# WANNATE® HT-600

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® HT-600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>1,6-Hexamethylene Disocyanate Based Polyisocyanate</td>
</tr>
<tr>
<td>Other means of identification</td>
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</tbody>
</table>

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

**Relevant identified uses**
- Binding agents, intermediates; other: isocyanate component for polyurethanes.

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

<table>
<thead>
<tr>
<th>Registered company name</th>
<th>WANHUA CHEMICAL GROUP Co., LTD.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>No.17 Tianshan Road, Yantai, Shandong China</td>
</tr>
<tr>
<td>Telephone</td>
<td>0535-3031150</td>
</tr>
<tr>
<td>Fax</td>
<td>0535-3382221-1150</td>
</tr>
<tr>
<td>Website</td>
<td><a href="https://www.whchem.com">https://www.whchem.com</a></td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:whsds@whchem.com">whsds@whchem.com</a></td>
</tr>
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</table>

### Emergency telephone number

<table>
<thead>
<tr>
<th>Association / Organisation</th>
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</thead>
<tbody>
<tr>
<td>Emergency telephone numbers</td>
<td>+86 532-83889090</td>
</tr>
<tr>
<td>Other emergency telephone numbers</td>
<td>+86 535-8203123</td>
</tr>
</tbody>
</table>

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

**SUMMARY OF HAZARD IN AN EMERGENCY SITUATION**

- Liquid.
- Does not mix with water.
- Combustible.
- Harmful by inhalation.
- May cause SENSITISATION by inhalation.
- May cause SENSITISATION by skin contact.

<table>
<thead>
<tr>
<th>Classification [1]</th>
<th>Skin Corrosion/Irritation Category 3, Eye Irritation Category 2B, Acute Toxicity (Oral) Category 5, Acute Toxicity (Dermal) Category 5, Acute Toxicity (Inhalation) Category 4, Skin Sensitizer Category 1</th>
</tr>
</thead>
</table>

**Legend:**

### Label elements

<table>
<thead>
<tr>
<th>Hazard pictogram(s)</th>
<th>![Hazard Pictogram]</th>
</tr>
</thead>
</table>

**SIGNAL WORD**  
**WARNING**

### Hazard statement(s)

- **H316** Causes mild skin irritation
- **H320** Causes eye irritation.
H303 May be harmful if swallowed.
H313 May be harmful in contact with skin
H332 Harmful if inhaled.
H317 May cause an allergic skin reaction.

Precautionary statement(s) Prevention
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P261 Avoid breathing mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.

Precautionary statement(s) Response
P312 Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
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.
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.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage
Not Applicable

Precautionary statement(s) Disposal
P501 Dispose of contents/container in accordance with local regulations.

Physical and Chemical Hazard

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, nervousness, 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.

Health Hazards

Inhaled
Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

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Inhalation hazard is increased at higher temperatures.

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the bloodstream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

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

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.

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

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Eye
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 instillation 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/ulceration may occur.

Chronic
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.

Persons with a history of asthma or other respiratory problems or are known to be sensitised, should not be engaged in any work involving the handling of isocyanates. [CCTRADE-Bayer, APMF]

A 90-day inhalation study in rats with polymeric MDI (6 hours/day, 5 days/week) produced moderate to severe hyperplastic inflammatory lesions in the nasal cavities and lungs at levels of 8 mg/m3 or greater.

Polyisocyanates still contain small amounts of monomeric isocyanate (typically <0.5 parts per weight) and both – the polyisocyanate and the monomer - have toxicological importance. In addition, solvents also contribute to the overall toxicity of these products.

Due to the higher molecular weight and the much lower vapor pressure the polyisocyanates exhibit a significantly reduced health hazard as compared to the corresponding monomers. Nevertheless they should only be handled under controlled conditions. They are not or only slightly irritating to the skin and eyes, but might be irritating to the respiratory tract (nose, throat, lung). Polyisocyanates might act as skin sensitisers On that basis there is clear evidence from
sensitive animal models that aliphatic polyisocyanates and prepolymers (HDI-based as well as IPDI-based, for example) may cause skin sensitisation. It is decided to classify all HDI-based and IPDI-based polyisocyanates and prepolymers as skin sensitisers. From animal models, however, there is no evidence that polyisocyanates are sensitising to the respiratory tract. Results from animal tests with repeated aerosol exposures indicate that under these conditions the respiratory tract is the primary target of aliphatic polyisocyanates, other organs are not significantly affected. Available information does not provide evidence that polyisocyanates might either be mutagenic, carcinogenic or toxic to reproduction. Polymers based on isocyanate monomers (polyurethanes) are generally of low concern. However, in the majority of cases it is not possible to conclude from the chemical name of the polymer whether an individual polyurethane is, or is not, of low concern. Finished polyurethane polymers used in the majority of household applications contain no unreacted isocyanate groups. The production of these polymers involves the use of an excess of the hydroxyl group-containing monomer or monomers leading to complete reaction of all of the isocyanate groups. For certain applications, however, similar polymer chemistry can be used with the isocyanate group-containing monomer in excess. This results in the formation of a polyurethane 'pre-polymer', which is intended to be further reacted in its end use. Where the pre-polymer is identified as being 'blocked', it indicates that there are no free isocyanate groups. The polymer contained in this product has a reactive group generally considered to be of high concern (US EPA). There are health concerns for isocyanates on the basis of their skin and respiratory sensitisation properties and other lung effects e.g. TDI and MDI. Aromatic isocyanates may be potentially carcinogenic (e.g. TDI and DADI). Frequently new chemical isocyanates are manufactured with a significant excess of isocyanate monomer. Whilst it is generally accepted that polymers with a molecular weight exceeding 1000 are unlikely to pass through biological membranes, oligomers with lower molecular weight and specifically, those with a molecular weight below 500, may. Estimations based on a "highly" dispersed polymer population suggest that a polymer of approximate molecular weight 5000 could contain no more than one reactive group of high concern for it to be regulated as a polymer of low concern (a so-called PLC). Polymers with a molecular weight above 10000 are generally considered to be PLCs because these are not expected to be absorbed by biological systems. The choice of 10000 as a cut-off value is thought to provide a safety factor of 100, regarded as reasonable in light of limited data, duration of studies, dose levels at which effects are seen, and extrapolation from animals to humans.

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, rashes 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
Skin contact and/or ingestion may produce health damage*. Cumulative effects may result following exposure*. May produce discomfort of the eyes, respiratory tract and skin*.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances
See section below for composition of Mixtures

Mixtures

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% (weight)</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>28182-81-2</td>
<td>≥99.75</td>
<td>1,6-Hexamethylene Disocyanate Based Polyisocyanate</td>
</tr>
<tr>
<td>822-06-0</td>
<td>≤0.25</td>
<td>hexamethylene disocyanate</td>
</tr>
</tbody>
</table>

SECTION 4 FIRST AID MEASURES

Description of first aid measures

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

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.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.
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, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e., becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as cinically can comfortably drink.
- Seek medical advice.

Continued...
Advise for rescue team (PPE requirement for rescue personnel)

Indication of any immediate medical attention and special treatment needed

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.

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.

(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.

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

Special hazards arising from the substrate or mixture

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

Advice for firefighters

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

Fire/Explosion Hazard
- Combustible.
- Moderate fire hazard when exposed to heat or flame.
- When heated to high temperatures decomposes rapidly generating vapour which pressures and may then rupture containers with release of flammable and highly toxic isocyanate vapour.
- Burns with acrid black smoke and poisonous fumes.
- Combustion yields traces of highly toxic hydrogen cyanide HCN, plus toxic nitrogen oxides NOx and carbon monoxide.
- Combustion products include: carbon dioxide (CO2), isocyanates, hydrogen cyanide and minor amounts of nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.
- May emit corrosive fumes.
- 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

Continued...
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 spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste disposal.

Chemical Class: cyanates and isocyanates

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>LAND SPILL - SMALL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cross-linked polymer - particulate</td>
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<td>shovel</td>
<td>shovel</td>
<td>R, W, SS</td>
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<td>wood fiber - particulate</td>
<td>1</td>
<td>throw</td>
<td>pitchfork</td>
<td>R, P, DGC, RT</td>
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<tr>
<td>cross-linked polymer - pillow</td>
<td>1</td>
<td>throw</td>
<td>pitchfork</td>
<td>R, D, G, RT</td>
</tr>
<tr>
<td>sorbent clay - particulate</td>
<td>2</td>
<td>shovel</td>
<td>shovel</td>
<td>R, I, P</td>
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<tr>
<td>foamed glass - pillow</td>
<td>2</td>
<td>throw</td>
<td>pitchfork</td>
<td>R, P, DGC, RT</td>
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<tr>
<td>wood fiber - particulate</td>
<td>3</td>
<td>shovel</td>
<td>shovel</td>
<td>R, W, P, DGC</td>
</tr>
</tbody>
</table>

LAND SPILL - MEDIUM

| cross-linked polymer - particulate | 1 | blower | skiploader | R, W, SS |
| cross-linked polymer - pillow | 1 | throw | skiploader | R, DGC, RT |
| polypropylene - particulate | 2 | blower | skiploader | R, S, DGC |
| expanded mineral - particulate | 3 | blower | skiploader | R, I, W, P, DGC |
| wood fiber - particulate | 3 | blower | skiploader | R, W, P, DGC |
| polypropylene - mat | 3 | throw | skiploader | DGC, RT |

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


Major Spills

- Liquid isocyanates and high isocyanate vapour concentrations will penetrate seals on self contained breathing apparatus - SCBA should be used inside encapsulating suit where this exposure may occur.

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).
- Dilute 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 absorbent materials (equal to that of estimated spill pool volume). Intensively contact between 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 decontamination 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. 0.88) 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%
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, alkalis 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.
- Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- 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.

**SECTION 7 HANDLING AND STORAGE**

### Precautions for safe handling

<table>
<thead>
<tr>
<th>Safe handling</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Avoid all personal contact, including inhalation.</td>
<td>- for commercial quantities of isocyanates:</td>
</tr>
<tr>
<td>- Wear protective clothing when risk of exposure occurs.</td>
<td>- 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.</td>
</tr>
<tr>
<td>- Use in a well-ventilated area.</td>
<td>- 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.</td>
</tr>
<tr>
<td>- Prevent concentration in hollows and sumps.</td>
<td>- 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)...</td>
</tr>
<tr>
<td>- <strong>DO NOT enter confined spaces until atmosphere has been checked.</strong></td>
<td>- 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.</td>
</tr>
<tr>
<td>- Avoid smoking, naked lights or ignition sources.</td>
<td>- 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.</td>
</tr>
<tr>
<td>- Avoid contact with incompatible materials.</td>
<td>- Store in original containers.</td>
</tr>
<tr>
<td>- When handling, <strong>DO NOT eat, drink or smoke.</strong></td>
<td>- Keep containers securely sealed.</td>
</tr>
<tr>
<td>- Keep containers securely sealed when not in use.</td>
<td>- No smoking, naked lights or ignition sources.</td>
</tr>
<tr>
<td>- Avoid physical damage to containers.</td>
<td>- Store in a cool, dry, well-ventilated area.</td>
</tr>
<tr>
<td>- Always wash hands with soap and water after handling.</td>
<td>- Store away from incompatible materials and foodstuff containers.</td>
</tr>
<tr>
<td>- Work clothes should be laundered separately.</td>
<td>- Protect containers against physical damage and check regularly for leaks.</td>
</tr>
<tr>
<td>- Use good occupational work practice.</td>
<td>- Observe manufacturer’s storage and handling recommendations contained within this SDS.</td>
</tr>
<tr>
<td>- Observe manufacturer’s storage and handling recommendations contained within this SDS.</td>
<td>- <strong>DO NOT allow clothing wet with material to stay in contact with skin</strong></td>
</tr>
</tbody>
</table>

### Conditions for safe storage, including any incompatibilities

<table>
<thead>
<tr>
<th>Suitable container</th>
<th>Storage incompatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Metal can or drum</td>
<td>- Avoid cross contamination between the two liquid parts of product (kit).</td>
</tr>
<tr>
<td>- Packaging as recommended by manufacturer.</td>
<td>- 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.</td>
</tr>
<tr>
<td>- Check all containers are clearly labelled and free from leaks.</td>
<td>- This excess heat may generate toxic vapour.</td>
</tr>
</tbody>
</table>

**Continued...**
## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### Control parameters

#### OCCUPATIONAL EXPOSURE LIMITS (OEL)

<table>
<thead>
<tr>
<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 disocyanate</td>
<td>Hexamethylene disocyanate</td>
<td>0.03 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<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 disocyanate</td>
<td>Hexamethylene disocyanate: (1,6-Diisocyanatohexane)</td>
<td>0.018 ppm</td>
<td>0.2 ppm</td>
<td>3 ppm</td>
</tr>
<tr>
<td>hexamethylene disocyanate polymer</td>
<td>Hexamethylene disocyanate polymer</td>
<td>7.8 mg/m³</td>
<td>86 mg/m³</td>
<td>510 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Original IDLH</th>
<th>Revised IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene disocyanate</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>hexamethylene disocyanate polymer</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

#### MATERIAL DATA

For isocyanates:

- Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. This should emphasise:
  - **demography**, 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 1,6-hexamethylene disocyanate (HDI):

The toxicological action of HDI is similar to that of toluene disocyanate 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

- 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.
- 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.

- 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/AHA 29.3-2007 or national equivalent).
- Local exhaust ventilation with full face positive-pressure air supplied breathing apparatus (hood or helmet type) is required.

### Appropriate engineering controls

- 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.

- 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/AHA 29.3-2007 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:

- **Lower end of the range**
  - Room air currents minimal or favourable to capture
  - Contaminants of low toxicity or of nuisance value only
  - Intermittent, low production.
  - Large hood or large air mass in motion

- **Upper end of the range**
  - Disturbing room air currents
  - Contaminants of high toxicity
  - High production, heavy use
  - Small hood-local control only

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.
- 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 adhesion 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. 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).

### Eye and face protection
- Safety goggles with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adhesion 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. 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

**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.
- Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
- Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

### Hands/feet protection

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
- 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.
- 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.
- Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
- Contaminated gloves should be replaced.

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.

Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
- Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
- Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

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.
- Do NOT wear natural rubber (latex) gloves.
- Isocyanate resistant materials include Teflon, Viton, nitrile rubber and some Polyurethane (PU) 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.
### 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>slight</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</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>158</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Flammability</strong></td>
<td>Not Applicable</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>0.00246 Pa (at 20 °C)</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>1.16 g/cm³ (at 25 °C)</td>
</tr>
<tr>
<td><strong>Partition coefficient n-octanol / water</strong></td>
<td>9.81</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature (°C)</strong></td>
<td>445</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>250</td>
</tr>
<tr>
<td><strong>Viscosity (cSt)</strong></td>
<td>1200 (at 25 °C)</td>
</tr>
<tr>
<td><strong>Molecular weight (g/mol)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Taste</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**

**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

**Respiratory protection**
Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.

For spraying or operations which might generate aerosols:
- Full face respirator with supplied air.
- In certain circumstances, personal protective of the individual employee is necessary.
  - Personal protective devices should be regarded as being supplementary to substitution and engineering control and should not be used in preference to them as they do nothing to eliminate the hazard.
  - However, in some situations, minimising exposure to isocyanates by enclosure and ventilation is not possible, and occupational exposure standards may be exceeded, particularly during on-site mixing of paints, spray-painting, foaming and maintenance of machine and ventilation systems. In these situations, air-line respirators or self-contained breathing apparatus complying with the appropriate national standard must be used.
  - Organic vapour respirators with particulate pre-filters and powered, air-purifying respirators are NOT suitable.
  - Personal protective equipment must be appropriately selected, individually fitted and workers trained in their correct use and maintenance. Personal protective equipment must be regularly checked and maintained to ensure that the worker is being protected.
- Air-line respirators or self-contained breathing apparatus complying with the appropriate national standard should be used during the clean-up of spills and the repair or clean-up of contaminated equipment.

**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.
- PVC apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

**Recommended material(s)**

**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the: "Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the computer-generated selection: WANNATE® HT-600

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARANEX-23</td>
<td>A</td>
</tr>
</tbody>
</table>

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

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

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

STOT - Repeated Exposure

<table>
<thead>
<tr>
<th>ENDPOINT TEST DURATION (HR) SPECIES VALUE SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspiration Hazard 3.6 9-443482 Chemwatch:</td>
</tr>
</tbody>
</table>

**SECTION 11 TOXICOLOGICAL INFORMATION**

**WANNATE® HT-600**

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

**hexamethylene diisocyanate**

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: 570 mg/kg[^2]</td>
<td>Not Available</td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 0.06 mg/l/4h[^2]</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 738 mg/kg[^2]</td>
<td></td>
</tr>
</tbody>
</table>

**1,6-Hexamethylene Diisocyanate Based Polyisocyanate**

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: &gt;5000 mg/kg[^2]</td>
<td></td>
</tr>
<tr>
<td>Inhalation (rat) LC50: 4.625 mg/l/1he[^2]</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;10000 mg/kg[^2]</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**

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

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 belonging 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 (hapitins) or after metabolism (prohapitins).

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. 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, atonics, 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 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.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. 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 of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

**SECTION 12 ECOLOGICAL INFORMATION**

**Toxicity**

<table>
<thead>
<tr>
<th>WANNATE® HT-600</th>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
</table>

Continued...
### Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene diisocyanate</td>
<td>LOW (KOC = 5984)</td>
</tr>
<tr>
<td>1,6-Hexamethylene Diisocyanate Based Polyisocyanate</td>
<td>LOW (KOC = 18560000)</td>
</tr>
</tbody>
</table>

### 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>1,6-Hexamethylene Diisocyanate Based Polyisocyanate</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
</tbody>
</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>hexamethylene diisocyanate polymer</td>
<td>LOW (LogKOW = 7.5795)</td>
</tr>
</tbody>
</table>

### Other adverse effects

No data available

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

- **Waste chemicals:**
  - Containers may still present a chemical hazard/danger when empty.
  - Return to supplier for reuse/recycling if possible. Otherwise:
    - If container cannot 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 container, 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. 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.
    - A Hierarchy of Controls seems to be common - the user should investigate:
      - Reduction
      - Reuse
      - Recycling
      - Disposal (if all else fails)
  - 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.

- **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

<table>
<thead>
<tr>
<th>Marine Pollutant</th>
<th>NO</th>
</tr>
</thead>
</table>

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

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

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

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

- Not Applicable

#### Precautions for Transport

#### 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>
</tr>
</thead>
<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
</tr>
<tr>
<td>China Occupational Exposure Limits for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td>Hexamethylene diisocyanate (822-06-0) is on the China Inventory of Hazardous Chemicals (Chinese)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1,6-Hexamethylene Diisocyanate Based Polyisocyanate(28182-81-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>China Inventory of Existing Chemical Substances</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia - AICS</td>
<td>Y</td>
</tr>
<tr>
<td>Canada - DSL</td>
<td>Y</td>
</tr>
<tr>
<td>Canada - NDSL</td>
<td>N (hexamethylene diisocyanate)</td>
</tr>
<tr>
<td>China - IECSC</td>
<td>Y</td>
</tr>
<tr>
<td>Europe - EINEC / ELINCS / NLP</td>
<td>Y</td>
</tr>
<tr>
<td>Japan - ENCS</td>
<td>N (1,6-Hexamethylene Diisocyanate Based Polyisocyanate)</td>
</tr>
<tr>
<td>Korea - KECI</td>
<td>Y</td>
</tr>
<tr>
<td>New Zealand - NZIoC</td>
<td>Y</td>
</tr>
<tr>
<td>Philippines - PICCS</td>
<td>Y</td>
</tr>
<tr>
<td>USA - TSCA</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Legend:**
- **Y** = All ingredients are on the inventory
- **N** = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

---

### SECTION 16 OTHER INFORMATION

#### Other information

#### Ingredients with multiple cas numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,6-Hexamethylene Diisocyanate Based Polyisocyanate</td>
<td>28182-81-2, 53200-31-0, 1192214-73-5</td>
</tr>
</tbody>
</table>

[Continued...]
Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

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

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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