



Manufacturers of UTHANE Polyurethane Coatings
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Date of Issue : 10/12/12

MATERIAL SAFETY DATA SHEET

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BC307 / 7505 BLACK HIGH OPACITY 1K-ETCH FINISH

Ref msds 00027

Classified as hazardous according to the criteria of Worksafe Australia

1. IDENTIFICATION

PRODUCT NAME : BC307 / 7505 HIGH OPACITY BLACK 1K-ETCH FINISH
OTHER NAMES : BC307 / 7505 HI-OP BLACK 1K ETCH FINISH
AVAILABLE COLORS : 7505 Black
CORRECT SHIPPING NAME : Flammable liquids
U.N. NUMBER : 1263
CAS RN NUMBER : Not Available
AICS STATUS : All Components Listed
DANGEROUS GOODS CLASS : 3 (Highly flammable liquid) SUBSIDIARY RISK(s) : NOT ASSIGNED
PACKAGING GROUP : II AS 1940 CLASS : 3 PG II
SUBSIDIARY RISK : None Allocated HAZCHEM CODE : •3YE
POISONS SCHEDULE : S5 EPG : 3A1

USE : Finishing of suitably prepared metal surfaces

For Industrial or Automotive Use Only In Areas Complying With Relevant Regulations.

COMPANY / UNDERTAKING

BC COATINGS
2 Hume Road, Smithfield, N.S.W., 2164
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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 Worksafe Australia****Classified as Dangerous Goods according to the criteria of the ADG (7th Edition)**

CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES

CLASSIFICATION / SYMBOL : HIGHLY FLAMMABLE / F

CLASSIFICATION / SYMBOL : HARMFUL / Xn - IRRITANT / Xi

GOVERNING DIRECTIVE : National Code of practice for the Labelling of Hazardous Substances.

HAZARDS IDENTIFICATION

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

This chemical can affect you when breathed in and can also rapidly pass through your skin.

Exposure can cause eye irritation and headaches.

Irritation of the nose and throat may also occur.

Higher levels may cause you to become dizzy and lightheaded and to pass out.

Exposure can damage the liver, kidneys, hearing and the sense of balance.

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

HAZARDS IDENTIFICATION

R11	Highly flammable.
R18	In use, may form flammable/explosive vapor-air mixture.
R20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
R34	Causes burns.
R36/37/38	Irritating to eyes, respiratory system and skin.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful : danger of serious damage to health by prolonged exposure through inhalation.
R49	May cause cancer by inhalation.

SAFETY ADVICE

S2	Keep out of reach of children.
S3/7/9	Keep container tightly closed in a cool, well ventilated place.
S16	Keep away from sources of ignition - No smoking.
S20/21	When using, do not eat, drink or smoke.
S22	Do not breathe dust.
S23	Do not breathe gas/fumes/vapour/spray.
S24/25	Avoid contact with skin and eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
S38	If insufficient ventilation, wear suitable respiratory equipment.
S43B	In case of fire use sand, earth, chemical powder or alcohol type foam.
S45	In case of accident or if you feel unwell, contact a doctor or Poisons Information Centre immediately (show the label where possible).
S51	Use only in well ventilated areas.

HARMFUL IF SWALLOWED**DANGEROUS GOODS CLASSIFICATION** : 3**POISONS SCHEDULE** : S5

2. HAZARDS IDENTIFICATION - continued**HEALTH EFFECTS - ACUTE EXPOSURE**

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

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

The liquid is toxic if aspirated.

Although it possesses narcotic properties, vapour concentrations sufficient to produce this effects are rarely, if ever, reached in industry.

Narcotic effects may occur at levels below the exposure standard.

It can also be absorbed through skin contact.

Acute (short term) health effects may occur immediately or shortly after exposure to this product.

Exposure can occur in the workplace or in the environment following releases to air, water, land, or groundwater.

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

Lower levels may cause trouble concentrating, headaches, and slowed reflexes.

Prolonged, repeated skin contact with low viscosity materials may de-fat the skin resulting in possible irritation and dermatitis.

There is evidence that long term repeated exposure to vapor concentrations greater than 50 ppm of Butanol may result in some loss of hearing.

Effects of chemicals on human health and the environment depend on how much chemical is present and the length and frequency of exposure.

Effects also depend on the health of a person or the condition of the environment when exposure occurs.

SWALLOWED

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

The material is highly irritating and toxic if swallowed.

Swallowing may cause breathing difficulty, abdominal discomfort, headache, dizziness, drowsiness, pain, nausea, vomiting, diarrhoea, upper respiratory tract irritation, mucous membrane irritation, central nervous system depression.

Large doses may produce kidney and liver damage.

Small amounts of liquid aspirated into respiratory system during ingestion or from vomiting may cause potentially lethal chemical pneumonitis, 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 vapour and the liquid are both severe eye irritants (experienced as discomfort or pain, excess blinking and tear production) and are capable of causing pain and severe conjunctivitis (marked excess redness and swelling of the conjunctiva).

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

SKIN

Will have a degreasing action on the skin.

Brief contact may cause slight irritation with itching and local redness.

The liquid is irritating to the skin and may cause burning sensation and is capable of causing skin reactions which may lead to dermatitis from repeated or prolonged exposures.

Frequent contact may cause more severe irritation and may de-fat and dry the skin, leading to discomfort and irritant contact dermatitis and possible tissue destruction.

Capable of being absorbed by the skin.

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

Toxic effects may result from skin absorption.

Symptoms for skin absorption are the same as for inhalation.

Absorption by skin may readily exceed vapour inhalation exposure.

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

Capable of causing skin sensitization and allergic skin reactions.

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

Bare, unprotected skin should not be exposed to this material.

The material may accentuate any pre-existing skin condition.

2. HAZARDS IDENTIFICATION - continued**HEALTH EFFECTS - ACUTE EXPOSURE (continued)****INHALED**

Nasal and eye irritation usually occur at concentrations in air well below the TLV.

Vapor/mist concentrations are highly irritating to the eyes, mucous membranes, the upper respiratory tract (experienced as nasal discomfort and discharge) and, lungs (with chest pain and coughing) and may be harmful if inhaled.

Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea, vomiting; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue lassitude, irritability, of co-ordination, may cause dizziness, drowsiness, disorientation, mental confusion, slurred speech, and gastrointestinal disturbances (e.g. nausea, anorexia and flatulence).

Inhalation hazard is increased at higher temperatures.

Toxic effects are increased by consumption of alcohol.

Repeated exposure may cause sensitization and/or allergic reactions.

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

HEALTH EFFECTS - CHRONIC EXPOSURE

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

Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision, double vision and symptoms of central nervous system depression.

Chronic (long term) health effects can occur at some time after exposure to this product and can last for months or years.

Significant exposure to this chemical may adversely affect people with chronic disease of the respiratory system, skin and/or eyes.

Evidence from animal tests indicate that repeated or prolonged solvent inhalation exposures could result in kidney disorders, nervous system impairment, liver and kidney damage, blood changes and may cause brain damage. [PATTYS].

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

Capable of causing skin sensitization and allergic skin reactions.

Skin contact may aggravate an existing dermatitis.

Prolonged or concentrated inhalation may cause talcosis, a pulmonary fibrosis which may lead in turn to severe and permanent damage to the lungs.

Effects may include shortness of breath and coughing.

Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary diseases.

n-Butanol can damage the hearing and sense of balance.

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.

3. COMPOSITION

<u>CHEMICAL ENTITY</u>	<u>CAS No.</u>	<u>ANNEX I INDEX No.</u>	<u>EINECS No.</u>	<u>PROPORTION (% Wt)</u>
Ethyl Alcohol (Denatured)	64-17-5	Not Available	Not Available	30 - 60 %
(Ethyl Alcohol / Ethanol)	64-17-5	603-002-00-5	200-578-6	95 - 100%)
(Methyl Isobutyl Ketone / MIBK)	108-10-1	606-004-00-4	203-550-1	0.25 %)
(Denatonium Benzoate / Bitrex)	3734-33-6	Not Available	223-095-2	6 ppm)
n-Butanol	71-36-3	603-004-00-6	200-751-6	< 10 %
Toluene	108-88-3	601-021-00-3	203-625-9	10 - 30 %
Xylene (Mixed Isomers) * (Aromatic Petroleum Hydrocarbon)	1330-20-7	215-535-7	601-022-00-9	< 10 %
Methyl Ethyl Ketone	78-93-3	606-002-00-3	201-159-0	10 - 30 %
Synthetic Polymers (Proprietary Blend)	Not Available	Not Available	Not Available	10 - 30 %
Pigments (Proprietary Blend)	Non-Hazardous	Not Available	Not Available	< 10 %
Hydrated Magnesium Silicate (containing no asbestos fibres) **	14807-96-6	Not Available	238-877-9	< 10 %
(containing Crystalline Silica - Quartz)	14808-60-7	Not Available	238-878-4	0 - < 2 %)
Phosphoric Acid	7664-38-2	015-011-00-6	231-633-2	< 10 %
Miscellaneous Additives (Proprietary Blend)	Not Available	Not Available	Not Available	< 10 %
			<u>TOTAL</u>	<u>100</u>

* 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

** The respirable fraction of free crystalline silica in this product is < 2 %.

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

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

4. FIRST AID MEASURES

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

SWALLOWED

Harmful if swallowed.

If patient is fully conscious, give milk or water to rinse out mouth and to drink.

Do NOT give anything by mouth to an unconscious person.

Do NOT induce vomiting.

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

If this product comes in contact with the eyes :-

Immediately and continuously irrigate with copious quantities of fresh, low pressure, running 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 and gently flush area with water until irritation subsides.

Check the victim for contact lenses and remove if present.

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

Seek IMMEDIATE medical attention, preferably from an ophthalmologist.

SKIN

If this product comes in contact with the 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.

Laundry contaminated clothing before re-use.

Discard internally contaminated gloves and footwear.

Thoroughly dry contaminated shoes before re-use.

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 respiratory irritation, dizziness, nausea or unconsciousness occurs seek IMMEDIATE medical attention and call an ambulance.

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

There is no specific antidote.

Treat symptomatically based on judgement of doctor and individual reactions of patient.

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

Onset of symptoms may be delayed several hours after exposure.

BUTANOL is especially toxic if aspirated.

The vapors appear to cause a special vacuolar keratopathy in humans.

Extreme care must be taken to prevent aspiration.

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

Any material aspirated during vomiting may cause lung injury.

Pulmonary oedema is a possible complication following aspiration.

Onset of symptoms may be delayed several hours after exposure.

If 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**

Extreme fire hazard when exposed to heat, flame and/or oxidizers.

Liquid and vapour are EXTREMELY flammable.

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

The use of compressed air for filling, discharging, mixing or handling is not recommended due to vapour hazard

Leaks of gas or spills of liquid can readily form flammable / explosive mixtures at temperatures at or above flash point which may ignite explosively and flashback a considerable distance along the vapor trail to source of ignition.

Contact with strong oxidizers may cause fire. Do not store or mix with strong oxidants.

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

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

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

On combustion, may emit toxic fumes of phosphoric acid fumes, phosphorus oxide, carbon monoxide (CO) and carbon dioxide (CO₂).

Sensitive to static discharge.

FIRE EXTINGUISHING PROCEDURES

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.

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

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

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

Use water spray to cool fire-exposed surfaces and to protect personnel.

Minimize breathing gases, vapour, fumes or decomposition products.

Fire-fighters to wear self-contained breathing apparatus with a full face piece and operated in the pressure demand or other positive pressure mode if risk of exposure to vapour or products of combustion.

Either allow fire to burn under controlled conditions or extinguish with foam or dry chemical.

Try to cover liquid spills with foam.

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

This product may produce a floating fire hazard on water.

FIRE EXTINGUISHING MEDIA

For small fires use water fog in large quantities, foam, dry agent (carbon dioxide, dry chemical powder).

For large fires use foam or water fog (or if unavailable fine water spray).

Water may be ineffective but should be used to cool fire exposed structures.

Fire-men have to wear self-contained breathing apparatus if risk of exposure to vapour or products of combustion.

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

There should a written emergency plan developed for each workplace or work operation.

Clean up spills immediately.

Do not empty into drains.

Isolate hazard area.

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.

May be violently or explosively reactive.

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

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

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

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.

Avoid breathing vapours 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 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.

Take measures to minimize the effect on ground water.

This product is partially soluble in water.

MINOR SPILLS

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 for later disposal.

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

MAJOR SPILLS

Consider evacuation.

Warn occupants of down wind areas of fire and explosion hazard.

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 by any means available to prevent spreading and to prevent it entering sewers, drains or natural waterways.

Take measures to minimize the effect on ground water.

Advise authorities product has entered or may enter sewers, watercourses, low areas, or has contaminated soil or vegetation.

Pump the liquid (use explosion proof or hand pump) to a salvage tank for recycling or later disposal.

Dilute contained spill with water.

Absorb remaining material with suitable absorbent (sand, soil, vermiculite, diatomaceous earth & etc.).

Collect solid residues and seal in labelled, flammable waste containers and follow state or local authority regulations and guidelines for disposal of the waste.

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.

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

Dispose of at an appropriate licensed waste disposal site or facility in accordance with current applicable laws and regulations and product characteristics at time of disposal.

7. HANDLING and STORAGE

Observe manufacturer's storing and handling recommendations.

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

Store in original metal containers in an approved flame-proof area out of direct sunlight.

Many plastics are unsuitable as storage and handling materials

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

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

Avoid exposure to temperatures above 50 °C.

Explosion protection required.

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.

Metal containers involving the transfer of 23 litres or more of this chemical should be grounded and bonded.

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

Protect containers against physical damage.

Keep container dry and tightly closed when not in use.

Handle containers with care.

Open slowly in order to control possible pressure release.

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

Materials are stable on storage, but should be stored in a cool and well ventilated place away from sources of ignition, strong oxidizing agents (peroxides, liquid chlorine, concentrated oxygen, sodium hypochlorite), acids, alkali metals (sodium, potassium, lithium) and alkalis since violent reactions may occur.

Do NOT store in aluminium containers.

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

Outside or detached storage is preferred.

Storage and use areas must be "NO SMOKING" areas.

Exhaust ventilation necessary if product is sprayed.

Irritating to eyes, skin and mucous membranes.

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

Keep away from, food, drink, animal feeding stuffs clothing and odor sensitive materials.

A flammable atmosphere can be produced in storage tank headspaces even when stored at a temperature below the flashpoint.

Monitor and maintain headspace gas concentrations below flammable limits.

Ensure that there are no ignition sources in the area immediately surrounding filling and venting operations.

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.

PROCESS HAZARD

Sudden release of hot organic chemical vapours 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 "auto-ignition" 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.

Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

Use in a well ventilated area sufficient to maintain airborne concentration levels below exposure standard or general exhaust is adequate under normal operating conditions.

In confined areas where there is inadequate ventilation, or if risk of overexposure exists, wear SAA (supplied air type) respirator meeting the requirements of AS1715 & AS1716.

Where rapid build up of vapors or mists are generated, particularly in warehouses and enclosed storage areas, and natural ventilation is inadequate, a flame proof exhaust ventilation system is required to maintain concentration below exposure standard.

If local exhaust ventilation is not used, and where the potential exists for exposures over 50 ppm, use an approved full face-piece respirator with an organic vapor /acid mist cartridge/canister (meeting the requirements of AS1715 & AS1716).

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 TWA's.

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

Correct fit is essential to ensure adequate protection.

Make sure that the correct cartridge is selected for the conditions encountered.

Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

Use away from all ignition sources.

No smoking or open lights.

Keep containers closed when not in use.

Equipment MUST be explosion proof.

Refer to "AS 1940 - The storage and handling of flammable and combustible liquids", "AS 2430 - Explosive gas atmospheres" and "AS 2865 - Safe working in a confined space" for further information concerning these subjects.

NOTE : Vapour 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.

In evaluating the controls present in your workplace, consider :-

- (1) how hazardous the substance is,
- (2) how much of the substance is released into the workplace and
- (3) whether harmful skin or eye contact could occur.

Post hazard and warning information in the work area.

Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects.

Periodic inspection and maintenance of process equipment and control equipment such as ventilation systems is an important work practice control.

Frequently, equipment which is near failure or in disrepair will not perform normally.

Regular inspections can detect abnormal conditions so that maintenance can then be performed.

If equipment is routinely inspected, replaced, or repaired before failure is likely, the risk of exposure occurring will be reduced.

8. EXPOSURE CONTROLS - continued**RESPIRATORS**

It would be useful that all employees who wear respiratory protection be medically screened to determine whether any health conditions exist which could affect the employee's ability to wear a respirator.

Common health problems which could present difficulty with respirator use include claustrophobia (an intolerance of feeling enclosed and a subjective feeling of breathing difficulty), chronic rhinitis, nasal allergies (necessitating frequent removal of the respirator to deal with nasal discharges), and chronic sinusitis.

In addition, difficulties with use of respirators may arise in employees with hypertension, respiratory or cardiac diseases.

A drawback to respirator use is the skin irritation that can develop with some employees, particularly in hot, humid, and/or dirty environments.

Such irritation can cause considerable distress and disrupt work schedules.

Often work is strenuous and the increased breathing resistance of the respirator reduces its acceptability to employees.

Safety problems are presented by respirators since they limit vision.

Voice transmission through a respirator can be difficult, annoying, and fatiguing.

To be used effectively, respirators must be individually selected and fitted, conscientiously and properly worn, regularly maintained, and replaced as necessary. In many workplaces, these conditions are difficult, if not impossible, to satisfy.

LOCAL EXHAUST : Face velocity > 20 m/second

FLAMMABILITY

Extreme hazard.

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.

Vapour 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**

This Fact Sheet is a summary of potential and the most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below. 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.

The following exposure limits are guides to be used in the control of occupational health hazards and are for air levels only. Follow applicable regulations (refer WORKSAFE Australia Exposure Standards). When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above. 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. Follow applicable regulations (refer WORKSAFE Australia Exposure Standards). All atmospheric contamination should be kept to as low a level as is practically possible. All contact with this chemical should be reduced to the lowest possible level. Follow applicable regulations (refer WORKSAFE Australia Exposure Standards). No value has been assigned for this specific material by the N.H.M.R.C. The Threshold Limit Value (TLV), as published by Worksafe Australia [National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, 1991], for some of the components is listed below.

ETHYL ALCOHOL / ETHANOL

TLV-TWA : 1,000 ppm (1,880 mg/m³) A4 (Proposed)
STEL : 1,250 ppm (1,250 mg/m³) (Canada)
IDLH Level (Immediate Danger to Life & Health) : 15,000 ppm
Odour Threshold Value : 49 - 716 ppm (detection), 101 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.

n-BUTANOL

TLV C / TLV-TWA : 50 ppm (152 mg/m³) Ceiling / Peak Limitation Sk
Notice Of Intended Change
IDLH Level : 8,000 ppm
Odour Threshold Value : 0.12 - 3.4 ppm (detection), 1.0 - 3.5 ppm (recognition)
The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

Effects Of Repeated Over-Exposure

There is evidence to suggest that long-term repeated exposure to n-BUTANOL vapor concentrations > 50 ppm may result in some loss of hearing.

Exposure limits with "Sk" or "skin" notation indicate that vapour and liquid may be absorbed through intact skin.

NOTE : Detector tubes for n-Butanol, measuring in excess of 5 ppm are commercially available.
Exposure at or below the recommended TLV-TWA is thought to provide protection against hearing loss due to vestibular and auditory nerve damage in younger workers and to protect against the significant risk of headache and irritation.

TOLUENE

TLV-TWA : 50 ppm (188 mg/m³) SKIN A4
STEL : 150 ppm (565 mg/m³) (Under review)
NOTE : This substance has been classified by the ACGIH as A4
NOT classifiable as causing Cancer in humans.

IDLH Level (Immediate Danger to Life & Health) : 2,000 ppm
Odour Threshold Value : 0.16 - 6.7 (detection), 1.9 - 69 (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.

8. EXPOSURE CONTROLS - continued**EXPOSURE LIMITS - continued****METHYL ETHYL KETONE**

TLV-TWA	:	150 ppm (445 mg/m ³)
STEL	:	330 ppm (890 mg/m ³)
NOTE	:	This substance has been classified by the ACGIH as A4 NOT classifiable as causing Cancer in humans.

Odour Threshold Value : 2 ppm (approx.)

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

Methyl Ethyl Ketone may be a teratogen in humans.

All contact with this chemical should be reduced to the lowest possible level.

XYLENE (all isomers)

TLV-TWA	:	80 ppm (350 mg/m ³) A4	(Under review)
STEL	:	150 ppm (655 mg/m ³)	
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.

Exposure to xylene at or below the recommended TLV-TWA and STEL is thought to minimise the risk of irritant effects and to produce neither significant narcosis or chronic injury.

An earlier skin notation was deleted because percutaneous absorption is gradual and protracted and does not substantially contribute to the dose received by inhalation.

NOTE : This substance has been classified by the ACGIH as A4. NOT classifiable as causing Cancer in humans. (Under review)
Peak concentration limit according to Category II 1, i.e. German MAK-value may be exceeded for no more than 30 minutes by a factor of no more than 2 (i.e. may rise to no more than 200 ml/m³ up to 4 times per shift (half life period < 2 hours).

NOTE : Detector tubes for o-xylene, measuring in excess of 10 ppm, are available commercially.
(m-xylene and p-xylene give almost the same response).
Xylene vapour is an irritant to the eyes, mucous membranes and skin and causes narcosis at high concentrations.

Exposure to doses sufficiently high to produce intoxication and unconsciousness also produce transient liver and kidney toxicity. Neurological impairment is NOT evident amongst volunteers inhaling up to 400 ppm, though complaints of ocular and upper respiratory tract irritation occur at 200 ppm for 3 to 5 minutes.

PHOSPHORIC ACID

TLV-TWA	:	1 mg/m ³
STEL	:	3 mg/m ³
PEL (Permissible Exposure Limit)	:	1 mg/m ³

HYDRATED MAGNESIUM SILICATE (containing no asbestos fibres)

TLV-TWA	:	2.5 mg/m ³ as inspirable dust
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QUARTZ (crystalline silica)

TLV-TWA	:	0.1mg/m ³
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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 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.

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 this chemical.

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

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.

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.

However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Avoid contact with the skin and eyes, and avoid breathing vapors or mists.

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

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.

Do not take contaminated work clothes home. Family members could be exposed.

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

ALWAYS wash hands carefully before breaks, eating, drinking, smoking, using the toilet 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.

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

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

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.

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 using barrier cream and wearing chemically resistant work clothing (PVC apron and sleeves or full PVC covering), or other oil impervious work clothing, safety boots (PVC or rubber boots) and impervious chemical protective gloves (PVC, Viton, polyurethane or Fluorene/ Chloroprene) 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. Wash skin thoroughly with soap and water after contact.

Ensure that there is ready access to an emergency shower.

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

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

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

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

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

EYES

EYES should be protected by chemical splash goggles, safety glasses fitted with side shields or full face shield unless full face-piece respiratory protection is worn.

Contact lenses should **NOT** be worn as 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.

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

Avoid breathing vapors. Enclose operations and general or local exhaust ventilation to meet TLV requirements.

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

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

Correct respirator fit is essential to obtain adequate protection.

Increased protection is obtained from full face-piece powered air purifying respirators.

A full face organic vapour respirator may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.

For emergencies, or instances where the exposure levels are not known, use a full face, positive pressure, air-supplied respirator (meeting the requirements of AS1715 and AS1716) operated in continuous flow or other positive pressure mode.

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

WARNING, air purifying respirators do not protect workers in oxygen deficient atmospheres.

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.

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 face-piece 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.

Be sure to consider all potential exposures in your workplace.

You may need a combination of filters, pre-filters, cartridges, or canisters to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.

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.

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.

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.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE		: Black colored, low viscosity, highly flammable liquid. Characteristic alcoholic odor.	
BOILING POINT	(°C)	: 78.3	(Ethanol)
MELTING / FREEZING POINT	(°C)	: -117	
VAPOR PRESSURE	(@ 20 °C)	: 44.0 mm Hg	(Ethanol)
RELATIVE VAPOR DENSITY	(@ 20 °C)	: 1.59 (Air = 1)	(Ethanol)
SPECIFIC GRAVITY	(@ 20 °C)	: 0.920 ± 0.005 (Water =1)	
% VOLATILES	(by volume)	: 84.5 ± 0.5 %	
EVAPORATION RATE		: 253 (n-Butyl Acetate =100)	(Ethanol)
FLASH POINT	(°C)	: 13.0 (Closed Cup)	(Ethanol)
FLAMMABILITY LIMITS	(% volume)	: 3.5 LEL / 19.0 UEL	(Ethanol)
pH VALUE		: Not available	
SOLUBILITY IN WATER		: ~ 10% (by weight) (appreciable)	
AUTOIGNITION TEMPERATURE (°C)		: 392.0	(Ethanol)
VOC CONTENT		: 695 ± 5.0 gm / Litre	
CHEMICAL REACTIVITY		: Stable Aluminium containers should be avoided as aluminium alcoholates may be formed.	
OTHER PROPERTIES		: Can readily form flammable mixture.	

10. STABILITY and REACTIVITY

Hazardous Polymerisation	: Will not occur.
Hazardous reactions	: None known
Stability (Thermal, Light, etc.)	: Stable under ordinary conditions of use and storage.
Conditions to Avoid	: Heat, sparks, flame ,build up of static electricity and incompatibles.
Incompatibility (materials to avoid for purpose of transport, handling & storage only)	: Avoid contact with strong alkalis, alkali metals, mineral acids, halogens, strong oxidizers (liquid chlorine, concentrated oxygen, sodium hypochlorite, peroxides, chlorates, perchlorates, nitrates, & permanganates), silver salts, acid chlorides, metal hydrides, hydrazine; sulphides, phosphides, cyanides, acetylides, fluorides, silicides & carbides as reaction releases flammable and/or poisonous gases. Aluminium containers should be avoided as aluminium alcoholates may be formed.
Hazardous components of mixtures	: Not applicable for this product.
Reactivity	: Phosphoric acid attacks most metals
Hazardous decomposition products	: No hazardous decomposition products when stored and handled correctly. : Carbon monoxide and carbon dioxide when heated to decomposition Phosphorus Oxides may be liberated in the case of incomplete combustion.
Hazardous components of mixtures	: The presence of approximately 10% of n-BUTANOL in this product poses chronic toxicological problems. n-BUTANOL is especially toxic if aspirated. The vapors appear to cause a special vacuolar keratopathy in humans. There is evidence to suggest that long-term repeated exposure to n-BUTANOL vapour concentrations > 50 ppm may result in some loss of hearing.

All components are registered in accordance with Australian Inventory of Chemical Substances(ACIS).
The precise composition of this mixture is proprietary information.
A more complete disclosure can be provided to a physician or nurse in the event of a medical emergency.

11. TOXICOLOGICAL INFORMATION**ACUTE TOXICITY**

Prolonged, repeated skin contact with low viscosity materials may de-fat the skin resulting in possible irritation and dermatitis. High vapor concentrations are irritating to the respiratory tract may cause nausea, vomiting, headache, dizziness anaesthetic and may have other central nervous system effects.

Do NOT induce vomiting if swallowed

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, such as Toluene, irritate the skin and mucous membranes and are narcotic if inhaled in high concentrations.

ETHYL ALCOHOL / ETHANOL

Oral	LD ₅₀	(rat)	:	7,060 mg/kg
Oral	LD ₅₀	(mouse)	:	3,450 mg/kg
Oral	LD ₅₀	(human)	:	1,400 mg/kg
Oral	LDL ₀	(human)	:	1,400 mg/kg
Oral	LDL ₀	(human child)	:	2,000 mg/kg
Dermal	LD ₅₀	(rabbit)	:	20,000 mg/kg
Inhalation	LC ₅₀	(rat)	:	20,000 ppm / 10 hours.
Inhalation	LC ₅₀	(mouse)	:	39,000 ppm / 4 hours
Eye Irritation (rabbit)			:	500 mg / 24 hours Severe Irritant
Reproductive Toxicity			:	Ethyl Alcohol has been linked to birth defects in humans.
Carcinogenicity			:	Chronic alcohol ingestion is associated with liver cancer.
Chronic Effects			:	Chronic intoxication by swallowing or repeated inhalation, may cause degenerative changes in the liver, kidneys, hair, gastrointestinal tract and heart muscle. The combination of this product and Toluene produce potentiated (greatly increased) health effects.

NOTE : Persons with pre-existing liver impairment, skin and respiratory disorders may be at an increased risk from exposure. Concurrent absorption of ethanol and some drugs may cause adverse health effects.

n-BUTANOL

Oral	LD ₅₀	(rat)	:	800 - 2,500 mg/kg
Inter-peritoneal	LC ₅₀	(rat)	:	200 - 1,122 mg/kg
Dermal	LD ₅₀	(rabbit)	:	3,400 - 5,100 mg/kg
Skin		(rabbit)	:	20 - 500 mg / 24 hours caused moderate irritation
Eye		(rabbit)	:	0.005 ml instilled in eye caused severe irritation
Swallowed			:	Harmful if swallowed, may cause gastric irritation and narcosis. Injury to auditory systems from inhaling vapours has been reported.

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

Chronic Toxicology (Summary) : Prolonged, repeated skin contact with low viscosity materials may de-fat the skin resulting in possible irritation and dermatitis.

TOLUENE

Oral	LD ₅₀	(rat)	:	5,000 mg/kg
Dermal	LD ₅₀	(rabbit)	:	> 2,000 mg/kg
Inhalation	LC ₅₀	(mouse)	:	5,320 ppm / 8 hours
Inhalation	LC ₅₀	(rat)	:	8,000 ppm / 4 hours. Practically non- toxic.
Inhalation	TCLO	(human)	:	100 ppm Irritant (CNS recording changes, hallucinations)
Skin Irritation (rabbit)			:	Moderate Irritant
Eye Irritation (rabbits)			:	May cause moderate irritation.
OTHER			:	Do NOT induce vomiting if swallowed

The oral LD₅₀ in the rat, suggests that Toluene would not be acutely toxic to terrestrial animals unless present in very high concentrations.

GENETIC TOXICOLOGY (SUMMARY) : Negative in a series of assays on similar substances.

REPRODUCTIVE TOXICOLOGY (SUMMARY) :

No adverse effects observed in developing embryos when pregnant rats were exposed to 400 ppm of similar materials.

NEUROTOXICOLOGY (SUMMARY) :

Inhalation studies with toluene (1,500 ppm), 6 hours/day, 5 days /week for 6 months in rats showed no neurotoxicity.

11. TOXICOLOGICAL INFORMATION - continued**ACUTE TOXICITY - continued****METHYL ETHYL KETONE**

Oral	LD ₅₀	(rat)	: 2,737 mg/kg.	Moderately toxic.
Dermal	LD ₅₀	Range (rabbit)	: 5,000 - 13,000 mg/kg.	Practically non-toxic.
Inhalation	LC ₅₀	(rabbit)	: 13,000 mg/kg	
Inhalation	LC ₅₀	(rat)	: 23,500 mg/m ³ / 8 hours	
Inhalation		(human)	: Irritating to nose and throat, will cause nausea, vomiting, headache, dizziness.	
Skin		(rabbit)	: May cause moderate irritation on prolonged or repeated contact. If allowed to remain, may cause smarting and reddening of the skin. Not readily absorbed.	
Eye		(rabbit)	: Can cause strong-moderate irritation.	
Eye		(human)	: Burns, causes severe damage. Eye irritation reported in humans exposed to vapour as low as 350 ppm.	
Swallowed			: Harmful if swallowed, may cause gastric irritation and narcosis.	

Toxicological data suggest that methyl ethyl ketone interacts with and enhances the neurotoxicity of n-hexane, 2,5-hexanedione and methyl-n-butyl ketone in the body but direct evidence implicating methyl ethyl ketone is lacking. 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").

Methyl ethyl ketone has been shown to be weakly hepatotoxic in experimental animals at very high doses.

XYLENE

Oral	LD ₅₀	(rat)	: 4,300 mg/kg	
				Considered to be no more than slightly toxic based on single dose level testing at 2,000 mg/kg.
Oral	LDLO	(human)	: 50 mg/kg	
Dermal	LD ₅₀	(rabbit)	: >2,000 mg/kg	
				Considered to be no more than slightly toxic based on single dose level testing at 2,000 mg/kg.
Inhalation	LC ₅₀	(rat)	: 5,000 ppm / 4 hours	
Inhalation	LC ₅₀	(rat)	: 5,320 ppm / 8 hours	
Inhalation	LCLO	(human)	: 10,000 ppm / 6 hours	
Inhalation	TLCO	(human)	: 200 ppm - Irritant (CNS recording changes, hallucinations)	
Inhalation	Lowest Toxic Concentration	(human)	: 200 ppm (olfaction effects; conjunctival irritation)	
Inhalation	LCLO	(human)	: 10,000 ppm / 6 hours	
Eyes		(rabbit)	: 87 mg - Mild irritant	
Eyes		(human)	: 200 ppm - Moderate irritant	
Skin Irritation		(rabbit)	: 500 mg / 24 hours - Moderate irritant on prolonged or repeated contact. May cause severe irritation on prolonged or repeated contact.	
Swallowed			: Do NOT induce vomiting if swallowed	

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

Aromatic hydrocarbons, such as xylenes, irritate the skin and mucous membranes and are narcotic if inhaled in high concentrations. Prolonged, repeated skin contact with low viscosity materials may de-fat the skin resulting in possible irritation and dermatitis.

PHOSPHORIC ACID

Oral	LD ₅₀	(rat)	: 1,530 mg/kg
Skin	LD ₅₀	(rabbit)	: 2,740 mg/kg
Inhalation	TC _{LO}	(human)	: 100 mg/m ³

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 concentrations.

12. ECOLOGICAL INFORMATION**ETHYL ALCOHOL / ETHANOL**

Environmental Fate

ThOD : 1.5 mg/L O₂
BOD₅ : 76 % O₂ of ThOD

Aquatic Toxicity

Fish Toxicity (Acute) LC₅₀ : > 1000 mg /L / 48 hours (Golden ide)
Fish LC₅₀ : 8000 mg/L / 48 hours (Trout)
Crustacean : No effect at 10 g/L, 48 hours (Daphnia)
Daphnia EC₅₀ : > 1000 mg /L / 24 hours (Daphnia Magna)
Blue-Green Algae : No data available
Green Algae : No data available

Persistence And Degradability : Degree of elimination : 94 % - Inherently bio-degradable.

Mobility : Highly mobile on dilution

Bioaccumulation : Not expected to bio-accumulate significantly.

XYLENES

Ecotoxicity : Harmful effect on aquatic organisms. Hazard for drinking water supplies.

Environment Protection : Do not allow to enter waters, waste water, or soil.

Bio-Accumulative Potential : An appreciable bioaccumulation potential is to be expected (log P(o/w) >3).

Persistence / Degradability Biologic Degradation : Biodegradable.

Oil / Water Partition Coefficient, P : log P (oct) = 1.82

Mobility / Distribution : log P(o/w) : 3.1 - 3.2.

Water Pollution Factors

ThOD : 3.125 g/g.
COD : 78.0% of ThOD
BOD₅ : 1.020
BOD₂₀ : 1.450

0.1 mg/L affects the self-purification of surface waters.

Acute Toxicity

Acute Toxicity - Fish : LC₅₀: 14 mg/L / 96 hour (Onchorhynchus mykiss)
: LC₅₀: 86 mg/L / 48 hour (Leuciscus idus)
Acute Toxicity : EC₅₀: 165 mg/L / 24 hour (Daphnia Daphnia magna)

Toxicity Threshold (cell multiplication inhibition tests)

Bacteria : 115 mg/L
Algae : 280 mg/L
Green Algae : 21 mg/L
Protozoa : 321- 574 mg/L
96 hour TL_M @ 24 °C : 320 ppm (algae)
48 hour TL_M @ 24 °C : 44 ppm (daphnia)
96 hour LC₅₀ : 100 ppm (bluegill sunfish)**METHYL ETHYL KETONE**

Acute Toxicity

Fish : Low toxicity : LC/EC/IC₅₀ > 1000 mg/l
Aquatic Invertebrates : Low toxicity : LC/EC/IC₅₀ > 100 mg/l
Algae : Low toxicity : LC/EC/IC₅₀ > 1000 mg/l
Microorganisms : Low toxicity : LC/EC/IC₅₀ > 1000 mg/l

Mobility : Dissolves in water.

Persistence/Degradability : Readily biodegradable meeting the 10 day window criterion.
Oxidizes rapidly by photo-chemical reactions in air.

Bioaccumulation : Not expected to bio-accumulate significantly.

12. ECOLOGICAL INFORMATION - continued**TOLUENE**

Ecotoxicity	: Harmful effect on aquatic organisms. Hazard for drinking water supplies.
Environment Protection	: Do not allow to enter waters, waste water, or soil.
Bio-Accumulative Potential	: Does not bio-accumulate significantly.
Persistence / Degradability Biologic Degradation	: Readily biodegradable meeting the 10 day window criterion.
Oil / Water Partition Coefficient, P	: log P (oct) = 2.73 - volatilises in air
Mobility / Distribution	: Floats on water. If product enters soil, it will be highly mobile and may contaminate groundwater.
Other Adverse Effects	: In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.
Water Pollution Factors	
ThOD	: Not Available
COD	: Not Available
BOD ₅	: Not Available
BOD ₂₀	: 0.1 mg/L affects the self- purification of surface waters.

Acute Toxicity**Freshwater toxic concentrations**

Acute Toxicity - Fish	: 61 ppm / 1 hour	(sunfish)
Acute Toxicity - Fish	: 44 ppm / 96 hours	(sunfish)
Acute fish toxicity LC ₅₀	: 17,000 µg/L / 96 hours	(bluegill)
Acute fish toxicity EC ₅₀	: 31,000 µg/L / 24 hours	(Daphnia Magna)
Toxic : 1 < LC ₅₀ /EC ₅₀ /IC ₅₀	: <= 10 mg/l	
Aquatic Invertebrates	: Harmful	: 10 < LC ₅₀ /EC ₅₀ /IC ₅₀ <= 100 mg/l
Algae	: Low toxicity	: LC ₅₀ /EC ₅₀ /IC ₅₀ > 100 mg/l

Toxicity Threshold (cell multiplication inhibition tests)**Freshwater Toxicity**

96 hours TL _M	: 24 ppm	(fathead minnow)
7 - 8 days TL _M	: No data available	(blue-green algae)
7 - 8 days TL _M	: No data available	(green algae)
Saltwater Toxicity	: 24 hour TL _M : 33 ppm	(brine shrimp)

n-BUTANOL

ACUTE TOXICITY Fish	: LC ₅₀ : 1,855 mg/L / 24 hour (Carassius auratus)(Goldfish)
	: LC ₅₀ : 1,840 mg/L / 96 hour (Pimephales promelas) (Fathead minnow)
Algae	: EC ₅₀ : 1,855 mg/L / 24 hour (Daphnia Daphnia magna)
Fish	: Low toxicity : LC/EC/IC ₅₀ > 1000 mg/l
Aquatic Invertebrates	: Low toxicity : LC/EC/IC ₅₀ > 1000 mg/l
Algae	: Low toxicity : LC/EC/IC ₅₀ > 100 mg/l
Micro-organisms	: Expected to have low toxicity : LC/EC/IC ₅₀ > 1000 mg/l

ACUTE TOXICITY - ALGAE: IC₅₀: 650 mg/L / 72 hour**BIOACCUMULATION**

: Not expected to bio-accumulate significantly.

HAZARDOUS AIR POLLUTANT

: No

log Pow (Verschueren 1983)

: 0.88

WATER POLLUTION FACTORS

ThOD	: Not Available
COD	: 200 mg/L
BOD	: 4.6 ppm after 4 days Using activated sludge at 20 °C. Under these conditions a total of 98.9 % of the initial n-Butanol (100 mg/l) was removed at a rate of 84.0 mg COD/g hr.

PERSISTENCE/DEGRADABILITY

: No data available.

MOBILITY / DISTRIBUTION

: No data available.

PRODUCTS OF DEGRADATION: These products are Carbon oxides (CO, CO₂) and water.**BIO-CONCENTRATION**

: n-Butanol is not expected to bio-concentrate

12. ECOLOGICAL INFORMATION - continued

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

This chemical is a colorless, flammable liquid with a distinctive odor.

It may enter the environment from industrial or municipal waste treatment plant discharges or spills.

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 is expected to have moderate acute toxicity to aquatic life.

Insufficient data are available to evaluate or predict the short-term effects of this chemical 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 is expected to have a moderate chronic toxicity to aquatic life.

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

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

This chemical is slightly persistent in water, with a half-life of between 1 to 10 days.

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

When released into the soil, this material is expected to leach into groundwater.

When released into the soil, this material is expected to quickly evaporate.

When released into water, this material may evaporate to a moderate extent.

WATER SOLUBILITY

Slightly soluble in water.

ABIOTIC EFFECTS

No information on abiotic effects of this product.

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 slightly higher than the average concentration than the water from which the fish was taken.



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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.

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

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. Recycle containers where possible, or dispose of in an authorised landfill.

Do NOT reuse empty containers without commercial cleaning or reconditioning.

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

Empty product containers may contain product residue.

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.

CORRECT SHIPPING NAME	: FLAMMABLE LIQUIDS, N.O.S.		
UN NUMBER	: 1263	PACKAGING GROUP	: II
HAZCHEM CODE	: •3YE	SUBSIDIARY RISK	: NOT ASSIGNED
POISONS SCHEDULE	: No Information Found	EPG	: 3A1
CLASS	: 3 (Highly Flammable Liquid)	AS 1940 Class	: 3 PG II
IMO HAZARD CLASS	: INFLAMMABLE LIQUID/3.1	ADG CLASS	: 3
ICAO / IATA CLASS	: 3		
PASSENGER PACKING INSTRUCTION	: 3	PASSENGER MAX. QUANTITY / PACK	: 5L / 1L
CARGO MAX. QUANTITY	: 60L		
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	: Closed head drums, pails, 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		

Class 3 flammable liquids shall **NOT** be loaded in the same vehicle or packed in the same freight containers 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.

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

Refer to Australian Code for the Transport of Dangerous Goods By Road and Rail (7th Edition) for transport regulations and state Dangerous Goods regulations for storage requirements.

This material must be stored, maintained and used in accordance with the relevant regulations.

15. REGULATORY INFORMATION**Hazardous according to criteria of Worksafe Australia****Classified as Dangerous Goods according to the criteria of the ADG (7th Edition)**

CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES

CLASSIFICATION / SYMBOL : HIGHLY FLAMMABLE / F

CLASSIFICATION / SYMBOL : HARMFUL / Xn - IRRITANT / Xi

GOVERNING DIRECTIVE : National Code of practice for the Labelling of Hazardous Substances.

HAZARDS IDENTIFICATION

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

This chemical can affect you when breathed in and can also rapidly pass through your skin.

Exposure can cause eye irritation and headaches.

Irritation of the nose and throat may also occur.

Higher levels may cause you to become dizzy and lightheaded and to pass out.

Exposure can damage the liver, kidneys, hearing and the sense of balance.

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

HAZARDS IDENTIFICATION

R11	Highly flammable.
R18	In use, may form flammable/explosive vapor-air mixture.
R20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
R34	Causes burns.
R36/37/38	Irritating to eyes, respiratory system and skin.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful : danger of serious damage to health by prolonged exposure through inhalation.
R49	May cause cancer by inhalation.

SAFETY ADVICE

S2	Keep out of reach of children.
S3/7/9	Keep container tightly closed in a cool, well ventilated place.
S16	Keep away from sources of ignition - No smoking.
S20/21	When using, do not eat, drink or smoke.
S22	Do not breathe dust.
S23	Do not breathe gas/fumes/vapour/spray.
S24/25	Avoid contact with skin and eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
S38	If insufficient ventilation, wear suitable respiratory equipment.
S43B	In case of fire use sand, earth, chemical powder or alcohol type foam.
S45	In case of accident or if you feel unwell, contact a doctor or Poisons Information Centre immediately (show the label where possible).
S51	Use only in well ventilated areas.

HARMFUL IF SWALLOWED

DANGEROUS GOODS CLASSIFICATION : 3**POISONS SCHEDULE** : S5

16. OTHER INFORMATION**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.

AICS : Australian Inventory of Chemical Substances

CAS Number : Chemical Abstracts Number

IARC : International Agency for Research on Cancer



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16. OTHER INFORMATION - contunued

DATE OF PREPARATION / LAST REVISION : 10/12/12

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