may produce eye damage, permanent for the lighter species.</p> |
| Chronic | <p>Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.</p> <p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.</p> <p>Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother.</p> <p>Respiratory sensitisation may result in allergic/asthma like responses; from coughing and minor breathing difficulties to bronchitis with wheezing, gasping.</p> <p>Sensitisation may give severe responses to very low levels of exposure, i.e. hypersensitivity.</p> |

| Ethylenediamine | <table border="1"> <thead> <tr> <th>TOXICITY</th> <th>IRRITATION</th> </tr> </thead> <tbody> <tr> <td>Not Available</td> <td>Not Available</td> </tr> </tbody> </table> | TOXICITY | IRRITATION | Not Available | Not Available | | | | | | |
|---|--|----------|------------|--|-----------------------------|---|--------------------------------|--|------------------------------------|--|-----------------------------------|
| TOXICITY | IRRITATION | | | | | | | | | | |
| Not Available | Not Available | | | | | | | | | | |
| ethylenediamine | <table border="1"> <thead> <tr> <th>TOXICITY</th> <th>IRRITATION</th> </tr> </thead> <tbody> <tr> <td>Dermal (rabbit) LD50: 750 mg/kg^[2]</td> <td>Eye (rabbit):0.67 mg SEVERE</td> </tr> <tr> <td>Inhalation(Mouse) LC50; 0.3 mg/L4h^[2]</td> <td>Eye (rabbit):0.75mg/24h SEVERE</td> </tr> <tr> <td>Oral (Guinea) LD50; 470 mg/kg^[2]</td> <td>Skin(rabbit):10 mg/24h open SEVERE</td> </tr> <tr> <td></td> <td>Skin(rabbit):450 mg open moderate</td> </tr> </tbody> </table> | TOXICITY | IRRITATION | Dermal (rabbit) LD50: 750 mg/kg ^[2] | Eye (rabbit):0.67 mg SEVERE | Inhalation(Mouse) LC50; 0.3 mg/L4h ^[2] | Eye (rabbit):0.75mg/24h SEVERE | Oral (Guinea) LD50; 470 mg/kg ^[2] | Skin(rabbit):10 mg/24h open SEVERE | | Skin(rabbit):450 mg open moderate |
| TOXICITY | IRRITATION | | | | | | | | | | |
| Dermal (rabbit) LD50: 750 mg/kg ^[2] | Eye (rabbit):0.67 mg SEVERE | | | | | | | | | | |
| Inhalation(Mouse) LC50; 0.3 mg/L4h ^[2] | Eye (rabbit):0.75mg/24h SEVERE | | | | | | | | | | |
| Oral (Guinea) LD50; 470 mg/kg ^[2] | Skin(rabbit):10 mg/24h open SEVERE | | | | | | | | | | |
| | Skin(rabbit):450 mg open moderate | | | | | | | | | | |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | | | | | | | | | | |

| | |
|-----------------------------------|--|
| ETHYLENEDIAMINE | <p>Acute toxicity of ethylenediamine (LD50, rat, oral range from 637 mg/kg to 1850 mg/kg; LC50, rat, inhalation >29 mg/l and LD50, rabbit, dermal 560 mg/kg) is considered to be low to moderate. Due to the high alkalinity, ethylenediamine is corrosive to the skin and eyes. It is a dermal and respiratory sensitiser in humans and has been reported to cross-sensitize for chemicals of similar structure. In repeat dose studies, decreased body weight along with decreased water and feed consumption were observed.</p> <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.</p> |
| Ethylenediamine & ETHYLENEDIAMINE | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.</p> <p>Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins.</p> <p>Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema.</p> <p>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> <p>The following information refers to contact allergens as a group and may not be specific to this product.</p> <p>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.</p> <p>Acute toxicity of ethylenediamine (EDA) is considered to be low to moderate. In animal testing, it affected the eyes (causing clouding of the lens and atrophy of the retina) and kidneys. EDA is also capable of causing hypersensitivity to the airway and asthma in the work environment, although the levels required for this to occur are not known. EDA is corrosive to the skin and eyes due to its high alkalinity.</p> |

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

Ethylenediamine

Legend: ✘ – Data either not available or does not fill the criteria for classification
✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| Ethylenediamine | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| ethylenediamine | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------|-----------|--------------------|-------------------------------|-----------|--------|
| | EC50 | 96h | Algae or other aquatic plants | 61mg/l | 1 |
| | EC50 | 48h | Crustacea | 17mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 645mg/l | 1 |
| | NOEC(ECx) | 504h | Crustacea | 2mg/l | 1 |
| | LC50 | 96h | Fish | >11.5mg/l | 4 |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 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*

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Ether amines show moderate to high water solubility and have low to moderate volatility.

Ether amines are not readily biodegradable, may show inherent biodegradability and exhibit moderate to high toxicity to aquatic organisms.

for ethylenediamine (EDA):

Environmental Fate: EDA's vapor pressure is 12 hPa at 200 C, the log Pow range is from -1.3 to -2.04 and the water solubility is 110 g/L. While EDA does not have as high a stability constant as several higher molecular weight ethyleneamines, it does have the potential to chelate copper.

No atmospheric effects are expected, as reaction of EDA with hydroxyl radicals is likely to be rapid (half-life 8.9 h), and washout of volatilised EDA is expected. Volatilisation to the atmosphere is likely from soil but not from water.

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|-----------------|-------------------------|------------------|
| ethylenediamine | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|-----------------|------------------|
| ethylenediamine | LOW (BCF = 0.07) |

Mobility in soil

| Ingredient | Mobility |
|-----------------|-------------------|
| ethylenediamine | LOW (KOC = 24.72) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product. <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"> ▶ Reduction ▶ Reuse ▶ Recycling ▶ Disposal (if all else fails) <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Where in doubt contact the responsible authority. ▶ Recycle wherever possible. ▶ 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. ▶ Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with suitable dilute acid followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus ▶ Decontaminate empty containers. |
|-------------------------------------|--|

Ethylenediamine

SECTION 14 Transport information

Labels Required

| | | |
|------------------|---|---|
| |  |  |
| Marine Pollutant | NO | |
| HAZCHEM | •2W | |

Land transport (ADG)

| | | |
|------------------------------------|--------------------|----------------|
| 14.1. UN number or ID number | 1604 | |
| 14.2. UN proper shipping name | ETHYLENEDIAMINE | |
| 14.3. Transport hazard class(es) | Class | 8 |
| | Subsidiary Hazard | 3 |
| 14.4. Packing group | II | |
| 14.5. Environmental hazard | Not Applicable | |
| 14.6. Special precautions for user | Special provisions | Not Applicable |
| | Limited quantity | 1 L |

Air transport (ICAO-IATA / DGR)

| | | |
|------------------------------------|---|----------------|
| 14.1. UN number | 1604 | |
| 14.2. UN proper shipping name | Ethylenediamine | |
| 14.3. Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subsidiary Hazard | 3 |
| | ERG Code | 8F |
| 14.4. Packing group | II | |
| 14.5. Environmental hazard | Not Applicable | |
| 14.6. Special precautions for user | Special provisions | Not Applicable |
| | Cargo Only Packing Instructions | 855 |
| | Cargo Only Maximum Qty / Pack | 30 L |
| | Passenger and Cargo Packing Instructions | 851 |
| | Passenger and Cargo Maximum Qty / Pack | 1 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y840 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 0.5 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|------------------------------------|------------------------|----------------|
| 14.1. UN number | 1604 | |
| 14.2. UN proper shipping name | ETHYLENEDIAMINE | |
| 14.3. Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subsidiary Hazard | 3 |
| 14.4. Packing group | II | |
| 14.5. Environmental hazard | Not Applicable | |
| 14.6. Special precautions for user | EMS Number | F-E , S-C |
| | Special provisions | Not Applicable |
| | Limited Quantities | 1 L |

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

Not Applicable

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

| | |
|-----------------|---------------|
| Product name | Group |
| ethylenediamine | Not Available |

Continued...

Ethylenediamine

14.7.3. Transport in bulk in accordance with the IGC Code

| Product name | Ship Type |
|-----------------|---------------|
| ethylenediamine | Not Available |

SECTION 15 Regulatory information

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

ethylenediamine is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
 Australian Inventory of Industrial Chemicals (AIIC)
 Chemical Footprint Project - Chemicals of High Concern List

Additional Regulatory Information

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | Yes |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 13/02/2024 |
| Initial Date | 14/02/2024 |

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 0.2 | 13/02/2024 | Hazards identification - Classification |

Other information

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

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

Definitions and abbreviations

- ▶ PC - TWA: Permissible Concentration-Time Weighted Average
- ▶ PC - STEL: Permissible Concentration-Short Term Exposure Limit
- ▶ IARC: International Agency for Research on Cancer
- ▶ ACGIH: American Conference of Governmental Industrial Hygienists
- ▶ STEL: Short Term Exposure Limit
- ▶ TEEL: Temporary Emergency Exposure Limit,
- ▶ IDLH: Immediately Dangerous to Life or Health Concentrations
- ▶ 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
- ▶ DNEL: Derived No-Effect Level
- ▶ PNEC: Predicted no-effect concentration

Ethylenediamine

- ▶ AIIIC: 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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