



Manufacturers of UTHANE Polyurethane Coatings
2 Hume Road, Smithfield, N.S.W., 2164
Phone +612 9729-2000 Fax +612 9729-2279

Emergency Telephone No. +612 9634-5560 / +61 412 226 505

Date Of Issue : 04/04/12

MATERIAL SAFETY DATA SHEET

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UW2173 AQUAFLOH HARDENER – PART “B”

Ref msds 00267B

Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION

PRODUCT NAME : UW2173 AQUAFLOH HARDENER - PART "B"
AVAILABLE COLORS : 8100 CLEAR
OTHER NAMES : UW2173 Hardener / AQUAFLOH Hardener
CORRECT SHIPPING NAME : RESIN SOLUTION, COMBUSTIBLE
UN NUMBER : Not Regulated
DANGEROUS GOODS CLASS : Not Regulated
PACKAGING GROUP : Not Regulated
SUBSIDIARY RISK : Not Regulated
HAZCHEM CODE : Not Regulated
POISONS SCHEDULE : S6
EPG : Not Available
USE : Chemical curing agent for reactive 2K water borne spraying finishes to provide rapid air dry finishes with the properties of baked enamels on prepared surfaces.

For industrial use only in spray areas complying with relevant regulations.

This product is one component of a two component system.

Both components must be mixed together immediately prior to use.

Not suitable for use in homemaker (DIY) applications.

COMPANY / UNDERTAKING

BC COATINGS
2 Hume Road, Smithfield, N.S.W. 2164
Phone +612 9729-2000, FAX +612 9729-2279
Emergency Telephone No. +612 9634-5560

The following personnel should be contacted depending on the nature of the inquiry.

TECHNICAL MANAGER	PRODUCTION MANAGER
MANAGING DIRECTOR	SALES MANAGER

AUSTRALIAN POISONS INFORMATION CENTRE 24 HOUR SERVICE : 13 11 26

POLICE OR FIRE BRIGADE : 000 (exchange) : 1100

This Fact Sheet is a summary of potential and the most severe health hazards that may result from exposure.

Always read the Material Safety Data Sheets (MSDS) for any products you use at work.

They contain useful information on hazards and control measures.

Safety Data Sheets are current for a maximum of five years but may be updated more frequently.

Please ensure that you have a current copy.

The information given in this bulletin and by the company's technical staff is provided as a general guide only to facilitate the adoption of appropriate measures in relation to handling, storage and disposal of the product.

Although BC Coatings has taken all reasonable care to ensure that the information is accurate, it accepts no responsibility for any loss or damage however caused that results there from and does not warrant such accuracy whether or not the information originated with BC Coatings .

BC Coatings urges each recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product.

The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should notify its employees, agents, contractors and others whom it knows or believes will use this material or the information in this MSDS and any other information regarding hazards or safety.

Users of the product are requested to contact BC Coatings technical section for detailed information regarding the qualities and characteristics of the product before it is used.

We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

2. HAZARDS IDENTIFICATION**Hazardous according to criteria of Safe Work Australia****CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES****CLASSIFICATION / SYMBOL** : HARMFUL / Xn, IRRITANT / Xi**GOVERNING DIRECTIVE** : National Code of practice for the Labelling of Hazardous Substances.

This material is hazardous according to criteria of Safe Work Australia; HAZARDOUS SUBSTANCE.

Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail; NON-DANGEROUS GOODS.

HAZARD STATEMENTS:

H317 May cause an allergic skin reaction.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS:

P273 Avoid release to the environment.
P280 Wear protective gloves.
P302 + P352 IF ON SKIN Wash with plenty of soap and water.
P304 + P340 IF INHALED Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 Call a POISON CENTRE or doctor/ physician if you feel unwell.

SUPPLEMENTARY HAZARDOUS CHARACTERISTICS AND LABELLING ELEMENTS:

Contains isocyanates. May produce an allergic reaction.
Xn Harmful

CONTAINS

hexamethylene-1,6-diisocyanate homopolymer
Aliphatic Polyisocyanate
Contains isocyanates.

RISK PHRASES

R20 Harmful by inhalation.
R23 Toxic by inhalation
R36/37/38 Irritating to eyes, respiratory system and skin
R41 Risk of serious damage to the eyes
R42/43 May cause sensitization by inhalation or skin contact.
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES

S7/8 Keep container tightly closed and dry
S24/25 Avoid contact with skin and eyes
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/38 Wear suitable protective clothing, gloves and eye/face protection
S61 Avoid release to the environment. Refer to special instructions / Safety data sheets.

POISONS SCHEDULE

S6 Poison



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3. COMPOSITION

COMPONENTS	CAS No.	PROPORTION w/w	RISK PHRASES
Hexamethylene di-isocyanate, homopolymer	28182-81-2	> 88%	R43
Hexamethylene di-isocyanate	822-06-0	< 0.5%	R2,3 R36/37/38, R42/43
Other ingredient (s)	-	to 100%	-
	TOTAL	100 %	

All components are registered in accordance with Australian Inventory of Chemical Substances.

4. FIRST AID MEASURES

Poison Information Centres in each State capital city can provide additional assistance for scheduled poisons.

INHALED

If fumes or combustion products are inhaled :

Remove affected person(s) to fresh air, taking care not to become affected yourself.

Remove any contaminated clothing and loosen remaining clothing.

If breathing is normal, allow the patient to assume the most comfortable position and keep warm.

Keep at rest until fully recovered.

If patient finds breathing difficult and develops a bluish discoloration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask.

If breathing has stopped, commence Expired Air Resuscitation (E.A.R.).

In the event of cardiac arrest, commence Cardio-Pulmonary Resuscitation (C.P.R.).

Seek **IMMEDIATE** medical attention or transport to hospital, or doctor, without delay.

SKIN CONTACT

If skin or hair contact occurs :

Immediately remove any contaminated clothing, including footwear.

Wash skin and hair thoroughly with running water.

Contact with the skin may result in severe irritation and drying of the skin which may lead to dermatitis if contact is prolonged.

Toxic effects may result from skin absorption.

Capable of causing skin sensitization and allergic skin reactions.

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

The material may accentuate any pre-existing skin condition.

If swelling, redness, blistering or irritation occurs seek medical assistance.

Thoroughly dry contaminated shoes before re-use.

Discard internally contaminated gloves and shoes.

EYE CONTACT

Immediately and continuously irrigate with copious quantities of low pressure, fresh water for at least 15 minutes.

Eyelids should be held open.

Ensure irrigation under the eyelids by occasionally lifting upper and lower lids.

Remove any contaminated clothing.

Seek **IMMEDIATE** medical attention, preferably from an ophthalmologist.

Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SWALLOWED

Considered an unlikely route of entry in commercial/industrial environments.

Harmful if swallowed.

Give milk or water to rinse out mouth and to drink to dilute the chemical.

Do NOT give anything by mouth to an unconscious person.

If swallowed, do NOT induce vomiting due to the hazard of aspiration into the lungs which may cause mild to severe pulmonary injury and possibly death.

Tends to break into a foam if the patient vomits.

Should vomiting occur, place patient's head downwards, head lower than hips, to prevent vomit entering the lungs.

Call a doctor and/or transport to an emergency facility or hospital **IMMEDIATELY**.

ADVICE TO DOCTOR

Treat symptomatically.

Principal routes of exposure are skin contact/absorption and inhalation of the vapor/spray mist.

Primary threat to life from ingestion and/or inhalation, is respiratory failure.

Product contains free organic isocyanate which may cause respiratory and skin sensitization.

Sensitized people can react to very low levels of airborne isocyanates.

Skin sensitization may result from a single acute exposure.

Sensitization may cause difficulty in breathing similar to asthma.

Onset of symptoms may be delayed several hours after exposure.

Extreme care must be taken to prevent aspiration.

Material if aspirated into lungs may cause chemical pneumonitis.

Can cause corneal burns.

5. FIRE FIGHTING MEASURES**FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.**

Combustible liquid.

SUITABLE EXTINGUISHING MEDIA

Normal foam, dry agent (carbon dioxide, dry chemical powder).

UNSUITABLE EXTINGUISHING MEDIA: High volume water jet.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE:

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen, isocyanate vapors and traces of hydrogen cyanide.

Keep containers cool with water spray.

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

In the event of fire and/or explosion do not breathe fumes.

ADVICE FOR FIRE-FIGHTERS:

Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to vapour or products of combustion.

Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters.

6. ACCIDENTAL RELEASE MEASURES**SPILLS****FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.****MAJOR SPILLS**

Consider evacuation.

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

Keep unauthorized persons away at a safe distance and move upwind until clean up is complete.

Shut off all possible sources of ignition and ensure adequate ventilation / exhaust ventilation.

Stop liquid at the source if safe to do so.

No smoking, naked lights or ignition sources. Increase ventilation.

Do not empty into drains.

Use only spark-free and/or explosion proof equipment.

Avoid breathing vapours and contact with skin and eyes.

Wear breathing apparatus, protective gloves and full protective clothing.

If a leak or spill has not ignited, use water spray or fog to disperse/absorb the vapours and to protect men attempting to stop leak.

Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas.

Dyke the area with sand, earth or vermiculite, to prevent spreading and to prevent it entering sewers, drains or natural waterways.

Water spray or fog may be used to disperse /absorb vapour.

Water spray may be used to flush spills away from exposures.

Remove mechanically; cover the remainder with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand).

After approximately one hour transfer to waste container and do not seal (evolution of CO₂).

Keep damp in a safe ventilated area for several days.

Further disposal by incineration.

Ventilate area well to evaporate remaining liquid and to dispel vapor.

Clean area with detergent and water - do not allow product to enter drains, sewers or water courses - inform the local authorities or emergency services if this occurs.



7. HANDLING and STORAGE

Classified as a C1 (COMBUSTIBLE LIQUID) for the purpose of storage and handling, in accordance with the requirements of AS 1940.

Refer to State Regulations for storage and transport requirements.

This material is a Scheduled Poison S6 and must be stored, maintained and used in accordance with the relevant regulations.

HANDLING

Prior to working with this product, you should be trained on its proper handling and storage.

Observe manufacturer's storing and handling recommendations.

Packing as supplied by manufacturer. (Metal can / Metal drum / Metal safety cans).

Do not store in copper or copper alloy tanks.

Do not store in tin containers.

Sources of ignition, such as smoking, open flames, or ignition sources are prohibited where this product is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

Use non-sparking tools and equipment especially when opening and closing containers.

Avoid exposure to temperatures above 50 °C.

Store away from incompatible materials described in Section 10.

Keep containers closed when not in use - check regularly for leaks.

Keep dry (reacts with water, may lead to drum rupture) and tightly closed in a cool and well ventilated place.

Protect containers against physical damage and check regularly for leaks.

Open containers slowly in order to control possible pressure release.

Ensure adequate ventilation (equivalent to outdoors), or exhaust ventilation in the working area to prevent build up of explosive atmosphere.

Exhaust ventilation necessary if product is sprayed.

The threshold limit values noted in Section 8 must be monitored.

In all areas where isocyanate aerosols and/or vapor concentrations are produced in elevated concentrations, exhaust ventilation must be provided in such a way that the workplace exposure limits (TLV) is not exceeded.

The air should be drawn away from the personnel handling the product

The personal protective measures described in Section 8 must be observed.

The precautions required in the handling of isocyanates must be taken.

To prevent fire or explosion risk from static accumulation and discharge, effectively ground and bond product, transfer system and all process equipment, including tanks and drums.

Irritating to eyes, skin and mucous membranes.

Avoid prolonged, repeated contact with eyes, skin contact and breathing vapours, mists or aerosols.

Refer to AS 1940 (Storage and handling of flammable and combustible liquids) and AS 2865 (Safe working in a confined space), for more specific information on these subjects.

PRECAUTIONS FOR SAFE HANDLING:

Keep out of reach of children.

Keep away from foodstuffs, drinks and tobacco.

Avoid contact with skin and eyes and the inhalation of vapors, mists and aerosols.

Wash hands before breaks and at end of work and use skin-protecting ointment.

Keep working clothes separately.

Take off all contaminated clothing immediately.

PROCESS HAZARD

Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperatures and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources.

Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.

Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.

Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapors".



8. EXPOSURE CONTROLS

ENGINEERING CONTROLS :

None required when handling small quantities.

OTHERWISE :

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure.

The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release.

Isolating operations can also reduce exposure.

Respirators serve as supplemental protection to reduce employee exposures when engineering and work practice controls are not sufficient to achieve the necessary reduction to or below the TWAs.

Use away from all ignition sources.

Ensure sufficient ventilation to maintain concentration below exposure standard in warehouse or closed storage areas.

Where rapid build up of vapors or mists are generated, particularly in enclosed areas, and natural ventilation is inadequate, a flame proof exhaust ventilation system is required.

Refer to AS 1940 - The storage and handling of flammable and combustible liquids and AS 2430 - Explosive gas atmospheres for further information concerning ventilation requirements.

Use with local exhaust ventilation or while wearing organic vapor /acid mist respirator (meeting the requirements of AS1715 & AS1716) or dust respirator/air supplied mask.

The effectiveness of an air purifying respirator is limited. Use it only for a single, short term exposure.

Refer also to protective measures for the other components used with this product.

Keep containers closed when not in use.

Equipment MUST be explosion proof.

NOTE : Vapor is heavier than air and may collect in hollows, pits storage tanks or sumps.

Do **NOT** enter confined spaces where vapor may have collected without using an approved, positive pressure, self-contained breathing apparatus (meeting the requirements of AS1715 and AS1716) and an observer present for assistance.

LOCAL EXHAUST : Face velocity > 20 m/min.

8. EXPOSURE CONTROLS - continued**EXPOSURE LIMITS**

No value assigned for this specific material by the National Occupational Health and Safety Commission.

However, the Threshold Limit Value (TLV-TWA), as published by the National Occupational Health and Safety Commission , for some of the individual constituents is listed below.

Exposure limits with “skin” notation indicate that vapour and liquid may be absorbed through intact skin.

‘Sen’ Notice - sensitizer. The substance can cause a specific immune response in some people.

An affected individual may subsequently react to exposure to minute levels of that substance.

Isocyanates, all (as -NCO) : 8hr TWA = 0.02 mg/m³, 15 min STEL = 0.07 mg/m³, Sen.

German MAK-value (TRGS 900) hexamethylene-1, 6-diisocyanate

: 0.01 ml/m³ (ppm) corresponding to 0.07 mg/m³ (eight hours average value)

Peak concentration limit according to Category II 1, i.e. German MAK-value may be exceeded for short periods (not more than 5 minutes) by a factor of no more than 2 (i.e. may rise to no more than 0.02 ml/m³) up to eight times per shift. Sensitization possible.

Many isocyanate compounds cause respiratory and skin sensitization.

Sensitized people can react to very low levels of airborne iso-cyanates and should not work with this material. [APMF]

Worker exposure by all routes should be carefully controlled and kept to a minimum when handling/mixing components and during spray application.

The European Committee of Paint, Printing Inks and Artists’ Colours Manufacturer’s Association (CEPE) provides the following information on coatings containing isocyanates :

Ready-to-use paints may have an irritant effect on mucous membranes - especially on breathing organs - and cause hypersensitivity reactions. Inhalation of vapour or spray mist may cause Sensitization.

When handling paints containing isocyanates all precautions required for solvent-containing paints must be followed.

Vapour and spray mist in particular should not be inhaled.

Allergics and asthmatics as well as people prone to respiratory ailments should not work with isocyanate containing paints.

Any existing national regulations for handling of isocyanates and solvents must be observed.

Airborne emissions must be controlled within local and national limits, in accordance with the appropriate legislation.

SENSITIZER

Many isocyanate compounds can cause respiratory and skin sensitization.

Exposure to a sensitizer, once sensitization has occurred, may manifest itself as a skin rash or inflammation or as an asthmatic condition, and, in some individuals, this reaction can be extremely severe.

Sensitized people can react to very low levels of airborne isocyanates and should not work with this material. [APMF]

Worker exposure by all routes should be carefully controlled and kept to a minimum when handling/mixing components and during spray application.

This notation indicates that caution should be exercised in the industrial use of this substance.

NOTE

The above TLV's are issued as guidelines only and should not be interpreted as the fine line between safe and dangerous conditions. The above exposure limits are for air levels only.

When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Follow applicable regulations. (refer WORKSAFE Australia Exposure Standards)

All atmospheric contamination should be kept to as low a level as is practically possible.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and air samples.

You have a legal right to obtain copies of sampling results from your employer.

If you think you are experiencing any work related health problems, see a doctor trained to recognize occupational diseases.

Take this MSDS with you.



8. EXPOSURE CONTROLS - continued

EXPOSURE LIMITS - continued

TLV-TWA is the time weighted average concentration of the workplace atmosphere for a normal 8 hour work day and a 40 hour work week, to which nearly all workers may be repeatedly exposed day after day without adverse effect.

These TLV's are issued as guidelines only and should not be interpreted as the fine line between safe and dangerous conditions. All atmospheric contamination should be kept to as low a level as is practically possible.

STEL's are expressed as airborne concentrations of substances, averaged over a period of 30 minutes.

This short term TWA concentration should not be exceeded at any time during a normal 8 hour working day.

Workers should not be exposed at the STEL concentration continuously for longer than 15 minutes, or for more than four such periods per working day.

A minimum of 250 minutes should be allowed between successive exposures at the STEL concentration.

STEL is the concentration to which workers can be exposed continuously for a short period of time without suffering from :

- irritation
- chronic or irreversible tissue damage, or
- narcosis of a sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency, and provided that the daily TLV-TWA is not exceeded.

Sk NOTICE - absorption through the skin, mucous membranes and eye may be a significant source of exposure.

The exposure standard is invalidated if such contact should occur.

Exposure limits with “skin” notation indicate that vapour and liquid may be absorbed through intact skin.

Absorption by skin may readily exceed vapour inhalation exposure.

Symptoms for skin absorption are the same as for inhalation.

Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

PEAK LIMITATION - a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes.

ODOR THRESHOLD

When considering the odor threshold of a substance, one finds that reported values are widely divergent.

Two major factors which influence odor detection are differences between individuals in the ability to perceive a particular odor and the methodology employed in conducting the odor threshold determination.

In their "Guide to Industrial Respiratory Protection - Appendix C" , NIOSH states:

Amoore and Hautala (33) found that on average, 95% of a population will have a personal odor threshold that lies within the range from about one-sixteenth to sixteen times the reported mean "odor threshold" for a substance.

In further explanation, Amoore and Hautala state:

The ability of members of the population to detect a given odor is strongly influenced by the innate variability of different persons' olfactory powers, their prior experience with that odor, and by the degree of attention they accord the matter.



8. EXPOSURE CONTROLS - continued

PERSONAL PROTECTION

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.

However, for some jobs personal protective equipment may be appropriate.

In case of hypersensitivity of the respiratory tract and skin (e.g. asthmatics and those who suffer from chronic bronchitis and chronic skin complaint) it is inadvisable to work with the product.

Eye wash fountains and safety showers should be available for emergency use.

Use adequate general or local exhaust ventilation to meet TLV requirements.

Skin contact should be avoided by wearing chemically resistant work clothing, boots and gloves.

All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Contact lenses should not be worn in areas where eye contact with this product can occur.

Observe good personal hygiene.

Keep away from foodstuffs, drinks and tobacco.

Keep working clothes separate.

Take off immediately all contaminated clothing.

Launder contaminated clothing and other protective equipment before storing or re-using, and discard internally contaminated gloves and footwear.

ALWAYS wash hands before eating, drinking, smoking, using the toilet, before breaks and at end of work.

Do not eat, smoke, or drink where this product is handled, processed, or stored, since the chemical can be swallowed.

Personal protective equipment should not be worn in lunch areas to prevent migration of this product to an area where other employees may be unknowingly exposed.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Adviser.

For detailed advice on Personal Protective Equipment, refer to the following Australian Standards :-

HB 9 (Handbook 9)	Manual of industrial personal protection.
AS 1377	Eye protectors for industrial applications.
AS 1715	Selection, use and maintenance of respiratory protective devices.
AS 1716	Respiratory protective devices.

When exposure is likely, personal protective equipment in combination appropriate to the degree and nature of exposure, should be selected from the following lists :-

SKIN

Skin contact should be avoided by wearing chemically resistant apron or other work clothing, safety boots and chemical protective gloves if needed to avoid repeated or prolonged skin contact.

Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing for your operation.

All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Do NOT use solvent to clean the skin but use skin cleansing cream.

Ensure that there is ready access to an emergency shower.

If contamination occurs, immediately remove all contaminated clothing, wash or shower to remove the chemical and change into clean clothing.

Clothing wet with product should be soaked with water before removal to prevent the possibility of ignition by static electricity discharges.

At the end of the work shift, wash any areas of the body that may have contacted this product, whether or not known skin contact has occurred.

Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to this product.

Internally contaminated footwear and contaminated gloves should be disposed of.

8. EXPOSURE CONTROLS - continued**PERSONAL PROTECTION - continued****RESPIRATORY**

Avoid breathing vapors.

Enclose operations and use local exhaust ventilation to meet TLV requirements.

If local exhaust ventilation or enclosure is not used, respirators should be worn.

Respiratory protection required if airborne concentration exceeds TLV.

Respiratory protection required in insufficiently ventilated working areas and during spraying.

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

For short periods of work, a combination of charcoal filter and particulate filter is recommended.

For long period, a self-contained breathing apparatus (meeting the requirements of AS1715 and AS1716) with a full facepiece operated in continuous flow or other positive pressure mode is recommended.

If vapor causes eye irritation or if an inhalation risk for higher exposures exists an approved air supplied breathing apparatus (meeting the requirements of AS1715 and AS1716) operated in pressure demand or other positive pressure mode should be used.

Correct respirator fit is essential to obtain adequate protection.

If while wearing a filter, cartridge or canister respirator, you can smell, taste, or otherwise detect this product, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately.

Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge, or canister.

If the seal is no longer good, you may need a new respirator.

NOTE : Isocyanate vapours will not be adequately absorbed by organic vapor respirators. [NSW D.I.R. 3-1982].

Where the concentration of vapor or mist is unknown or expected to approach or exceed the Worksafe Exposure Standards limit, the following additional equipment is recommended : -

(1) Short elevated exposures, e.g. spillage - goggles and correct respiratory equipment should be worn.

N.B.

if the vapor/mist concentration exceeds the exposure limit by more than 10 times, air supplied apparatus should be used.

(2) For prolonged elevated exposures - Full face air supplied or self contained breathing apparatus should be worn.

NOTE : Make sure the correct cartridges are used for the potential air contamination.

The effectiveness of an air purifying respirator is limited.

Use it only for a single, short term exposure.

For emergency and other conditions where the exposure guide line may be greatly exceeded, use an approved, positive pressure, self-contained breathing apparatus and an observer present for assistance.

For further information consult your Occupational Health and Safety Adviser.

EYES

Eyes should be protected by chemical splash goggles, safety glasses fitted with side shields or full face shield.

Contact lenses should **NOT** be worn; soft lenses may absorb irritants and all lenses concentrate irritants.

If vapor causes eye irritation or if an inhalation risk exists a full-face, organic vapor respirator (meeting the requirements of AS1715 & AS1716) should be used.

Eye wash fountains (capable of maintaining an appropriate water pressure for an appropriate length of time to remove the product from the eyes) and safety showers should be available for emergency use.

9. PHYSICAL and CHEMICAL PROPERTIES**PHYSICAL DESCRIPTION / PROPERTIES**

APPEARANCE		: Clear, colorless to pale yellow liquid.
ODOR		: Almost odourless
pH VALUE		: Not applicable
VAPOR PRESSURE		: ≈ 17 hPa (20 °C) / 26 hPa (50 °C) / 28 hPa (55 °C)
VAPOR PRESSURE		: 0.007 hPa (20 °C) Hexamethylene-1,6-diisocyanate
VAPOR PRESSURE		: < 0.0001 hPa (20 °C) Hexamethylene-1,6-diisocyanate Homopolymer
VAPOR DENSITY		: Not Established (Air = 1)
SETTING POINT		: approx. - 48 °C
BOILING POINT (INITIAL)	(°C)	: > 300 (@ 1.013 hPa)
FREEZING POINT	(°C)	: - 27.0
SOLUBILITY IN WATER	(15 °C)	: Immiscible as resin (reacts with water)
SPECIFIC GRAVITY	(@ 25°C)	: 1.160 \pm 0.03 (WATER = 1)
FLASH POINT	(°C)	: ≈ 192 (Closed Cup)
FLAMMABILITY LIMITS	(% volume)	: LEL = 0.9 % / UEL = 9.5 % (Hexamethylene-1,6-diisocyanate)
AUTOIGNITION TEMPERATURE	(°C)	: Not Applicable
IGNITION TEMPERATURE		: ≈ 425 °C
DECOMPOSITION TEMPERATURE		: Not Established
VOC CONTENT		: 520 \pm 1.0 gm / Litre
VISCOSITY (DYNAMIC)	(@ 25°C)	: 3,800 mPa.s
% VOLATILES	(by volume)	: 62.0 \pm 0.50
EVAPORATION RATE		: Not Established
Octanol/Water Partition Coefficient Log P (oct)		: Not Established

OTHER PROPERTIES :

Contains free organic isocyanate (0.5 % w/w).

Mixed and thinned material require special precautions and use of protective gear for application. [APMF]

Long term storage or storage at higher than normal temperatures will increase free organic isocyanate content to 0.90% maximum.

Reacts with water, may generate a large volume of foam, carbon dioxide gas & heat.

10. STABILITY and REACTIVITY**REACTIVITY / COMPATIBILITY**

- Hazardous polymerization : Cannot occur
- Stability : Stable under normal conditions
- Conditions to Avoid : Heat, sources of ignition, sparks, open flame and build up of static electricity.
Avoid exposure to humidity.
- Incompatibility (materials to avoid for purpose of transport, handling & storage only)
: Avoid contact with water, strong alkalis, mineral acids, halogens, strong oxidizers (liquid chlorine, concentrated oxygen, sodium hypochlorite), alcohols, amines, bases, metal compounds, detergent solutions, rubber, polyethylene and PVC, and most tank linings. .
- Hazardous reactions : Exothermic reaction with amines and alcohols; reacts slowly with water and protic solvents forming CO₂ ; foaming in confined spaces / closed containers
- risk of bursting owing to increase of pressure.
Reacts with water, may generate a large volume of foam, carbon dioxide gas and heat.
Iso-cyanates will attack and embrittle some plastics and rubbers.
Forms toxic fumes when thermally decomposed.
- Hazardous decomposition products : No hazardous decomposition products when stored and handled correctly.
- Hazardous combustion products : In case of fire, formation of fumes, smoke, carbon monoxide, carbon dioxide, nitrogen oxide, isocyanate vapour, and traces of hydrogen cyanide is possible.

HAZARDOUS COMPONENTS OF MIXTURES

All components are registered in accordance with Australian Inventory of Chemical Substances(ACIS).

11. TOXICOLOGICAL INFORMATION**TOXICITY**

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label.

Symptoms or effects that may arise if the product is mishandled and overexposure occurs are :

Ingestion : No adverse effects expected, however, large amounts may cause nausea and vomiting.
Do NOT induce vomiting if swallowed

Eye contact : A severe eye irritant. Contamination of eyes can result in permanent injury.

Skin contact : Contact with skin will result in irritation.

A skin sensitiser.

Repeated or prolonged skin contact may lead to allergic contact dermatitis.

Long Term Effects : No information available for the product.

Limits shown for guidance only.

Follow applicable regulations (refer WORKSAFE Australia Exposure Standards).

No LD₅₀ data available for this specific product. Data for principal ingredients only.

ALIPHATIC POLYISOCYANATE

Toxicological studies of a comparable product

ACUTE TOXICITY

Oral	LD ₅₀	(rat)	: > 5,000 mg/kg
Eye		(rabbit)	: Slight reddening,
Skin		(rabbit)	: Slight reddening, superficial cauterization / 4 hours

Hexamethylene-1,6-diisocyanate Homopolymer**ACUTE TOXICITY**

Dermal	LD ₅₀	(rat, male/female)	: > 2,000 mg/kg
Dermal	LD ₅₀	(rabbit, male/female)	: > 2,000 mg/kg
Inhalation	LC ₅₀	(rat, female)	: 390 mg/kg / 4 hours - Test atmosphere: dust/mist

The substance was tested in a form (i.e. specific particle size distribution) that is different from the forms in which the substance is placed on the market and in which it can reasonably be expected to be used.

Based on the “split-entry” concept and available data on particle size during end-use of the substance a modified classification for acute inhalation toxicity is justified.

Hexamethylene-1,6-diisocyanate**ACUTE TOXICITY**

Dermal	LD ₅₀	(rat, male/female)	: > 7,000 mg/kg
Inhalation	LC ₅₀	(rat, female)	: 124 mg/kg / 4 hours - Test atmosphere: vapor
Primary skin irritation		(rabbit)	: An irritant effect cannot be distinguished from a mechanical load caused by the removal of the test specimen.
Primary mucosae irritation		(rabbit)	: Result: slight irritant

SENSITIZATION

Skin sensitization (local lymph node assay (LLNA)) : mouse Result : Positive

11. TOXICOLOGICAL INFORMATION - continued**TOXICITY - continued**

Toxicological studies of a comparable product.

No pulmonary sensitisation observed in animal tests.

No pulmonary sensitisation potential was observed in guinea pigs after either intradermal or inhalative induction with polyisocyanate based on hexamethylene diisocyanate.

Hexamethylene-1,6-Diisocyanate Homopolymer

Subacute, subchronic and prolonged toxicity.

Application Route : Inhalative
Species : rat, male/female
Dose Levels : 0 - 0.5 - 3.3 - 26.4 mg/m³
Exposure duration : 90 days
Frequency of treatment : 6 hours a day, 5 days a week
NOAEL : 3.3 mg/m³ air
Test substance : as aerosol

Method: OECD Test Guideline 413 Evidence of damage to organs other than the organs of respiration was not found.

Hexamethylene-1,6-diisocyanate

Subacute, subchronic and prolonged toxicity.

Application Route : Inhalative
Species : rat, male/female
Dose Levels : 0 - 0.035 - 0.175 - 1.23 mg/m³
Exposure duration : 90 days
Frequency of treatment : 6 hours a day, 5 days a week
NOAEL : 0.035 mg/m³
LOAEL (Lowest observable adverse effect level) : 0.175 mg/m³
Target Organs : Nasal inner lining
Test substance : as vapour
Findings : Irritation to nasal cavity and to lungs.

CARCINOGENICITY

Hexamethylene-1,6-Diisocyanate Homopolymer

No data available.

Hexamethylene-1,6-Diisocyanate

Species : rat, male/female
Application Route : Inhalative
Dose Levels : 0 - 0.035 - 0.175 - 1.23 mg/m³
Exposure duration : 90 days
Frequency of treatment : 6 hours/day, 5 days/week
Test substance : as vapour

Did not show carcinogenic effects in animal experiments.

11. TOXICOLOGICAL INFORMATION - continued**TOXICITY - continued****REPRODUCTIVE TOXICITY/FERTILITY**

Hexamethylene-1,6-Diisocyanate Homopolymer : Available data show no indications for reproductive toxicity.

Hexamethylene-1,6-diisocyanate

Species : rat, male/female
Application Route : Inhalative
Dose Levels : 0 - 0,005 - 0,050 - 0,300 ppm
Exposure duration : males: 28 day : females: 50 days
Frequency of treatment : 6 hours/day 7 days/week
Exposure time before mating – Male : 14 days
Exposure time before mating – Female : 14 days
Test substance : as vapour
NOAEL - Parents : 0.005 ppm
NOAEL - F1 : 0.3 ppm

Fertility and developmental toxicity tests did not reveal any effect on reproduction.

REPRODUCTIVE TOXICITY/TERATOGENICITY

Hexamethylene-1,6-diisocyanate Homopolymer

Animal experiments on structurally similar compounds showed no indication of specific reproductive toxicity.

Hexamethylene-1,6-diisocyanate

NOAEL (teratogenicity) : 0.3 ppm
NOAEL (maternal) : 0.005 ppm
Species : rat, female
Application Route : Inhalative
Dose Levels : 0 - 0.005 - 0.050 - 0.300 ppm
Frequency of treatment : 6 hours/day (Exposure duration: day 0 - 19 of gestation)
Test substance : as vapour

Did not show teratogenic effects in animal experiments.

GENOTOXICITY IN VITRO

Test type : Salmonella/microsome test (Ames test)

Result : No indication of mutagenic effects.

Toxicological studies of a comparable product.

GENOTOXICITY IN VIVO

Hexamethylene-1,6-diisocyanate

Test type : Micronucleus test
Species : mouse, male/female
Application Route : Inhalative
Exposure duration : 6 hours
Result : negative
Test substance : as vapour

11. TOXICOLOGICAL INFORMATION - continued**TOXICITY - continued****STOT EVALUATION - ONE-TIME EXPOSURE**

Hexamethylene-1,6-diisocyanate Homopolymer

Route of exposure : Inhalative / May cause respiratory irritation.

Hexamethylene-1,6-diisocyanate

Route of exposure : Inhalation

Target Organs : Respiratory Tract / May cause respiratory irritation.

STOT EVALUATION - REPEATED EXPOSURE:

Hexamethylene-1,6-diisocyanate Homopolymer

: Based on available data, the classification criteria are not met.

Hexamethylene-1,6-diisocyanate

: Based on available data, the classification criteria are not met.

ASPIRATION TOXICITY

Hexamethylene-1,6-diisocyanate Homopolymer

: Based on available data, the classification criteria are not met.

Hexamethylene-1,6-diisocyanate

: Based on available data, the classification criteria are not met.

CMR ASSESSMENT

Hexamethylene-1,6-diisocyanate Homopolymer

Carcinogenicity

: Based on available data, the classification criteria are not met.

Mutagenicity

: In vitro tests did not show mutagenic effects

Teratogenicity

: Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility

: Based on available data, the classification criteria are not met.

Hexamethylene-1,6-diisocyanate

Carcinogenicity

: Did not show carcinogenic effects in animal experiments.

Mutagenicity

: In vitro and in vivo tests did not show mutagenic effects.

Teratogenicity

: Did not show teratogenic effects in animal experiments.

Reproductive toxicity/Fertility

: Animal testing did not show any effects on fertility.

TOXICOLOGY ASSESSMENT

Hexamethylene-1,6-diisocyanate Homopolymer

Acute effects

: Harmful if inhaled.

Sensitization

: May cause sensitization by skin contact.

Hexamethylene-1,6-diisocyanate

Acute effects

: Fatal if inhaled.

Harmful if swallowed.

Causes severe skin burns and eye damage.

Sensitization

: May cause sensitization by inhalation and skin contact.

Repeated dose toxicity

: Based on available data, the classification criteria are not met.

SPECIAL PROPERTIES / EFFECTS

Over-exposure, especially during spraying operations without the necessary precautions entails the risk of concentration-dependent irritating effects on eyes, nose, throat, and respiratory tract.

Delayed appearance of the complaints and development of hyper-sensitivity (difficult breathing, coughing, asthma) are possible.

Hypersensitive persons may suffer from these effects even at low isocyanate concentrations including concentrations below the TWA-limit.

In case of longer contact with skin, tanning and irritating effects are possible.

Animal tests and other research indicate that skin contact with diisocyanates can play a role in causing isocyanate sensitization and respiratory reaction.



12. ECOLOGICAL INFORMATION

The product is a clear liquid at room temperature.

Do not allow to escape into waters, waste water or soil.

This product may enter the environment from industrial discharges, municipal waste treatment plant discharges, or spills.

No environmental impact data available for this specific product.

However for some of the components :

TOXICITY

Acute Fish toxicity

Species: Danio rerio (zebra fish) LC₅₀ 35.2 mg/l Exposure duration: 96 hours
Ecotoxicological reports on a comparable product

Species: Daphnia magna (Water flea) EC₅₀ > 100 mg/l Exposure duration: 48 hours
Ecotoxicological reports on a comparable product

Acute Toxicity For Algae

Tested on: Desmodesmus subspicatus (Green algae) IC₅₀ 72 mg/l Duration of test : 72 hours
Ecotoxicological reports on a comparable product

Acute Bacterial Toxicity

Tested on: activated sludge EC₅₀ > 10.000 mg/l
Ecotoxicological reports on a comparable product

ECOTOXICOLOGY ASSESSMENT

Hexamethylene-1,6-diisocyanate Homopolymer

Acute aquatic toxicity : Based on available data, the classification criteria are not met.

There is no evidence of a chronic aquatic toxicity.

Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

Hexamethylene-1,6-diisocyanate

Acute aquatic toxicity : Based on available data, the classification criteria are not met.

There is no evidence of a chronic aquatic toxicity.

Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

12. ECOLOGICAL INFORMATION - continued**PERSISTENCE AND DEGRADABILITY**

Biodegradability : Biodegradation : 0 %, i.e. not readily degradable
Ecotoxicological reports on a comparable product

Stability in water

Hexamethylene-1,6-diisocyanate Homopolymer

Test type : Hydrolysis
Half life : 7.7 hours at 23 °C

The substance hydrolyzes rapidly in water.
Studies of a comparable product.

Hexamethylene-1,6-diisocyanate

Test type : Hydrolysis
Half life : 0.23 hours at 23 °C

The substance hydrolyzes rapidly in water.

Photodegradation:

Hexamethylene-1,6-diisocyanate Homopolymer

Test type : Phototransformation in air
Temperature : 25 °C
Sensitizer : OH-radicals
Half-life indirect photolysis : 10.3 hours
Method : SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

Test type : Phototransformation in air
Temperature : 25 °C
Sensitizer : OH-radicals
Half-life indirect photolysis : 3 hours
Method : SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

Studies of hydrolysis products.

Hexamethylene-1,6-diisocyanate

Test type : Phototransformation in air
Temperature : 25 °C
Sensitizer : OH-radicals
Half-life indirect photolysis : 48.4 hours
Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Test type : Phototransformation in air
Temperature : 25 °C
Sensitizer : OH-radicals
Half-life indirect photolysis : 5.6 hours
Method : SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

Studies of hydrolysis products.

12. ECOLOGICAL INFORMATION - continued**VOLATILITY (HENRY'S LAW CONSTANT)**

Hexamethylene-1,6-diisocyanate Homopolymer

Calculated value = < 0.000001 Pa*m³/mol at 25 °C

Method : Bond-method

The substance has to be scored as non-volatile from water.

Hexamethylene-1,6-diisocyanate

Calculated value = 5 Pa*m³/mol at 25 °C

Method : Bond-method

The substance has to be scored as non-volatile from water.

BIOACCUMULATION

Hexamethylene-1,6-diisocyanate Homopolymer

Species : value calculated

Bioconcentration factor (BCF) : 3.2

Method : (calculated)

An accumulation in aquatic organisms is not to be expected.

Species : value calculated

Bioconcentration factor (BCF) : 367.7

Method : (calculated)

An accumulation in aquatic organisms is not to be expected. Studies of hydrolysis products.

Hexamethylene-1,6-diisocyanate

Species : value calculated

Bioconcentration factor (BCF) : 57.6

Method: (calculated)

An accumulation in aquatic organisms is not to be expected.

Species: value calculated

Bioconcentration factor (BCF): 3,2

Method: (calculated)

An accumulation in aquatic organisms is not to be expected. Studies of hydrolysis products.

MOBILITY IN SOIL**Distribution among environmental compartments:**

Hexamethylene-1,6-diisocyanate Homopolymer

Adsorption/Soil : Not Applicable

Hexamethylene-1,6-diisocyanate

Adsorption/Soil : Not Applicable

ENVIRONMENTAL DISTRIBUTION

Hexamethylene-1,6-diisocyanate Homopolymer : Not Applicable

Hexamethylene-1,6-diisocyanate : Not Applicable

Results of PBT and vPvB assessment

Hexamethylene-1,6-diisocyanate Homopolymer

This substance does not meet the criteria for classification as PBT or vPvB.

Hexamethylene-1,6-diisocyanate

This substance does not meet the criteria for classification as PBT or vPvB.

ADDITIONAL INFORMATION ON ECOTOXICOLOGYThe resin reacts with water at the interface forming CO₂ and a solid insoluble product with high melting point (polyurea).

This reaction is accelerated by surfactants (e.g. detergents) or by water soluble solvents.

Previous experience shows that polyurea is inert and non-degradable.



Manufacturers of UTHANE Polyurethane Coatings
2 Hume Road, Smithfield, N.S.W., 2164
Phone +612 9729-2000 Fax +612 9729-2279

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13. DISPOSAL CONSIDERATIONS

This product is NOT suitable for disposal by either landfill or via municipal sewers, drains, natural streams or rivers.

Consult an expert on disposal of any recovered material and ensure conformity to local disposal regulations.

It may be necessary to contain and dispose of this product as a HAZARDOUS WASTE.

Contact your state Environmental Program for specific recommendations.

Refer to State Land Waste Management Authority for specific recommendations.

Advise of combustible/chemical nature.

Recycle product where possible.

Do NOT reuse empty containers without commercial cleaning or reconditioning.

Empty containers may be disposed of after neutralizing any product remaining on the walls of the container with a mixture of mixture of ammonia solution (190 g/L), water and ethanol (5%, 50% and 45%).

Afterwards, remove warning labels.

Normally suitable for incineration by an approved agent provided local regulations are observed.

Do NOT pressurise, cut, heat, or weld containers.

Empty product containers may contain product residue.



14. TRANSPORT INFORMATION

Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail; NON-DANGEROUS GOODS.

Refer to relevant regulations for storage and transport requirements.

STORAGE AND TRANSPORT

CORRECT SHIPPING NAME	: Resin Solution, Combustible		
UN No	: Not Regulated	PACKAGING GROUP	: Not Regulated
CLASS	: Not Regulated	ICAO / IATA-DGR	: Not Regulated
AS 1940 Class	: Not Regulated		
SUBSIDIARY RISK	: NOT ASSIGNED	HAZCHEM CODE	: Not Regulated
POISONS SCHEDULE	: S6		
IMO HAZARD CLASS	: Not Regulated		
DECLARATION FOR LAND SHIPMENT	: Resin solution		
DECLARATION FOR SEA SHIPMENT	: Resin solution		
DECLARATION FOR SHIPMENT BY AIR	: Resin solution	EMS	: Not Regulated
STORAGE TEMPERATURE	(°C) : Ambient	Avoid heat below +10 °C or above +50 °C	
TRANSPORT TEMPERATURE	(°C) : Ambient	Avoid heat below +10 °C or above +50 °C	
LOADING / UNLOADING TEMPERATURE	(°C) : Ambient	Avoid heat below +10 °C or above +50 °C	
STORAGE / TRANSPORTATION PRESSURE (kPa)	: Atmospheric		
ELECTROSTATIC ACCUMULATION HAZARD ?	: No, but use proper grounding procedure.		
USUAL SHIPPING CONTAINERS	: Drums, cans.		
MATERIALS AND COATINGS SUITABLE	: Carbon Steel / Stainless Steel.		
MATERIALS AND COATINGS UNSUITABLE	: Natural Rubber / Butyl Rubber / E P D M / Polystyrene / Polyethylene / Polypropylene / Polyvinyl chloride / Polyvinyl alcohol / Polyacrylonitrile		

This material is a Scheduled Poison (S6) and must be stored, maintained and used in accordance with the relevant regulations.

MARINE TRANSPORT

Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; NON-DANGEROUS GOODS.

AIR TRANSPORT

Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; NON-DANGEROUS GOODS.

15. REGULATORY INFORMATION**Hazardous according to criteria of Safe Work Australia**

HAZARDOUS SUBSTANCE.

CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES**CLASSIFICATION / SYMBOL** : HARMFUL / Xn, IRRITANT / Xi / N DANGEROUS FOR THE ENVIRONMENT
GOVERNING DIRECTIVE : National Code of practice for the Labelling of Hazardous Substances.**NOT CLASSIFIED AS A DANGEROUS GOODS ACCORDING TO THE CRITERIA OF THE ADG CODE FOR THE PURPOSE OF TRANSPORT**

Type : Organic Substances

Water contaminating class (Germany) : 1 slightly water endangering
(in accordance with Annex 4 to the Directive on Water-Hazardous Substances)

Any existing national regulations on the handling of isocyanates must be observed.

Other regulations

The European Committee of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE) provides the following information on coatings containing isocyanates

: Ready-to-use paints containing isocyanates may have an irritant effect on mucous membranes - especially on breathing organs - and cause hypersensitivity reactions.

Inhalation of vapor or spray mist may cause sensitisation.

When handling paints containing isocyanates all precautions required for solvent-containing paints must be followed.

Vapor and spray mist in particular should not be inhaled.

Allergics and asthmatics as well as people prone to respiratory ailments should not work with isocyanate containing paints.

A Chemical Safety Assessment has been carried out for:

Hexamethylene-1,6-diisocyanate Homopolymer

Hexamethylene-1,6-diisocyanate

RISK PHRASES

R20	Harmful by inhalation.
R23	Toxic by inhalation
R36/37/38	Irritating to eyes, respiratory system and skin
R41	Risk of serious damage to the eyes
R42/43	May cause sensitization by inhalation or skin contact.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES

S7/8	Keep container tightly closed and dry
S24/25	Avoid contact with skin and eyes
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/38	Wear suitable protective clothing, gloves and eye/face protection
S61	Avoid release to the environment. Refer to special instructions / Safety data sheets.

POISONS SCHEDULE S6 Poison

All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION**Full text of hazardous (H) warnings referred to under sections 2 and 3 of the CLP classification (1272/2008/CE).**

H226	Flammable liquid and vapour.
H290	May be corrosive to metals.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3 of the EU classification

R10	Flammable.
R20	Harmful by inhalation.
R20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
R23	Toxic by inhalation.
R34	Causes burns.
R36/37/38	Irritating to eyes, respiratory system and skin.
R37	Irritating to respiratory system.
R42/43	May cause sensitization by inhalation and skin contact.
R43	May cause sensitization by skin contact.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

The product is used as a hardener in coating materials.

The handling of coating materials containing reactive polyisocyanates and residual monomeric HDI requires appropriate protective measures referred to in this safety data sheet.

These products may therefore be used only in industrial or trade applications.

They are not suitable for use in home worker (DIY) applications.

16. OTHER INFORMATION - continued**LD₅₀** (Lethal Dose, 50 %)

LD₅₀ is the amount of a material, given all at once, which causes the death of 50 % (one half) of a group of test animals. The LD₅₀ is one way to measure the short-term poisoning potential (acute toxicity) of a material.

The LD₅₀ can be found for any route of entry or administration but dermal (applied to the skin) and oral (given by mouth) administration methods are the most common.

LC₅₀ (Lethal Concentration, 50 %)

LC values usually refer to the concentration of a chemical in air but in environmental studies it can also mean the concentration of a chemical in water.

For inhalation experiments, the concentration of the chemical in air that kills 50 % of the test animals in a given time (usually four hours) is the LC₅₀ value.

EC₅₀ (half maximal effective concentration)

refers to the concentration of a drug, antibody or toxicant which induces a response halfway between the baseline and maximum after some specified exposure time. It is commonly used as a measure of drug's potency.

IC₅₀ (half maximal inhibitory concentration)

is a measure of the effectiveness of a compound in inhibiting biological or biochemical function.

This quantitative measure indicates how much of a particular drug or other substance (inhibitor) is needed to inhibit a given biological process (or component of a process, i.e. an enzyme, cell, cell receptor or micro-organism) by half.

TL_M (Median Tolerance Limit)

the concentration of toxicant or substance at which 50% of the test organisms survive over the test period.

log Pow / log P(o/w)

in chemistry and the pharmaceutical sciences, a partition- (P) or distribution coefficient (D) is the ratio of concentrations of a compound in the two phases of a mixture of two immiscible solvents at equilibrium. Hence these coefficients are a measure of differential solubility of the compound between these two solvents. The phrase "Partition Coefficient" is now considered obsolete by IUPAC, and the appropriate alternative ("partition constant", "partition ratio" or "distribution ratio") should be used as appropriate. Normally one of the solvents chosen is water while the second is hydrophobic such as octanol. Hence both the partition and distribution coefficient are measures of how hydrophilic ("water loving") or hydrophobic ("water fearing") a chemical substance is. A partition coefficient can also be used when one or both solvents is a solid though.

THEORETICAL OXYGEN DEMAND (ThOD)

is the calculated amount of oxygen required to oxidize a compound to its final oxidation products.

or

the amount of oxygen that theoretically can be consumed if the test substance is completely oxidized by micro-organisms.

Calculated from the test substance's chemical structure; units mg O₂ per mg of test substance.

CHEMICAL OXYGEN DEMAND (COD) test is commonly used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in surface water (e.g. lakes and rivers), making COD a useful measure of water quality.

It is expressed in milligrams per litre (mg/L), which indicates the mass of oxygen consumed per litre of solution.

Older references may express the units as parts per million (ppm).

BIOCHEMICAL OXYGEN DEMAND (BOD) is a chemical procedure for determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period.

It is not a precise quantitative test, although it is widely used as an indication of the organic quality of water.

It is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C and is often used as a robust surrogate of the degree of organic pollution of water.

BOD can be used as a gauge of the effectiveness of wastewater treatment plants.



Manufacturers of UTHANE Polyurethane Coatings
2 Hume Road, Smithfield, N.S.W., 2164
Phone +612 9729-2000 Fax +612 9729-2279

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16. OTHER INFORMATION - continued

DATE OF PREPARATION / LAST REVISION : 04/04/12

PRINCIPAL REFERENCES

Supplier's Material Safety Data Sheet

In "Registry of Toxic Effects of Chemical Substances 1995" (Ed. D. Sweet),
(US Dept. of Health & Human Services: Cincinnati 1995)

END OF MSDS