# Laminex - Colour Tech Door Paint Hardener Part B

**The Laminex Group**

Chemwatch Hazard Alert Code: **3**

Chemwatch: **24-1415**
Version No: **3.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **11/03/2014**
Print Date: **12/06/2014**
Initial Date: **Not Available**
L.GHS.AUS.EN

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

### Product Identifier

| | |
|---|---|
| **Product name** | Laminex - Colour Tech Door Paint Hardener Part B |
| **Chemical Name** | Not Applicable |
| **Synonyms** | 853 Part B, 854 MCI Part B, I854B |
| **Proper shipping name** | RESIN SOLUTION, flammable |
| **Chemical formula** | Not Applicable |
| **Other means of identification** | Not Available |
| **CAS number** | Not Applicable |

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

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|---|---|
| **Relevant identified uses** | Use according to manufacturer's directions.<br>Requires that the two parts be mixed by hand or mixer before use, in accordance with manufacturers directions. Mix only as much as is required. **Do not** return the mixed material to the original containers<br>, Used in a mixture with Base (Part A) for coating surfaces requiring a hard wearing texture coating. |

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

| | | | |
|---|---|---|---|
| **Registered company name** | The Laminex Group | | |
| **Address** | 90-94 Tram Road Doncaster 3108 VIC<br>Australia | | |
| **Telephone** | +61 3 9848 4811 | | |
| **Fax** | +61 3 9840 6513 | | |
| **Website** | www.thelaminexgroup.com.au | | |
| **Email** | Not Available | | |

### Emergency telephone number

| | | | |
|---|---|---|---|
| **Association / Organisation** | Not Available | | |
| **Emergency telephone numbers** | Not Available | | |
| **Other emergency telephone numbers** | Not Available | | |

### CHEMWATCH EMERGENCY RESPONSE

| Primary Number | Alternative Number 1 | Alternative Number 2 |
|---|---|---|
| 1800 039 008 | +612 9186 1132 | Not Available |

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

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

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

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|---|---|
| **Poisons Schedule** | S6 |

Continued...

| | |
|---|---|
| **GHS Classification [1]** | Flammable Liquid Category 2, Acute Toxicity (Inhalation) Category 4, Eye Irrit. 2, Respiratory Sensitizer Category 1, Skin Sensitizer Category 1 |
| ***Legend:*** | *1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI* |

### Label elements

| | |
|---|---|
| **GHS label elements** |  |
| **SIGNAL WORD** | **DANGER** |

### Hazard statement(s)

| | |
|---|---|
| **H225** | Highly flammable liquid and vapour |
| **H332** | Harmful if inhaled |
| **H319** | Causes serious eye irritation |
| **H334** | May cause allergy or asthma symptoms or breathing difficulties if inhaled |
| **H317** | May cause an allergic skin reaction |
| **AUH066** | Repeated exposure may cause skin dryness and cracking |

### Supplementary statement(s)

Not Applicable

### CLP classification (additional)

Not Applicable

### Precautionary statement(s): Prevention

| | |
|---|---|
| **P101** | If medical advice is needed, have product container or label at hand. |
| **P102** | Keep out of reach of children. |
| **P103** | Read label before use. |
| **P210** | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| **P233** | Keep container tightly closed. |
| **P261** | Avoid breathing dust/fume/gas/mist/vapours/spray. |
| **P271** | Use only outdoors or in a well-ventilated area. |
| **P280** | Wear protective gloves/protective clothing/eye protection/face protection. |
| **P284** | [In case of inadequate ventilation] wear respiratory protection. |
| **P240** | Ground/bond container and receiving equipment. |
| **P241** | Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment. |
| **P242** | Use only non-sparking tools. |
| **P243** | Take precautionary measures against static discharge. |
| **P272** | Contaminated work clothing should not be allowed out of the workplace. |

### Precautionary statement(s): Response

| | |
|---|---|
| **P304+P340** | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| **P321** | Specific treatment (see advice on this label). |
| **P342+P311** | If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider |
| **P370+P378** | In case of fire: Use… to extinguish. |
| **P302+P352** | IF ON SKIN: Wash with plenty of water and soap |
| **P305+P351+P338** | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| **P312** | Call a POISON CENTER/doctor/physician/first aider/if you feel unwell. |
| **P333+P313** | If skin irritation or rash occurs: Get medical advice/attention. |
| **P337+P313** | If eye irritation persists: Get medical advice/attention. |
| **P362+P364** | Take off contaminated clothing and wash it before reuse. |
| **P303+P361+P353** | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |

### Precautionary statement(s): Storage

| | |
|---|---|
| **P403+P235** | Store in a well-ventilated place. Keep cool. |

### Precautionary statement(s): Disposal

| | |
|---|---|
| **P501** | Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration |

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Continued...

### Substances

See section below for composition of Mixtures

### Mixtures

| CAS No | %[weight] | Name |
|---|---|---|
| Not Available | 30-<60 | isocyanate functional material |
| 110-19-0 | 10-<30 | isobutyl acetate |
| 1330-20-7 | <10 | xylene |
| 584-84-9 | NotSpec. | toluene-2,4-diisocyanate |
| 822-06-0 | NotSpec. | hexamethylene diisocyanate |
| | NotSpec. | ingredients determined not to be hazardous |

## SECTION 4 FIRST AID MEASURES

### Description of first aid measures

| | |
|---|---|
| **Eye Contact** | If this product comes in contact with the eyes:<br>▸ Wash out immediately with fresh running water.<br>▸ 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.<br>▸ Seek medical attention without delay; if pain persists or recurs seek medical attention.<br>▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| **Skin Contact** | If skin contact occurs:<br>▸ Immediately remove all contaminated clothing, including footwear.<br>▸ Flush skin and hair with running water (and soap if available).<br>▸ Seek medical attention in event of irritation. |
| **Inhalation** | ▸ If fumes or combustion products are inhaled remove from contaminated area.<br>▸ Lay patient down. Keep warm and rested.<br>▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.<br>▸ 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.<br>▸ Transport to hospital, or doctor. |
| **Ingestion** | ▸ If swallowed do **NOT** induce vomiting.<br>▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.<br>▸ Observe the patient carefully.<br>▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.<br>▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.<br>▸ Seek medical advice.<br>▸ Avoid giving milk or oils.<br>▸ Avoid giving alcohol. |

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

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

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BASIC TREATMENT

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

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ADVANCED TREATMENT

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

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EMERGENCY DEPARTMENT

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- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress

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- syndrome.
- Consult a toxicologist as necessary.

*BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994*

For sub-chronic and chronic exposures to isocyanates:

- This material may be a potent pulmonary sensitiser which causes bronchospasm even in patients without prior airway hyperreactivity.
- Clinical symptoms of exposure involve mucosal irritation of respiratory and gastrointestinal tracts.
- Conjunctival irritation, skin inflammation (erythema, pain vesiculation) and gastrointestinal disturbances occur soon after exposure.
- Pulmonary symptoms include cough, burning, substernal pain and dyspnoea.
- Some cross-sensitivity occurs between different isocyanates.
- Noncardiogenic pulmonary oedema and bronchospasm are the most serious consequences of exposure. Markedly symptomatic patients should receive oxygen, ventilatory support and an intravenous line.
- Treatment for asthma includes inhaled sympathomimetics (epinephrine [adrenalin], terbutaline) and steroids.
- Activated charcoal (1 g/kg) and a cathartic (sorbitol, magnesium citrate) may be useful for ingestion.
- Mydriatics, systemic analgesics and topical antibiotics (Sulamyd) may be used for corneal abrasions.
- There is no effective therapy for sensitised workers.

[Ellenhorn and Barceloux; Medical Toxicology]

**NOTE:** Isocyanates cause airway restriction in naive individuals with the degree of response dependant on the concentration and duration of exposure. They induce smooth muscle contraction which leads to bronchoconstrictive episodes. Acute changes in lung function, such as decreased FEV1, may not represent sensitivity.

[Karol & Jin, Frontiers in Molecular Toxicology, pp 56-61, 1992]

Personnel who work with isocyanates, isocyanate prepolymers or polyisocyanates should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitisation conditions of the skin should not handle or work with isocyanates. Anyone who develops chronic respiratory distress when working with isocyanates should be removed from exposure and examined by a physician. Further exposure must be avoided if a sensitivity to isocyanates or polyisocyanates has developed.

Toluene diisocyanate is a known pulmonary sensitiser. Annual medical surveillance should be conducted including pulmonary history, examination of the heart and lungs, 14 x 17 inch (35 x 47 cm) x-ray and pulmonary function testing (FCV, FEV1).

In normal commercial preparations of toluene diisocyanate, the 2,4-isomer dominates in the ratio 4:1. However it is also hydrolysed, in air , more rapidly than the 2,6-isomer. Airway sensitivities may result from the appearance of immunoglobulins in the blood. Frequent inability to detect antibodies to TDI in clinical cases may result from the routine use of diagnostic antigens containing predominantly 2,4-TDI, whereas individuals may have been exposed to atmospheres in which 2,6-TDI was the predominant isomer. [Karol & Jin, Frontiers of Molecular Toxicology, pp 55-61, 1992]

For acute or short term repeated exposures to xylene:

- Gastro-intestinal absorption is significant with ingestions. For ingestions exceeding 1-2 ml (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended. The use of charcoal and cathartics is equivocal.
- Pulmonary absorption is rapid with about 60-65% retained at rest.
- Primary threat to life from ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases ($pO_2$ < 50 mm Hg or $pCO_2$ > 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comments |
|---|---|---|---|
| Methylhippu-ric acids in urine | 1.5 gm/gm creatinine | End of shift | |
| | 2 mg/min | Last 4 hrs of shift | |

## SECTION 5 FIREFIGHTING MEASURES

### Extinguishing media

- Water spray or fog.
- Alcohol stable foam.
- Dry chemical powder.
- Carbon dioxide.

**Do not** use a water jet to fight fire.

### Special hazards arising from the substrate or mixture

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

### Advice for firefighters

| | |
|---|---|
| **Fire Fighting** | ▸ Alert Fire Brigade and tell them location and nature of hazard.<br>▸ May be violently or explosively reactive.<br>▸ Wear breathing apparatus plus protective gloves in the event of a fire.<br>▸ Prevent, by any means available, spillage from entering drains or water course.<br>▸ Consider evacuation (or protect in place).<br>▸ Fight fire from a safe distance, with adequate cover.<br>▸ If safe, switch off electrical equipment until vapour fire hazard removed.<br>▸ Use water delivered as a fine spray to control the fire and cool adjacent area.<br>▸ Avoid spraying water onto liquid pools.<br>▸ **Do not** approach containers suspected to be hot. |

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|---|---|
| | ▸ Cool fire exposed containers with water spray from a protected location.<br>▸ If safe to do so, remove containers from path of fire. |
| **Fire/Explosion Hazard** | ▸ Liquid and vapour are highly flammable.<br>▸ Severe fire hazard when exposed to heat, flame and/or oxidisers.<br>▸ Vapour may travel a considerable distance to source of ignition.<br>▸ Heating may cause expansion or decomposition leading to violent rupture of containers.<br>▸ On combustion, may emit toxic fumes of carbon monoxide (CO).<br>Combustion products include:<br>,<br>carbon dioxide ($CO_2$)<br>,<br>isocyanates<br>,<br>and minor amounts of<br>,<br>hydrogen cyanide<br>,<br>nitrogen oxides (NOx)<br>,<br>other pyrolysis products typical of burning organic material |

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

**Minor Spills**

- 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.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

**Major Spills**

Chemical Class: ester and ethers
For release onto land: recommended sorbents listed in order of priority.

| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS |
|---|---|---|---|---|
| LAND SPILL - SMALL | | | | |
| cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS |
| cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT |
| sorbent clay - particulate | 2 | shovel | shovel | R,I, P |
| wood fiber - particulate | 3 | shovel | shovel | R, W, P, DGC |
| wood fiber - pillow | 3 | throw | pitchfork | R, P, DGC, RT |
| treated wood fiber - pillow | 3 | throw | pitchfork | DGC, RT |
| LAND SPILL - MEDIUM | | | | |
| cross-linked polymer - particulate | 1 | blower | skiploader | R,W, SS |
| cross-linked polymer - pillow | 2 | throw | skiploader | R, DGC, RT |
| sorbent clay - particulate | 3 | blower | skiploader | R, I, P |
| polypropylene - particulate | 3 | blower | skiploader | W, SS, DGC |
| expanded mineral - particulate | 4 | blower | skiploader | R, I, W, P, DGC |
| wood fiber - particulate | 4 | blower | skiploader | R, W, P, DGC |

Legend
DGC: Not effective where ground cover is dense
R; Not reusable
I: Not incinerable
P: Effectiveness reduced when rainy
RT:Not effective where terrain is rugged
SS: Not for use within environmentally sensitive sites
W: Effectiveness reduced when windy
Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;
R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988
For isocyanate spills of less than 40 litres (2 m2):

- Evacuate area from everybody not dealing with the emergency, keep them upwind and prevent further access, remove ignition sources and, if inside building, ventilate area as well as possible.
- Notify supervision and others as necessary.
- Put on personal protective equipment (suitable respiratory protection, face and eye protection, protective suit, gloves and impermeable boots).
- Control source of leakage (where applicable).
- Dike the spill to prevent spreading and to contain additions of decontaminating solution.
- Prevent the material from entering drains.
- Estimate spill pool volume or area.
- Absorb and decontaminate. - Completely cover the spill with wet sand, wet earth, vermiculite or other similar absorbent. - Add neutraliser (for suitable formulations: see below) to the adsorbent materials (equal to that of estimated spill pool volume). Intensify contact between

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- spill, absorbent and neutraliser by carefully mixing with a rake and allow to react for 15 minutes
- Shovel absorbent/decontaminant solution mixture into a steel drum.
- Decontaminate surface. - Pour an equal amount of neutraliser solution over contaminated surface. - Scrub area with a stiff bristle brush, using moderate pressure. - Completely cover decontaminant with vermiculite or other similar absorbent. - After 5 minutes, shovel absorbent/decontamination solution mixture into the same steel drum used above.
- Monitor for residual isocyanate. If surface is decontaminated, proceed to next step. If contamination persists, repeat decontaminate procedure immediately above
- Place loosely covered drum (release of carbon dioxide) outside for at least 72 hours. Label waste-containing drum appropriately. Remove waste materials for incineration.
- Decontaminate and remove personal protective equipment.
- Return to normal operation.
- Conduct accident investigation and consider measures to prevent reoccurrence.

**Decontamination:**
Treat isocyanate spills with sufficient amounts of isocyanate decontaminant preparation ("neutralising fluid"). Isocyanates and polyisocyanates are generally not miscible with water. Liquid surfactants are necessary to allow better dispersion of isocyanate and neutralising fluids/ preparations. Alkaline neutralisers react faster than water/surfactant mixtures alone.
Typically, such a preparation may consist of:
Sawdust: 20 parts by weight Kieselguhr 40 parts by weight plus a mixture of {ammonia (s.g. 0.880) 8% v/v non-ionic surfactant 2% v/v water 90% v/v}.
Let stand for 24 hours
Three commonly used neutralising fluids each exhibit advantages in different situations.
**Formulation A** :

| | |
|---|---|
| liquid surfactant | 0.2-2% |
| sodium carbonate | 5-10% |
| water to | 100% |

**Formulation B**

| | |
|---|---|
| liquid surfactant | 0.2-2% |
| concentrated ammonia | 3-8% |
| water to | 100% |

**Formulation C**

| | |
|---|---|
| ethanol, isopropanol or butanol | 50% |
| concentrated ammonia | 5% |
| water to | 100% |

After application of any of these formulae, let stand for 24 hours.

Formulation B reacts faster than Formulation A. However, ammonia-based neutralisers should be used only under well-ventilated conditions to avoid overexposure to ammonia or if members of the emergency team wear suitable respiratory protection. Formulation C is especially suitable for cleaning of equipment from unreacted isocyanate and neutralizing under freezing conditions. Regard has to be taken to the flammability of the alcoholic solution.

- Avoid contamination with water, alkalies and detergent solutions.
- Material reacts with water and generates gas, pressurises containers with even drum rupture resulting.
- **DO NOT** reseal container if contamination is suspected.
- Open all containers with care.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse /absorb vapour.
- Contain spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

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

## SECTION 7 HANDLING AND STORAGE

### Precautions for safe handling

**Safe handling**

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- **DO NOT** allow clothing wet with material to stay in contact with skin
- Electrostatic discharge may be generated during pumping - this may result in fire.
- Ensure electrical continuity by bonding and grounding (earthing) all equipment.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec).
- Avoid splash filling.
- Do NOT use compressed air for filling discharging or handling operations.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- **DO NOT** enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights, heat or ignition sources.

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| | |
|---|---|
| | ▸ When handling, **DO NOT** eat, drink or smoke.<br>▸ Vapour may ignite on pumping or pouring due to static electricity.<br>▸ **DO NOT** use plastic buckets.<br>▸ Earth and secure metal containers when dispensing or pouring product.<br>▸ Use spark-free tools when handling.<br>▸ Avoid contact with incompatible materials.<br>▸ Keep containers securely sealed.<br>▸ Avoid physical damage to containers.<br>▸ Always wash hands with soap and water after handling.<br>▸ Work clothes should be laundered separately.<br>▸ Use good occupational work practice.<br>▸ Observe manufacturer's storage and handling recommendations contained within this MSDS.<br>▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions. |
| **Other information** | for commercial quantities of isocyanates:<br>▸ Isocyanates should be stored in adequately bunded areas. Nothing else should be kept within the same bunding. Pre-polymers need not be segregated. Drums of isocyanates should be stored under cover, out of direct sunlight, protected from rain, protected from physical damage and well away from moisture, acids and alkalis.<br>▸ Where isocyanates are stored at elevated temperatures to prevent solidifying, adequate controls should be installed to prevent the high temperatures and precautions against fire should be taken.<br>▸ Where stored in tanks, the more reactive isocyanates should be blanketed with a non-reactive gas such as nitrogen and equipped with absorptive type breather valve (to prevent vapour emissions)..<br>▸ Transfer systems for isocyanates in bulk storage should be fully enclosed and use pump or vacuum systems. Warning signs, in appropriate languages, should be posted where necessary.<br>▸ Areas in which polyurethane foam products are stored should be supplied with good general ventilation. Residual amounts of unreacted isocyanate may be present in the finished foam, resulting in hazardous atmospheric concentrations.<br><br>▸ Store in original containers in approved flame-proof area.<br>▸ No smoking, naked lights, heat or ignition sources.<br>▸ **DO NOT** store in pits, depressions, basements or areas where vapours may be trapped.<br>▸ Keep containers securely sealed.<br>▸ Store away from incompatible materials in a cool, dry well ventilated area.<br>▸ Protect containers against physical damage and check regularly for leaks.<br>▸ Observe manufacturer's storage and handling recommendations contained within this MSDS. |

### Conditions for safe storage, including any incompatibilities

| | |
|---|---|
| **Suitable container** | ▸ Packing as supplied by manufacturer.<br>▸ Plastic containers may only be used if approved for flammable liquid.<br>▸ Check that containers are clearly labelled and free from leaks.<br>▸ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.<br>▸ For materials with a viscosity of at least 2680 cSt. (23 deg. C)<br>▸ For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)<br>▸ Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C): (i) Removable head packaging; (ii) Cans with friction closures and (iii) low pressure tubes and cartridges may be used.<br>▸ Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages<br>▸ In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic. |
| **Storage incompatibility** | ▸ Segregate from alcohol, water.<br>▸ Avoid contamination with water, alkalies and detergent solutions.<br>▸ Material reacts with water and generates gas, pressurises containers with even drum rupture resulting.<br>▸ **DO NOT** reseal container if contamination is suspected.<br>▸ Open all containers with care.<br>▸ Avoid reaction with oxidising agents |

**PACKAGE MATERIAL INCOMPATIBILITIES**

Not Available

## 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 | isobutyl acetate | Isobutyl acetate | 713 mg/m3 / 150 ppm | Not Available | Not Available | Not Available |
| Australia Exposure Standards | xylene | Xylene (o-, m-, p-isomers) | 350 mg/m3 / 80 ppm | 655 mg/m3 / 150 ppm | Not Available | Not Available |
| Australia Exposure Standards | toluene-2,4-diisocyanate | Isocyanates, all (as-NCO) | 0.02 mg/m3 | 0.07 mg/m3 | Not Available | Sen |
| Australia Exposure Standards | hexamethylene diisocyanate | Isocyanates, all (as-NCO) | 0.02 mg/m3 | 0.07 mg/m3 | Not Available | Sen |

**EMERGENCY LIMITS**

| Ingredient | TEEL-0 | TEEL-1 | TEEL-2 | TEEL-3 |
|---|---|---|---|---|
| isobutyl acetate | 150 ppm | 150 ppm | 250 ppm | 1300 ppm |

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| | | | | |
|---|---|---|---|---|
| xylene | 100 ppm | 130 ppm | 920 ppm | 2500 ppm |
| toluene-2,4-diisocyanate | 0.25 / 0.005 ppm | 0.02 / 0.75 ppm | 1.5 / 0.083 ppm | 1.5 / 0.51 ppm |
| hexamethylene diisocyanate | 0.005 ppm | 0.015 ppm | 0.2 ppm | 3.5 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| isocyanate functional material | Not Available | Not Available |
| isobutyl acetate | 7,500 ppm | 1,300 [LEL] ppm |
| xylene | 1,000 ppm | 900 ppm |
| toluene-2,4-diisocyanate | Not Available | Not Available |
| hexamethylene diisocyanate | Not Available | Not Available |

**MATERIAL DATA**

for isobutyl acetate:
Odour Threshold Value: 0.40-0.44 ppm (recognition)
The TLV-TWA is identical with that of n-butyl acetate and is thought to minimise the potential for ocular and upper respiratory tract irritation.
for toluene diisocyanate:
NOTE: Detector tubes for toluene diisocyanate, measuring in excess of 0.02 ppm, are commercially available.
The odour recognition threshold, 0.05-0.4 ppm in air, is not reliable and being above exposure standard, gives no warning of exposure.
A substantial proportion of the working population (4.3% to 25%) can be sensitised to TDI at the ES-TWA. Such sensitisation was not limited to highly susceptible individuals and workers often developed symptoms early. Preplacement exams have been unsuccessful in identifying those who may develop sensitisation. Allergy, bronchial asthma and chronic bronchitis sufferers should be excluded from exposure to TDI. Chronic low level exposures below 0.02 ppm have been reported to cause sensitisation. Workers complained of cough, phlegm production, breathlessness and wheezing 2 to 17 years after the last exposure and it is reported that several workers developed chronic bronchitis 40 months after removal from exposure. Effects of TDI appear to be dose-related and there is a threshold (0.005 ppm) below which no respiratory effects are produced by at least the isomer 2,4-TDI. It should be noted that some polyurethane production facilities also emit amines which are the most important cause of respiratory symptoms and occupational asthma.
Odour Safety Factor(OSF)
OSF=0.029 ("2,4-TOLUENEDIISOCYANATE")

for xylenes:
IDLH Level: 900 ppm
Odour Threshold Value: 20 ppm (detection), 40 ppm (recognition)
NOTE: Detector tubes for o-xylene, measuring in excess of 10 ppm, are available commercially. (m-xylene and p-xylene give almost the same response).
Xylene vapour is an irritant to the eyes, mucous membranes and skin and causes narcosis at high concentrations. Exposure to doses sufficiently high to produce intoxication and unconsciousness also produces transient liver and kidney toxicity. Neurologic impairment is NOT evident amongst volunteers inhaling up to 400 ppm though complaints of ocular and upper respiratory tract irritation occur at 200 ppm for 3 to 5 minutes.
Exposure to xylene at or below the recommended TLV-TWA and STEL is thought to minimise the risk of irritant effects and to produce neither significant narcosis or chronic injury. An earlier skin notation was deleted because percutaneous absorption is gradual and protracted and does not substantially contribute to the dose received by inhalation.
Odour Safety Factor(OSF)
OSF=4 (XYLENE)

for 1,6-hexamethylene diisocyanate (HDI):
The toxicological action of HDI is similar to that of toluene diisocyanate and and the TLV-TWA is analogous. In light of reported asthmatic/ respiratory sensitisation-like responses in HDI exposed workers, individuals who may be hypersusceptible or otherwise unusually responsive may not be adequately protected at this limit.

## Exposure controls

**Appropriate engineering controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. 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.

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.
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: |
|---|---|
| solvent, vapours, degreasing etc., evaporating from tank (in still air). | 0.25-0.5 m/s (50-100 f/min.) |
| 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) | 0.5-1 m/s (100-200 f/min.) |
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/min.) |

Within each range the appropriate value depends on:

| 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 |

Continued...

| | |
|---|---|
| | 4: Large hood or large air mass in motion \| 4: Small hood-local control only<br>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. |
| **Personal protection** |  |
| **Eye and face protection** | ▸ Safety glasses with side shields.<br>▸ Chemical goggles.<br>▸ 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] |
| **Skin protection** | See Hand protection below |
| **Hands/feet protection** | ▸ Wear chemical protective gloves, e.g. PVC.<br>▸ Wear safety footwear or safety gumboots, e.g. Rubber<br>**NOTE:**<br>▸ 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.<br>▸ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.<br>For esters:<br>▸ Do NOT use natural rubber, butyl rubber, EPDM or polystyrene-containing materials.<br>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.<br>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.<br>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:<br>▸ frequency and duration of contact,<br>▸ chemical resistance of glove material,<br>▸ glove thickness and<br>▸ dexterity<br>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).<br>▸ 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.<br>▸ 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.<br>▸ Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.<br>▸ Contaminated gloves should be replaced.<br>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. |
| **Body protection** | See Other protection below |
| **Other protection** | ▸ Overalls.<br>▸ PVC Apron.<br>▸ PVC protective suit may be required if exposure severe.<br>▸ Eyewash unit.<br>▸ Ensure there is ready access to a safety shower.<br>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.<br>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).<br>Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return. |
| **Thermal hazards** | Not Available |

### Recommended material(s)

**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:
***"Forsberg Clothing Performance Index".***
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Laminex - Colour Tech Door Paint Hardener Part B

| Material | CPI |
|---|---|
| PE/EVAL/PE | A |
| PVA | A |
| TEFLON | A |

### Respiratory protection

Type A 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 | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|---|---|---|---|

Continued...

| | |
|---|---|
| VITON | A |
| BUTYL | C |
| BUTYL/NEOPRENE | C |
| HYPALON | C |
| NAT+NEOPR+NITRILE | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE | C |
| NITRILE+PVC | C |
| PVC | C |
| PVDC/PE/PVDC | 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.

| Factor | | | |
|---|---|---|---|
| up to 5 x ES | A-AUS / Class 1 | - | A-PAPR-AUS / Class 1 |
| up to 25 x ES | Air-line* | A-2 | A-PAPR-2 |
| up to 50 x ES | - | A-3 | - |
| 50+ x ES | - | Air-line** | - |

* - Continuous-flow; ** - Continuous-flow or positive pressure demand
^ - 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)

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

| | |
|---|---|
| **Appearance** | Clear yellowish viscous liquid with a strong solvent odour; not miscible with water. Will react slowly with water to release carbon dioxide. |

| | | | |
|---|---|---|---|
| **Physical state** | Liquid | **Relative density (Water = 1)** | 1.08 |
| **Odour** | Not Available | **Partition coefficient n-octanol / water** | Not Available |
| **Odour threshold** | Not Available | **Auto-ignition temperature (°C)** | Not Available |
| **pH (as supplied)** | Not Available | **Decomposition temperature** | Not Available |
| **Melting point / freezing point (°C)** | Not Available | **Viscosity (cSt)** | Not Available |
| **Initial boiling point and boiling range (°C)** | 110 | **Molecular weight (g/mol)** | Not Applicable |
| **Flash point (°C)** | 10 | **Taste** | Not Available |
| **Evaporation rate** | Not Available | **Explosive properties** | Not Available |
| **Flammability** | Flammable. | **Oxidising properties** | Not Available |
| **Upper Explosive Limit (%)** | Not Available | **Surface Tension (dyn/cm or mN/m)** | Not Available |
| **Lower Explosive Limit (%)** | Not Available | **Volatile Component (%vol)** | 60 |
| **Vapour pressure (kPa)** | Not Available | **Gas group** | Not Available |
| **Solubility in water (g/L)** | Immiscible | **pH as a solution(1%)** | Not Available |
| **Vapour density (Air = 1)** | >1 | **VOC g/L** | Not Available |

## SECTION 10 STABILITY AND REACTIVITY

| | |
|---|---|
| **Reactivity** | See section 7 |
| **Chemical stability** | ▸ Unstable in the presence of incompatible materials.<br>▸ Product is considered stable.<br>▸ 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

| | |
|---|---|
| **Inhaled** | Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.<br>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.<br>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract |

Continued...

| | |
|---|---|
| | irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.<br>Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterised by headache and dizziness, increased reaction time, fatigue and loss of co-ordination<br><br>Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted amongst workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, oedema and focal alveolar haemorrhage. Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonise this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in adipose tissue.<br>Xylene is a central nervous system depressant. Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.<br>The main effects of simple aliphatic esters are narcosis and irritation and anaesthesia at higher concentrations. These effects become greater as the molecular weights and boiling points increase. Central nervous system depression , headache, drowsiness, dizziness, coma and neurobehavioral changes may also be symptomatic of overexposure. Respiratory tract involvement may produce mucous membrane irritation, dyspnea, and tachypnea, pharyngitis, bronchitis, pneumonitis and, in massive exposures, pulmonary oedema (which may be delayed). Gastrointestinal effects include nausea, vomiting, diarrhoea and abdominal cramps. Liver and kidney damage may result from massive exposures. |
| **Ingestion** | Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.<br>Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).<br>Accidental ingestion of the material may be damaging to the health of the individual. |
| **Skin Contact** | Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.<br>The material may produce moderate skin irritation; limited evidence or practical experience suggests, that the material either:<br>▸ produces moderate inflammation of the skin in a substantial number of individuals following direct contact and/or<br>▸ produces significant, but moderate, inflammation when applied to the healthy intact skin of animals (for up to four hours), such inflammation being present twenty-four hours or more after the end of the exposure period.<br>Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact 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.<br>Open cuts, abraded or irritated skin should not be exposed to this material |
| **Eye** | Limited evidence or practical experience suggests, that the material may cause moderate eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged exposure may cause moderate inflammation (similar to windburn) characterised by a temporary redness of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. |
| **Chronic** | Practical evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a substantial number of individuals at a greater frequency than would be expected from the response of a normal population.<br>Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking.<br>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.<br>Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.<br>On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.<br>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.<br>There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.<br>With most allergens, removal of the offending agent results in the individual becoming asymptomatic. Toluene diisocyanate (TDI)-induced asthma may continue for months or even years after exposure ceases. This may be due to a non-allergenic condition known as reactive airway dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Evidence of carcinogenic potential of commercial grade TDI in female mice included induction of haemangiomas in the spleen and subcutaneous tissues, hepatocellular adenomas, and haemangiosarcomas in the liver, ovary and peritoneum. Ingestion of commercial grade TDI produced subcutaneous fibromas, pancreatic acinar cell adenomas, mammary gland fibroadenomas and subcutaneous fibromas and fibrosarcomas in female rats. No treatment related tumours were induced in male mice.<br>Prolonged or repeated contact with xylenes may cause defatting dermatitis with drying and cracking. Chronic inhalation of xylenes has been associated with central nervous system effects, loss of appetite, nausea, ringing in the ears, irritability, thirst anaemia, mucosal bleeding, enlarged liver and hyperplasia. Exposure may produce kidney and liver damage. In chronic occupational exposure, xylene (usually mix ed with other solvents) has produced irreversible damage to the central nervous system and ototoxicity (damages hearing and increases sensitivity to noise), probably due to neurotoxic mechanisms.<br>Industrial workers exposed to xylene with a maximum level of ethyl benzene of 0.06 mg/l (14 ppm) reported headaches and irritability and tired quickly. Functional nervous system disturbances were found in some workers employed for over 7 years whilst other workers had enlarged livers. Xylene has been classed as a developmental toxin in some jurisdictions.<br>Small excess risks of spontaneous abortion and congenital malformation were reported amongst women exposed to xylene in the first trimester of pregnancy. In all cases, however, the women were also been exposed to other substances. Evaluation of workers chronically exposed to xylene has demonstrated lack of genotoxicity. Exposure to xylene has been associated with increased risks of haemopoietic malignancies but, again, simultaneous exposure to other substances (including benzene) complicates the picture. A long-term gavage study to mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.<br>Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis). |

| **Laminex - Colour Tech Door Paint Hardener Part B** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | Not Available | Not Available |

Continued...

| | TOXICITY | IRRITATION |
|---|---|---|
| **isobutyl acetate** | Dermal (rabbit): 20000 mg/kg Eye(rabbit): 500 mg/24hr | moderate |
| | Inhalation (Rat) LC: 8000 ppm/4h | Skin(rabbit): 500 mg open mild |
| | Oral (Rabbit) LD50: 4763 mg/kg | |
| | Oral (rat) LD50: 13400 mg/kg | |
| | Not Available | Not Available |

| | TOXICITY | IRRITATION |
|---|---|---|
| **xylene** | Inhalation (Guinea pig) LC: 450 ppm/4h | Eye (human): 200 ppm irritant |
| | Inhalation (human) TCLo: 200 ppm | Eye (rabbit): 5 mg/24h SEVERE |
| | Inhalation (Human) TCLo: 200 ppm/4h | Eye (rabbit): 87 mg mild |
| | Inhalation (man) LCLo: 10000 ppm/6h | Skin (rabbit):500 mg/24h moderate |
| | Inhalation (rat) LC50: 5000 ppm/4h | |
| | Intraperitoneal (Mouse) LD50: 1548 mg/kg | |
| | Intraperitoneal (Rat) LD50: 2459 mg/kg | |
| | Intravenous (Rabbit) LD: 129 mg/kg | |
| | Oral (Human) LD: 50 mg/kg | |
| | Oral (human) LDLo: 50 mg/kg | |
| | Oral (Mouse) LD50: 2119 mg/kg | |
| | Oral (rat) LD50: 4300 mg/kg | |
| | Subcutaneous (Rat) LD50: 1700 mg/kg | |
| | Not Available | Not Available |

| | TOXICITY | IRRITATION |
|---|---|---|
| **toluene-2,4-diisocyanate** | Inhalation (human) TCLo: 20 ppb/2 yr | Eye (rabbit): 100 mg - SEVERE |
| | Inhalation (human) TCLo: 500 ppb | Skin (rabbit): 500 mg(open)-SEVERE |
| | Inhalation (human) TCLo: 80 ppb | Skin (rabbit):500 mg/24hr-moderate |
| | Inhalation (rat) LC50: 14 ppm/14 hr | |
| | Inhalation (rat) LC50: 600 ppm/6 hr | |
| | Oral (rat) LD50: 5800 mg/kg | |
| | Not Available | Not Available |

| | TOXICITY | IRRITATION |
|---|---|---|
| **hexamethylene diisocyanate** | Dermal (rabbit) LD50: 593 mg/kg | |
| | Inhalation (mouse) LC50: 30 mg/m3 | |
| | Inhalation (rat) LC50: 60 mg/m3/4h | |
| | Intravenous (mouse) LD50: 5.6 mg/kg | |
| | Oral (mouse) LD50: 350 mg/kg | |
| | Oral (rat) LD50: 738 mg/kg | |
| | Not Available | Not Available |

** Value obtained from manufacturer's msds*
*unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances*

**Laminex - Colour Tech Door Paint Hardener Part 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.

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

Continued...

| | |
|---|---|
| | lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.<br>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. |
| **ISOBUTYL ACETATE** | The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.<br>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.<br>Inhalation (rat): 8000ppm/4h Skin(rabbit): 500 mg/24hr moderate |
| **XYLENE** | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.<br>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.<br>The substance is classified by IARC as Group 3:<br>**NOT** classifiable as to its carcinogenicity to humans.<br>Evidence of carcinogenicity may be inadequate or limited in animal testing.<br>Reproductive effector in rats |
| **TOLUENE-2,4-DIISOCYANATE** | The following information refers to contact allergens as a group and may not be specific to this product.<br>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.<br><br>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic 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.<br>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.<br><br>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).<br>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.<br>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.<br><br>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.<br>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.<br>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.<br>for diisocyanates:<br>In general, there appears to be little or no difference between aromatic and aliphatic diisocyanates as toxicants. In addition, there are insufficient data available to make any major distinctions between polymeric (<1000 MW) and monomeric diisocyanates. Based on repeated dose studies in animals by the inhalation route, both aromatic and aliphatic diisocyanates appear to be of high concern for pulmonary toxicity at low exposure levels. Based upon a very limited data set, it appears that diisocyanate prepolymers exhibit the same respiratory tract effects as the monomers in repeated dose studies. There is also evidence that both aromatic and aliphatic diisocyanates are acutely toxic via the inhalation route. Most members of the diisocyanate category have not been tested for carcinogenic potential. Though the aromatic diisocyanates tested positive and the one aliphatic diisocyanate tested negative in one species, it is premature to make any generalizations about the carcinogenic potential of aromatic versus aliphatic diisocyanates. In the absence of more human data, it would be prudent at this time to assume that both aromatic and aliphatic diisocyanates are respiratory sensitisers. Diisocyanates are moderate to strong dermal sensitisers in animal studies. Skin irritation studies performed on rabbits and guinea pigs indicate no difference in the effects of aromatic versus aliphatic diisocyanates.<br>For monomers, effects on the respiratory tract (lungs and nasal cavities) were observed in animal studies at exposure concentrations of less than 0.005 mg/L. The experimental animal data available on prepolymeric diisocyanates show similar adverse effects at levels that range from 0.002 mg/L to 0.026 mg/L.<br>There is also evidence that both aromatic and aliphatic diisocyanates are acutely toxic via the inhalation route<br>**Oncogenicity:** Most members of the diisocyanate category have not been tested for carcinogenic potential. Commercially available Poly-MDI was tested in a 2-year inhalation study in rats. The tested material contained 47% aromatic 4,4'-methylenediphenyl diisocyanate (MDI) and 53% higher molecular weight oligomers. Interim sacrifices at one year showed that males and females in the highest dose group (6 mg/m3) had treatment related histological changes in the nasal cavity, lungs and mediastinal lymph nodes. The incidence and severity of degeneration and basal cell hyperplasia of the olfactory epithelium and Bowman's gland hyperplasia were increased in males at the mid and high doses and in females at the high dose following the two year exposure period. Pulmonary adenomas were found in 6 males and 2 |

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females, and pulmonary adenocarcinoma in one male in the high dose group. However, aliphatic hexamethylene diisocyanate (HDI) was found not to be carcinogenic in a two year repeated dose study in rats by the inhalation route. HDI has not been tested in mice by the inhalation route.
Though the oral route is not an expected route of exposure to humans, it should be noted that in two year repeated dose studies by the oral route, aromatic toluene diisocyanate (TDI) and 3,3'-dimethoxy-benzidine-4,4'-diisocyanate (dianisidine diisocyanate, DADI) were found to be carcinogenic in rodents. TDI induced a statistically significant increase in the incidence of liver tumors in rats and mice as well as dose-related hemangiosarcomas of the circulatory system and has been classified by the Agency as a B2 carcinogen. DADI was found to be carcinogenic in rats, but not in mice, with a statistically increase in the incidence of pancreatic tumors observed.
**Respiratory and Dermal Sensitization:** Based on the available toxicity data in animals and epidemiologic studies of humans, aromatic diisocyanates such as TDI and MDI are strong respiratory sensitisers. Aliphatic diisocyanates are generally not active in animal models for respiratory sensitization. However, HDI and possibly isophorone diisocyanate (IPDI), are reported to be associated with respiratory sensitization in humans. Symptoms resulting from occupational exposure to HDI include shortness of breath, increased bronchoconstriction reaction to histamine challenges, asthmatic reactions, wheezing and coughing. Two case reports of human exposure to IPDI by inhalation suggest IPDI is a respiratory sensitiser in humans. In view of the information from case reports in humans, it would be prudent at this time to assume that both aromatic and aliphatic diisocyanates are respiratory sensitisers. Studies in both human and mice using TDI, HDI, MDI and dicyclohexylmethane-4,4'-diisocyanate (HMDI) suggest cross-reactivity with the other diisocyanates, irrespective of whether the challenge compound was an aliphatic or aromatic diisocyanate. Diisocyanates are moderate to strong dermal sensitisers in animal studies. There seems to be little or no difference in the level of reactivity between aromatic and aliphatic diisocyanates.
**Dermal Irritation:** Skin irritation studies performed on rabbits and guinea pigs indicate no difference in the effects of aromatic versus aliphatic diisocyanates. The level of irritation ranged from slightly to severely irritating to the skin. One chemical, hydrogenated MDI (1,1-methylenebis-4-isocyanatocyclohexane), was found to be corrosive to the skin in guinea pigs.
Isocyanate vapours/mists are irritating to the upper respiratory tract and lungs; the response may be severe enough to produce bronchitis with wheezing, gasping and severe distress, even sudden loss of consciousness, and pulmonary oedema. Possible neurological symptoms arising from isocyanate exposure include headache, insomnia, euphoria, ataxia, anxiety neurosis, depression and paranoia. Gastrointestinal disturbances are characterised by nausea and vomiting. Pulmonary sensitisation may produce asthmatic reactions ranging from minor breathing difficulties to severe allergic attacks; this may occur following a single acute exposure or may develop without warning after a period of tolerance. A respiratory response may occur following minor skin contact. Skin sensitisation is possible and may result in allergic dermatitis responses including rash, itching, hives and swelling of extremities.
Isocyanate-containing vapours/ mists may cause inflammation of eyes and nasal passages.
Onset of symptoms may be immediate or delayed for several hours after exposure. Sensitised people can react to very low levels of airborne isocyanates. Unprotected or sensitised persons should not be allowed to work in situations allowing exposure to this material.

**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen
[*National Toxicology Program: U.S. Dep. of Health & Human Services 2002*]

**HEXAMETHYLENE DIISOCYANATE**

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.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic 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.

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.
for 1,6-hexamethylene diisocyanate:
Exposures to HDI are often associated with exposures to its prepolymers, especially to a trimeric biuretic prepolymer of HDI (HDI-BT), which is widely used as a hardener in automobile and airplane paints, and which typically contains 0.5-1% unreacted HDI. There is evidence that diisocyanate prepolymers may induce asthma at the same or greater frequency as the monomers; therefore, there is a need to assess the potential for human exposure to prepolymeric HDI as well as monomeric HDI.
1,6-Hexamethylene diisocyanate is corrosive to the skin and the eye.
1,6-Hexamethylene diisocyanate was found to induce dermal and respiratory sensitization in animals and humans. There is no threshold known for this effect.
Inhalation studies with repeated exposures to 1,6-hexamethylene diisocyanate vapor show that the respiratory tract is the target with 1,6-hexamethylene diisocyanate showing primarily upper respiratory tract lesions (nasal cavity). 1,6-Hexamethylene diisocyanate did not show a neurotoxic effect in a combined reproduction/developmental/neurotoxicity study. Life-time inhalation exposure to rats revealed a progression of non-neoplastic respiratory tract lesions, primarily to the nasal cavity, and represented the sequelae of non-specific irritation. Based on the presence of only reversible tissue responses to irritation at the low concentration of 0.005 ppm, this concentration was a NOAEL. No carcinogenic potential in rats was observed after life-time inhalation.
1,6-Hexamethylene diisocyanate showed no mutagenic activity *in vitro* in bacterial and in mammalian cell test systems.
1,6-Hexamethylene diisocyanate showed no clastogenic activity *in vivo*.
1,6-Hexamethylene diisocyanate has no effect on fertility and post-natal viability through post-natal day 4 in the rat after inhalation up to 0.299

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ppm. The overall NOEL was 0.005 ppm.
Inhalation of 1,6-hexamethylene diisocyanate during the pregnancy of rats produced maternal effects (nasal turbinate histopathology) at concentrations ³ 0.052 ppm. No developmental toxicity was observed up to 0.308 ppm.
Isocyanate vapours/mists are irritating to the upper respiratory tract and lungs; the response may be severe enough to produce bronchitis with wheezing, gasping and severe distress, even sudden loss of consciousness, and pulmonary oedema. Possible neurological symptoms arising from isocyanate exposure include headache, insomnia, euphoria, ataxia, anxiety neurosis, depression and paranoia. Gastrointestinal disturbances are characterised by nausea and vomiting. Pulmonary sensitisation may produce asthmatic reactions ranging from minor breathing difficulties to severe allergic attacks; this may occur following a single acute exposure or may develop without warning after a period of tolerance. A respiratory response may occur following minor skin contact. Skin sensitisation is possible and may result in allergic dermatitis responses including rash, itching, hives and swelling of extremities.
Isocyanate-containing vapours/ mists may cause inflammation of eyes and nasal passages.
Onset of symptoms may be immediate or delayed for several hours after exposure. Sensitised people can react to very low levels of airborne isocyanates. Unprotected or sensitised persons should not be allowed to work in situations allowing exposure to this material.

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

**CMR STATUS**

| | | | |
|---|---|---|---|
| **CARCINOGEN** | toluene-2,4-diisocyanate | Australia Exposure Standards - Carcinogens | Carc. 2 |

## SECTION 12 ECOLOGICAL INFORMATION

### Toxicity

**NOT AVAILABLE**

| Ingredient | Endpoint | Test Duration | Effect | Value | Species | BCF |
|---|---|---|---|---|---|---|
| **isocyanate functional material** | Not Available | Not Available | Not Available | Not Available | Not Available | Not Available |
| **isobutyl acetate** | Not Available | Not Available | Not Available | Not Available | Not Available | Not Available |
| **xylene** | Not Available | Not Available | Not Available | Not Available | Not Available | Not Available |
| **toluene-2,4-diisocyanate** | Not Available | Not Available | Not Available | Not Available | Not Available | Not Available |
| **hexamethylene diisocyanate** | Not Available | Not Available | Not Available | Not Available | Not Available | Not Available |

Within an aromatic series, acute toxicity increases with increasing alkyl substitution on the aromatic nucleus. For example, there is an increase in toxicity as alkylation of the naphthalene structure increases. The order of most toxic to least in a study using grass shrimp (Palaemonetes pugio) and brown shrimp (Penaeus aztecus) was dimethylnaphthalenes > methylnaphthalenes >naphthalenes.
Studies conclude that the toxicity of an oil appears to be a function of its di-aromatic and tri-aromatic hydrocarbons, which includes three-ring hydrocarbons such as phenanthrene.
The heavier (4-, 5-, and 6-ring) PAHs are more persistent than the lighter (2- and 3-ring) PAHs and tend to have greater carcinogenic and other chronic impact potential. PAHs in general are more frequently associated with chronic risks. These risks include cancer and often are the result of exposures to complex mixtures of chronic-risk aromatics (such as PAHs, alkyl PAHs, benzenes, and alkyl benzenes), rather than exposures to low levels of a single compound.
Anthrcene is a phototoxic PAH . UV light greatly increases the toxicity of anthracene to bluegill sunfish. . Benchmarks developed in the absence of UV light may be under-protective, and biological resources in strong sunlight are at more risk than those that are not.
For xylenes :
log Koc : 2.05-3.08
Koc : 25.4-204
Half-life (hr) air : 0.24-42
Half-life (hr) H2O surface water : 24-672
Half-life (hr) H2O ground : 336-8640
Half-life (hr) soil : 52-672
Henry's Pa m3 /mol: 637-879
Henry's atm m3 /mol: 7.68E-03
BOD 5 if unstated: 1.4,1%
COD : 2.56,13%
ThOD : 3.125
BCF : 23
log BCF : 1.17-2.41
**Environmental Fate**
**Terrestrial fate:**: Measured Koc values of 166 and 182, indicate that 3-xylene is expected to have moderate mobility in soil. Volatilisation of p-xylene is expected to be important from moist soil surfaces given a measured Henry's Law constant of 7.18x10-3 atm-cu m/mole. The potential for volatilisation of 3-xylene from dry soil surfaces may exist based on a measured vapor pressure of 8.29 mm Hg. p-Xylene may be degraded during its passage through soil). The extent of the degradation is expected to depend on its concentration, residence time in the soil, the nature of the soil, and whether resident microbial populations have been acclimated. p-Xylene, present in soil samples contaminated with jet fuel, was completely degraded aerobically within 5 days. In aquifer studies under anaerobic conditions, p-xylene was degraded, usually within several weeks, with the production of 3-methylbenzylfumaric acid, 3-methylbenzylsuccinic acid, 3-methylbenzoate, and 3-methylbenzaldehyde as metabolites.
**Aquatic fate:** Koc values indicate that p-xylene may adsorb to suspended solids and sediment in water. p-Xylene is expected to volatilise from water surfaces based on the measured Henry's Law constant. Estimated volatilisation half-lives for a model river and model lake are 3 hours and 4 days, respectively. BCF values of 14.8, 23.4, and 6, measured in goldfish, eels, and clams, respectively, indicate that bioconcentration in aquatic organisms is low. p-Xylene in water with added humic substances was 50% degraded following 3 hours irradiation suggesting that indirect photooxidation in the presence of humic acids may play an important role in the abiotic degradation of p-xylene. Although p-xylene is biodegradable and has been observed to degrade in pond water, there are insufficient data to assess the rate of this process in surface waters. p-Xylene has been observed to degrade in anaerobic and aerobic groundwater in several studies; however, it is known to persist for many years in groundwater, at least at sites where the concentration might have been quite high.
**Atmospheric fate:**
Most xylenes released to the environment will occur in the atmosphere and volatilisation is the dominant environmental fate process. In the ambient atmosphere, xylenes are expected to exist solely in the vapour phase. Xylenes are degraded in the atmosphere primarily by reaction with photochemically-produced hydroxyl radicals, with an estimated atmospheric lifetime of about 0.5 to 2 days. Xylenes' susceptibility to photochemical oxidation in the troposphere is to the extent that they may contribute to photochemical smog formation.
According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere and from its vapour pressure, p-xylene, is expected to exist solely as a vapour in the ambient

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atmosphere. Vapour-phase p-xylene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 16 hours. A half-life of 1.0 hr in summer and 10 hr in winter was measured for the reaction of p-xylene with photochemically-produced hydroxyl radicals. p-Xylene has a moderately high photochemical reactivity under smog conditions, higher than the other xylene isomers, with loss rates varying from 9-42% per hr. The photooxidation of p-xylene results in the production of carbon monoxide, formaldehyde, glyoxal, methylglyoxal, 3-methylbenzylnitrate, m-tolualdehyde, 4-nitro-3-xylene, 5-nitro-3-xylene, 2,6-dimethyl-p-benzoquinone, 2,4-dimethylphenol, 6-nitro-2,4-dimethylphenol, 2,6-dimethylphenol, and 4-nitro-2,6-dimethylphenol.
**Ecotoxicity:**
for xylenes
Fish LC50 (96 h) Pimephales promelas 13.4 mg/l; Oncorhyncus mykiss 8.05 mg/l; Lepomis macrochirus 16.1 mg/l (all flow through values); Pimephales promelas 26.7 (static)
Daphnia EC50 948 h): 3.83 mg/l
Photobacterium phosphoreum EC50 (24 h): 0.0084 mg/l
Gammarus lacustris LC50 (48 h): 0.6 mg/l

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

### Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|---|---|
| Not Available | Not Available | Not Available |

### Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|---|
| Not Available | Not Available |

### Mobility in soil

| Ingredient | Mobility |
|---|---|
| Not Available | Not Available |

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

| | |
|---|---|
| **Product / Packaging disposal** | ▸ Containers may still present a chemical hazard/ danger when empty.<br>▸ Return to supplier for reuse/ recycling if possible.<br>Otherwise:<br>▸ 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.<br>▸ Where possible retain label warnings and MSDS and observe all notices pertaining to the product.<br>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.<br>A Hierarchy of Controls seems to be common - the user should investigate:<br>▸ Reduction<br>▸ Reuse<br>▸ Recycling<br>▸ Disposal (if all else fails)<br>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.<br>▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains.<br>▸ It may be necessary to collect all wash water for treatment before disposal.<br>▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.<br>▸ Where in doubt contact the responsible authority.<br>▸ Recycle wherever possible.<br>▸ 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.<br>▸ Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).<br>▸ Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed. |

## SECTION 14 TRANSPORT INFORMATION

### Labels Required

| | |
|---|---|
| |  |
| **Marine Pollutant** | NO |
| **HAZCHEM** | •3YE |

### Land transport (ADG)

| | |
|---|---|
| **UN number** | 1866 |
| **Packing group** | II |
| **UN proper shipping name** | RESIN SOLUTION, flammable |
| **Environmental hazard** | No relevant data |

Continued...

| | |
|---|---|
| **Transport hazard class(es)** | Class: 3<br>Subrisk: |
| **Special precautions for user** | Special provisions: *<br>Limited quantity: 5 L |

### Air transport (ICAO-IATA / DGR)

| | |
|---|---|
| **UN number** | 1866 |
| **Packing group** | II |
| **UN proper shipping name** | Resin solution flammable |
| **Environmental hazard** | No relevant data |
| **Transport hazard class(es)** | ICAO/IATA Class: 3<br>ICAO / IATA Subrisk:<br>ERG Code: 3L |
| **Special precautions for user** | Special provisions: A3<br>Cargo Only Packing Instructions: 364<br>Cargo Only Maximum Qty / Pack: 60 L<br>Passenger and Cargo Packing Instructions: 353<br>Passenger and Cargo Maximum Qty / Pack: 5 L<br>Passenger and Cargo Limited Quantity Packing Instructions: Y341<br>Passenger and Cargo Limited Maximum Qty / Pack: 1 L |

### Sea transport (IMDG-Code / GGVSee)

| | |
|---|---|
| **UN number** | 1866 |
| **Packing group** | II |
| **UN proper shipping name** | RESIN SOLUTION flammable |
| **Environmental hazard** | |
| **Transport hazard class(es)** | IMDG Class: 3<br>IMDG Subrisk: |
| **Special precautions for user** | EMS Number: F-E , S-E<br>Special provisions:<br>Limited Quantities: 5 L |

### Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

| Source | Ingredient | Pollution Category | Residual Concentration - Outside Special Area (% w/w) | Residual Concentration |
|---|---|---|---|---|
| 40-7-4-8-0-0-AA-20140404 | isobutyl acetate | Y | Not Available | Not Available |
| 40-7-4-8-0-0-AA-20140404 | xylene | Y | Not Available | Not Available |
| 40-7-4-8-0-0-AA-20140404 | toluene-2,4-diisocyanate | Y | Not Available | Not Available |
| 40-7-4-8-0-0-AA-20140404 | hexamethylene diisocyanate | Y | Not Available | Not Available |

## SECTION 15 REGULATORY INFORMATION

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

| | |
|---|---|
| **isobutyl acetate(110-19-0) is found on the following regulatory lists** | "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Maritime Dangerous Goods Requirements (IMDG Code)","IOFI Global Reference List of Chemically Defined Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","Australia Exposure Standards","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)","FisherTransport Information","Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes","OSPAR National List of Candidates for Substitution – Norway","Joint FAO/WHO Expert Committee on Food Additives (JECFA) - Specifications for Flavourings","OECD List of High Production Volume (HPV) Chemicals","Australia Inventory of Chemical Substances (AICS)","Belgium Federal Public Service Mobility and Transport, Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (Dutch)","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)","Sigma-AldrichTransport Information","OECD Existing Chemicals Database","Australia National Pollutant Inventory","International Air Transport Association (IATA) Dangerous Goods Regulations","GESAMP/EHS Composite List - GESAMP Hazard Profiles","Australia Hazardous Substances Information System - Consolidated Lists","Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List","IMO IBC Code Chapter 17: Summary of minimum requirements","International Fragrance Association (IFRA) Survey: Transparency List" |

Continued...

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| **xylene(1330-20-7) is found on the following regulatory lists** | "International Maritime Dangerous Goods Requirements (IMDG Code)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Council of Chemical Associations (ICCA) - High Production Volume List","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5","OSPAR List of Chemicals for Priority Action","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","Australia Exposure Standards","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)","FisherTransport Information","IMO Provisional Categorization of Liquid Substances - List 3: (Trade-named) mixtures containing at least 99% by weight of components already assessed by IMO, presenting safety hazards","Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes","Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","OECD List of High Production Volume (HPV) Chemicals","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix I","Australia Inventory of Chemical Substances (AICS)","Australia Drinking Water Guideline Values For Physical and Chemical Characteristics","Belgium Federal Public Service Mobility and Transport, Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (Dutch)","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)","WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water","OECD Existing Chemicals Database","UNECE - Kiev Protocol on Pollutant Release and Transfer Registers - Annex II","Australia High Volume Industrial Chemical List (HVICL)","Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm - Domestic water supply quality","Australia National Pollutant Inventory","International Air Transport Association (IATA) Dangerous Goods Regulations","GESAMP/EHS Composite List - GESAMP Hazard Profiles","Australia Hazardous Substances Information System - Consolidated Lists","Australia Hazardous chemicals requiring Health Monitoring","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)","Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List","IMO IBC Code Chapter 17: Summary of minimum requirements","International Fragrance Association (IFRA) Survey: Transparency List","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7","Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - organic compounds)","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6" |
| **toluene-2,4-diisocyanate(584-84-9) is found on the following regulatory lists** | "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Maritime Dangerous Goods Requirements (IMDG Code)","International Council of Chemical Associations (ICCA) - High Production Volume List","Australia - New South Wales Protection of the Environment Operations (Waste) Regulation 2005 - Waste transported within NSW or interstate and required to be tracked","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)","Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 1","Australia Hazardous Substances Requiring Health Surveillance","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","Australia - Tasmania - Work Health and Safety Regulations 2012 - Hazardous Chemicals at Major Hazard Facilities (and their Threshold Quantity) - Table 15.1","Australia - Northern Territories Work Health and Safety National Uniform Legislation Regulations- Requirements for health monitoring - Hazardous chemicals (other than lead) requiring health monitoring","Australia Exposure Standards","Australia - Western Australia Hazardous Substances Requiring Health Surveillance","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)","FisherTransport Information","Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes","Australia - South Australia - Work Health and Safety Regulations 2012 - Schedule 15—Hazardous chemicals at major hazard facilities (and their threshold quantity) Table 15.1","Australia - Tasmania Hazardous Substances Requiring Health Surveillance","Australia - New South Wales - Work Health and Safety Regulation 2011 - Hazardous chemicals at major hazard facilities (and their threshold quantity) - Table 15.1","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","OECD List of High Production Volume (HPV) Chemicals","Australia Inventory of Chemical Substances (AICS)","Belgium Federal Public Service Mobility and Transport, Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (Dutch)","Australia Occupational Health and Safety (Commonwealth Employment) (National Standards) Regulations 1994 - Hazardous Substances Requiring Health Surveillance","Australia - Queensland Work Health and Safety Regulation - Hazardous chemicals (other than lead) requiring health monitoring","Australia - South Australia - Work Health and Safety Regulations 2012 - Requirements for health monitoring - Hazardous chemicals (other than lead) requiring health monitoring","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)","Sigma-AldrichTransport Information","OECD Existing Chemicals Database","Australia - New South Wales - Work Health and Safety Regulation 2011 - Requirements for health monitoring -Hazardous chemicals (other than lead) requiring health monitoring","Australia High Volume Industrial Chemical List (HVICL)","Australia Work Health and Safety Regulations 2011 - Hazardous chemicals (other than lead) requiring health monitoring","Australia National Pollutant Inventory","International Air Transport Association (IATA) Dangerous Goods Regulations","GESAMP/EHS Composite List - GESAMP Hazard Profiles","Australia - New South Wales Hazardous Substances Requiring Health Surveillance","Australia - Queensland Work Health and Safety Regulation - Hazardous chemicals at major hazard facilities (and their threshold quantity)","Australia Hazardous Substances Information System - Consolidated Lists","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)","Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List","Australia Work Health and Safety Regulations 2011 - Hazardous chemicals at major hazard facilities and their threshold quantity","Australia - Tasmania - Work Health and Safety Regulations 2012 - Requirements for Health Monitoring - Hazardous chemicals (other than lead) requiring health monitoring","IMO IBC Code Chapter 17: Summary of minimum requirements","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6" |
| **hexamethylene diisocyanate(822-06-0) is found on the following regulatory lists** | "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Maritime Dangerous Goods Requirements (IMDG Code)","International Council of Chemical Associations (ICCA) - High Production Volume List","Australia - New South Wales Protection of the Environment Operations (Waste) Regulation 2005 - Waste transported within NSW or interstate and required to be tracked","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)","Australia Hazardous Substances Requiring Health Surveillance","Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","Australia - Northern Territories Work Health and Safety National Uniform Legislation Regulations- Requirements for health monitoring - Hazardous chemicals (other than lead) requiring health monitoring","Australia Exposure Standards","Australia - Western Australia Hazardous Substances Requiring Health Surveillance","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)","Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes","Australia - Tasmania Hazardous Substances Requiring Health Surveillance","OECD List of High Production Volume (HPV) Chemicals","Australia Inventory of Chemical Substances (AICS)","Belgium Federal Public Service Mobility and Transport, Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (Dutch)","Australia Occupational Health and Safety (Commonwealth Employment) (National Standards) Regulations 1994 - Hazardous Substances Requiring Health Surveillance","Australia - Queensland Work Health and Safety Regulation - Hazardous chemicals (other than lead) requiring health monitoring","Australia - South Australia - Work Health and Safety Regulations 2012 - Requirements for health monitoring - Hazardous chemicals (other than lead) requiring health monitoring","United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)","Sigma-AldrichTransport Information","OECD Existing Chemicals Database","Australia - New South Wales - Work Health and Safety Regulation 2011 - Requirements for health monitoring -Hazardous chemicals (other than lead) requiring health monitoring","Australia National Pollutant Inventory","Australia Work Health and Safety Regulations 2011 - Hazardous chemicals (other than lead) requiring health monitoring","International Air Transport Association (IATA) Dangerous Goods Regulations","GESAMP/EHS Composite List - GESAMP Hazard Profiles","Australia - New South Wales Hazardous Substances Requiring Health Surveillance","Australia Hazardous Substances Information System - Consolidated Lists","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)","Australia - Tasmania - Work Health and Safety Regulations 2012 - Requirements for Health Monitoring - Hazardous chemicals (other than lead) requiring health monitoring","Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List","Acros Transport Information","IMO IBC Code Chapter 17: Summary of minimum requirements","Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6" |

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## SECTION 16 OTHER INFORMATION

### Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

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