



Manufacturers of UTHANE Polyurethane Coatings
2 Hume Road, Smithfield, N.S.W., 2164
Phone +61 9729-2000 Fax +61 9729-2279

Date of Issue: 01/10/15

Emergency Telephone No. +61 412 226 505

MATERIAL SAFETY DATA SHEET
VC840 GLASS ADDITIVE

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Ref msds 00150

1. IDENTIFICATION

PRODUCT NAME	: VC840 GLASS ADDITIVE		
CORRECT SHIPPING NAME	: Paint Related Material, N.O.S., LFP		
OTHER NAMES	: VC840 ADDITIVE		
UN NUMBER	: 1263		
AICS STATUS	: All Components Listed		
DANGEROUS GOODS CLASS	: 3.3 (Combustible Liquid)		
IMO HAZARD CLASS	: INFLAMMABLE LIQUID/3.3		
PACKAGING GROUP	: II	AS 1940 CLASS	: PG II
SUBSIDIARY RISK	: Not Applicable	HAZCHEM CODE	: 3X
POISONS SCHEDULE	: S5	EPG	: Not Available
USE	: Activation of 2-Pack Polyurethane coatings for conventional spray systems to be used on glass and some plastic surfaces.		

For industrial use only in areas complying with relevant regulations.

This product is one component of a multi-component system.

All components must be mixed together immediately prior to use.

COMPANY / UNDERTAKING

BC COATINGS
2 Hume Road, Smithfield, N.S.W., 2164
PHONE +61 9729-2000, FAX +61 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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2. HAZARDS IDENTIFICATION

Hazardous according to criteria of Worksafe Australia

CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES

CLASSIFICATION / SYMBOL : IRRITANT / Xi
GOVERNING DIRECTIVE : National Code of practice for the Labelling of Hazardous Substances.
LABEL NAME : Paint Related Material

HAZARDS IDENTIFICATION

If swallowed seek medical advice immediately and show this container or label.
Swallowed product will hydrolyse in the stomach and produce methanol, which is toxic.

RISK PHRASES

R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
R36/37/38 Irritating to eyes, skin and respiratory system.
R42/43 May cause sensitisation by inhalation and skin contact.

SAFETY ADVICE

S20/21 When using, do not eat, drink or smoke.
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.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S43B In case of fire use sand, earth, chemical powder or alcohol type foam
S51 Use only in well ventilated areas.

HMIS Hazard Rating : Health : 2 Fire : 1 Reactivity : 1 PPI : X
HMIS Hazard Rating: 4 = Severe Hazard; 3= Serious Hazard; 2= Moderate Hazard, 1= Slight Hazard
0 = Minimal Hazard,
X = Personal protection rating to be supplied by user depending on use conditions.

MATERIALS TO AVOID

: Strong oxidizers, strong acids or strong bases
(hydrolysis can occur causing decomposition and release of heat).

Reacts with water or moisture to form methanol.



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

TARGET ORGANS

: Eyes, skin, respiratory system, central nervous system, mucous membranes, gastrointestinal tract, blood, liver and kidneys.

ROUTES OF ENTRY

: Inhalation, ingestion, eye contact, skin contact, absorption

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

: Skin disorders, damaged skin, respiratory system disease, kidney, liver, or blood disorders

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

Corneal damage may occur after prolonged contact.

Can be absorbed by the skin with resultant toxic effects.

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

Breathing air, which contains chemicals, resulting from its use in spraying applications, may cause delayed lung damage.

Very high exposures can cause a build up of fluid in the lungs (pulmonary oedema), which can result in death.

Systemic effects from short-term, high concentration exposures may include lung, kidney and brain damage.

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

Effects of chemicals on human health and the environment depend on how much of the 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.

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

Skin contact may aggravate an existing dermatitis.

Long term repeated overexposure to methanol vapor concentrations of 2,000 ppm or greater may allow a cumulative effect to occur with resulting nausea, abdominal pain, vomiting, headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, clouded and double vision.

Heart muscle, liver and/or kidney injury may occur.

Prolonged overexposure at levels of 800 – 1,000 ppm may result in severe eye damage in some persons.

Repeated skin contact may cause a cumulative dermatitis.

Skin contact may aggravate an existing dermatitis.

May aggravate an existing liver or kidney disease.

SWALLOWED

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

This product hydrolyzes in the stomach to form methanol.

May cause nausea, abdominal pain, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behaviour, visual disturbances, drowsiness, coma and death.

There may be a delay of several hours between swallowing methanol and the onset of signs and symptoms.

The effects observed are part in due to acidosis and partially to cerebral oedema.

Visual effects include blurred vision, diplopia, changes in color perception, restriction of visual fields, and complete blindness.

Ingestion of moderate quantities of methanol also produces metabolic acidosis.

Onset of symptoms may be delayed up to 48 hours.

60 – 200 ml. of methanol is a fatal dose for most adults. Ingestion of as little as 10 ml. has caused blindness.

With massive overdoses, liver, kidney and heart muscle injuries have been described.



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2. HAZARDS IDENTIFICATION - continued

HEALTH EFFECTS - ACUTE EXPOSURE (continued)

EYE

The vapour and the liquid are both severe eye irritants (experienced as discomfort or pain, excess blinking and tear production). Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, with marked excess redness and swelling of the conjunctiva.

Corneal injury may result.

Corneal injury may be severe, extensive, and, if not treated promptly, could result in permanent impairment of vision.

SKIN

Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

Contact with the skin may result in severe irritation with itching, local redness and possible swelling if exposure is prolonged.

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

Vapour and liquid both capable of being absorbed by the skin with resultant toxic effects.

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.

Capable of causing skin sensitisation and allergic skin reactions.

The material may accentuate any pre-existing skin condition.

Bare unprotected skin, abraded or irritated skin, open cuts etc. should not be exposed to this material.

Increased pigmentation of the skin may occur.

INHALED

Short term harmful health effects are not expected from vapor generated at ambient temperatures.

However, this material is capable of forming methanol if hydrolyzed.

Methanol vapor may cause dizziness, drowsiness, disturbances of vision, and tingling, numbness, and shooting pains in the hands and forearms.

Vapor/mist concentrations above recommended exposure levels are extremely irritating to mucous membranes, eyes, upper respiratory tract and lungs and may have other central nervous system effects.

Acute effects from inhalation of high vapor concentrations may be dryness of the mouth and throat, chest and nasal irritation with coughing and sneezing, nausea and vomiting, stupor, low blood pressure, rapid and irregular pulse, and weakness of the legs.

CNS depression may be evident early and is characterized by headache, dizziness, increased reaction time, fatigue, lassitude, drowsiness, irritability, loss of co-ordination, impaired judgement, gastrointestinal disturbances (e.g. nausea, anorexia and flatulence).

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

Inhalation hazard is increased at higher temperatures.

Repeated exposure may cause sensitisation and/or allergic reactions.



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2. HAZARDS IDENTIFICATION - continued

HEALTH EFFECTS - CHRONIC EXPOSURE

Principal routes of exposure are usually by accidental skin and eye contact contact/absorption and inhalation of vapours especially at higher temperatures.

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

Symptoms of chronic exposure may include weakness, loss of appetite, burning eyes, stomach-ache, nausea, vomiting, sore throat, fatigue, insomnia, heartburn, intestinal pain, slightly enlarged liver, colitis, and dermatitis.

Can be absorbed through the skin with resultant toxic effects.

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

Skin contact may aggravate an existing dermatitis.

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

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

The components in this chemical have not been adequately evaluated to determine whether brain or other nerve damage could occur with repeated exposure.

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 product.



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3. COMPOSITION

<u>CHEMICAL ENTITY</u>	<u>CAS No.</u>	<u>ANNEX I INDEX No.</u>	<u>EINECS No.</u>	<u>Proportion (% w/w)</u>
ORGANO SILANE ESTER (proprietary mixture)	2530-83-8	Not Available	Not Available	> 60
METHANOL Additional methanol may be formed by reaction with	67-56-1	603-001-00-X moisture	200-659-6	< 1

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

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



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4 . FIRST AID MEASURES

Ensure an eye bath and safety shower are available and ready for use.

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 two glasses of water. Induce vomiting.

When 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.

Ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body.

Do **NOT** give anything by mouth if the victim is convulsing or unconscious .

IMMEDIATELY call a doctor or Poisons Information Centre and/or transport to an emergency facility or hospital.

If medical advice is delayed, and if the person has swallowed a moderate volume of material (\pm 50 ml.), then give \pm 100 ml. of hard liquor, such as whiskey.

For children, give proportionally less liquor, according to weight.

EYE

If this product comes in contact with the eyes :

First 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.

Immediately and continuously irrigate with copious quantities of fresh, low pressure water or normal saline solution for at least 15 minutes while simultaneously calling a hospital or poison control centre.

Eyelids should be held open.

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

Remove any contaminated clothing and flush area with water until irritation subsides.

Do **NOT** put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician.

IMMEDIATELY after flushing eyes transport the victim to a hospital even if no symptoms (such as redness or irritation) develop.

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

SKIN

Can be absorbed through the skin with resultant toxic effects.

IMMEDIATELY soak contaminated clothing, including footwear, with water.

Remove all contaminated clothing, including footwear, and 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 and be prepared to transport the victim to a hospital for treatment.

Launder contaminated clothing before re-use.

Allow contaminated footwear to dry thoroughly before re-using.

Discard internally contaminated gloves and footwear.



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4 . FIRST AID MEASURES - continued

INHALED

If fumes or combustion products are inhaled :-

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

Provide proper respiratory protection to rescuers entering an unknown atmosphere.

Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used. If not available, use a level of protection greater than or equal to that advised under Respirator Recommendation.

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 symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital.

If breathing is difficult and/or 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.

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



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4 . FIRST AID MEASURES - continued

ADVICE TO DOCTOR

There is no specific antidote.

Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the 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.

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

Individuals experiencing breathing difficulties after exposure to vapor generated in aerosol applications should be observed for at least 48 hours in case delayed respiratory complications develop.

Oxygen and artificial respiration as needed.

Skin sensitisation may result from a single acute exposure.

Sensitisation may cause difficulty in breathing similar to asthma.

This product reacts with moisture in the acid content of the stomach to form methanol.

The combination of visual disturbances, metabolic acidosis, and formic acid in the urine is evidence of methanol poisoning.

The therapeutic intravenous administration of ethanol (10 ml. per hour) allows it to be preferentially oxidized and reduced production of methanol metabolites.

Acidosis must be treated by means of intravenous sodium bicarbonate and methanol elimination may be increased by haemodialysis, as indicated.

Treatment should be based on blood methanol levels and acid-base balance.

Folates may be administered to enhance the metabolism of formaldehyde.

4-Methyl pyrazole has been suggested as an antidote : because of its alcohol dehydrogenase inhibiting effects, it reduces the production of formate and the development of metabolic acidosis.

However, the value of this antidote remains to be proven in humans.



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4 . FIRST AID MEASURES - continued

MEDICAL TESTING

For those with frequent or potentially high exposure (half the TLV or greater, or significant skin contact), the following are recommended before beginning work and at regular times after that:

- * Liver and kidney function tests, and evaluation for renal tubular acidosis.
- * Hearing test (audiogram) and test for balance.
- * Exam of the nervous system.
- * Complete blood count.

If symptoms develop or overexposure is suspected, the following may be useful:

Any evaluation should include a careful history of past and present symptoms with an exam.

Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information.

A comprehensive physical examination with emphasis given to haematological and pulmonary systems, mucous membranes, skin and eyes.

Comprehensive medical, work and reproductive histories with special emphasis directed to the haematological system and symptoms related to pulmonary and mucous membrane irritation.

Interview for brain effects, including recent memory, mood (irritability, withdrawal), concentration, headaches, malaise and altered sleep patterns.

Consider cerebellar, autonomic and peripheral nervous system evaluation.

Positive and borderline individuals should be referred for neuropsychological testing.

In addition, the physician should determine the worker's suitability for respirator use.

Workers or job applicants who have medical conditions that would be aggravated by the use of a respirator need to receive counselling on the increased risk of impairment of their health.

In certain cases, to provide sound medical advice to the employer and the employee, the physician must evaluate situations not directly related to this product.

For example, employees with skin diseases may be unable to tolerate wearing protective clothing.

In addition, those with chronic respiratory diseases may not tolerate the wearing of respirators.

Additional tests and procedures that will help the physician determine which employees are medically unable to wear respirators must include a pulmonary function test with measurement of the employee's forced vital capacity (FVC), and forced expiratory volume at one second (FEV1).

Ratios of FEV1 to FVC as well as measured FVC and measured FEV1 to their expected values corrected for variations due to age, sex, race, and height must be calculated. Whether a chest X-ray will provide useful information should be considered.

Any evaluation should include a careful history of past and present symptoms with an exam.



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5 . FIRE FIGHTING MEASURES

FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.

FIRE AND EXPLOSION HAZARD

Material is stable under normal conditions of use.

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

Do not store or mix with caustics, amines, alkanolamines, aldehydes, strong oxidants (such as chlorine, bromine and fluorine) and chlorinated compounds since violent reactions occur and may cause fire.

Liquid and vapour are EXTREMELY flammable.

Vapour/leaks of gas or spills of liquid form readily flammable/explosive mixtures at temperatures at or above flash point.

Vapor/air mixtures may ignite explosively when exposed to flame or spark and flashback along the vapor trail may occur.

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

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

In the case of incomplete combustion may form toxic materials such as carbon monoxide (CO), carbon dioxide (CO₂), silicone oxides, fumes and smoke.

Persons who have inhaled gases of combustion should lie down and keep still.

Call doctor **IMMEDIATELY**.

FIRE FIGHTING PROCEDURES

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

Stop liquid at the source if safe to do so.

Try to cover liquid spills with foam.

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

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

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.

In the case of incomplete combustion may form toxic materials such as carbon monoxide (CO), carbon dioxide (CO₂), silicone oxides, fumes and smoke.

Minimize breathing gases, vapour, fumes or decomposition products.

Firefighters must work from the windward side.

Use supplied-air breathing equipment for enclosed areas.

Fire-fighters to wear self-contained breathing apparatus with a full face piece operated in positive pressure mode and a fully enclosed chemically resistant suit for enclosed areas or if risk of exposure to vapour or products of combustion..

Persons who have inhaled combustion gases should lie down and keep still.

Call doctor **IMMEDIATELY**.

This material may produce a floating fire hazard.

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

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

Try to cover liquid spills with foam.

After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.

SPECIAL FIRE PRECAUTIONS

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

FIRE FIGHTING MEDIA

For small fires use water fog in large quantities, alcohol-type or all-purpose-type foam, dry agent (carbon dioxide, dry chemical powder).

For large fires either allow fire to burn under controlled conditions or extinguish with foam (by manufacturer's recommended techniques), carbon dioxide (CO₂), dry chemical, or water fog.

Water spray may be ineffective, but should be used to keep fire-exposed containers and structures cool.

Spill fires may be extinguished by flooding with large amounts of water.



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6 . ACCIDENTAL RELEASE MEASURES

For LARGE spills and fires IMMEDIATELY call your fire department and tell them location and nature of hazard.

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

Pollutant - contain spillage.

Clean up spills immediately.

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.

Slippery when spilt.

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

Consider evacuation.

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

Stop liquid at the source if safe to do so.

May be violently or explosively reactive.

No smoking, naked lights or ignition sources.

Increase ventilation.

Ventilate confined spaces.

Open all windows and doors.

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

Tools made of plastic must NOT be used because of their tendency to produce static electricity.

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

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

Avoid breathing vapours and contact with skin and eyes.

Wear breathing apparatus, gloves and full protective clothing to prevent skin and eye contamination and inhalation of vapours.

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

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.

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 in suitable sealed, 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.

MAJOR SPILLS

May be violently or explosively reactive.

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.

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

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

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) the liquid 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 for later disposal.

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.

Do not re-enter the contaminated area until the Safety Officer (or other responsible person) has verified that the area is safe.

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



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7 . HANDLING and STORAGE

STORAGE	TEMPERATURE	(° C)	: Ambient
TRANSPORT	TEMPERATURE	(° C)	: Ambient
LOADING/UNLOADING	TEMPERATURE	(° C)	: Ambient
STORAGE/TRANSPORT	PRESSURE	(kPa)	: Atmospheric
ELECTROSTATIC ACCUMULATION HAZARD			: No, but use proper grounding procedure.
USUAL SHIPPING CONTAINERS			: Tanks, drums, cans.
MATERIALS AND COATINGS SUITABLE			: Carbon Steel, Stainless Steel.
MATERIALS AND COATINGS UNSUITABLE			: Natural Rubbers, Butyl Rubber, E P D M Polystyrene, Polyethylene, Polypropylene, Polyvinyl chloride, Polyvinyl Alcohol Polyacrylonitrile

HANDLING AND STORAGE, GENERAL NOTES

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

Observe manufacturer's storing and handling recommendations.

Explosion protection required.

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.

Use only non-sparking tools and equipment especially when opening and closing containers of this product

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.

Store in dry, upright, tightly closed, properly grounded original metal containers in an approved, bunded, flame-proof area out of direct sunlight.

Materials are stable on storage, but should be stored in a cool, dry, well ventilated place away from sources of ignition, amines, alkanolamines, aldehydes, strong oxidizing agents (liquid chlorine, concentrated oxygen, sodium hypochlorite), strong acids and alkalis, and chlorinated compounds since violent reactions may occur.

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

Protect containers against physical damage.

Handle containers with care.

Open slowly in order to control possible pressure release.

Do not open or empty containers within the storage area.

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.

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

Monitor and maintain headspace gas concentrations below flammable limits.

Irritating to eyes, skin and mucous membranes.

Harmful in contact with or absorbed through the skin.

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

Intense smelling.

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

The product may be narcotic in high concentrations.

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.

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.



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7 . HANDLING and STORAGE - continued

OTHER PRECAUTIONS

DANGER : Harmful or fatal if swallowed, due to methanol production in the stomach.

POLYMERIZATION - HYDROLYSIS

The silane esters contained in this product, are not monomers in the usual sense, but polymeric materials may be produced under certain conditions of catalyzed partial hydrolysis.

Polysiloxanes are produced by polymerization of the silyl ester group in the presence of controlled amounts of water and alkali or acid catalyst at ambient temperatures.

At slightly higher temperatures ($\approx 50^{\circ}\text{C}$), polyglycols or polyglycol esters are produced via the epoxy functional group under the same conditions of water concentration and alkali or acid catalyst.

In as much as both of these reactions are exothermic and may occur simultaneously, the heat evolved may be cumulative and greatly accelerate the rate of reactions.

It is imperative, therefore, that unintentional contamination of the silane esters with water be avoided, and that intentional hydrolysis be properly controlled to avoid hazardous consequences.

DANGER !!! : Harmful or fatal if swallowed, due to methanol production in the stomach.

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".



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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.

Using respirators or protective equipment is less effective than the controls mentioned above.

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.

In evaluating the controls present in your workplace, consider how hazardous the substance is, how much of the substance is released into the workplace and whether harmful skin or eye contact could occur.

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

Equipment MUST be explosion proof.

No smoking or open lights. Use away from all ignition sources.

Keep containers closed when not in use.

Use in a well ventilated area sufficient to maintain airborne concentration levels below exposure standard .

General exhaust is adequate under normal operating conditions.

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

Where vapors or mists are generated, particularly in enclosed areas, and natural ventilation is inadequate, a flame proof local exhaust ventilation system (> 20 m/min) is required.

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.

If risk of overexposure exists, wear SAA (supplied air type meeting the requirements of AS1715 & AS1716) respirator.

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.

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.

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.

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.



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8. EXPOSURE CONTROLS - continued

WORKPLACE EXPOSURE LIMITS

This Fact Sheet is a summary source of information of all potential and 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. They are not a measure of relative toxicity.

These TLV's should **NOT** be interpreted as the fine line between safe and dangerous conditions.

The listed 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 below.

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

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

Follow applicable regulations. (refer WORKSAFE Australia Exposure Standards)

No value has been assigned for this specific material by the ACGIH (Worksafe Australia).

Limits shown for guidance only. Follow applicable regulations (refer WORKSAFE Australia Exposure Standards).

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

Threshold Limit Value (TLV) as recommended by the National Occupational Health & Safety Commission (N.H.M.R.C.) (Worksafe Australia [1991]) for some of the components is :-

METHANOL

TLV-TWA	(ACGIH 1995-1996)	:	200 ppm	(262 mg/m ³)	SK
STEL	(ACGIH 1992-1993)	:	250 ppm	(328 mg/m ³)	SK
OSHA-PEL		:	200 ppm	(260 mg/m ³)	
NIOSH-REL		:	200 ppm	(260 mg/m ³)	SK
STEL	(NIOSH)	:	250 ppm	(325 mg/m ³)	SK
IDLH Level	(NIOSH)	:	6,000 ppm		

NOTE

Detector tubes for methanol are available.

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

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

Although the nature of this product makes it unlikely that the airborne concentration of the components would approach the NH & MRC limits under normal handling and use, atmospheric monitoring may be required especially when large quantities are to be handled or when the product is sprayed or force dried.

SILANE ESTER

TLV-TWA	(ACGIH 1995-1996)	:	None Listed
STEL	(ACGIH 1995-19963)	:	None Listed
IDLH Level	(NIOSH)	:	None Listed



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8. EXPOSURE CONTROLS - continued

WORKPLACE EXPOSURE LIMITS - continued

TLV-TWA is the time weighted average airborne 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 dividing line between safe and dangerous concentrations of chemicals and/or conditions.

They are not a measure of relative toxicity.

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 15 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 60 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.

IDLH - Immediate Danger to Life and Health.

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.



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8. EXPOSURE CONTROLS - continued

PERSONAL PROTECTION

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.

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

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

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.

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

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 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.

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.

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

Prolonged or repeated contact with skin should be avoided by using barrier cream and wearing non-flammable, anti-static, impervious, chemically resistant work clothing (PVC apron and sleeves or full PVC covering or other), safety boots and impervious, chemical protective gloves (Butyl rubber, Neoprene, Nitrile, PVC-coated).

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

Due to variations in glove construction and local conditions, a final assessment should be made by the user.

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.

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

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

At the end of the 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 facepiece respiratory protection is worn.

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.



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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.

Use suitable respirator or supplied-air respiratory protection in confined or enclosed spaces.

Respiratory protection required in insufficiently ventilated working areas and during spraying where airborne concentration exceeds TLV.

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

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.

An air-fed mask, or for short periods of work, a combination of charcoal filter and particulate filter is recommended.

If vapor causes eye irritation or if an inhalation risk exists an air supplied breathing apparatus (meeting the requirements of AS1715 and AS1716) 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.

If the possibility of exposures above TLV requirements 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.

Common health problems which could present difficulty with respirator use include claustrophobia (intolerance of feeling enclosed and 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 users, particularly in hot, humid, and/or dirty environments.

The increased breathing resistance of the respirator reduces its acceptability to the user.

Safety problems are presented by respirators since they limit vision.

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

Movement of the jaw in speaking causes leakage reducing the efficiency of the respirator and decreasing protection against exposures.

To be used effectively, respirators must be individually selected and fitted, conscientiously and properly worn, regularly maintained, and replaced as necessary.



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9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE	: Clear, water white.	
ODOR	Mixes with many organic solvents. May float on water.	
pH VALUE	: Mild, non-residual odor.	
VAPOR PRESSURE (mm Hg @ 20°C)	: Not Available	
RELATIVE VAPOR DENSITY	: < 1.3	
BOILING POINT	: > 1.0 (Air = 1)	
FREEZING POINT	: 290 °C (@ 760 mm Hg)	
SOLUBILITY IN WATER (% by weight)	: < -70 °C	
SPECIFIC GRAVITY (@ 25 °C)	: Reacts slowly	
FLASH POINT	: 1.070 ± 0.005 (Water =1)	
FLAMMABILITY LIMITS (% Volume)	: 110 °C (Pensky-Martens Closed Cup)	
AUTOIGNITION TEMPERATURE (°C)	: LOWER : Not determined / UPPER : Not determined	
DECOMPOSITION POINT (°C)	: Not determined	
VOC CONTENT (excluding water & exempts)	: ≥ 300	
EVAPORATION RATE	: Not determined (Butyl Acetate = 1)	
VISCOSITY	: Not Applicable	
% VOLATILES (by volume)	: Not determined	
Octanol/Water Partition Coefficient Log P (oct)	: Not determined (Toluene)	
OTHER PROPERTIES	: Contact with strong oxidizers may cause fire and explosion.	



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10. STABILITY and REACTIVITY

REACTIVITY / COMPATIBILITY

Hazardous Polymerisation

: HYDROLYSIS

The silane esters contained in this product, are not monomers in the usual sense, but polymeric materials may be produced under certain conditions of catalyzed partial hydrolysis.

Polysiloxanes are produced by polymerization of the silyl ester group in the presence of controlled amounts of water and alkali or acid catalyst at ambient temperatures. At slightly higher temperatures ($\approx 50^{\circ}\text{C}$), polyglycols or polyglycol esters are produced via the epoxy functional group under the same conditions of water concentration and alkali or acid catalyst.

In as much as both of these reactions are exothermic and may occur simultaneously, the heat evolved may be cumulative and greatly accelerate the rate of reactions.

Conditions To Avoid Polymerization

: It is imperative, therefore, that unintentional contamination of the silane esters with water be avoided, and that intentional hydrolysis be properly controlled to avoid hazardous consequences.

Decomposition is dependent on time and temperature.

Hazardous Reactions

: Can react with water or moisture to form methanol.

Stability (Thermal, Light, etc.)

: Stable

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, alkali metals, mineral acids, halogens, strong oxidizers (liquid chlorine, concentrated oxygen, sodium hypochlorite, peroxides, perchloric acid, chromium trioxide, chlorates, perchlorates, nitrates & permanganates), silver salts, acid chlorides, metal hydrides, hydrazine, amines, rubber, polyethylene, PVC and most tank linings.

Hazardous.

Do NOT store in aluminium containers.

Hazardous decomposition products

: No hazardous decomposition products when stored and handled correctly.

Carbon monoxide, carbon dioxide, silicone oxides, fumes and smoke in the case of incomplete combustion.

Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.

Acute overexposure to the products of combustion may result in irritation of the respiratory tract.

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

DANGER !!!

: Harmful or fatal if swallowed, due to methanol production in the stomach.



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11. TOXICOLOGICAL INFORMATION

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

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

ORGANO SILANE ESTER

Oral	LD ₅₀	(rat)	:> 24,000 mg/kg
Dermal	LD ₅₀	(rabbit)	:> 4,000 mg/kg
Inhalation			: saturated vapor, dynamic, 8 hours - Rat: none killed out of 8
Skin Irritation		(rabbit)	: moderate erythema (0,01 ml, undiluted, unoccluded) classification : irritant
Eye Irritation		(rabbit)	: severe eye injury (0,1 ml undiluted) classification : irritant to eyes.

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH.

Genetic toxicity : In vitro studies (Ames, mouse lymphoma, SCE) : positive
In vitro studies (rat, rabbit) : not mutagenic

Carcinogenic properties : Chronic study, mouse skin painting : not tumorigenic

Teratogenic properties : Rats : no evidence for embryotoxicity or teratogenic effects.
Rabbits : no evidence for embryotoxicity or teratogenic effects.

This silane ester was weakly mutagenic in the following in vitro procedures :
Ames test, mouse lymphoma assay, and a sister chromatid exchange test.

However, such in vitro mutagenic activity was reduced by exposing the material to homogenates of mammalian tissue.

Detailed in vitro studies have shown that repeated exposure to the material, even at otherwise toxic doses, does not cause any mutagenic events.

These findings indicate that this material can be biologically converted to product(s) which are not mutagenic, and, thus, the material should not present a significant genetic hazard to the intact organism.

This is confirmed by the lack of any local tumorigenic response to the chronic recurrent application of the material to the skin of mice.

In a developmental toxicity study with rats given this silane ester by gavage over the period of organogenesis, the only effect was minimal foetotoxicity at 3,000 mg/kg/day (reduced ossification at one site) in the presence of maternal toxicity.

There were no embryotoxic or teratogenic effects.

No effects were seen at 500 and 1,500 mg/kg/day.

Recurrent exposure of rats to a respirable aerosol of a hydrolyzate of this silane ester did not cause any respiratory tract injury or evidence of systemic toxicity.



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11. TOXICOLOGICAL INFORMATION - continued

TOXICITY - continued

METHANOL

Induces narcosis but only at exposures at or above the LD₅₀

Oral	LD ₅₀	(mouse)	:	7,300 mg/kg
Oral	LD ₅₀	(rabbit)	:	14,200 mg/kg
Oral	LD ₅₀	(rat)	:	8,000 mg/kg
Oral	LD _{LO}	(human)	:	428 mg/kg
Dermal	LD ₅₀	(rabbit)	:	15,800 mg/kg
Inhalation	LC ₅₀	(rat)	:	128.2 mg/kg / 4 hour
Inhalation	LC ₅₀	(rat)	:	87.5 mg/kg / 6 hour
				In most cases deaths were attributed to lung and kidney damage.
Inhalation	LD ₅₀	(rabbit)	:	1,826 mg/kg
Skin		(rabbit)	:	Standard Draize Test (Skin, rabbit) = 20 mg /24 hr (Moderate) Draize value = 40 mg - Moderate irritant. Draize value 100 mg /24 hr - Moderate irritant.
Eye		(rabbit)	:	Standard Draize Test - Administration into the eye = 40 mg Moderate irritant. Standard Draize Administration into the eye = 100 mg/24 hr - Moderate irritant
CARCINOGENICITY			:	Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
NEUROTOXICITY			:	No information available.

Toxic by inhalation, ingestion or skin absorption.

May be a reproductive hazard.

Ingestion may be fatal. Risk of very serious, irreversible damage if swallowed.

Exposure may cause eye, kidney, heart and liver damage.

Chronic or substantial acute exposure may cause serious eye damage, including blindness.

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, respiratory tract and can adversely affect the nervous system.

Effects range from headaches, dizziness, nausea, and numbness in fingers and toes to unconsciousness and death.

Direct, prolonged contact with the liquid may irritate the skin and the eyes.

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 including concentrations below the TWA-limit.

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



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12. ECOLOGICAL INFORMATION

The product is a colorless liquid at room temperature and is highly flammable.

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

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

It is a liquid at room temperature and is flammable.

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

No environmental impact data available for this specific product. However for some of the components :

BIOLOGICAL EFFECTS

METHANOL - BIOLOGICAL EFFECTS

ENVIRONMENTAL FATE

When released into the soil, this material is expected to readily biodegrade. 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 the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into the air, this material is expected to exist in the aerosol phase with a short half-life. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into air, this material is expected to have a half-life between 10 and 30 days. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.

ENVIRONMENTAL TOXICITY

This material is expected to be slightly toxic to aquatic life.

WATER POLLUTION FACTORS

ThOD	: Not Available
COD	: Not Available
BOD ₅	: Not Available

ACUTE TOXICITY

Acute Toxicity - Fish	: LC ₅₀ : 10,800 mg/L / 96 hour	(Rainbow Trout)
TL _M	: LC ₅₀ : 10 g/L / 48 hour	(Daphnia (Daphnia))
Acute Toxicity - Fish	: LC ₅₀ : 8,000 mg/L / 48 hour	(Trout)

Acute Toxicity - Fish : EC₅₀ / IC₅₀ ≤ 10 mg/L – Toxic

PERSISTENCE & DEGRADABILITY

: Degree of elimination = 99 %
Evaluation = Biodegradable

MOBILITY

: No information available

ORGANO SILANE ESTER - BIOLOGICAL EFFECTS

DEGRADABILITY

BOD 28 : 37% OECD 301A

ACUTE TOXICITY

Fish	: LC ₅₀ : 55 mg/L / 96 hour	(Cyprinus carpio)
Other species	: EC ₅₀ : 473 mg/L / 48 hour	(Daphnia)
	: EC ₅₀ : 255 mg/L / 72 hour	(Algae)



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12. ECOLOGICAL INFORMATION - continued

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 slight acute toxicity to aquatic life.

No data are available on the short-term effects of this product on plants, 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 slight chronic toxicity to aquatic life.

No data are available on the long-term effects of this product on plants, birds, or land animals.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

This chemical is slightly persistent in water, with a half-life of between 2 to 20 days.

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

ABIOTIC EFFECTS

No information on abiotic effects of this product.

According to the definition provided in the Federal Register (1992), this product is a volatile organic compound (VOC) substance. As a VOC, this product can contribute to the formation of photochemical smog in the presence of other VOCs.

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

Recycle product where possible.

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

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.

Advise of flammable/chemical nature.

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

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

Incinerate in a furnace where permitted under Federal, State and local regulations.

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.



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14. TRANSPORT INFORMATION

Classified as a Class 9 (MISCELLANEOUS) Dangerous Substance for the purpose of transport.
Refer to relevant regulations for storage and transport requirements.

PROPER SHIPPING NAME	: Environmentally Hazardous Substance, Liquid, N.O.S.		
UN NUMBER	: 1263	PACKAGING GROUP	: II
HAZCHEM CODE	: •3YE	SUBSIDIARY RISK	: NOT ASSIGNED
POISONS	: S5	EPG	: 3A1
CLASS	: 3.1 (Flammable Liquid)	AS 1940 Class	: PG II
IMO HAZARD CLASS	: INFLAMMABLE LIQUID/3.3	ADG CLASS	: 3
ICAO / IATA CLASS	: 3	PASSENGER MAX. QUANTITY / PACK	: 5L / 1L
PASSENGER PACKING INSTRUCTION	: 3	TRANSPORT TEMPERATURE (°C)	: Ambient
CARGO MAX. QUANTITY	: 60L	LOADING / UNLOADING TEMPERATURE (°C)	: Ambient
STORAGE 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.

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.

Even though this material is not listed as a Scheduled Poison it must be stored, maintained and used in accordance with the relevant regulations.



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15. REGULATORY INFORMATION

Hazardous according to criteria of Worksafe Australia

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.
LABEL NAME : Paint Related Material, Thinner

HAZARDS IDENTIFICATION

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

RISK PHRASES

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.
R33	Danger of cumulative effects.
R36/37/38	Irritating to eyes, skin and respiratory system.
R42/43	May cause sensitisation by inhalation and skin contact.
R47 (2)	May cause birth defects. Teratogenic effects - Category 2
R48/20	Harmful : danger of serious damage to health by prolonged exposure through inhalation.
R61	May cause harm to the unborn child.
R62	Possible risk of impaired fertility.
R63	Possible risk of harm to the unborn child.
R65	May cause lung damage if swallowed.
R66	Repeated exposure may cause skin dryness and cracking..
R67	Vapors may cause drowsiness and dizziness.

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.
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.
S43B	In case of fire use sand, earth, chemical powder or alcohol type foam
S45	In case of accident or if you feel unwell, seek medical advice immediately. (Show label or MSDS where possible).
S51	Use only in well ventilated areas.
S61	Avoid release into the environment.
S62	If swallowed, do NOT induce vomiting.

HMIS Hazard Rating : Health : 2 Fire : 3 Reactivity : 1 PPI : X
HMIS Hazard Rating: 4 = Severe Hazard; 3= Serious Hazard; 2= Moderate Hazard, 1= Slight Hazard
0 = Minimal Hazard,
X = Personal protection rating to be supplied by user depending on use conditions.

MATERIALS TO AVOID

: Strong oxidizers, strong acids or strong bases
(hydrolysis can occur causing decomposition and release of heat).
Reacts with water or moisture to form methanol.



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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.



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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)

All components in this product are listed on the Australian Inventory of Chemical Substances (AICS).