



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

Date of Issue : 12/07/07

**MATERIAL SAFETY DATA SHEET**

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**UT925 2-PACK UTHANE – PART “A” (LEAD FREE COLORS)**

Ref msds 00126A

**Hazardous according to criteria of Worksafe Australia**

**1. IDENTIFICATION**

**PRODUCT NAME** : UT925 2-PACK UTHANE - PART " A " – LEAD FREE COLORS  
**AVAILABLE COLORS** : White, Clear, Black, range of tinted colors – in gloss levels ranging from full gloss to matte.  
**OTHER NAMES** : UT925 – Part “A”  
**U.N. NUMBER** : 1263  
**DANGEROUS GOODS CLASS** : 3.2 (Flammable Liquid)  
**SUBSIDIARY RISK** : Nil  
**HAZCHEM CODE** : 3YE  
**POISONS SCHEDULE** : S5  
**EPG** : 3C1  
**USE** : Reactive spray coating to provide a tough, durable finish for interior applications

**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.**

**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 source of information of all potential and 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 three 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.



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**MATERIAL SAFETY DATA SHEET**

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**UT925 2-PACK UTHANE – PART “A” (LEAD FREE COLORS)**

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**2. COMPOSITION**

<b>CHEMICAL ENTITY</b>	<b>CAS No.</b>	<b>PROPORTION ( % w/w )</b>
Xylenes * (Mixed Isomers)	1330-20-7	10 - 30
Petroleum Hydrocarbons Mixture, Aromatic (Complex Mixture)	N/A	< 10
n-Butyl Acetate	123-86-4	10 - 30
2 - Ethoxyethyl Acetate	111-15-9	< 10
Synthetic Polymers, Hydroxy Functional (Proprietary Composition)	N/A	20 - < 60 (depending on color &/or gloss)
Titanium Dioxide Pigment	13463-67-7	0 - < 60 (depending on color &/or gloss)
Organic Pigments (Proprietary Blend)	N/A	0 - < 20 (depending on color)
Mineral Pigments / Fillers / Extenders (Proprietary Composition)	Non-Hazardous	0 - < 60 (depending on color &/or gloss)
Amorphous (Precipitated) Silica (containing no asbestos & < 1% crystalline silica) (Proprietary Composition)	112926-00-8	0 - < 10 (depending on color &/or gloss)
Methylenediaminomethylethyl Polycondensate	Non-hazardous	0 - < 10 (depending on color &/or gloss)
Miscellaneous Additives (Proprietary Composition)	N/A	< 10

\* Xylenes may be a common name for any combination of the following :  
1,2-Dimethylbenzene (ortho Xylene), CAS # 95-47-6  
1,3-Dimethylbenzene (meta Xylene), CAS # 108-38-3  
1,4-Dimethylbenzene (para Xylene), CAS # 106-42-3

More detailed information available to medical staff in case of an emergency.

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

**3. HAZARDS IDENTIFICATION****HEALTH EFFECTS - ACUTE EXPOSURE**

The following acute (short term) health effects may occur immediately or shortly after exposure to this product:

High vapor concentrations are irritating to the eyes and the respiratory tract, may cause coughing, headaches and dizziness, are anaesthetic and may have other central nervous system effects.

Very high levels can cause death.

Narcotic effects occur at levels below the exposure standard.

If a large amount (> 1 ml/kg) is ingested and retained, symptoms of CNS depression and irritation occur and include weakness, dizziness, unconsciousness and convulsions.

**TARGET ORGANS** : Central nervous system, eyes, skin, gastro-intestinal tract, blood, liver and kidneys

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE** : Damaged skin, respiratory system disease

**ROUTES OF ENTRY** : Ingestion, inhalation, skin contact, eye contact, absorption

**SWALLOWED**

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

The liquid is irritating and may be toxic if swallowed.

Tends to break into a foam if the patient vomits.

Ingestion can result in nausea, cramps, pain, vomiting, diarrhoea and central nervous system depression.

Small amounts of liquid aspirated into respiratory system during ingestion or from vomiting may cause broncho-pneumonia or pulmonary oedema.

If the victim is uncoordinated there is a greater likelihood of vomit entering the lungs and causing subsequent complications.

**EYE**

The vapor and the liquid are both severe eye irritants if exposure is prolonged.

The liquid is capable of causing severe damage with loss of sight if not promptly and adequately treated.

Corneal changes have been reported in furniture polishers exposed to xylene.

**SKIN**

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 sensitisation 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.

**INHALED**

This product is a central nervous system depressant.

CNS depression characterised by dizziness and headache.

Vapor/mist is extremely irritating to mucous membranes, upper respiratory tract and lungs.

Inhalation hazard is increased at higher temperatures.

Toxic effects are increased by consumption of alcohol.

Repeated exposure may cause sensitisation and/or allergic reactions.

Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache, dizziness, increased reaction time, loss or co-ordination, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g. nausea, anorexia and flatulence).

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.



**3. HAZARDS IDENTIFICATION - continued**

**HEALTH EFFECTS - CHRONIC EXPOSURE**

Principal routes of exposure are usually by skin contact/absorption and inhalation of vapor.

Chronic (long term) health effects can occur at some time after exposure to liquid hydrocarbons and can last for months or years. Evidence from animal tests indicate that repeated or prolonged solvent inhalation exposures could result in kidney disorders, nervous system impairment, liver and blood changes. [PATTYS].

Repeated exposure to this product can cause poor memory, difficulty in concentration and other brain effects.

This chemical has not been adequately evaluated to determine whether brain or other nerve damage could occur with repeated exposure. However, many solvents and other petroleum based chemicals have been shown to cause such damage.

Effects may include reduced memory and concentration, personality changes (withdrawal, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").

Prolonged or repeated skin contact causes severe irritation and may lead to de-fatting and dermatitis.

Capable of causing skin sensitisation and allergic skin reactions.

**MIXED EXPOSURES**

Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure.

Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by liquid hydrocarbons.



#### **4. FIRST AID MEASURES**

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

##### **SWALLOWED**

Harmful if swallowed.

Give milk or water to rinse out mouth.

Do NOT give anything by mouth to an unconscious person.

If swallowed, do NOT induce vomiting due to the hazard of solvent 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.

This is especially important as aspiration of this material into the lungs can cause chemical pneumonia, which can be fatal.

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

##### **EYE**

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.

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

##### **SKIN**

Soak contaminated clothing, including footwear, with water and then remove.

Gently wash the affected areas thoroughly with water, then mild soap and water.

If exposure has been prolonged or severe or if swelling, redness or irritation occur seek medical advice.

Launder contaminated clothing before re-use.

Thoroughly dry contaminated shoes before re-use.

Discard internally contaminated gloves and shoes.

##### **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 breathing is difficult and patient is cyanotic (blue), ensure airways are clear 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.

##### **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.

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.

Gastric lavage with a cuffed endotracheal tube to prevent further aspiration should be done.

When vomiting occurs, hold patient with head below the hips to prevent pulmonary aspiration.



## **5. FIRE FIGHTING MEASURES**

FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.

### **FIRE AND EXPLOSION HAZARD**

Flammable liquid, can release vapors that form flammable mixtures at temperatures at or above the flash point.

Liquid and vapor are highly flammable.

Severe fire hazard when exposed to heat, flame and/or oxidisers.

Burns very rapidly and explosively.

When burning may form toxic materials such as carbon monoxide (CO,) carbon dioxide (CO<sub>2</sub>), various hydrocarbons, fumes and smoke possible.

Vapor forms and explosive mixture with air.

Severe explosion hazard, in the form of vapor, when exposed to flame or spark.

Vapor / air mixtures may ignite explosively and flashback a considerable distance along the vapor trail to source of ignition.

Do not store or mix with strong oxidants (such as chlorine, bromine and fluorine) since violent reactions may occur.

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

Product can accumulate static charges which can cause an incendiary electrical discharge.

Shut off any leak if safe to do so and remove sources of re-ignition.

If safe to do so, remove containers from the path of the fire and keep cool with water spray.

Firefighters should wear self-contained breathing apparatus with a full face piece and operated in positive pressure mode.

### **FIRE FIGHTING MEASURES**

Shut off any leak if safe to do so and remove sources of re-ignition.

If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop leak.

If safe to do so, remove containers from the path of the fire and keep cool with water spray.

Keep storage tanks, pipelines, fire exposed surfaces etc. cool with water spray.

Minimize breathing gases, vapor, fumes or decomposition products.

Firefighters should wear self-contained breathing apparatus with a full face piece and operated in positive pressure mode.

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

Prevent run off from fire control or dilution from entering waterways, sewers or drinking water supply.

This product may form a floating fire hazard on water.

If employees are expected to fight fires, they must be trained and equipped as stated in the appropriate regulations.

### **FIRE FIGHTING MEDIA**

Either allow fire to burn under controlled conditions or extinguish with alcohol stable foam, carbon dioxide (CO<sub>2</sub>), or dry chemical.

Try to cover liquid spills with foam.

Water spray may be ineffective, but should be used in case of larger fires, water spray be used to keep fire exposed containers cooled.

Avoid spraying water directly into storage containers due to danger of boilover.

Fire-men have to wear self-contained breathing apparatus.



## **6. ACCIDENTAL RELEASE MEASURES**

### **SPILLS**

#### **FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.**

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

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

Stop liquid at the source if safe to do so.

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

May be violently or explosively reactive.

Keep solvents out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build up of explosive concentrations.

Do not empty into drains.

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

Avoid breathing vapors and contact with skin and eyes. Control personal contact by using protective equipment.

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

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

### **MINOR SPILLS**

Clean up spills immediately.

Small spills may be absorbed onto any absorbent material such as sand, soil or vermiculite or other absorbent material.

Collect residues and place in sealed, labelled, flammable waste container.

### **MAJOR SPILLS**

Consider evacuation.

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

Avoid breathing vapors and contact with skin and eyes.

Wear breathing apparatus, protective gloves and full protective clothing.

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

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

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

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

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

Pump the liquid to a labelled salvage tank for recycling or later disposal.

Remove mechanically; cover remainders 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 CO<sub>2</sub>).

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**

### **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).

Explosion protection required.

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.

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.

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 vapors or mists.

Intense smelling. Keep away from foodstuffs and clothing.

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.

### **STORAGE REQUIREMENT**

Keep container dry and securely sealed when not in use.

Check all containers are clearly labelled and check regularly for leaks.

Store in original containers in a cool, dry, well-ventilated, approved flammable liquid storage area away from direct sunlight.

Do NOT store in pits, depressions, basements or areas where vapors may be trapped.

Materials are stable on storage, but should be stored in a cool and well ventilated place away from sources of ignition, strong oxidizing agents (liquid chlorine, bromine, fluorine, concentrated oxygen, sodium hypochlorite), acids, alkalis (since violent reactions occur) and odor sensitive materials.

Protect containers against physical damage and check regularly for leaks.

Avoid exposure to temperatures above 50 °C.

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

Empty product containers may contain product residue.

Do NOT reuse empty containers without commercial cleaning or reconditioning.

### **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.

Use dust containment system to reduce nuisance dust concentration to permissible exposure levels.

**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.

**FLAMMABILITY**

Highly flammable liquid.

Can readily form flammable mixture with air.

May form explosive mixtures with air.

Avoid direct sources of heat, naked lights, sparks, all ignition sources and oxidising materials.

Prevent build up of flammable vapors.

Vapor may travel a considerable distance to source of ignition and flash back.

Explosion proof equipment necessary in areas where this product is being used.

Earth and bond all process equipment, including tanks, hoses and drums to avoid static charge build up.

Nearby equipment should be earthed.

Ensure ventilation is adequate to prevent build up of explosive atmosphere.

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.

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

No value has been assigned for this specific material by the National Occupational Health & Safety Commission. However, the Threshold Limit Value (TLV-TWA), as published by WORKSAFE [1995], for some of the individual constituents is listed below.

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

**XYLENE (all isomers)**

TLV-TWA	: 80 ppm (350 mg/m <sup>3</sup> )	A4	(Under review)
STEL	: 150 ppm (655 mg/m <sup>3</sup> )		
IDLH Level	: 1000 ppm		
Odour Threshold Value	: 20 ppm (detection), 40 ppm (recognition)		

The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

**NOTE :**

This substance has been classified by the ACGIH as A4. NOT classifiable as causing Cancer in humans.

Detector tubes for o-xylene, measuring in excess of 10 ppm, are available commercially.

(m-xylene and p-xylene give almost the same response).

Xylene vapor is an irritant to the eyes, mucous membranes and skin and causes narcosis at high concentrations.

**AROMATIC PETROLEUM HYDROCARBONS MIXTURE (RCP 160-185) (HSPA OELS)**

TLV-TWA	: 100 ppm, 8 hours	(Supplier recommendation)
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**n-BUTYL ACETATE**

TLV-TWA	: 150 ppm (713 mg/m <sup>3</sup> ) / STEL - 200 ppm (950 mg/m <sup>3</sup> )	(ACGIH)	A4
PEL (PERMISSIBLE EXPOSURE LIMIT)	: 150 ppm (710 mg/m <sup>3</sup> )		
ODOR THRESHOLD	: 0.0063 ppm (detection), 0.038 - 12 ppm (recognition)		

The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

IDLH Level : 10,000 ppm

NOTE : This substance has been classified by the ACGIH as A4 - NOT classifiable as causing Cancer in humans.

Exposure at or below the recommended TLV-TWA is thought to prevent significant irritation of the eyes and respiratory passages as well as narcotic effects.

**2-ETHOXYETHYL ACETATE**

TLV-TWA	: 5 ppm (27 mg/m <sup>3</sup> )	(ACGIH)	"Sk"	"Peak Limitation"
ES-TWA	: 5 ppm (27 mg/m <sup>3</sup> )		"Sk"	"Peak Limitation"
MEL-TWA	: 10 ppm (55 mg/m <sup>3</sup> )		"Sk"	"Peak Limitation"
ODOR THRESHOLD	: 0.06 ppm (detection), 0.13 (recognition)			

The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

This product is readily hydrolysed in the body yielding ethylene glycol mono-ethyl ether, which is a putative reproductive toxin.

The TLV-TWA is thought to be protective against testicular effects.

**AMORPHOUS (PRECIPITATED) SILICA**

TLV-TWA	: 10 mg/m <sup>3</sup> Total Dust, 8 hour		
TLV-TWA	: 2 mg/m <sup>3</sup> Respirable Dust (fumed silica)		
ES-TWA	: 2 mg/m <sup>3</sup> Respirable Dust (fumed silica)		
OES-TWA	: 6 mg/m <sup>3</sup> Total Inhalable Dust (fumed silica)		
OES-TWA	: 2.4 mg/m <sup>3</sup> Respirable Dust (fumed silica)		
IDLH Level	: 3,000 mg/m <sup>3</sup>		

**ORGANIC PIGMENTS / MINERAL PIGMENTS / EXTENDERS / FILLERS**

TLV-TWA	: 10 mg/m <sup>3</sup> total dust, 8 hour	
OES-TWA	: 6 mg/m <sup>3</sup> respirable dust	

**METHYLENEDIAMINOMETHYLETHYL POLYCONDENSATE**

LTEL-TWA	: 10 mg/m <sup>3</sup> total inhalable dust, 8 hour	(EH40, 1998)
LTEL-TWA	: 4 mg/m <sup>3</sup> total respirable dust, 8 hour	(EH40, 1998)



## 8. EXPOSURE CONTROLS - continued

### EXPOSURE LIMITS - continued

#### NOTE

The above TLV's are issued as guidelines only in the control of occupational health hazards 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.

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

Take this Fact Sheet with you.

#### 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.

**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 vapor and liquid may be absorbed through intact skin.

Absorption by skin may readily exceed vapor 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.

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

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.

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**

Avoid prolonged or repeated contact with skin by wearing impervious, chemically resistant work clothing (PVC apron and sleeves or full PVC covering or other work clothing), safety boots and Barrier cream with chemical protective gloves (polyethylene, Butyl rubber, Neoprene, Polyvinyl Alcohol, nitrile or P.V.C.) 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.

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

Remove contaminated shoes, thoroughly dry before re-use.

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.

**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.**

At concentrations up to 100 ppm, a chemical cartridge respirator with organic vapor/acid mist cartridge is recommended.

Above this level, 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.

Exposure to 2,000 ppm is immediately dangerous to life and health.

If the possibility of exposures above 2,000 ppm exists, use an approved self-contained breathing apparatus (meeting the requirements of AS1715 and AS1716) with a full facepiece operated in continuous flow or other positive pressure mode.

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		: Various colored, low viscosity liquids. Strong lacquer odor.	
BOILING POINT	(°C)	: 138.0	(Xylene)
VAPOR PRESSURE	(kPa @ 38°C)	: 5.2	(Xylene)
SPECIFIC GRAVITY	(@ 25°C)	: 0.970 - 1.400	(Water =1)
		(depending on color &/or gloss)	
% VOLATILES	(by volume)	: 66.0 ± 1.0	
EVAPORATION RATE		: 0.7	(Butyl Acetate =1) (Xylene)
FLASH POINT	(°C)	: 27.0	Tag Closed Cup (Xylene)
FLAMMABILITY LIMITS	(% volume)	: 1.7 LEL / 7.0 UEL	(Xylene)
AUTOIGNITION TEMPERATURE	(°C)	: 499.0	(Xylene)
SOLUBILITY IN WATER	(% weight)	: Negligible	
SOLUBILITY IN WATER		: Negligible	
pH VALUE		: Not applicable	

**OTHER PROPERTIES**

: Flammable, vapors can readily form explosive mixture with air

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

Hazardous polymerization	: Cannot occur
Stability	: Stable under normal conditions
Conditions to Avoid	: Heat, sparks, flame and build up of static electricity.
Incompatibility (materials to avoid for purpose of transport, handling & storage only)	: Avoid contact with strong alkalis, mineral acids, halogens, strong oxidizers (liquid chlorine, concentrated oxygen, sodium hypochlorite), alcohols, amines, rubber, polyethylene and PVC, and most tank linings.
Hazardous reactions	: None known
Hazardous decomposition products	: No hazardous decomposition products when stored and handled correctly.
Hazardous combustion products	: In case of fire, formation of fumes, smoke and carbon monoxide

**HAZARDOUS COMPONENTS OF MIXTURES**

The presence of approximately 0.1 % of Benzene in this product poses chronic toxic problems.

The most serious of the hazards is the gradual undetectable destruction of various components of the blood-forming organs.

This occurs as a consequence of prolonged or repeated inhalation of Benzene vapor at concentrations greater than 10 ppm TLV.

If these excessive exposures continue and if diagnosis is delayed, death may occur.

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

**11. TOXICOLOGICAL INFORMATION****TOXICITY**

Evidence from animal tests is available to indicate that repeated or prolonged exposure to hydrocarbon solvents could result in liver, kidney and central nervous disorders as well as anaemia and leukopenia (lowered white cell count). Aromatic hydrocarbons, such as those contained in this product, irritate the skin and mucous membranes and are narcotic if inhaled in high concentrations. Harmful if swallowed, may cause gastric irritation and narcosis. Do NOT induce vomiting if swallowed. Prolonged, repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis. Limits shown for guidance only. Follow applicable regulations (refer WORKSAFE Australia Exposure Standards). No LD<sub>50</sub> data available for this specific product. Data for principal ingredients only.

**XYLENE**

Oral	LD <sub>50</sub>	(rat)	: 4,300 mg/kg
Oral	LDLO	(human)	: 50 mg/kg
Inhalation	LC <sub>50</sub>	(rat)	: 5,000 ppm/4 hours
Inhalation	Lowest Toxic Concentration	(human)	: 200 ppm (olfaction effects; conjunctival irritation)
Inhalation	TCLO	(human)	: 200 ppm Irritant (CNS recording changes, hallucinations)
Inhalation	LCLO	(human)	: 10,000 ppm / 6hrs
Dermal	LD <sub>50</sub>	(rabbit)	: > 2,000 mg/kg
Skin Irritation		(rabbit)	: 500 mg / 24 hr. Moderate irritant on prolonged or repeated contact.
Eye Irritation		(human)	: 200 ppm - moderate
Eye Irritation		(rabbit)	: 5 mg/24hr May cause severe irritation on prolonged or repeated contact.

**RCP AROMATIC HYDROCARBONS MIXTURE**

Oral	LD <sub>50</sub>	(rat)	: > 2,000 mg/kg
Dermal	LD <sub>50</sub>	(rat)	: > 2,000 mg/kg
Inhalation	LC <sub>50</sub>	(rat)	: > near-saturated vapor concentration / 4 hours
Skin Irritation			: May cause moderate skin irritation (but insufficient to classify).
Eye Irritation			: Essentially non-irritating to eyes.
Respiratory Irritation			: Repeated inhalation of vapors and mists is expected to cause irritation of the respiratory tract.
Sensitization			: Not a skin sensitizer.

**n-BUTYL ACETATE**

Oral	LD <sub>50</sub>	(rat)	: 13,100 mg/kg
Oral	LD <sub>50</sub>	(mouse)	: 7,060 mg/kg
Oral	LD <sub>50</sub>	(rabbit)	: 3,020 mg/kg
Dermal	L <sub>D</sub> 50	(rabbit)	: >5,000 mg/kg
Inspired	LD <sub>50</sub>	(mouse)	: 1,230 mg/kg
Inhalation	LC <sub>50</sub>	(rat)	: 2,000 ppm/4 hours
Inhalation	LC <sub>50</sub>	(rat)	: < 391 ppm/4 hr (aerosol)
Inhalation	TLCO	(human)	: Not Available (CNS recording changes, hallucinations)
Eyes		(rabbit)	: 20-100 mg - Moderate to severe irritant
Skin		(rabbit)	: 500 mg/24 hr - Mild to moderate irritant
Other			: Do <b>NOT</b> induce vomiting if swallowed

Vapor at concentrations above the exposure standard has an anaesthetic effect, which may lead to headache, dizziness and loss of consciousness.

**11. TOXICOLOGICAL INFORMATION - continued****TOXICITY - continued****2-ETHOXYETHYL ACETATE**

Oral	LD <sub>50</sub>	(rat)	: 2,900 mg/kg
Dermal	LD <sub>50</sub>	(rabbit)	: 10,500 mg/kg
Inhalation	LC <sub>50</sub>	(rat)	: 12,100 mg/m <sup>3</sup> /8 hours
Eyes		(rabbit)	: Moderate Irritant
Skin			: Harmful
Other			: Harmful if swallowed or by inhalation.

Inhalation studies conducted in rats and rabbits during gestation produced maternal and developmental toxicity at 100-300 ppm, including teratogenicity at 200-300 ppm.

There was no evidence of maternal or developmental toxicity (including teratogenicity) in either species at 50 ppm. (Tyl, R.W. et al; Fundam. Appl. Toxicol. 1988, 10(1), 20-39).

Studies in mice indicate that repeated exposure to this material can cause damage to blood cells and male reproductive organs. (Union Carbide; Health Effects Overview; Nov. 1982).

**AROMATIC PETROLEUM HYDROCARBONS**

Oral	LD <sub>50</sub>	(rat)	: 2,900 mg/kg
Dermal	LD <sub>50</sub>	(rabbit)	: 10,500 mg/kg
Inhalation	LC <sub>50</sub>	(rat)	: 12,100 mg/m <sup>3</sup> /8 hours
Eyes		(rabbit)	: Moderate Irritant
Skin			: Harmful
Other			: Harmful if swallowed or by inhalation.

Evidence from animal tests is available to indicate that repeated or prolonged exposure to hydrocarbon solvents could result in liver, kidney and central nervous disorders as well as anaemia and leucopenia (lowered white cell count).

Aromatic hydrocarbons irritate the skin and mucous membranes and are narcotic if inhaled in high concentrations.

Chronic exposure to high concentrations of BENZENE have been associated with blood abnormalities and leukaemia in a small percentage of exposed workers.

**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.





## **12. ECOLOGICAL INFORMATION**

This product may enter the environment from industrial discharges, municipal waste treatment plant discharges, or spills. It is a liquid at room temperature and is flammable.  
Do not allow to escape into waters, waste water or soil.

### **ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS**

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance. This product has high acute toxicity to aquatic life and causes injury to various agricultural and ornamental crops. Insufficient data are available to evaluate or predict the short-term effects of this product to birds or land animals.

### **CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS**

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behaviour.

Chronic effects can be seen long after first exposure(s) to a toxic chemical.

This product has high chronic toxicity to aquatic life.

Insufficient data are available to evaluate or predict the long-term effects of this product to plants, birds, or land animals.

### **WATER SOLUBILITY**

This product is moderately soluble in water. Concentrations of between 1 to 1,000 milligrams will mix with a litre of water.

### **DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT**

This product is non-persistent in water.

The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.

About 99.3% of the solvents in this product will eventually end up in the air; about 0.5% will end up in water; about 0.1%, respectively will end up in terrestrial soils and in aquatic sediments.

### **BIOACCUMULATION IN AQUATIC ORGANISMS**

Some substances increase in concentration, or bio-accumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food.

These chemicals can become concentrated in the tissues and internal organs of animals and humans.

The concentration of this product found in fish tissues is expected to be somewhat higher than the average concentration of this product in the water from which the fish was taken.

## **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 flammable/chemical nature.

Recycle product where possible.

Do NOT reuse empty containers without commercial cleaning or reconditioning.

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.

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**MATERIAL SAFETY DATA SHEET**  
**UT925 2-PACK UTHANE – PART “A” (LEAD FREE COLORS)**Page 18 of 19  
Ref msds 00126A**14. TRANSPORT INFORMATION**

Classified as a Dangerous Good (Class 3) (FLAMMABLE LIQUID) Dangerous Substance for the purpose of transport.  
Refer to relevant regulations for storage and transport requirements.

**STORAGE AND TRANSPORT**

Classified as a Dangerous Good (Class 3) for transport purposes.

SHIPPING NAME	: Paint related material	PACKAGING GROUP	: II
UN No	: 1263	ICAO / IATA-DGR	: 3 1263 II
CLASS	: 3.1 ( highly flammable Liquid )		
AS 1940 Class	: PG II		
SUBSIDIARY RISK	: NOT ASSIGNED	HAZCHEM CODE	: 3[Y]E
IMO HAZARD CLASS	: INFLAMMABLE LIQUID/3.1	EPG	: 3A2
DECLARATION FOR LAND SHIPMENT	: 1263, Paint related material		
DECLARATION FOR SEA SHIPMENT	: Paint related material		
DECLARATION FOR SHIPMENT BY AIR	: Paint related material		
STORAGE TEMPERATURE	(°C)	: Ambient	
TRANSPORT TEMPERATURE	(°C)	: Ambient	
LOADING / UNLOADING TEMPERATURE	(°C)	: Ambient	
STORAGE / TRANSPORTATION PRESSURE (kPa)	: Atmospheric		
ELECTROSTATIC ACCUMULATION HAZARD ?	: Yes, use proper grounding procedure.		
USUAL SHIPPING CONTAINERS	: Drums, pails.		
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		

Class 3 flammable liquids shall NOT be loaded in the same vehicle with :-

- Class 1 Explosives
- Class 2.1 Flammable gases (when both in bulk)
- Class 2.3 Poisonous gases
- Class 4.2 Spontaneously combustible substances
- Class 5.1 Oxidizing agents
- Class 5.2 Organic peroxides
- Class 7 Radioactive substances
- Halogens (chlorinated compounds & etc.)
- Foodstuffs and foodstuff empties.

Refer to Australian Code for the Transport of Dangerous Goods By Road and Rail (6<sup>th</sup> Edition) for transport regulations and state Dangerous Goods regulations for storage requirements.

This material is a Scheduled Poison (S5) and must be stored, maintained and used in accordance with the relevant regulations.



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**MATERIAL SAFETY DATA SHEET**  
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**15. REGULATORY INFORMATION**

**HAZARDS IDENTIFICATION**

Leaks of gas or spills of liquid can readily form flammable mixtures at temperatures at or above flash point.

**SYMBOLS**

Xn	Harmful
N	Dangerous for the environment

**RISK PHRASES**

R10	Flammable.
R20/21	Harmful by inhalation and in contact with skin.
R36/37/38	Irritating to eyes, respiratory system and skin.
R42/43	May cause sensitisation by inhalation and skin contact.
R51/53	Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.
R65	May cause lung damage if swallowed.
R67	Vapors may cause drowsiness and dizziness.

**SAFETY ADVICE**

S02	Keep out of the reach of children.
S09	Keep container in a well ventilated place.
S16	Keep away from sources of ignition - No smoking.
S23	Do not breathe gas/fumes/vapor/spray.
S24/25	Avoid contact with skin and eyes.
S33	Take precautionary measures against static discharges.
S43B	In case of fire use sand, earth, chemical powder or alcohol type foam
S61	Avoid release into the environment.
S62	If swallowed, do NOT induce vomiting.

**16. OTHER INFORMATION**

**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)