WANNATE® HB-75MX
WANHUA CHEMICAL GROUP Co., LTD.

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

Product Identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>WANNATE® HB-75MX</th>
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<tbody>
<tr>
<td>Synonyms</td>
<td>Solution of 1, 6-Hexamethylene Diisocyanate Based Biuret Polyisocyanate</td>
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<tr>
<td>Proper shipping name</td>
<td>FLAMMABLE LIQUID, N.O.S.</td>
</tr>
<tr>
<td>Other means of identification</td>
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Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Binding agents, intermediates; other isocyanate component for polyurethanes. The highly reactive diisocyanates are important materials used in production of PUR products. Their reaction with various polyols and auxiliary materials is utilized to obtain miscellaneous material structures like foams, coatings or adhesives.

Details of the supplier of the safety data sheet

Registered company name: WANHUA CHEMICAL GROUP Co., LTD.
Address: No.17 Tianshan Road, Yantai, Shandong,
Telephone: 0535-3031150
Fax: 0535-338222-1150
Website: https://www.whchem.com
Email: whsds@whchem.com

Emergency telephone number

<table>
<thead>
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<tbody>
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<td>Emergency telephone numbers</td>
<td>+86 532-8389090</td>
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<td>Other emergency telephone numbers</td>
<td>+86 535-6203123</td>
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SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

SUMMARY OF HAZARD IN AN EMERGENCY SITUATION

Liquid.
Does not mix with water.
Sinks in water Flammable.
Harmful by inhalation.
Harmful in contact with skin.
May cause SENSITISATION by inhalation.
May cause SENSITISATION by skin contact.

Classification [1] Skin Corrosion/Irritation Category 2, Skin Sensitizer Category 1, Respiratory Sensitizer Category 1, Eye Irritation Category 2B, Acute Toxicity (Inhalation) Category 4, Flammable Liquid Category 3, Acute Toxicity (Dermal) Category 5


Label elements

<table>
<thead>
<tr>
<th>Hazard pictogram(s)</th>
<th></th>
</tr>
</thead>
</table>
Hazard statement(s)

- **H315**: Causes skin irritation.
- **H317**: May cause an allergic skin reaction.
- **H334**: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **H320**: Causes eye irritation.
- **H322**: Harmful if inhaled.
- **H26**: Flammable liquid and vapour.
- **H313**: May be harmful in contact with skin.

Precautionary statement(s) Prevention

- **P210**: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- **P233**: Keep container tightly closed.
- **P261**: Avoid breathing 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.
- **P342+P311**: If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider.
- **P370+P378**: In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
- **P305+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.
- **P304+P350**: IF ON SKIN or hair: Take off immediately all contaminated clothing. Rinse skin with water/shower.
- **P303+P361+P335**: 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 in accordance with local regulations.

Physical and Chemical Hazard

- **Liquid**
- **Does not mix with water**
- **Sinks in water**
- **Flammable**
- **Toxic smoke/fumes in a fire**
- **Reacts with water**

Health Hazards

**Inhaled**

Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally distress. The vapour/mist may be highly irritating to the upper respiratory tract and lungs; the response may be severe enough to produce bronchitis 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 for several hours after exposure. Sensitized people can react to very low doses, and should not be allowed to work in situations allowing exposure to this material. Continued exposure of sensitised persons may lead to possible long term respiratory impairment. Inhalation hazard is increased at higher temperatures. Mice exposed at up to 3000 ppm PGMEA 6 hr/day for a total of 9 days during an 11-day period showed no pronounced effect on the weights of liver, kidneys, heart, spleen, thymus or testes. Histopathological examination revealed degeneration of the olfactory epithelium in mice exposed at 300 ppm for the same time. Rats, similarly failed to show changes in internal organs and did not show olfactory epithelium degeneration until 3000 ppm. The no-effect level in rats was 1000 ppm.
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 xylene (1000 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 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.

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.

### Ingestion

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual. 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. Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).

### Skin Contact

- **The material may accentuate any pre-existing dermatitis condition.**
- **Repeated application of commercial grade PGMEA to the skin of rabbits for 2-weeks caused slight redness and very slight exfoliation.**
- **Open cuts, abraded or irritated skin should not be exposed to this material.**

### Eye

### Chronic

- **The material produces moderate skin irritation; evidence exists, or practical experience predicts, that the material either**: produces moderate infiltration of the skin in a substantial number of individuals following direct contact, or 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.
- **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 (vesication), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the epidermis, there may be focal oedema of the skin (spider naevi). Occasionally there may be inflammatory oedema of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/irritation may occur.

### Experimental data

- **Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure.**
- **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.

### Toxic effects

#### Skin

Skin contact with the material may be harmful; systemic effects may result following absorption.

#### The material may accentuate any pre-existing dermatitis condition.

#### Repeated application of commercial grade PGMEA to the skin of rabbits for 2-weeks caused slight redness and very slight exfoliation.

#### Open cuts, abraded or irritated skin should not be exposed to this material.

#### **The material produces moderate skin irritation; evidence exists, or practical experience predicts, that the material either**

- produces moderate infiltration of the skin in a substantial number of individuals following direct contact, and/or
- 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.

### Eye

Unlabeled propylene glycol monomethyl ether acetate (PGMEA) causes moderate discomfort, slight conjunctival redness and slight corneal injury in rabbits.

Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after installation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by a temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/irritation may occur.

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Xylene has been classed as a developmental toxin in some jurisdictions. 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 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 haematopoietic 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.

CONTAINS free organic isocyanate. Mixing and application requires special precautions and use of personal protective gear [APMF]. 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.

Environmental Hazards
See Section 12

Other hazards
Ingestion may produce health damage*. Cumulative effects may result following exposure*. May produce discomfort of the eyes and skin*.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances
See section below for composition of Mixtures

Mixtures

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<td>hexamethylene diisocyanate</td>
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<td>108-65-6</td>
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<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
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<td>1330-20-7</td>
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<td>28182-81-2</td>
<td>~75</td>
<td>hexamethylene diisocyanate polymer</td>
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SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact
- If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.

Skin Contact
- If skin contact occurs:
  - Immediately remove all contaminated clothing, including footwear.
  - Flush skin and hair with running water (and soap if available).
  - Seek medical attention in event of irritation.

Inhalation
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

Following uptake by inhalation, move person to an area free from risk of further exposure. Oxygen or artificial respiration should be administered as needed. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. A physician should be consulted.

Ingestion
- If swallowed do NOT induce vomiting.
- If vomiting occurs, ease patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casually can comfortably drink.
- Seek medical advice.
- Avoid giving milk or oils.
- Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Advise for rescue team (PPE requirement for rescue personnel)

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

Alert Fire Brigade and tell them location and nature of hazard.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

This material may be a potent pulmonary sensitizer 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, subcutaneous pain and dyspnoea.

Some cross-sensitivity occurs between different isocyanates.

Necarcinogenic 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.

NOTE: Isocyanates cause airway restriction in naive individuals with the degree of response dependent on the concentration and duration of exposure. They induce smooth muscle contraction which brings 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.

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 60-80% 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 (pO2 < 50 mm Hg or pCO2 > 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 can act as a reservoir.
- 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.

For poisons (where specific treatment regime is absent):

**BIOLOGICAL EXPOSURE INDEX - BEI**

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Index</th>
<th>Sampling Time</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylhippu-ric acids in urine</td>
<td>1.5 gm/gm creatinine</td>
<td>End of shift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mg/min</td>
<td></td>
<td>Last 4 hrs of shift</td>
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</table>

As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).

For poisons (where specific treatment regime is absent):

**ADVANCED TREATMENT**

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- 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.

**EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994**

BRONSTEIN, A.C. and CURRANCE, P.L.

SECTION 5 FIREFIGHTING MEASURES

**Extinguishing media**

- Small quantities of water in contact with hot liquid may react violently with generation of a large volume of rapidly expanding hot sticky semi-solid foam.
- Prevents additional hazard when fire fighting in a confined space.
- Cooling with flooding quantities of water reduces this risk.
- Water spray or fog may cause frothing and should be used in large quantities.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

**Special hazards arising from the substrate or mixture**

**Fire Incompatibility**

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

**Advice for firefighters**

**Fire Fighting**

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves in the event of a fire.

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

Use fire fighting procedures suitable for surrounding area.

DO NOT approach containers suspected to be hot.

Cool fire exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

Liquid and vapour are flammable.

Moderate fire hazard when exposed to heat or flame.

Vapour forms an explosive mixture with air.

Moderate explosion hazard when exposed to heat or flame.

Vapour may travel a considerable distance to source of ignition.

Heating may cause expansion or decomposition leading to violent rupture of containers.

On combustion, may emit toxic fumes of carbon monoxide (CO).

Combustion products include:
- carbon dioxide (CO2)
- isocyanates
- hydrogen cyanide
- and minor amounts of nitrogen oxides (NOx)
- other pyrolysis products typical of burning organic material.

When heated at high temperatures many isocyanates decompose rapidly generating a vapour which pressurises containers, possibly to the point of rupture.

Release of toxic and/or flammable isocyanate vapours may then occur

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Measures for Preventing Secondary Contamination

Refer to section above

Environmental precautions

See section 12

Methods and material for containment and cleaning up

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

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue (see Section 13 for specific agent).
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

Chemical Class: aromatic hydrocarbons

For release onto land: recommended sorbents listed in order of priority.

<table>
<thead>
<tr>
<th>SORBENT TYPE</th>
<th>RANK</th>
<th>APPLICATION</th>
<th>COLLECTION</th>
<th>LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feathers - pillow</td>
<td>1</td>
<td>throw</td>
<td>pitchfork</td>
<td>DGC, RT</td>
</tr>
<tr>
<td>cross-linked polymer - particulate</td>
<td>2</td>
<td>shovel</td>
<td>shovel</td>
<td>R, W, SS</td>
</tr>
<tr>
<td>cross-linked polymer - pillow</td>
<td>2</td>
<td>throw</td>
<td>pitchfork</td>
<td>R, DGC, RT</td>
</tr>
<tr>
<td>sorbent clay - particulate</td>
<td>3</td>
<td>shovel</td>
<td>shovel</td>
<td>R, I, P,</td>
</tr>
<tr>
<td>treated clay/ treated natural organic - particulate</td>
<td>3</td>
<td>shovel</td>
<td>shovel</td>
<td>R, I</td>
</tr>
<tr>
<td>wood fibre - pillow</td>
<td>4</td>
<td>throw</td>
<td>pitchfork</td>
<td>R, P, DGC, RT</td>
</tr>
</tbody>
</table>

LAND SPILL - MEDIUM

<table>
<thead>
<tr>
<th>SORBENT TYPE</th>
<th>RANK</th>
<th>APPLICATION</th>
<th>COLLECTION</th>
<th>LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>cross-linked polymer - particulate</td>
<td>1</td>
<td>blower</td>
<td>skiploader</td>
<td>R, W, SS</td>
</tr>
<tr>
<td>treated clay/ treated natural organic - particulate</td>
<td>2</td>
<td>blower</td>
<td>skiploader</td>
<td>R, I</td>
</tr>
<tr>
<td>sorbent clay - particulate</td>
<td>3</td>
<td>blower</td>
<td>skiploader</td>
<td>R, I, P</td>
</tr>
<tr>
<td>polypropylene - particulate</td>
<td>3</td>
<td>blower</td>
<td>skiploader</td>
<td>W, SS, DGC</td>
</tr>
<tr>
<td>feathers - pillow</td>
<td>3</td>
<td>throw</td>
<td>skiploader</td>
<td>DGC, RT</td>
</tr>
<tr>
<td>expanded mineral - particulate</td>
<td>4</td>
<td>blower</td>
<td>skiploader</td>
<td>R, I, W, P, DGC</td>
</tr>
</tbody>
</table>

Continued...
SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

- 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.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.

Personal Protective Equipment advice is contained in Section 8 of the SDS.
Keep containers securely sealed when not in use.
Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately. Laundry contaminated clothing before re-use.
Use good occupational work practice.
Observe manufacturer's storage and handling recommendations contained within this SDS.
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

### Conditions for safe storage, including any incompatibilities

**Suitable container**

- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

For low viscosity materials

- Drums and jerrycans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
- Cans with friction closures and low pressure tubes and cartridges may be used.

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 *.

In addition, where inner packagings are glass and contain liquids of packing group I and II 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.

All inner and sole packagings must be packaged as recommended by manufacturer.

### Storage incompatibility

- Xylenes:
  - may ignite or explode in contact with strong oxidisers, 1,3-dichloro-5,5-dimethylhydantoin, uranium fluoride
  - attack some plastics, rubber and coatings
  - may generate electrostatic charges on flow or agitation due to low conductivity.
  - Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic rings and strong oxidising agents.
  - Aromatics can react exothermically with bases and with diazo compounds.
  - Avoid cross contamination between the two liquid parts of product (kit).
  - If two part products are mixed or allowed to mix in proportions other than manufacturer's recommendation, polymerisation with gelation and evolution of heat (exotherm) may occur.
  - This excess heat may generate toxic vapour
  - Propylene glycol monomethyl ether acetate:
    - may polymerise unless properly inhibited due to peroxide formation
  - should be isolated from UV light, high temperatures, free radical initiators
  - may react with strong oxidisers to produce fire and/or explosion
  - reacts violently with with sodium peroxide, uranium fluoride
  - is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates, boranes
  - Avoid reaction with water, alcohols and detergent solutions.
  - Isocyanates and thiocyanocyanates are incompatible with many classes of compounds, reacting exothermically to release toxic gases. Reactions with amines, strong bases, aldehydes, alcohols, alkali metals, ketones, mercaptans, strong oxidisers, hydrides, phenols, and peroxides can cause vigorous releases of heat. Acids and bases initiate polymerisation reactions in these materials.
  - Isocyanates easily form adducts with carbodiimides, isothiocyanates, ketenes, or with substrates containing activated CC or CN bonds.
  - Some isocyanates react with water to form amines and liberate carbon dioxide. This reaction may also generate large volumes of foam and heat. Foaming in confined spaces may produce pressure in confined spaces or containers. Gas generation may pressurise drums to the point of rupture.
  - Do NOT resell container if contamination is expected
  - Open all containers with care
  - Base-catalysed reactions of isocyanates with alcohols should be carried out in inert solvents. Such reactions in the absence of solvents often occur with explosive violence.
  - Isocyanates will attack and embrittle some plastics and rubbers.
  - A range of exothermic decomposition energies for isocyanates is given as 20-30 kJ/mol.
  - The relationship between energy of decomposition and processing hazards has been the subject of discussion; it is suggested that values of energy released per unit of mass, rather than on a molar basis (J/g) be used in the assessment.
  - For example, in "open vessel processes" (with man-hole size openings, in an industrial setting), substances with exothermic decomposition energies below 500 J/g are unlikely to present a danger, whilst those in "closed vessel processes" (opening is a safety valve or bursting disk) present some danger where the decomposition energy exceeds 150 J/g.
SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

**OCCUPATIONAL EXPOSURE LIMITS (OEL)**

<table>
<thead>
<tr>
<th>INGREDIENT DATA</th>
<th>Source</th>
<th>Ingredient</th>
<th>Material name</th>
<th>TWA</th>
<th>STEL</th>
<th>Peak</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
<td>hexamethylene diisocyanate</td>
<td>Hexamethylene diisocyanate</td>
<td>0.03 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

**EMERGENCY LIMITS**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Material name</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene diisocyanate</td>
<td>Hexamethylene diisocyanate, (1,6-Disocyanatohexane)</td>
<td>0.018 ppm</td>
<td>0.2 ppm</td>
<td>3 ppm</td>
</tr>
<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td>Propylene glycol monomethyl ether acetate, alpha-isomer; (1-Methoxypropyl-2-acetate)</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>propylene glycol monomethyl ether acetate, beta-isomer</td>
<td>Propylene glycol monomethyl ether acetate, beta-isomer; (2-Methoxypropyl-1-acetate)</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>xylene</td>
<td>Xylenes</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>hexamethylene diisocyanate polymer</td>
<td>Hexamethylene diisocyanate polymer</td>
<td>7.8 mg/m³</td>
<td>86 mg/m³</td>
<td>510 mg/m³</td>
</tr>
</tbody>
</table>

**MATERIAL DATA**

for isocyanates:

- Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. This should emphasise:
  - demographic, occupational and medical history and health advice
  - completion of a standardised respiratory questionnaire
  - physical examination of the respiratory system and skin
  - standardised respiratory function tests such as FEV1, FVC and FEV1/FVC

Various portable or stationary instruments are available for the continuous measurement of isocyanates in the air. All of them function on the principle of colourimetric evaluation of an indicator paper strip. They are operating continuously and unattended. Paper tape systems are easy to use and do not require skilled analysts to operate them. They give rapid results and are therefore suitable for leak detection and in emergency situations. However:

- They may read incorrect at very high or very low humidity.
- are unsuitable for aerosols
- and may not be accepted for purposes of regulatory compliance.

Air monitoring of isocyanates requires sound analytical knowledge. In order to obtain reliable results only laboratories with experience in that specific area should be engaged with such measurements.

for propylene glycol monomethyl ether acetate (PGMEA)

Saturated vapour concentration: 4868 ppm at 20 °C.

A two-week inhalation study found nasal effects to the nasal mucosa in animals at concentrations up to 3000 ppm. Differences in the teratogenic potential of the alpha (commercial grade) and beta isomers of PGMEA may be explained by the formation of different metabolites. The beta-isomer is thought to be oxidised to methoxypropionic acid, a homologue to methoxyacetic acid which is a known teratogen. The alpha-form is conjugated and excreted. PGMEA mixture (containing 2% to 5% beta isomer) is a mild skin and eye irritant, produces mild central nervous system effects in animals at 3000 ppm and produces mild CNS impairment and upper respiratory tract and eye irritation in humans at 1000 ppm. In rats exposed to 3000 ppm PGMEA produced slight foetotoxic effects (delayed sternabral ossification) - no effects on foetal development were seen in rabbits exposed at 3000 ppm.

for 1,6-hexamethylene diisocyanate (HDI):

The toxicological action of HDI is similar to that of toluene diisocyanate and the TLV-TWA is analogous. In light of reported asthma/ 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.

for xylenes:

**IDLH Level:** 900 ppm

**Oxidant 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 oculair 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)**

**Exposure controls**

- All processes in which isocyanates are used should be enclosed wherever possible.
- Total enclosure, accompanied by good general ventilation, should be used to keep atmospheric concentrations below the relevant exposure standards.
- If total enclosure of the process is not feasible, local exhaust ventilation may be necessary. Local exhaust ventilation is essential where lower molecular weight isocyanates (such as TDI or HDI) is used or where isocyanate or polyurethane is sprayed.
- Where other isocyanates or pre-polymers are used and aerosol formation cannot occur, local exhaust ventilation may not be necessary if the atmospheric concentration can be kept below the relevant exposure standards.
Where local exhaust ventilation is installed, exhaust vapours should not be vented to the exterior in such a manner as to create a hazard. 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.
- Endorsement 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.

- Spraying of material or material in admixture with other components must be carried out in conditions conforming to local state regulations (AS/NZS 4114, UNI EN 12215:2010, ANSI/AIHA Z9.3–2007 or national equivalent).
- Local exhaust ventilation with full face positive-pressure air supplied breathing apparatus (hood or helmet type) is required.
- Spraying should be performed in a spray booth fitted with an effective exhaust system which complies with local environmental legislation.
- The spray booth area must be isolated from unprotected personnel whilst spraying is in progress and until all spraying mist has cleared.

**NOTE:** Isocyanate vapours will not be adequately absorbed by organic vapour respirators. 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.

<table>
<thead>
<tr>
<th>Type of Contaminant:</th>
<th>Air Speed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct spray, spray painting in shallow booths, drum filling, conveyor loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td>
<td>1: 2.5 m/s (200-500 f/min.)</td>
</tr>
</tbody>
</table>

Within each range the appropriate value depends on:

<table>
<thead>
<tr>
<th>Lower end of the range</th>
<th>Upper end of the range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Room air currents minimal or favourable to capture</td>
<td>1: Disturbing room air currents</td>
</tr>
<tr>
<td>2: Contaminants of low toxicity or of nuisance value only</td>
<td>2: Contaminants of high toxicity</td>
</tr>
<tr>
<td>3: Intermittent, low production.</td>
<td>3: High production, heavy use</td>
</tr>
<tr>
<td>4: Large hood or large air mass in motion</td>
<td>4: Small hood-local control only</td>
</tr>
</tbody>
</table>

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 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 4-10 m/s (800-2000 f/min.) for extraction of solvents generated by spraying at a point 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

- Safety glasses with side shields.
- Chemical goggles.

### Eye and face protection

- 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 lenses as soon as practicable. Lenses 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

**NOTE:**

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch bands should be removed and destroyed.
- Do NOT wear natural rubber (latex) gloves.
- Isocyanate resistant materials include Teflon, Viton, nitrile rubber and some PVA gloves.
- Protective gloves and overalls should be worn as specified in the appropriate national standard.
- Contaminated garments should be removed promptly and should not be re-used until they have been decontaminated.
- **NOTE:** Natural rubber, neoprene, PVC can be affected by isocyanates.

- **DO NOT** use skin cream unless necessary and then use only minimum amount.
- Isocyanate vapour may be absorbed into skin cream and this increases hazard.

### Body protection

See Other protection below

### Other protection

All employees working with isocyanates must be informed of the hazards from exposure to the contaminant and the precautions necessary to prevent damage to their health. They should be made aware of the need to carry out their work so that as little contamination as possible is produced, and of the importance of the proper use of all safeguards against exposure to themselves and their fellow workers. Adequate training, both in the proper execution of the task and in the use of all associated engineering controls, as well as of any personal protective equipment, is essential.

Employees exposed to contamination hazards should be educated in the need for, and proper use of, facilities, clothing and equipment and thereby maintain a high standard of personal cleanliness. Special attention should be given to ensuring that all personnel understand instructions, especially newly recruited employees and those with local-language difficulties, where they are known.

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

### Thermal hazards

Not Available

### 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.
### SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Colorless to pale yellow</td>
</tr>
<tr>
<td><strong>Physical state</strong></td>
<td>Liquid</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>Solvent-like</td>
</tr>
<tr>
<td><strong>Odour threshold</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>pH (as supplied)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Melting point / freezing point (°C)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range (°C)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Flash point (°C)</strong></td>
<td>38</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Flammability</strong></td>
<td>Flammable.</td>
</tr>
<tr>
<td><strong>Upper Explosive Limit (%)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Lower Explosive Limit (%)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Vapour pressure (kPa)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Solubility in water (g/L)</strong></td>
<td>Immiscible</td>
</tr>
<tr>
<td><strong>Vapour density (Air = 1)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Relative density (Water = 1)</strong></td>
<td>1.07</td>
</tr>
<tr>
<td><strong>Partition coefficient n-octanol / water</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature (°C)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Viscosity (mPa.s)</strong></td>
<td>225 (at 25 °C)</td>
</tr>
<tr>
<td><strong>Molecular weight (g/mol)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Explosive properties</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Oxidising properties</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Surface Tension (dyn/cm or mN/m)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Volatile Component (%vol)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Gas group</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>pH as a solution (1%)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>VOC g/L</strong></td>
<td>Not Available</td>
</tr>
</tbody>
</table>

### SECTION 10 STABILITY AND REACTIVITY

**Reactivity**

See section 7

**Chemical stability**

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

**Possibility of hazardous reactions**

See section 7

**Conditions to avoid**

See section 7

**Incompatible materials**

See section 7

**Hazardous decomposition products**

See section 5
## SECTION 11 TOXICOLOGICAL INFORMATION

### WANNATE® HB-75MX

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity</th>
<th>irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IRRITATION**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

### hexamethylene disocyanate

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity</th>
<th>irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: 570 mg/kg</td>
<td></td>
<td>Not Available</td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 6E-5 mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 738 mg/kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IRRITATION**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

### propylene glycol monomethyl ether acetate, alpha-isomer

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity</th>
<th>irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rat) LD50: &gt;2000 mg/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 6502.6355500942 mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;5000 mg/kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IRRITATION**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

### xylene

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity</th>
<th>irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: &gt;1700 mg/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 4988.596509405 mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 4300 mg/kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IRRITATION**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye (human): 200 ppm irritant</td>
<td></td>
</tr>
<tr>
<td>Eye (rabbit): 5 mg/24h SEVERE</td>
<td></td>
</tr>
<tr>
<td>Eye (rabbit): 87 mg mild</td>
<td></td>
</tr>
<tr>
<td>Skin (rabbit): 500 mg/24h moderate</td>
<td></td>
</tr>
</tbody>
</table>

### hexamethylene disocyanate polymer

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity</th>
<th>irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: &gt;5000 mg/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 0.004625 mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;10000 mg/kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IRRITATION**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin (rabbit): 500 mg - moderate</td>
<td></td>
</tr>
</tbody>
</table>

### HEXAMETHYLENE DISOCYANATE

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, with 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.

### PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER

for propylene glycol ethers (PGEs):

Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM).

Testing of a wide variety of propylene glycol ethers has shown that propylene glycol-based ethers are less toxic than some ethers of the ethylene series. The common toxicities associated with the lower molecular weight homologues of the ethylene series, such as adverse effects on reproductive organs, the developing embryo and fetus, blood (haemolytic effects), or thymus, are not seen with the commercial-grade propylene glycol ethers. In the ethylene series, metabolism of the terminal hydroxyl group produces an alkoxyacetic acid. The reproductive and developmental toxicities of the lower molecular weight homologues in the ethylene series are due specifically to the formation of methoxyacetic and ethoxyacetic acids. Longer chain length homologues in the ethylene series are not associated with the reproductive toxicity but can cause haemolysis in sensitive species, also through formation of an alkoxyacetic acid. The predominant alpha isomer of all the PGEs (thermodynamically favored during manufacture of PGEs) is a secondary alcohol incapable of forming an alkoxypropionic acid. In contrast beta-isomers are able to form the alkoxypropionic acids and these are linked to...
teratogenic effects (and possibly haemolytic effects). This alpha isoform comprises greater than 95% of the isomeric mixture in the commercial product.

Because the alpha isoform cannot form an alkyoxypionic acid, this is the most likely reason for the lack of toxicity shown by the PGEs as distinct from the lower molecular weight ethylene glycol ethers. More importantly, however, very extensive empirical evidence indicates that this class of commercial-grade glycol ehter presents a low toxicity hazard. PGEs, whether mono- or di-isopropylene glycol-based (and no matter what the alcohol group), show a very similar pattern of low to non-detectable toxicity of any type at doses or exposure levels greatly exceeding those showing pronounced effects from the ethylene series. One of the primary metabolites of the propylene glycol ethers is propylene glycol, which is of low toxicity and completely metabolised in the body.

As a class, the propylene glycol ethers are rapidly absorbed and distributed throughout the body when introduced by inhalation or oral exposure. Dermal absorption is somewhat slower but subsequent distribution is rapid. Most exposure for PGEs is via the urine and expired air. A small portion is excreted in the feces.

As a group PGEs exhibits low acute toxicity by the oral, dermal, and inhalation routes. Oral rat LD50's range from >3,000 mg/kg (PnB) to >5,000 mg/kg (DPMA). Dermal LD50's are all >2,000 mg/kg (PnB & DPnB), where no deaths occurred, and ranging up to >15,000 mg/kg (TPM). Inhalation LC50 values were higher than 5,000 mg/m3 for DPMA (4-hour exposure), and TPM (1-hour exposure). For DPnB the 4-hour LC50 is >2,040 mg/m3. For PnB, the 4-hour LC50 was >651 ppm (>3,412 mg/m3), representing the highest practically attainable vapor level. No deaths occurred at these concentrations. PnB and TPM are moderately irritating to eyes while the remaining category members are only slightly irritating to nonirritating. PnB is moderately irritating to skin while the remaining category members are slightly to non-irritating. None are skin sensitisers.

In repeated dose studies ranging in duration from 2 to 13 weeks, few adverse effects were found even at high exposure levels and effects that did occur were mild in nature. By oral administration, NOAEL's of 360 mg/kg-d for DPnB were observed for liver and kidney weight increases (without accompanying histopathology). NOAELs for these two chemicals were 1000 mg/kg (highest dose tested).

Dermal repeated-dose toxicity tests have been performed for many PGEs. For PnB, no effects were seen in a 13-week study at doses as high as 1,000 mg/kg-d. A dose of 273 mg/kg-d constituted a LOAEL (increased organ weights without histopathology) in a 13-week dermal study for DPnB. For TPM, increased kidney weights (no histopathology) and transiently decreased body weights were found at a dose of 2,895 mg/kg-d in a 90-day study in rabbits. By inhalation, no effects were observed in 2-week studies in rats at the highest tested concentrations of 3244 mg/m3 (600 ppm) for PnB and 2,010 mg/m3 (260 ppm) for DPnB. TPM caused increased liver weights without histopathology by inhalation in a 2-week study at a NOAEL of 360 mg/m3 (43 ppm). In this study, the highest tested TPM concentration, 1010 mg/m3 (120 ppm), also caused increased liver weights without accompanying histopathology. Although no repeated-dose studies are available for the oral route for TPM, or for any route for DPMA, it is anticipated that these chemicals would be similar to other category members.

One and two-generation reproductive toxicology testing has been conducted in mice, rats, and rabbits via the oral or inhalation routes of exposure on PM and PMA. In an inhalation rat study using PM, the NOAEL for parental toxicity is 300 ppm (1106 mg/m3) with decreases in body and organ weights occurring at the NOEL of 1000 ppm (3686 mg/m3). For offspring toxicity the NOEL is 1000 ppm (3686 mg/m3), with decreased body weights occurring at 3000 ppm (11058 mg/m3). For PMA, the NOAE (same day NOAEL) in a two parent and offspring toxicity is 1000 mg/m3, in a two generation study in rats. No adverse effects were found on reproductive organs, fertility rates, or other indices commonly monitored in such studies. In addition, there is no evidence from histopathological data from repeated-dose studies for the category members that would indicate that these chemicals would pose a reproductive hazard to human health.

In developmental toxicity studies many PGEs have been tested by various routes of exposure and in various species at significant exposure levels and show no frank developmental effects. Due to the rapid hydrolysis of DPMA to DPM, DPMA would not be expected to show teratogenic effects. At high doses where maternal toxicity occurs (e.g., significant body weight loss), an increased incidence of some anomalies such as delayed skeletal ossification or increased 13th ribs, have been reported. Commercially available PGEs showed no teratogenicity.

The weight of the evidence indicates that propylene glycol ethoxylates are not likely to be genotoxic. In vitro, negative results have been seen in a number of assays for PnB, DPnB, DPMA and TPM. Positive results were only seen in 3 out of 6 chromosome aberration assays in mammalian cells with DPnB. However, negative results were seen in a mouse micronucleus assay with DPnB and PM. Thus, there is no evidence to suggest these PGEs would be genotoxic in vivo.

In a 2-year bioassay on PM, there were no statistically significant increases in tumors in rats and mice. A BASF report (in ECETOC) showed that inhalation exposure to 545 ppm PGMEA (beta isomer) was associated with a teratogenic response in rabbits; but exposure to 145 ppm and 36 ppm had no adverse effects. The beta isomer of PGMEA comprises only 10% of the commercial material, the remaining 90% is alpha isomer. Hazard appears low but emphasizes the need for care in handling this chemical. [I.C.I]* Shin-Etsu SDS

**Continued...**
### SECTION 12 ECOLOGICAL INFORMATION

#### Toxicity

<table>
<thead>
<tr>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene disocyanate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>22mg/L</td>
<td>1</td>
</tr>
<tr>
<td>EC50</td>
<td>72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;77.4mg/L</td>
<td>2</td>
</tr>
<tr>
<td>ECO</td>
<td>24</td>
<td>Crustacea</td>
<td>&lt;0.33mg/L</td>
<td>1</td>
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<tr>
<td>NOEC</td>
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<td>Algae or other aquatic plants</td>
<td>11.7mg/L</td>
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<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>=100mg/L</td>
<td>1</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>=408mg/L</td>
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</tr>
<tr>
<td>ECO</td>
<td>24</td>
<td>Crustacea</td>
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<tr>
<td>NOEC</td>
<td>306</td>
<td>Fish</td>
<td>47.5mg/L</td>
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</tr>
<tr>
<td>xylene</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>2.6mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>&gt;3.4mg/L</td>
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<td>ECO</td>
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<td>4.6mg/L</td>
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<td>Algae or other aquatic plants</td>
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<tr>
<td>hexamethylene disocyanate polymer</td>
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<td></td>
<td></td>
<td></td>
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<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

**Legend:**
- Data available but does not fill the criteria for classification
- Data Not Available to make classification

---

**for propylene glycol ethers:**

**Environmental fate:**
Most are liquids at room temperature and all are water-soluble. Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM)

**Environmental fate:** Log octanol-water partition coefficients (log Kow's) range from 0.309 for TPM to 1.523 for DPnB. Calculated BCF's range from 1.47 for DPnB to 3.16 for DPMA and TPM, indicating low bioaccumulation. Henry's Law Constants, which indicate propensity to partition from water to air, are low for all category members, ranging from 5.7 x 10^-9 atm-m^3/mole for TPM to 2.7 x 10^-9 atm-m^3/mole for PnB. Fugacity modeling indicates that most propylene glycol ethers are likely to partition roughly equally into the soil and water compartments in the environment with small to negligible amounts remaining in other environmental compartments (air, sediment, and aquatic biota). Propylene glycol ethers are unlikely to persist in the environment. Once in air, the half-life of the category members due to direct reactions with photochemically generated hydroxyl radicals, range from 2.0 hours for TPM to 4.6 hours for PnB. In water, most members of this family are readily biodegradable under aerobic conditions. (DPMA degraded within 28 days (and within the specified 10-day window) but only using pre-adapted or "acclimated" inoculum.). In soil, biodegradation is rapid for PM and PMA.

**Ecotoxicity:**
Acute aquatic toxicity testing indicates low toxicity for both ethers and acetates. For ethers, effect concentrations are > 500 mg/L. For acetates, effect concentrations are > 151 mg/L. for polycyclics:
Polyisocyanates are not readily biodegradable. However, due to other elimination mechanisms (hydrolysis, adsorption), long retention times in water are not to be expected. The resulting polyurea is more or less inert and, due to its molecular size, not bioavailable. Within the limits of water solubility, polyisocyanates have a low to moderate toxicity for aquatic organisms.
Hydrolysis would represent the primary fate mechanism for the majority of the commercial isocyanate monomers, but is tempered somewhat by the lack of water solubility. In the absence of hydrolysis, sorption to solids (e.g., sludge and sediments) will be the primary mechanism of removal. Biodegradation is minimal for most compounds and volatilisation is negligible. Atmospheric degradation is not expected with removal from air occurring by washout or dry deposition. Volatilisation from surface waters (e.g., lakes and rivers) is expected to take years. In wastewater treatment this process is not expected to be significant.

Review of the estimated properties of the isocyanates suggest that sorption is the primary removal mechanism in the ambient environment and in wastewater treatment in the absence of significant hydrolysis. Sorption to solids in wastewater treatment is considered strong to very strong for most compounds. Sorption to sediments and soils in the environment is very strong in most instances. Migration to groundwater and surface waters is not expected due to sorption or hydrolysis.

Hydrolysis of the N=C=O will occur in less than hours in most instances and within minutes for more than 90% of the commercial isocyanates. However, the low to very low solubility of these substances will generally lessen the effectiveness of hydrolysis as a fate pathway. But hydrolysis should be considered one of the two major fate processes for the isocyanates.

Aerobic and/or anaerobic biodegradation of the isocyanates is not expected to occur at significant levels. Most of the substances take several months to degrade.

Degradation of the hydrolysis products will occur at varying rates depending on the moiety formed.

### 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 7.18×10⁻³ atm·m⁻³·mol⁻¹·m⁰. 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 photodegradation due to 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 be degraded 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.

- Xylene's 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 atmosphere. Vapour-phase p-xylene is degraded in the atmosphere primarily 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 0.9 to 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 9.4% per hr. The photooxidation of p-xylene results in the production of carbon monoxide, formaldehyde, glycolal, methylglyoxal, 3-methylbenzylfiddle, m-toluicdehyde, 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 hr: 3.83 mg/l
  - Photobacterium phosphoreum EC50 (24 h): 0.0084 mg/l
  - Gammaurus lacustris LC50 (48 h): 0.6 mg/l

- For glycol ethers:

  **Environmental fate**

- Ether groups are generally stable to hydrolysis in water under neutral conditions and ambient temperatures. OECD guideline studies indicate ready biodegradability for several glycol ethers although higher molecular weight species seem to biodegrade at a slower rate. No glycol ethers that have been tested demonstrate marked resistance to biodegradative processes. Upon release to the atmosphere by evaporation, high boiling glycol ethers are estimated to undergo photodegradation (atmospheric half-lives = 2-2.5 hr). When released to water, glycol ethers undergo biodegradation (typically 47-92% after 9-21 days) and have a low potential for bioaccumulation (log Kow ranges from 1.73 to >0.51).

**Ecotoxicity**

- Aquatic toxicity data indicate that the tri- and tetra ethylene glycol ethers are "practically non-toxic" to aquatic species. No major differences are observed in the order of toxicity going from the methyl- to the butyl ethers.

**Glycols exert a high oxygen demand for decomposition and once released to the environment cause the death of aquatic organisms if dissolved oxygen is depleted.**

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

### Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene diisocyanate</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>xylene</td>
<td>HIGH (Half-life = 360 days)</td>
<td>LOW (Half-life = 1.83 days)</td>
</tr>
<tr>
<td>hexamethylene diisocyanate polymer</td>
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<td>HIGH</td>
</tr>
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</table>

### Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene diisocyanate</td>
<td>LOW (LogKOW = 3.1956)</td>
</tr>
<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td>LOW (LogKOW = 0.56)</td>
</tr>
<tr>
<td>xylene</td>
<td>MEDIUM (BCF = 740)</td>
</tr>
</tbody>
</table>
Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene diisocyanate polymer</td>
<td>LOW (LogKOW = 7.5795)</td>
</tr>
<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td>HIGH (KOC = 1.838)</td>
</tr>
<tr>
<td>hexamethylene diisocyanate polymer</td>
<td>LOW (KOC = 18560000)</td>
</tr>
</tbody>
</table>

Other adverse effects
No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

- Containers may still present a chemical hazard/danger when empty.
- Return to supplier for reuse/recycling if possible.
- Otherwise:
  - If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
  - Where possible retain label warnings and SDS and observe all notices pertaining to the product.
  - DO NOT allow wash water from cleaning or process equipment to enter drains.
  - It may be necessary to collect all wash water for treatment before disposal.
  - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
  - Where in doubt contact the responsible authority.
  - DO NOT recycle spilled material.
  - Consult State Land Waste Management Authority for disposal.
  - Neutralise spill material carefully and decontaminate empty containers and spill residues with 10% ammonia solution plus detergent or a proprietary decontaminant prior to disposal.
  - DO NOT seal or stopper drums being decontaminated as CO2 gas is generated and may pressurise containers.
  - Puncture containers to prevent re-use.
  - Bury or incinerate residues at an approved site.

Contaminated packing materials:
Refer to section above

Precautions for Transport:
Refer to section above

SECTION 14 TRANSPORT INFORMATION

Labels Required

- Marine Pollutant: NO

Land transport (UN)

- UN number: 1993
- UN proper shipping name: FLAMMABLE LIQUID, N.O.S.

Transport hazard class(es)

- Class: 3
- Subrisk: Not Applicable

Packing group: III

Environmental hazard: Not Applicable

Special precautions for user

- Special provisions: 223; 274
- Limited quantity: 5 L

Air transport (ICAO-IATA / DGR)

- UN number: 1993
- UN proper shipping name: FLAMMABLE LIQUID, N.O.S.
### Transport hazard class(es)
- ICAO/IATA Class: 3
- ICAO / IATA Subrisk: Not Applicable
- ERG Code: 3L

### Packing group
- III

### Environmental hazard
- Not Applicable

### Special precautions for user
- Special provisions: A3
- Cargo Only Packing Instructions: 366
- Cargo Only Maximum Qty / Pack: 220 L
- Passenger and Cargo Packing Instructions: 355
- Passenger and Cargo Maximum Qty / Pack: 60 L
- Passenger and Cargo Limited Quantity Packing Instructions: Y344
- Passenger and Cargo Limited Maximum Qty / Pack: 10 L

### Sea transport (IMDG-Code / GGVSee)
- UN number: 1993
- UN proper shipping name: FLAMMABLE LIQUID, N.O.S.

### Transport hazard class(es)
- IMDG Class: 3
- IMDG Subrisk: Not Applicable

### Packing group
- III

### Environmental hazard
- Not Applicable

### Special precautions for user
- EMS Number: F-E, S-E
- Special provisions: 223 274 955
- Limited Quantities: 5 L

### Transport in bulk according to Annex II of MARPOL and the IBC code
- Not Applicable

### Precautions for Transport

Transportation precautions:
- Documentation covering all dangerous goods carried on the vehicle
- The transport unit must be placarded and marked in accordance with relevant transporting requirements.
- Personal protective equipment must be in sufficient quantities and suitable for use by the driver of the vehicle and where required for escape purposes, any other persons travelling in the vehicle.
- Vehicles transporting dangerous goods need to be equipped with sufficient and adequate fire protection systems and emergency equipment to handle spillages.
- Use flameproof or intrinsically safe electrical equipment
- Ensure all ignition sources are identified and eliminated or reduced where there is any likelihood of an incident due to a spill or release of fire risk dangerous goods.
- Likely to be incompatible however refer to SDS for further details:
  - Class 2.1, 2.2, 2.2 (with subrisk 5.1), 2.3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1
  - If applicable, use appropriate types of segregation devices to isolate incompatible dangerous goods:
  - Incompatible for transport with foodstuffs (including stock feed).
  - Routes for road vehicles should avoid heavily populated or environmentally sensitive areas, congested crossings or a concentration of people
  - Vehicle exhaust or hot engine components must be shielded to ensure cargo temperatures cannot be raised.

### Suitable Containers

See section 7

### SECTION 15 REGULATORY INFORMATION

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

<table>
<thead>
<tr>
<th>HEXAMETHYLENE DIISOCYANATE(822-06-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
<th></th>
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<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td>China Inventory of Hazardous Chemicals (Chinese)</td>
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<table>
<thead>
<tr>
<th>PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER(108-65-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
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<table>
<thead>
<tr>
<th>XYLENE(1330-20-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td>China Inventory of Hazardous Chemicals (Chinese)</td>
<td>International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEXAMETHYLENE DIISOCYANATE POLYMER(28182-81-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td>China Inventory of Hazardous Chemicals (Chinese)</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>propylene glycol monomethyl ether acetate, alpha-isomer</td>
<td>108-65-6, 84540-57-8, 142300-82-1</td>
</tr>
<tr>
<td>hexamethylene diisocyanate polymer</td>
<td>28182-81-2, 53200-31-0, 1192214-73-5</td>
</tr>
</tbody>
</table>

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

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit,
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BGF: BioConcentration Factors
BEI: Biological Exposure Index

Disclaimer

The information in the SDS applies only for the specified product and does not include mixtures of this product with other substances and mixtures. The SDS provides product safety information for personnel trained to use this product only.

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