



Manufacturers of UTHANE Polyurethane Coatings
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Date of Issue : 25/11/10

MATERIAL SAFETY DATA SHEET
BC512 PRE-CAT SEALER / UNDERCOAT

Page 1 of 37
Ref msds 00042

Hazardous according to criteria of Worksafe Australia

1. IDENTIFICATION

PRODUCT NAME : BC512 PRE-CAT SEALER / UNDERCOAT
AVAILABLE COLORS : Clear sealer / White Undercoat
OTHER NAMES : BC512 PRE-CAT SEALER, BC512 PRE-CAT UNDERCOAT
UN NUMBER : 1263
DANGEROUS GOODS CLASS : 3.1 (Highly Flammable Liquid)
SUBSIDIARY RISK : Nil
HAZCHEM CODE : •3YE
POISONS SCHEDULE : S5
EPG : 3A2
USE : Reactive spray coating to provide a tough, durable priming coat for interior timber applications.

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

COMPANY / UNDERTAKING

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

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

TECHNICAL MANAGER PRODUCTION MANAGER
MANAGING DIRECTOR SALES MANAGER

AUSTRALIAN POISONS INFORMATION CENTRE 24 HOUR SERVICE : 13 11 26

POLICE OR FIRE BRIGADE : 000 (exchange) : 1100

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

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

They contain useful information on hazards and control measures.

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

Please ensure that you have a current copy.

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

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

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

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

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

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

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

2. HAZARDS IDENTIFICATION**Hazardous according to criteria of Worksafe Australia****CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES**

CLASSIFICATION / SYMBOL : 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.

This chemical is a FLAMMABLE LIQUID and a FIRE HAZARD.

SYMBOLS

Xi	Irritant
Xn	Harmful
N	Dangerous for the environment

RISK PHRASES

R11	Highly flammable.
R18	In use, may form flammable/explosive vapor-air mixture.
R20/2122	Harmful by inhalation, in contact with skin and if swallowed.
R33	Danger of cumulative effects.
R36/37/38	Irritating to eyes, respiratory system and skin.
R42/43	May cause sensitisation by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R51/53	Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.
R63	Possible risk of harm to the unborn child.
R65	May cause lung damage if swallowed.
R67	Vapors may cause drowsiness and dizziness.

SAFETY ADVICE

S2	Keep out of the 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 fumes/vapour/spray
S24/25	Avoid contact with skin and eyes.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S36/37/39	Wear suitable protective clothing (coveralls, safety boots), chemical resistant 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.
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release into the environment.
S62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

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

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

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

Exposure to chemicals can occur in the workplace or in the environment following releases to air, water, land, or groundwater. This product can enter the body when breathed in with contaminated air or when consumed with contaminated food or water.

It can also be absorbed through skin contact.

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

Narcotic effects occur at levels below the exposure standard.

Very high levels can cause death.

The liquid is toxic if aspirated.

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

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

Toluene does not remain in the body due to its breakdown and removal.

Repeatedly breathing large amounts of Toluene, such as when "sniffing" glue or paint, can cause permanent brain damage.

As a result, humans can develop problems with speech, hearing, and vision.

Humans can also experience loss of muscle control, loss of memory, and decreased mental ability.

Exposure to Toluene can also adversely affect the kidneys.

Other studies show that repeat exposure to large amounts of Toluene adversely affects the nervous system, the kidneys, and the liver of animals.

Some animal data suggests a carcinogenic potential for Di-Octyl Phthalate.

Currently there is no sufficient evidence to suggest that Di-Octyl Phthalate is a potential human carcinogen.

Target Organs : Central nervous system, respiratory system, eyes, skin, GI tract, blood, liver and kidneys

Medical Conditions Generally Aggravated By Exposure : Damaged skin, respiratory system disease

Routes Of Entry : Ingestion, inhalation, skin contact, eye contact, absorption

SWALLOWED

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

The liquid is 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.

Effects on the nervous system characterise over exposure to higher aliphatic alcohols.

These include headache, muscle weakness, giddiness, ataxia (loss of muscle co-ordination), confusion, delirium and coma.

Gastrointestinal effects may include nausea, vomiting and diarrhoea.

Tends to break into a foam if the patient vomits.

Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

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

In the absence of effective treatment, respiratory arrest is the most common cause of death in animals acutely poisoned by the higher alcohols.

Aspiration of liquid alcohols produces an especially toxic response as they are able to penetrate deeply into the lung where they are absorbed and may produce pulmonary injury.

Those possessing lower viscosity elicit a greater response.

The result is a high blood level and prompt death at doses otherwise tolerated by ingestion without aspiration.

Large doses may produce kidney and liver damage.

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

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.

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

SKIN

Toxic effects may result from skin absorption.

Will have a degreasing action on the skin.

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

Frequent or prolonged 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.

Substance is readily absorbed through skin with resultant toxic effects and may cause central nervous system depression.

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

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.

Capable of causing skin sensitisation and allergic skin reactions.

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

The material may accentuate any pre-existing skin condition.

INHALED

This product is a central nervous system depressant. CNS depression characterised by dizziness and headache.

May cause headaches and dizziness, could be anaesthetic and may have other central nervous system effects.

Loss of consciousness may occur.

Central nervous system (CNS) depression may be evident early.

Vapor/mist concentrations are extremely 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.

Inhalation hazard is increased at higher temperatures.

Toxic effects are increased by consumption of alcohol.

Repeated exposure may cause sensitisation and/or allergic reactions.

Acute effects from inhalation of high concentrations of 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).

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

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



2. HAZARDS IDENTIFICATION - continued

HEALTH EFFECTS - CHRONIC EXPOSURE

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 co-ordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").

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

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

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

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

Prolonged or continuous skin contact with the liquid may cause de-fatting with drying, cracking, irritation and dermatitis following.

Skin contact may aggravate an existing dermatitis.

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

Capable of causing skin sensitisation and allergic skin reactions.

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

[PATTYS]

Repeated exposure to xylenes can damage bone marrow, causing low blood cell count.

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

It can also cause damage to the surface of the eye and cause stomach problems.

Evaluation of workers chronically exposed to xylenes has demonstrated a lack of genotoxicity.

Chronic Toluene habituation occurs following intentional abuse (glue sniffing) or from occupational exposure.

Ataxia, incoordination and tremors of the hands and feet (as a consequence of diffuse cerebral atrophy), headache, abnormal speech, transient memory loss, convulsions, coma, drowsiness, reduced colour perception, frank blindness, nystagmus (rapid, involuntary eye movements), decreased hearing leading to deafness and mild dementia have all been associated with chronic abuse.

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.

MATERIAL SAFETY DATA SHEET
BC512 PRE-CAT SEALER / UNDERCOAT

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>
Toluene (Aromatics (Paraffins)	108-88-3 Not Available Not Available	601-021-00-3 Not Available Not Available	203-625-9 Not Available Not Available	< 10 99.5% 0.5%
Xylenes * (Mixed Isomers)	1330-20-7	601-022-00-9	215-535-7	10 - 30
Ethylbenzene	100-41-4	601-023-00-4	202-849-4	< 10
n-Butyl Acetate	123-86-4	607-025-00-1	204-658-1	10 - 30
Methyl Ethyl Ketone	78-93-3	606-002-00-3	201-159-0	< 10
Methyl Iso-Butyl Ketone	108-10-1	203-550-1	606-004-00-4	< 10
Iso-Butanol	78-83-1	603-108-00-1	201-148-0	10 - 30
1-Methoxy-2-Propanol Acetate (Propoxy Methyl Acetate)	108-65-6	607-195-00-7	203-603-9	< 10
Iso-Propyl Alcohol (Isopropanol)	67-63-0	603-117-00-0	200-661-7	< 10
Denatured Ethanol	64-17-5	603-002-00-5	200-578-6	< 10
Synthetic Polymers (Proprietary Composition)	Not Available	Not Available	Not Available	10 - 30
Nitrocellulose (< 12.6% Nitrogen)	9004-70-0	603-037-01-3	215-535-7	< 10
Di-Octyl Phthalate	117-84-0	607-317-00-9	204-211-0	< 10
Miscellaneous Additives (Proprietary Composition)	Not Available	Not Available	Not Available	< 10
Titanium Dioxide (Proprietary Composition)	13463-57-7	Not Available	236-675-5	< 10 (depending on color)

* 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

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.

FIRST AID FACILITIES - Ensure an eye bath and safety shower are available and ready for use.

SWALLOWED

Harmful if swallowed.

If the victim is convulsing or unconscious, do **NOT** give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body.

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

DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT.

If the victim is conscious and not convulsing, rinse mouth out with plenty of water and give 1 or 2 glasses of water to drink to dilute the chemical and **IMMEDIATELY** call a doctor or hospital or Poisons Information Centre.

Tends to break into a foam if the patient vomits.

Do **NOT** induce vomiting due to the hazard of solvent aspiration into the lungs which may cause mild to severe pulmonary injury and possibly death.

Be prepared to transport the victim to a hospital if advised by a physician.

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

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 Poisons Information Centre.

Eyelids should be held open. Ensure irrigation under the eyelids by occasionally lifting upper and lower lids.

Remove clothing, if contaminated, and gently wash skin with water.

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

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

SKIN

If this product comes in contact with the skin

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, **IMMEDIATELY** 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 shoes.

Can be absorbed through the skin with resultant toxic effects.

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 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.

4. FIRST AID MEASURES - continued**ADVICE TO DOCTOR**

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.
Primary threat to life from ingestion and/or inhalation, is respiratory failure.
Onset of symptoms may be delayed several hours after exposure.
Extreme care must be taken to prevent aspiration.
Material if aspirated into lungs may cause chemical pneumonitis.
Therefore, emesis should not be induced mechanically or pharmacologically.
If it is considered necessary to evacuate the stomach contents, this should be done by means least likely to cause aspiration (e.g. gastric lavage after endotracheal intubation).
When vomiting occurs, hold patient with head below the hips to prevent pulmonary aspiration.
Any material aspirated during vomiting may cause lung injury.

Skin sensitisation may result from a single acute exposure.
Sensitisation may cause difficulty in breathing similar to asthma.

Methyl Ethyl Ketone in combination with Methyl Butyl Ketone and possibly other solvents can damage the nervous system.

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: -

Exam of the eyes by slit lamp.

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

Complete blood count to include at least a red cell count, a white cell count, haemoglobin and haematocrit.
Liver and kidney function tests.
Hearing test (audiogram) and test for balance.
Urine concentration of Methylhippuric Acid (at the end of work-shift) as an index of overexposure.
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.

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.

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.

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 components contained in this product.

For example, employees with skin diseases, whether or not they are product related, may be unable to tolerate wearing protective clothing.

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

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.



5. FIRE FIGHTING MEASURES

FOR LARGE SPILLS AND FIRES IMMEDIATELY CALL YOUR FIRE DEPARTMENT.

FIRE AND EXPLOSION HAZARD

Flammable liquid, can release vapors that form flammable mixtures at temperatures at or above the flash point.
Liquid and vapor are highly flammable.
Severe fire hazard when exposed to heat, flame and/or oxidisers.
Burns very rapidly and explosively.
When burning may form toxic materials such as carbon monoxide (CO,) carbon dioxide (CO₂), nitrous gases, various hydrocarbons, fumes and smoke possible.
Vapor forms and explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark.
Vapor / air mixtures may ignite explosively and flashback a considerable distance along the vapor trail to source of ignition.
Do not store or mix with strong oxidants (such as chlorine, bromine and fluorine) since violent reactions may occur.
Heating may cause expansion or decomposition leading to violent rupture of containers.
Product can accumulate static charges which can cause an incendiary electrical discharge.
Shut off any leak if safe to do so and remove sources of re-ignition.
If safe to do so, remove containers from the path of the fire and keep cool with water spray.
Firefighters should wear self-contained breathing apparatus with a full face piece and operated in positive pressure mode.

FIRE FIGHTING MEASURES

Shut off any leak if safe to do so and remove sources of re-ignition.
If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop leak.
If safe to do so, remove containers from the path of the fire and keep cool with water spray.
Keep storage tanks, pipelines, fire exposed surfaces etc. cool with water spray.
Minimize breathing gases, vapor, fumes or decomposition products.
Firefighters should wear self-contained breathing apparatus with a full face piece and operated in positive pressure mode.
Water spray may be used to flush spills away from exposures.
Prevent run off from fire control or dilution from entering waterways, sewers or drinking water supply.
This product may form a floating fire hazard on water.
If employees are expected to fight fires, they must be trained and equipped as stated in the appropriate regulations.

FIRE EXTINGUISHING MEDIA

Either allow fire to burn under controlled conditions or extinguish with alcohol stable foam, carbon dioxide (CO₂), or dry chemical.
Try to cover liquid spills with foam.

For small fires use alcohol stable foam or all-purpose-type foam, dry agent (carbon dioxide - CO₂), or dry chemical powder), water fog in large quantities.

For large fires use foam (by manufacturer's recommended techniques) or water fog (or if unavailable fine water spray).
Water spray may be ineffective, but should be used in case of larger fires, water spray be used to keep fire exposed containers cooled.
Avoid spraying water directly into storage containers due to danger of boilover.
Fire-men have to wear self-contained breathing apparatus.

This material may produce a floating fire hazard.

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

Keep unauthorized persons away at a safe distance and move upwind until clean up is complete.
Shut off all possible sources of ignition ensure adequate ventilation / exhaust ventilation.
Stop liquid at the source if safe to do so.
No smoking, naked lights or ignition sources.
Increase ventilation.
May be violently or explosively reactive.
Use only spark-free and/or explosion proof equipment.
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.
Avoid breathing vapors and contact with skin and eyes. Control personal contact by using protective equipment.
If a leak or spill has not ignited, use water spray or fog to disperse/absorb the vapors and to protect men attempting to stop leak.
Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas.

MINOR SPILLS

Clean up spills immediately.
Small spills may be absorbed onto any absorbent material such as sand, soil or vermiculite or other absorbent material.
Collect residues and place in sealed, labelled, flammable waste container.

MAJOR SPILLS

Consider evacuation.
Alert Fire Brigade and tell them location and nature of hazard.
Warn occupants of down wind areas of fire and explosion hazard.
In the event of a spillage, advise the local environment protection authority or emergency services that the product has entered or may enter sewers, drains, watercourses, or has contaminated soil or vegetation
Avoid breathing vapors and contact with skin and eyes.
Wear breathing apparatus, protective gloves and full protective clothing.
Dyke the area with sand, earth or vermiculite, to prevent spreading and to prevent it entering sewers, drains or natural waterways.
Take measures to minimize the effect on ground water.
Water spray or fog may be used to disperse /absorb vapor.
Water spray may be used to flush spills away from exposures.
Collect recoverable product (using explosion proof or hand pump) into sealed, labelled, flammable containers for recycling or disposal.
Use only spark-free and/or explosion proof equipment.
Dilute contained spill with water.
Pump the liquid to a labelled salvage tank for recycling or later disposal.
Cover remainders with wet, absorbent material (e.g. soil, sand, vermiculite, fire retardant treated sawdust or other inert material).
Remove mechanically; cover remainders with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand).
Collect solid residues and seal in sealed, 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 has been properly cleaned.
After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
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

HANDLING

Prior to working with this product, you should be trained on its proper handling and storage.
Observe manufacturer's storing and handling recommendations.
Packing as supplied by manufacturer. (Metal can / Metal drum / Metal safety cans).
Many plastics are unsuitable for storing / handling this product.
Methyl Isobutyl Ketone is incompatible with potassium-tert-butoxide.
Explosion protection required.
Sources of ignition, such as smoking, open flames, or ignition sources are prohibited where this product is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
Use non-sparking tools and equipment especially when opening and closing containers.
Avoid exposure to temperatures above 50 °C.
Protect containers against physical damage and check regularly for leaks.
Open containers slowly in order to control possible pressure release.
Ensure adequate ventilation (equivalent to outdoors), or exhaust ventilation in the working area to prevent build up of explosive atmosphere.
Ensure adequate ventilation or exhaust ventilation in the working area.
Exhaust ventilation necessary if product is sprayed.
To prevent fire or explosion risk from static accumulation and discharge, effectively ground and bond product, transfer system and all process equipment, including tanks and drums.
Irritating to eyes, skin and mucous membranes.
Avoid prolonged, repeated contact with eyes, skin contact and breathing vapors or mists.
Intense smelling. Keep away from foodstuffs and clothing.
Refer to AS 1940 (Storage and handling of flammable and combustible liquids) and AS 2865 (Safe working in a confined space), for more specific information on these subjects.

STORAGE REQUIREMENT

Keep container dry and securely sealed when not in use.
Check all containers are clearly labelled and check regularly for leaks.
Store in original containers in a cool, dry, well-ventilated, approved flammable liquid storage area away from direct sunlight.
Do **NOT** store in pits, depressions, basements or areas where vapors may be trapped.
Materials are stable on storage, but should be stored in a cool and well ventilated place away from sources of ignition, strong oxidizing agents (liquid chlorine, bromine, fluorine, concentrated oxygen, sodium hypochlorite), acids, alkalis (since violent reactions occur) and odor sensitive materials.
Protect containers against physical damage and check regularly for leaks.
Handle containers with care.
Avoid exposure to temperatures above 50 °C.
Do NOT pressurise, cut, heat, or weld containers.
Empty product containers may contain product residue.
Do NOT reuse empty containers without commercial cleaning or reconditioning.

PROCESS HAZARD

Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperatures and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources.
Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.
Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.
Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapors".

8. EXPOSURE CONTROLS**ENGINEERING CONTROLS**

None required when handling small quantities.

OTHERWISE

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

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

Isolating operations can also reduce exposure.

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

Use away from all ignition sources.

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

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

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

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

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

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

Keep containers closed when not in use.

Equipment MUST be explosion proof.

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

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

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

LOCAL EXHAUST : Face velocity > 20 m/min.

FLAMMABILITY

Highly flammable liquid.

Can readily form flammable mixture with air.

May form explosive mixtures with air.

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

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

Prevent build up of flammable vapors.

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

Avoid all ignition sources.

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

Take precautions against discharges of static electricity.

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.

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.

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

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. The following Exposure Standards 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 and should not be used as the fine dividing line between safe and dangerous concentrations of chemicals.

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

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 atmospheric contamination should be kept to as low a level as is workable.

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

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

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

No value has been assigned for this specific material by the National Occupational Health & Safety Commission.

Follow applicable regulations (refer WORKSAFE Australia Exposure Standards).

The Threshold Limit Value (TLV-TWA), as published by WORKSAFE [1995], for some of the individual constituents is listed below.

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

XYLENE (all isomers)

TLV-TWA : 80 ppm (350 mg/m³) A4 (Under review)

STEL (Short Term Exposure Limits) : 150 ppm (655 mg/m³)

IDLH Level : 1000 ppm

Odour Threshold Value : 20 ppm (detection), 40 ppm (recognition)

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

NOTE :

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

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.

1-METHOXY-2-PROPANOL ACETATE

TLV-TWA : 50 ppm (274 mg/m³) Sk

PEL (Permissible Exposure Limit - OSHA) : 100 ppm (548 mg/m³) Sk

STEL (Short Term Exposure Limits) : 100 ppm (548 mg/m³) Sk

Odour Threshold Value : 0.07 ppm (detection) / 0.12 ppm (recognition)

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

IDLH Level (Immediate Danger to Life & Health) : Not established for this product

TOLUENE

Toluene is listed as a hazardous air pollutant.

ES-TWA : 100 ppm (377 mg/m³)

TLV-TWA : 50 ppm (188 mg/m³) SKIN A4

Threshold Limit Value (TLV) : 100 ppm (377 mg/m³) SKIN A4

STEL (Short Term Exposure Limits) : 150 ppm (565 mg/m³) (Under review)

OSHA - Permissible Exposure Limit (PEL) : 200 parts ppm of air as an 8-hour time-weighted average (TWA) (29 CFR 1910.1000).

300 ppm, not to be exceeded during any 15 minute work period and a maximum peak concentration of 500 ppm.

IDLH Level (Immediate Danger to Life & Health) : 2,000 ppm

Odour Threshold Value : 0.16 - 6.7 ppm (detection), 1.9 - 69 ppm (recognition)

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

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

TLV-TWA	:	150 ppm (445 mg/m ³) maximum
PEL (Permissible Exposure Limit - OSHA)	:	200 ppm averaged over an 8-hour workshift.
NIOSH Recommended airborne exposure limit	:	200 ppm averaged over a 10-hour workshift.
ACGIH Recommended airborne exposure limit	:	200 ppm averaged over an 8-hour workshift / STEL 300 ppm
STEL (Short Term Exposure Limits)	:	330 ppm (890 mg/m ³)
IDLH Level (Immediate Danger to Life & Health)	:	3,000 ppm
Odour Threshold Value	:	2 ppm (approximate)

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

n-BUTYL ACETATE

TLV-TWA	:	150 ppm (713 mg/m ³)	(ACGIH)	A4
PEL (Permissible Exposure Limit)	:	150 ppm (710 mg/m ³)		
STEL (Short Term Exposure Limits)	:	200 ppm (950 mg/m ³)	(ACGIH)	A4
IDLH Level (Immediate Danger to Life & Health)	:	10,000 ppm		
Odour Threshold Value	:	0.0063 ppm (detection), 0.038 - 12 ppm (recognition)		

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

NOTE : This substance has been classified by the ACGIH as A4 - NOT classifiable as causing Cancer in humans. Exposure at or below the recommended TLV-TWA is thought to prevent significant irritation of the eyes and respiratory passages as well as narcotic effects.

DENATURED ETHANOL

TLV-TWA	:	1,000 ppm (1,880 mg/m ³)	A4 (Proposed)
STEL	:	1,250 ppm (1,250 mg/m ³)	(Canada)
IDLH Level (Immediate Danger to Life & Health)	:	15,000 ppm	
Odour Threshold Value	:	80 - 100 ppm (detection)	

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.

Iso-PROPYL ALCOHOL

TLV-TWA	(ACGIH)	:	400 ppm (980 mg/m ³)
PEL (Permissible Exposure Limit)	(OSHA)	:	400 ppm (980 mg/m ³)
STEL (Short Term Exposure Limits)		:	500 ppm (1230 mg/m ³)
IDLH Level (Immediate Danger to Life & Health)		:	Not available
Odour Threshold Value		:	22 ppm (detection)

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.

Iso-BUTANOL

TLV-TWA (ACGIH)	:	50 ppm (152 mg/m ³)
PEL (OSHA)	:	100 ppm (300 mg/m ³)
IDLH Level (Immediate Danger to Life & Health)	:	8,000 ppm
Odour Threshold Value	:	1.6 ppm (detection)

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



8. EXPOSURE CONTROLS - continued

EXPOSURE LIMITS - continued

AMORPHOUS (PRECIPITATED) SILICA

TLV-TWA : 10 mg/m³ Total Dust, 8 hour

DI-OCTYL PHTHALATE

TLV-TWA : 5 mg/m³
STEL (Short Term Exposure Limits) : 10 mg/m³
Odour Threshold Value : Not Available (detection) / Not Available (recognition)
The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

Some animal data suggests a carcinogenic potential for Di-Octyl Phthalate.
Currently there is no sufficient evidence to suggest that Di-Octyl Phthalate is a potential human carcinogen.

METHYL ISOBUTYL KETONE

TLV-TWA : 50 ppm (205 mg/m³) /
STEL : 75 ppm (307mg/m³) [WORKSAFE 1991] - (Under review)

IDLH Level : 3000 ppm
Odour Threshold Value : 0.47 - 0.68 ppm / 0.10 ppm (in air)
Unfatigued, odour recognition threshold (100% test panel) is 0.3 - 0.5 ppm. Distinct odour at 15 ppm.
Odour is objectionable and vapours are irritating to eyes at 200 ppm.
The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

NOTE : Detector tubes for methyl isobutyl ketone, measuring in excess of 50 ppm, are commercially available.
Exposure at or below the recommended TLV-TWA is should provide sufficient protection against the potential irritant effects, headache and nausea, neurasthenic symptoms and other systemic toxicities (including liver and kidney damage) produced by MIBK.

Exposure at or below the recommended TLV-TWA should provide sufficient protection against the potential irritant effects, headache and nausea, neurasthenic symptoms and other systemic toxicities (including liver and kidney damage) produced by methyl isobutyl ketone.

4-METHYL-2PENTANOL (0.3% by weight of Methyl IsoButyl Ketone)
TLV-TWA : 25 ppm (100 mg/m³) [WORKSAFE 1991]

TITANIUM DIOXIDE

TLV-TWA : 10 mg/m³ Total Dust, 8 hour



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.

8. EXPOSURE CONTROLS - continued**PERSONAL PROTECTION****WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.**

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

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

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

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

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

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

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

Observe good personal hygiene.

Keep away from foodstuffs, drinks and tobacco.

Keep working clothes separate.

Take off immediately all contaminated clothing.

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

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

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

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

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

For further information consult your Occupational Health and Safety Adviser.

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

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

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

SKIN

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

Prolonged or repeated skin contact should be avoided by using barrier cream and wearing impervious, chemically resistant work clothing (PVC apron and sleeves or full PVC covering), safety boots and protective gloves (polyethylene, Butyl rubber, Neoprene, Polyvinyl Alcohol, PE/EVOH/PE, nitrile or P.V.C.).

Final glove selection should be made by knowledgeable individuals based on the specific circumstances involved.

Protective suit may be required if exposure severe.

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

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

Ensure that there is ready access to an emergency shower.

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

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

Wash skin thoroughly with soap and water after contact to remove the chemical.

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

Remove contaminated shoes, thoroughly dry before re-use.

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

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

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

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

RESPIRATORY

Avoid breathing vapors.

Engineering controls must be effective to ensure that exposure to this chemical does not occur.

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

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

Respiratory protection required if airborne concentration exceeds TLV.

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

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

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in the appropriate regulations.

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

At concentrations up to 50 ppm, a chemical cartridge respirator with organic vapor/acid mist cartridge is recommended.

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

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

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

Check to make sure the respirator to face seal is still good.

If it is, replace the filter, cartridge, or canister.

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

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.

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

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

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

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

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

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

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

The effectiveness of an air purifying respirator is limited.

Use it only for a single, short term exposure.

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

For further information consult your Occupational Health and Safety Adviser.



MATERIAL SAFETY DATA SHEET
BC512 PRE-CAT SEALER / UNDERCOAT

9. PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION / PROPERTIES

APPEARANCE		: Clear OR white low viscosity liquids. Mix with most organic solvents.	
ODOR		: Strong lacquer odor.	
pH VALUE		: Not applicable	
VAPOR PRESSURE	(kPa @ 15°C)	: 2.2	(Toluene)
VAPOR PRESSURE	(kPa @ 20°C)	: 10.0	(Methyl Ethyl Ketone)
VAPOR PRESSURE	(kPa @ 38°C)	: 22.3	(Methyl Ethyl Ketone)
VAPOR DENSITY		: 3.7	(Air =1) (Xylene)
BOILING POINT	(°C)	: 78.5 - 81.0	(Methyl Ethyl Ketone)
FREEZING POINT	(°C)	: - 48.0	(Xylene)
SOLUBILITY IN WATER	(% weight)	: Negligible	
SPECIFIC GRAVITY	(@ 25°C)	: 0.930 - 1.010	(Water =1) (depending on color)
FLASH POINT	(°C)	: - 7.0	Tag Closed Cup (Methyl Ethyl Ketone)
EXPLOSIVE LIMITS	(% volume)	: 0.5 LEL / 11.5 UEL	(Methyl Ethyl Ketone)
AUTOIGNITION TEMPERATURE	(°C)	: 499.0	(Xylene)
VOC CONTENT		: 660 - 695 gm / Litre	(depending on color)
EVAPORATION RATE		: 5.6 - 6.0	(Butyl Acetate =1) (Methyl Ethyl Ketone)
% VOLATILES	(by volume)	: 77.5 - 81.5	(depending on color)
Octanol/Water Partition Coefficient Log P (oct)		: 3.12 - 3.20	(Xylene)

OTHER PROPERTIES : Flammable, vapors can readily form explosive mixture with air.
Methyl isobutyl ketone reacts vigorously with both reducing and oxidising agents.
It ignites on contact with potassium tert-butoxide and may form explosive peroxide on exposure to air.

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

- Hazardous Polymerization : Will not occur.
- Stability : Stable under normal conditions.
- Conditions to Avoid : Heat, sparks, flame and build up of static electricity.
- Incompatibility (materials to avoid for purpose of transport, handling & storage only)
: Avoid contact with strong alkalis, mineral acids, halogens, amines, alkanolamines, aldehydes, ammonia, strong oxidizers (liquid chlorine, bromine, fluorine, concentrated oxygen, sodium hypochlorite, perchloric acid, chromium trioxide, peroxides, chlorates, perchlorates, nitrates, & permanganates - increased risk of fire), alkali metal hydroxides (hydrolysis can occur), potassium tert-butyrate (ignition can occur), rubber, polyethylene and PVC, and most tank linings.
Hazardous.
- Hazardous reactions : Methyl isobutyl ketone reacts vigorously with both reducing and oxidising agents. It reacts violently with and ignites on contact with potassium tert-butoxide. May form explosive peroxide on exposure to air.
- Hazardous decomposition products : No hazardous decomposition products when stored and handled correctly. Carbon monoxide, carbon dioxide, nitrous gases, fumes and smoke in the case of incomplete combustion or thermal decomposition. Thermal decomposition is dependent on time and temperature. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.
- Hazardous combustion products : In case of fire, formation of fumes, smoke, nitrous gases, and carbon monoxide
- Hazardous composition products : No unusual.

11. TOXICOLOGICAL INFORMATION**TOXICITY**

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

Aromatic hydrocarbons, such as those contained in this product, irritate the skin and mucous membranes and are narcotic if inhaled in high concentrations.

Harmful if swallowed, may cause gastric irritation and narcosis.

Do NOT induce vomiting if swallowed

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

Limits shown for guidance only.

Follow applicable regulations (refer WORKSAFE Australia Exposure Standards).

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

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)	
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 leukopenia (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.

CARCINOGENICITY : NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CHRONIC TOXICOLOGY

No evidence of skin carcinogenic activity in laboratory tests.

No health effects in animals treated with this material in US NTP 2 -year bioassay.

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

GENETIC TOXICOLOGY

L51784 mouse lymphoma cell test : Negative Ames test.

Mutagenicity studied with similar materials in the Ames test, mouse lymphoma, rat bone marrow cytogenetics and dominant lethal assays showed no adverse effects.

REPRODUCTIVE TOXICOLOGY**XYLENE**

Teratogenic studies (rats) : Negative.

No birth defects reported when pregnant rats were exposed to 500 ppm Xylene.

Foetal weights slightly below normal at 500 ppm. No toxic effects on the foetus reported above 250 ppm.

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

Oral	LD ₅₀	(rat)	: >2,000 mg/kg
Dermal	LD ₅₀	(rat)	: >2,000 mg/kg
Inhalation	LC ₅₀	(rat)	: > 2 mg/L / 4 hours
Skin Irritation			: May cause moderate skin irritation (but insufficient to classify).
Swallowed			: Do NOT induce vomiting if swallowed
Eye Irritation			: Moderately irritating to eyes (but insufficient to classify).
Respiratory Irritation			: Repeated inhalation of vapours and mists is expected to cause irritation of the respiratory tract.
Sensitization			: Not expected to be a skin sensitiser.
Repeated Dose Toxicity			: Kidney: can cause kidney damage. : Liver: can cause liver damage. Central nervous system: repeated exposure affects the nervous system. Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss.
Mutagenicity			: Not mutagenic.
Carcinogenicity			: Limited evidence of carcinogenic effect.
Reproductive and Developmental Toxicity			: Causes slight foetotoxicity.

n-BUTYL ACETATE

Oral	LD ₅₀	(rat)	: 13,100 mg/kg
Dermal	LD ₅₀	(rabbit)	: >5,000 mg/kg
Inspired	LD ₅₀	(mouse)	: 1,230 mg/kg
Inhalation	LC ₅₀	(rat)	: 2,000 ppm/4 hours
Inhalation	TLCO	(human)	: Not Available (CNS recording changes, hallucinations)
Eyes		(rabbit)	: 20 - 100 mg - Moderate to severe irritant
Skin		(rabbit)	: 500 mg/24 hr - Mild to moderate irritant

TOLUENE

Oral	LD ₅₀	(rat)	: 5,000 mg/kg
Dermal	LD ₅₀	(rabbit)	: > 2,000 mg/kg
Dermal TCLO	LD ₅₀	(rabbit)	: 14,100 µL/kg
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		(rabbit)	: May cause moderate irritation.
Eye Irritation		(human)	: 400 ppm
Primary Dermal Irritation		(rabbit)	: Mild to moderate

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 - > 2,000 ppm for 2 hours - Moderately toxic
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.

11. TOXICOLOGICAL INFORMATION - continued

TOXICITY - continued

Iso-BUTANOL

Oral	LD ₅₀	(rat)	:	2,460	mg/kg - Moderately toxic.
Oral	LD ₅₀	(rabbit)	:	74.1	mg/kg
Dermal	LD ₅₀	(rabbit)	:	3,400	mg/kg
Inhalation	LC ₅₀	(rabbit)	:	2,630	mg/m ³ / 4 hours
Inhalation	LC ₅₀	(rat)	:	19,200	mg/m ³ / 4 hours
Inhalation	LCL ₀	(rat)	:	8,000	mg/m ³ / 4 hours
Skin		(rabbit)	:	500	mg / 24 hours - moderate irritant
Eyes		(rabbit)	:		Strong irritant with the danger of severe eye injury
Eyes	(Open)	(rabbit)	:	2	mg - severe irritant
Sensitization			:		No sensitizing effects known

					NTP Carcinogen
<u>Ingredient</u>	<u>Known</u>	<u>Anticipated</u>	<u>IARC Category</u>		
Isobutyl Alcohol (78-83-1)	No	No	None		

Iso-PROPYL ALCOHOL

Oral	LD ₅₀	(rat)	:	5,840	mg/kg
Inspired	LD ₅₀	(mouse)	:	933	mg/kg
Oral	LDLO	(rabbit)	:	5,000	mg/kg
Oral	LDLO	(human)	:	8,600	mg/kg
Dermal	LD ₅₀	(rabbit)	:	12,800	mg/kg
Inhalation	LC ₅₀	(rat)	:	16,000	ppm / 8 hours
Skin		(rabbit)	:	500	mg - mild irritant
Eyes		(rabbit)	:	100	mg - severe irritant

					NTP Carcinogen
<u>Ingredient</u>	<u>Known</u>	<u>Anticipated</u>	<u>IARC Category</u>		
Isopropyl Alcohol (67-63-0)	No	No	None		

NITROCELLULOSE

Oral	LD ₅₀	(rat)	:	>5,000	mg/kg
Dermal	LD ₅₀	(rabbit)	:		Not available
Inhalation	LC ₅₀	(mouse)	:		Not available

DI-OCTYL PHTHALATE

Oral	LD ₅₀	(rat)	:	> 30,000	mg/kg
Oral	LD ₅₀	(rabbit)	:	34,000	mg/kg
Oral	LD ₅₀	(mouse)	:	1,500	mg/kg
Oral Lowest Toxic Dose		(Human)	:	143	gm/kg (Gastrointestinal Effect)
Dermal	LD ₅₀	(rabbit)	:	25,000	mg/kg
Dermal	LD ₅₀	(rat)	:	4,000	mg/kg

There is sufficient experimental evidence to indicate that oral administration of Di-Octyl Phthalate to mice and rats causes liver damage and cancer.

Studies, however, in marmosets and human cells indicate that there is a fundamental difference in the metabolism of Di-Octyl Phthalate between rodents and primates, suggesting that low level exposure to humans is unlikely to produce the effects observed in rodents.

According to the classification criteria used by the International Agency for Research on Cancer (IACR), Di-Octyl Phthalate is a Group 2B agent (Group 2B – The agency is possibly carcinogenic to humans).

There is limited evidence that Di-n-Octyl Phthalate is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

11. TOXICOLOGICAL INFORMATION - continued

TOXICITY - continued

DENATURED ETHANOL

ETHYL ALCOHOL

Oral	LD ₅₀	(rat)	:	7,060 mg/kg
Oral	LD ₅₀	(mouse)	:	3,450 mg/kg
Oral	LD ₅₀	(human)	:	1,400 mg/kg
Inhalation	LC ₅₀	(rat)	:	38 mg / 10 hours
Inhalation	LC ₅₀	(rat)	:	20,000 ppm / 8 hours
Inhalation	LC ₅₀	(mouse)	:	39,000 ppm / 4 hours
Oral	LDL ₀	(human)	:	1,400 mg/kg
Oral	LDL ₀	(human child)	:	2,000 mg/kg
Dermal	LDL ₀	(rabbit)	:	20,000 mg/kg
Eye Irritation		(rabbit)	:	500 mg / 24 hours - Severe Irritant
Reproductive Toxicity			:	Ethanol has been linked to birth defects in humans
Carcinogenicity			:	Ethanol has been linked to cancer in humans. Chronic alcohol ingestion is associated with liver cancer. Most industrial ethanol contains denaturants that render it undesirable to drink.

Investigated as a tumorigen, mutagen, reproductive effector.

Health effects information is based on reported effects in use from overseas and Australian reports.

The denaturants used in this product may be one or more of the following: diethyl phthalate, denatonium benzoate, methyl isobutyl ketone (MIBK) or Methyl Violet.

The denaturants do not exceed 1.0% of the final product and at this low concentration do not alter the health and safety information for the product.

Ingredient	NTP Carcinogen		IARC Category
	Known	Anticipated	
Ethyl Alcohol (64-17-5)	No	No	None

1-METHOXY-2-PROPANOL ACETATE

Oral	LD ₅₀	(rat - female)	:	8,532 mg/kg
Oral	LD ₅₀	(rat - male)	:	> 10,000 mg/kg
Dermal	LD ₅₀	(rabbit)	:	> 5,000 mg/kg
Dermal	LD ₅₀	(rat)	:	> 5,000 mg/kg
Inhalation	LC ₅₀	(rat)	:	> 20 mg/L / 6 hours - Low toxicity
Inhalation	LC ₅₀	(rat)	:	> 4,345 ppm / 6 hours
				No adverse effects are anticipated from single exposure to vapor
Inhalation	LC ₅₀	(rat)	:	10,800 mg/m ³ / 3 hours
Inhalation	LC ₅₀	(mouse)	:	10,800 mg/m ³ / 3 hours
Dermal	LC50	(rabbit)	:	19,400 mg/kg
Skin			:	Not irritating to skin Prolonged/repeated contact may cause de-fatting of the skin which can lead to dermatitis
Eyes			:	Moderately irritating to eyes - Classified as irritant by the European Commission
Sensitization			:	Not a skin sensitizer
Repeated Dose Toxicity	:	Kidney	:	Caused kidney effects in male rats which are not considered relevant to humans
Mutagenicity			:	Not considered a mutagenic hazard.
Carcinogenicity			:	Not expected to be carcinogenic.
Reproductive and Developmental Toxicity			:	Not expected to impair fertility. Not a developmental toxicant.

TITANIUM DIOXIDE

Oral	LD ₅₀	(rat)	:	> 10,000 mg/kg
Dermal	LD ₅₀	(rabbit)	:	> 10,000 mg/kg
Inhalation	LC ₅₀	(rat)	:	> 6.8 mg/L / 4 hours - Low toxicity



11. TOXICOLOGICAL INFORMATION - continued

TOXICITY - continued

METHYL ISO-BUTYL KETONE

Oral	LD ₅₀	(rat)	: 2,080 mg/kg (20% methyl isobutyl ketone dissolved in Tergitol 7 surfactant)
Oral	LD ₅₀	(rat)	: 5.7 mL/kg (≈ 4570 mg/kg) (undiluted Methyl IsoButyl Ketone)
Oral	LD ₅₀	(mouse)	: 1,900 mg/kg / 24 hour
Inhalation	LC ₅₀	(rat)	: 2,000 ppm / 4 hours - Moderately toxic.
Inhalation	LC ₅₀	(mouse)	: 23,300 mg/kg
Inhalation	LCLO	(rat)	: 4,000 ppm / 15 minutes.
Inhalation	TCLO	(human)	: 200 ppm - Irritant (CNS recording changes, hallucinations)
Dermal	LD ₅₀	(rabbit)	: >3,000 mg/kg
Considered to be no more than slightly toxic based on single dose level testing at 3 g/kg.			
Eyes		(rabbit)	: 40 mg - Severe Irritant
Eyes		(human)	: 200 ppm / 15 minutes - Irritating
Skin		(rabbit)	: 500 mg / 24 hours - Mild Irritant

High vapor concentrations are irritating to the respiratory tract may cause nausea, vomiting, headache, dizziness anaesthetic and may have other central nervous system effects.

Workers near a centrifuge were exposed to 500 ppm of methyl isobutyl ketone for 20 - 30 minutes per day.

They complained of weakness, loss of appetite, headache, burning eyes, nausea, vomiting and sore throats

A 90 day continuous exposure experiment involving rats at 100 ppm of methyl isobutyl ketone resulted in kidney damage.

Mutagenicity studied with similar materials in the Ames test, mouse lymphoma, rat bone marrow cytogenetics and dominant lethal assays showed no adverse effects.

In mutagenicity assays, requested by and submitted to EPA under Section 4 of the Toxic Substances Control Act (TSCA), Methyl Iso-Butyl Ketone tested positive in the mouse lymphoma and cell transformation assays.

Results were suggestive but equivocal for unscheduled DNA synthesis.

GENETIC TOXICOLOGY

L51784 mouse lymphoma cell test	: Negative Ames test.
In vivo cytogenetics assay	: Negative.
Unscheduled DNA synthesis in rat hepatocytes	: Negative

SUBCHRONIC TOXICOLOGY

Rats exposed to 1,000 ppm 6 hours/day, 5 days/week for 90 days developed only increased liver weight.

SPECIAL PROPERTIES / EFFECTS

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

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 and can adversely affect the nervous system.

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

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

Direct, prolonged contact with liquid product irritates the skin. The liquid also irritates the eyes.

Human health effects associated with breathing or otherwise consuming smaller amounts of the product over long periods of time are not known.

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").

12. ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION

The product is a clear 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 :

XYLENES

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at Exposure Standards (ES or TLV)

Determinant	Index	Sampling Time	Comment
Methyl hippuric acid	1.5 gm/gm	End of shift	Acids in urine
creatinine	2.0 mg/min	Last 4 hours of shift	

BIOLOGICAL EFFECTS

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

: LC₅₀: 14 mg/l /96 hour (Onchorhynchus mykiss)
 : LC₅₀: 86 mg/l /48 hour (Leuciscus idus)
 : 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 hr TL_M @ 24.0 °C (algae) : 320 ppm
 48 hr TL_M @ 24.0 °C (daphnia) : 44 ppm
 96 hr LC₅₀ (bluegill sunfish) : 100 ppm

ETHYL BENZENE

ACUTE TOXICITY

Fish : Toxic : 1 < LC/EC/IC₅₀ <= 10 mg/l
 Aquatic Invertebrates : Toxic : 1 < LC/EC/IC₅₀ <= 10 mg/l
 Algae : Toxic : 1 < LC/EC/IC₅₀ <= 10 mg/l
 Micro-organisms : Expected to be harmful : 10 < LC/EC/IC₅₀ <= 100 mg/l

Environment Protection : Do not allow to enter waters, waste water, or soil.
 : If product enters soil, it will be highly mobile and may contaminate groundwater.

Bioaccumulation : Not expected to bio-accumulate significantly.
 Persistence/Degradability : Readily biodegradable.
 Mobility / Distribution : Floats on water. Oxidises rapidly by photo-chemical reactions in air.
 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 : Not available

12. ECOLOGICAL INFORMATION - continued**Di-OCTYL PHTHALATE****ECOTOXICITY IN WATER**

Fish	LC ₅₀	:	0.7 mg/L / 96 hours	(lepomis macrochirus)
	LC ₅₀	:	> 100 mg/L / 96 hours	(trout)
Algae	EC ₅₀	:	130 mg/L	(scenedesmus subspicatus)
Algae	EC ₅₀	:	100 mg/L	(gymnodium breve)
Oil / Water Partition Coefficient		:	log(oil/water) : 7.6 - The product is more soluble in oil	

WATER POLLUTION FACTORS : Not available

Bioaccumulation	:	although DOP should bio-concentrate, it is rapidly metabolised and cannot bio-accumulate
Biodegradation	:	this product degrades readily and rapidly in the presence of oxygen; bio-degradation rates as rapid as complete degradation in 12 days to 13 weeks depending on test methods
Products of Biodegradation	:	Possibly hazardous short term degradation products are not likely.
Toxicity of the Products of Biodegradation	:	The product itself and its products of degradation are not toxic.
Abiotic Degradation	:	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 18 hours
Mobility in soil, water	:	this product is water insoluble & adsorbs strongly to soil particles - it is immobile in soil & water

NITROCELLULOSE

Ecological characteristics measured of water damped nitrocellulose are :

Acute fish toxicity	LC ₅₀	:	> 10,000 mg/l	(96 hours) Brachydanio rerio (Zebra barbel)
Acute bacterial toxicity	EC ₅₀	:	> 10,000 mg/l	(OECD Guideline for Testing of Chemicals, No. 209)

Ecological characteristics measured of alcohol damped nitrocellulose are

Acute fish toxicity	LC ₅₀	:	No data available	
Acute fish toxicity	LC ₀	:	>1,000 mg/l	
Acute fish toxicity	LC ₁₀₀	:	9,000 mg/l	
Acute bacterial toxicity	EC ₅₀	:	>1,000 mg/l	
Acute bacterial toxicity	EC ₁₀₀	:	7,800 mg/l	
Bioaccumulation	Log POW	:	< 0 - not lipophile, no bioaccumulation potential.	
Degradability		:	94.0%	
Degradability	28 days	:	100% on 10 mg/l, OECD 301 B	

WATER POLLUTION FACTORS

ThOD	:	Not available
COD	:	463 mg/g (DIN 38409 - H 43)
BOD ₅	:	0 mg O ₂ /l at 20 mg/l, DIN 38409 - H 51

Iso-BUTANOL**ACUTE TOXICITY**

Fish	LC ₅₀	:	1,430 mg / L / 96 hours	(Pimephales promelas)
Fish	LC ₅₀	:	754 mg / L / 96 hours	(Ecosar)
Aquatic Invertebrates	EC ₅₀	:	1,300 mg / L / 48 hours	(Daphnia magna Straus)
Aquatic Invertebrates	EC ₅₀	:	1,100 mg / L / 48 hours	(Daphnia Pulex)
Aquatic Invertebrates	EC ₅₀	:	1,200 mg / L / 48 hours	(Ceriodaphnia reticulata)
Green algae	EC ₅₀	:	433 mg / L / 96 hours	
Oil / Water Partition Coefficient, P		:	log P (oct) < 3.0	

ENVIRONMENTAL FATE

When released into the soil & water, this material is expected to readily biodegrade.

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

This material is not expected to significantly bioaccumulate.

When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

ENVIRONMENTAL TOXICITYThis material is not expected to be toxic to aquatic life. The LC₅₀/96-hour values for fish are over 100 mg/l.

12. ECOLOGICAL INFORMATION - continued

TOLUENE

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at Exposure Standards (ES or TLV)

Determinant	Index	Sampling Time	Comment
1. Hippuric acid in urine	2.5 gm/gm creatinine	End of shift Last 4 hours of shift	B, NS
2. Toluene in venous blood	1 mg/L	End of shift	SQ
3. Toluene in end-exhaled air		End of shift	SQ

NS : Non-specific determinant; also observed after exposure to other material.
 SQ : Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.
 B : Background levels occur in specimens collected from subjects NOT exposed.

BIOLOGICAL EFFECTS

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 bioaccumulate 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
 BOD₅ : Not Available
 BOD₂₀ : 0.1 mg/L affects the self purification of surface waters.

ACUTE TOXICITY

Freshwater toxic concentrations
 Acute Toxicity - Fish : 61 ppm / 1 hour (sunfish) / 44 ppm / 96 hours (sunfish)
 Acute fish toxicity LC₅₀ : 17,000 µg/L / 96 hours (bluegill)
 Acute fish toxicity EC₅₀ : 31,000 µg/L / 24 hours (Daphnia Magna)
 Toxic : 1 < LC₅₀/EC₅₀/IC₅₀ : ≤ 10 mg/l
 Aquatic Invertebrates : Harmful : 10 < LC₅₀/EC₅₀/IC₅₀ ≤ 100 mg/l
 Algae : Low toxicity : LC₅₀/EC₅₀/IC₅₀ > 100 mg/l

TOXICITY THRESHOLD (cell multiplication inhibition tests)

Freshwater toxicity
 96 hours TL_M (fathead minnow): 24 ppm
 Saltwater Toxicity
 24 hr TL_M (brine shrimp) : 33 ppm

TITANIUM DIOXIDE

Aquatic Toxicity
 Fish LC₅₀ : >1,000 mg/L / 48 hour (leuciscus idus)
 Mobility : There is no evidence of mobility (solid particles)
 Persistence And Degradability : Is persistent and does not bio-degrade
 Bioaccumulation : Does not bio-accumulate significantly

12. ECOLOGICAL INFORMATION - continued**ECOLOGICAL INFORMATION - continued****1-METHOXY-2-PROPANOL ACETATE****ACUTE TOXICITY****Invertebrates (Immobilization) (static open system)**

Water flea	EC ₅₀	:	407mg/L / 24 hours / 373mg/L / 48 hours	(Daphnia magna)
Water flea	LC ₅₀	:	408 - 500 mg/L	(Daphnia magna)
Green alga	EC ₅₀	:	>1,000 mg/L / 0 - 72 hours	(Selenastrum capricornutum)
Acute fish toxicity	LC ₅₀	:	17,000 µg/L / 96 hours	(bluegill)
	LC ₅₀	:	100 - 180 mg/l	(rainbow trout) (Oncorhynchus mykiss)

Material is not classified as dangerous to aquatic organisms (LC₅₀/EC₅₀/IC₅₀/LL₅₀/EL₅₀ > 100 mg/L in most sensitive species).

Fish	:	Low toxicity	:	LC/EC/IC ₅₀ > 100 mg/l
Aquatic Invertebrates	:	Low toxicity	:	LC/EC/IC ₅₀ > 100 mg/l
Algae	:	Low toxicity	:	LC/EC/IC ₅₀ > 1000 mg/l
Microorganisms	:	Low toxicity	:	LC/EC/IC ₅₀ > 1000 mg/l

Mobility : If product enters soil, it will be highly mobile and may contaminate groundwater
Dissolves in water.

Persistence/degradability : Inherently bio-degradable. Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulation : Not expected to bio-accumulate significantly.

Products of Biodegradation : Possibly hazardous short term degradation products are not likely.

Toxicity of the Products of Bio-degradation : The product itself and its products of degradation are not toxic

Partition coefficient, n-octanol/water : 0.56 Measured (log Pow)

WATER POLLUTION FACTORS

ThOD	:	Not Available
COD	:	1.74 mg O ₂ /g
BOD ₅	:	0.36 mg O ₂ /L

Iso-PROPYL ALCOHOL

ACUTE TOXICITY - This material is not expected to be toxic to aquatic life

Fish	LC ₅₀	:	> 100 mg / L / 96 hours
Aquatic Invertebrates	EC ₅₀	:	Not Available
Aquatic Invertebrates	EC ₅₀	:	Not Available
Aquatic Invertebrates	EC ₅₀	:	Not Available
Green algae	EC ₅₀	:	Not Available

WATER POLLUTION FACTORS

ThOD	:	Not available
COD	:	Not available
BOD ₅	:	Not available
BOD ₂₀	:	Not available

Bioaccumulation : Not expected to bio-accumulate significantly.

Persistence & Degradability : Moderately bio-degradable.

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

When released into the soil, this material may leach into groundwater.

When released into the air & water, this material is expected to have a half-life between 1 and 10 days.

When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

12. ECOLOGICAL INFORMATION - continued**ECOLOGICAL INFORMATION - continued****DENATURED ETHANOL****AQUATIC TOXICITY**

Crustacean		: No effect at 10 g/L, 48 hour	(Daphnia)
Fish	LC ₅₀	: 8,000 mg/L / 48 hour	(trout)
Toxicity to fish (acute)	LC ₅₀	: >1000 mg/L / 48 hour	(Golden ide)
	EC ₅₀	: >1000 mg/L / 24 hour	(Daphnia magna)

WATER POLLUTION FACTORS

ThOD		: 1.5 mg/L O ₂	
COD		: Not available	
BOD ₅		: 76 % O ₂ of ThOD	
BOD ₂₀		: Not available	
Bioaccumulation		: Not expected to bio-accumulate significantly.	
Persistence And Degradability		: (Ethanol) : Degree of elimination : 94 % - Inherently bio-degradable.	

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

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 & water, this material is expected to quickly evaporate.

METHYL ISO-BUTYL KETONE**ACUTE TOXICITY**

Fish	LC ₅₀	: 675 - 750 mg/L / 48 hour	(Golden Orfe)
Fish	LC ₅₀	: 460 mg/L / 24 hour	(Carassius auratus - Gold fish)
Fish	LC ₅₀	: 505 - 540 mg/L / 96 hour	(Pimephales promelas - fathead minnow)
Fish	LC ₅₀	: 600 mg/L / 96 hour	(Onchorhynchus mykiss)

OTHER ORGANISMS

LC ₅₀	: 4,280 mg/L / 24 hour	(Daphnia magna - water flea)
LC ₅₀	: 1,230 mg/L / 24 hour	(Artemia salina - brine shrimp)
EC ₅	: 275 mg/L / 16 hour	(Pseudomonas putida)
EC ₅₀	: 980 mg/L / 48 hour	(Scenedesmus subspicatus)
EC ₁₀₀	: 170 mg/L / 48 hour	(Daphnia magna - water flea)
IC ₅	: 725 mg/L / 7 day	(Scenedesmus quadricauda)

WATER POLLUTION FACTORS

ThOD	: 2.72 g/g	
COD (measured)	: 2.46 g O ₂ / g	Expected to be low due to the low value of the octanol-water coefficient
BOD	: 2.06 g O ₂ / g	
BOD ₅ (5 days)	: 79 % from ThOD (using sludge from a waste treatment plant).	
BOD ₂₀ (20 days)	: Not Available	

ECOTOXICITY : Ecological problems are NOT to be expected when the product is handled and used with due care and attention.

This material is practically non-toxic to aquatic organisms.

ENVIRONMENT PROTECTION : Do not allow to enter waters, waste water, or soil.

BIO-ACCUMULATIVE POTENTIAL : The non-acclimated extent of bio-oxidation was 69% after 20 days, in fresh water.

BIOLOGIC DEGRADATION : Biodegradable when oxygen present.
99 % / 7 days. Readily biodegradable.

No appreciable bioaccumulation potential is to be expected (log P(o/w) 1-3)

OCTANOL-WATER CO-EFFICIENT : log Pow = 1.38

OIL / WATER PARTITION COEFFICIENT, P : Not Available

MOBILITY / DISTRIBUTION : log P(o/w) : 1.31 (experimental).

12. ECOLOGICAL INFORMATION - continued**ECOLOGICAL INFORMATION - continued****METHYL ETHYL KETONE**

Oral	LD ₅₀	(rat)	: 2,737 mg/kg - Moderately toxic.
Oral	LD ₅₀	(mouse)	: 4,050 mg/kg
Dermal	LD ₅₀	Range (rabbit)	: 5,000 - 13,000 mg/kg - Practically non-toxic.
Intraperitoneal	LD ₅₀	(rat)	: 607 mg/kg
Inhalation	LC ₅₀	(rabbit)	: 13,000 mg/kg
Inhalation	LC ₅₀	(rat)	: 23,500 mg/m ³ / 8 hour - > 2,000 ppm for 2 hours - Moderately toxic.
Inhalation	LC ₅₀	(mouse)	: 402 mg/m ³ / 4 hour
Inhalation		(human)	: Irritating to nose and throat, will cause nausea, vomiting, headache, dizziness.
Skin		(rabbit)	: 500 mg/24H - 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)	: 350 ppm - 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.

12. ECOLOGICAL INFORMATION - continued**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 has high acute toxicity to aquatic life and causes injury to various agricultural and ornamental crops. Since comparative data on the toxicity of the several forms are limited and inconclusive, all forms are considered equal in toxicity for purposes of these ecological fact sheets. Components in this product have high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of this product to land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behaviour. Chronic effects can be seen long after first exposure(s) to a toxic chemical. This product has high chronic toxicity to aquatic life. Xylene has high chronic toxicity to aquatic life. n-Butanol has slight acute toxicity to aquatic life and birds. Insufficient data are available to evaluate or predict the long-term effects of n-Butyl Alcohol to plants, birds, or land animals.

WATER SOLUBILITY

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

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Xylene is non-persistent in water, with a half-life of less than 2 days.
n-Butyl Alcohol is slightly persistent in water, with a half-life of between 2 to 20 days.
Toluene is non-persistent in water, with a half-life less than 2 days.
Methyl Ethyl Ketone 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.

About 99.3% of Xylene will eventually end up in water; about 0.5% will end up in water; about 0.1%, respectively will end up in terrestrial soils and in aquatic sediments.

About 76.5% of n-Butyl Alcohol will eventually end up in water; the rest will end up in the air.

About 99.5% of Toluene will eventually end up in air; the rest will end up in the water.

About 60% of Methyl Ethyl Ketone will eventually end up in air; the rest will end up in the water.

BIOACCUMULATION IN AQUATIC ORGANISMS

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

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

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



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Date of Issue : 25/11/10

MATERIAL SAFETY DATA SHEET
BC512 PRE-CAT SEALER / UNDERCOAT

Page 33 of 37
Ref msds 00042

13. DISPOSAL CONSIDERATIONS

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

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

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

Contact your state Environmental Program for specific recommendations.

Refer to State Land Waste Management Authority for specific recommendations.

Advise of flammable/chemical nature.

Recycle product where possible.

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

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

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

Do NOT re-use empty containers without commercial cleaning or reconditioning.

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.

STORAGE AND TRANSPORT

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

SHIPPING NAME	: Paint related material	PACKAGING GROUP	: II
UN No	: 1263	ICAO / IATA-DGR	: 3 1263 II
CLASS	: 3.1 (highly flammable liquid)		
AS 1940 Class	: PG II		
SUBSIDIARY RISK	: NOT ASSIGNED	HAZCHEM CODE	: •3YE
IMO HAZARD CLASS	: INFLAMMABLE LIQUID/3.1	EPG	: 3A2
DECLARATION FOR LAND SHIPMENT	: 1263, Paint related material		
DECLARATION FOR SEA SHIPMENT	: Paint related material		
DECLARATION FOR SHIPMENT BY AIR	: Paint related material		
STORAGE TEMPERATURE	(°C) : Ambient		
TRANSPORT TEMPERATURE	(°C) : Ambient		
LOADING / UNLOADING TEMPERATURE	(°C) : Ambient		
STORAGE / TRANSPORTATION PRESSURE (kPa)	: Atmospheric		
ELECTROSTATIC ACCUMULATION HAZARD ?	: Yes, use proper grounding procedure.		
USUAL SHIPPING CONTAINERS	: Drums, pails.		
MATERIALS AND COATINGS SUITABLE	: Carbon Steel / Stainless Steel.		
MATERIALS AND COATINGS UNSUITABLE	: Natural Rubber / Butyl Rubber / E P D M / Polystyrene / Polyethylene / Polypropylene / Polyvinyl chloride / Polyvinyl alcohol / Polyacrylonitrile		

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

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

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

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

15. REGULATORY INFORMATION**CLASSIFICATION AND LABELLING ACCORDING TO NOHSC CODES****CLASSIFICATION / SYMBOL** : FLAMABLE / 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.

This chemical is a FLAMMABLE LIQUID and a FIRE HAZARD.

SYMBOLS

Xi	Irritant
Xn	Harmful
N	Dangerous for the environment

RISK PHRASES

R11	Highly flammable.
R18	In use, may form flammable/explosive vapor-air mixture.
R20/2122	Harmful by inhalation, in contact with skin and if swallowed.
R33	Danger of cumulative effects.
R36/37/38	Irritating to eyes, respiratory system and skin.
R42/43	May cause sensitisation by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R51/53	Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.
R63	Possible risk of harm to the unborn child.
R65	May cause lung damage if swallowed.
R67	Vapors may cause drowsiness and dizziness.

SAFETY ADVICE

S2	Keep out of the 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 fumes/vapour/spray
S24/25	Avoid contact with skin and eyes.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S36/37/39	Wear suitable protective clothing (coveralls, safety boots), chemical resistant 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.
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release into the environment.
S62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

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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Date of Issue : 25/11/10

MATERIAL SAFETY DATA SHEET
BC512 PRE-CAT SEALER / UNDERCOAT

Page 37 of 37
Ref msds 00042

16. OTHER INFORMATION

DATE OF PREPARATION / LAST REVISION : 25/11/10

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)