

# Hychem E100 Hardener

Chemwatch Material Safety Data Sheet

Issue Date: 25-Jan-2013

A317LP

Hazard Alert Code: HIGH

CHEMWATCH 6558-70

Version No:4.1.1.1

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## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

Hychem E100 Hardener

### PROPER SHIPPING NAME

CORROSIVE LIQUID, FLAMMABLE, N.O.S.(contains p-tert-butylphenol trimethylhexamethylene diamine benzene-1,3-dimethanamine nonylphenol 2,4,6-tris[(dimethylamino)methyl]phenol)

### PRODUCT USE

Epoxy resin hardener.

### SUPPLIER

Company: Hychem International Pty Ltd

Address:

Unit 1, 30 Bluett Drive

Smeaton Grange

NSW, 2567

Australia

Telephone: +61 2 4646 1660

Emergency Tel:1800 039 008

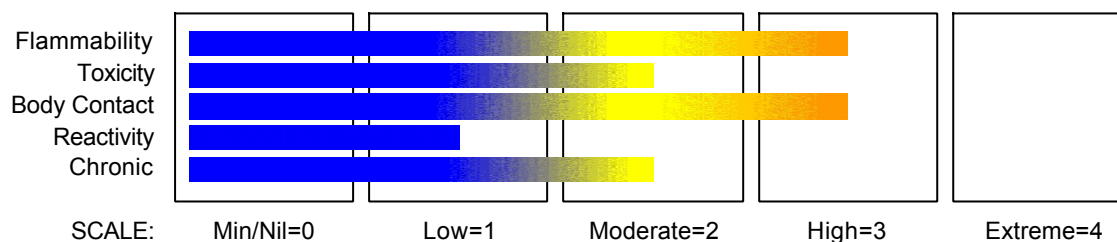
Fax: +61 2 4647 3700

## Section 2 - HAZARDS IDENTIFICATION

### STATEMENT OF HAZARDOUS NATURE

**HAZARDOUS SUBSTANCE. DANGEROUS GOODS.** According to the Criteria of NOHSC, and the ADG Code.

### CHEMWATCH HAZARD RATINGS



### RISK

- Flammable.
- Causes burns.

### SAFETY

- Keep locked up.
- Do not breathe gas/fumes/vapour/spray.

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## Section 2 - HAZARDS IDENTIFICATION

- Risk of serious damage to eyes.
- May cause SENSITISATION by inhalation and skin contact.
- Harmful to aquatic organisms, may cause long- term adverse effects in the aquatic environment.
- Possible risk of impaired fertility.
- Possible risk of harm to the unborn child.
- Vapours may cause drowsiness and dizziness.
- Inhalation, skin contact and/or ingestion may produce health damage\*.
- Cumulative effects may result following exposure\*.
- Limited evidence of a carcinogenic effect\*.
- \* (limited evidence).
- Avoid contact with skin.
- Avoid contact with eyes.
- Wear suitable protective clothing.
- Wear suitable gloves.
- Wear eye/face protection.
- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- Avoid exposure - obtain special instructions before use.
- To clean the floor and all objects contaminated by this material, use water and detergent.
- Keep container tightly closed.
- Take off immediately all contaminated clothing.
- In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
- In case of accident or if you feel unwell IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
- This material and its container must be disposed of as hazardous waste.
- In case of accident by inhalation: remove casualty to fresh air and keep at rest.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
alcohol, denatured	64-17-5	30-60
p- tert- butylphenol	98-54-4	10-30
trimethylhexamethylene diamine	25620-58-0	<10
benzene- 1, 3- dimethanamine	1477-55-0	<10
nonylphenol	25154-52-3	<10
2, 4, 6- tris[(dimethylamino)methyl]phenol	90-72-2	<10
pine oil	8002-09-3	<10

## Section 4 - FIRST AID MEASURES

### SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

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## Section 4 - FIRST AID MEASURES

- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

### EYE

- If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

### SKIN

- If skin contact occurs:
  - Immediately remove all contaminated clothing, including footwear.
  - Flush skin and hair with running water (and soap if available).
  - Seek medical attention in event of irritation.

### INHALED

- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

This must definitely be left to a doctor or person authorised by him/her.  
(ICSC13719).

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

### NOTES TO PHYSICIAN

For acute or short-term repeated exposures to highly alkaline materials:

- Respiratory stress is uncommon but present occasionally because of soft tissue edema.
- Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
- Oxygen is given as indicated.
- The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
- Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.

Alkalis continue to cause damage after exposure.

#### INGESTION:

- Milk and water are the preferred diluents
- No more than 2 glasses of water should be given to an adult.
- Neutralising agents should never be given since exothermic heat reaction may compound injury.

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## Section 4 - FIRST AID MEASURES

- \* Catharsis and emesis are absolutely contra-indicated.
  - \* Activated charcoal does not absorb alkali.
  - \* Gastric lavage should not be used.
- Supportive care involves the following:
- Withhold oral feedings initially.
  - If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
  - Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
  - Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).
- SKIN AND EYE:
- Injury should be irrigated for 20-30 minutes.
- Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology].

## Section 5 - FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

- Alcohol stable foam.
- Dry chemical powder.
- Carbon dioxide.
- Water spray or fog - Large fires only.

### FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 1000 metres in all directions.

### FIRE/EXPLOSION HAZARD

- Liquid and vapour are flammable.
  - Moderate fire hazard when exposed to heat or flame.
  - Vapour forms an explosive mixture with air.
  - Moderate explosion hazard when exposed to heat or flame.
  - Vapour may travel a considerable distance to source of ignition.
  - Heating may cause expansion or decomposition leading to violent rupture of containers.
  - On combustion, may emit toxic fumes of carbon monoxide (CO).
- Combustion products include: carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.

### FIRE INCOMPATIBILITY

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

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Section 5 - FIRE FIGHTING MEASURES

## HAZCHEM

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## Section 6 - ACCIDENTAL RELEASE MEASURES

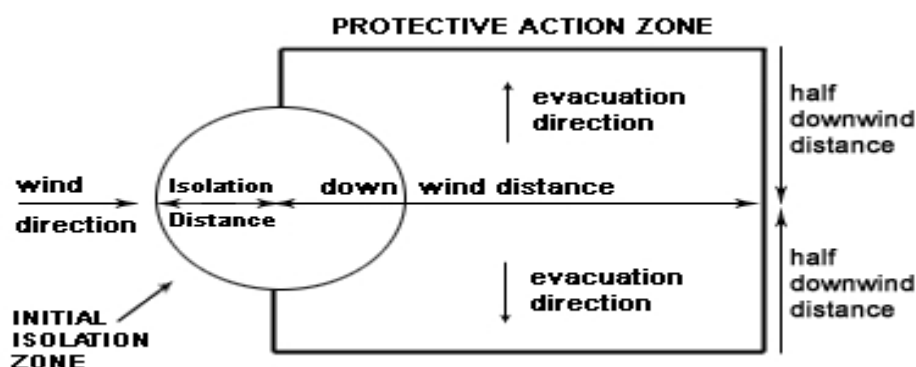
### MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

### MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

### PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

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## Section 6 - ACCIDENTAL RELEASE MEASURES

Isolation Distance	50 metres
Downwind Protection Distance	300 metres
IERG Number	18

### FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".

LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 132 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

### EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

alcohol, denatured      NA†

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

alcohol, denatured      3300 ppm

other than mild, transient adverse effects without perceiving a clearly defined odour is:

alcohol, denatured      1800 ppm\*

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

**Personal Protective Equipment advice is contained in Section 8 of the MSDS.**

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## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid generation of static electricity.
- DO NOT use plastic buckets.
- Earth all lines and equipment.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

### SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.

### STORAGE INCOMPATIBILITY

- Reacts with aluminium / zinc producing flammable, explosive hydrogen gas.
- Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.
- Avoid reaction with oxidising agents.

### STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.
- Store away from incompatible materials in a cool, dry well ventilated area.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.

### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+



+



+



+



X



+

+: May be stored together

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Section 7 - HANDLING AND STORAGE

O: May be stored together with specific preventions

X: Must not be stored together

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC	Notes
Australia Exposure Standards	alcohol, denatured (Ethyl alcohol)	1000	1880						
Australia Exposure Standards	benzene- 1, 3- dimethanamine (m- Xylene- a, a' - diamine)						0.1		

The following materials had no OELs on our records

- p- tert- butylphenol: CAS:98- 54- 4
- trimethylhexamethylene diamine: CAS:25620- 58- 0 CAS:25513- 64- 8
- nonylphenol: CAS:25154- 52- 3 CAS:84852- 15- 3 CAS:139- 84- 4  
CAS:136- 83- 4
- 2, 4, 6- tris[(dimethylamino)methyl]phenol: CAS:90- 72- 2
- pine oil: CAS:8002- 09- 3

### EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m <sup>3</sup> )	Revised IDLH Value (ppm)
alcohol, denatured	5909	3,300 [LEL]

### NOTES

Values marked LEL indicate that the IDLH was based on 10% of the lower explosive limit for safety considerations even though the relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations.

### MATERIAL DATA

ALCOHOL, DENATURED:

NONYLPHENOL:

P-TERT-BUTYLPHENOL:

TRIMETHYLHEXAMETHYLENE DIAMINE:

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

### HYCHEM E100 HARDENER:

Not available

### ALCOHOL, DENATURED:

For ethanol:

Odour Threshold Value: 49-716 ppm (detection), 101 ppm (recognition)

Eye and respiratory tract irritation do not appear to occur at exposure levels of less than 5000 ppm and the TLV-TWA is thought to provide an adequate margin of safety against such effects. Experiments in man show that inhalation of 1000 ppm caused slight symptoms of poisoning and 5000 ppm caused strong stupor and morbid sleepiness. Subjects exposed to 5000 ppm to 10000 ppm experienced smarting of the eyes and nose and coughing. Symptoms disappeared within minutes. Inhalation also causes local irritating effects to the eyes and upper respiratory tract, headaches, sensation of heat intraocular tension, stupor, fatigue and a need to sleep. At 15000 ppm there was continuous lachrymation and coughing.

### P-TERT-BUTYLPHENOL:

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

These substances are intravenous anaesthetic agents. They have a very low level of acute toxicity; they may cause skin irritation. Repeated exposure may irritate the stomach. There is no evidence of this group of substances causing mutation or adverse effects on reproduction. However, at high doses, there may be reduction of newborn weight and reduced survival in early lactation period.

MAK Category II Peak Limitation: For substances with systemic effects and with a half-life in humans ranging from two hours to shift-length.

Allows excursions of 5 times the MAK value, for 30 minutes (on average), twice per shift.

MAK values, and categories and groups are those recommended within the Federal Republic of Germany.

MAK value: 0.08 ppm, 0.08 mg/m<sup>3</sup>

### BENZENE-1,3-DIMETHANAMINE:

For benzene-1,3-dimethanamine (m-xylene-alpha,alpha'-diamine)

Saturates in air at 219.5 mg/m<sup>3</sup> (39.5 ppm) at 25 deg C.

The substance is a gastrointestinal irritant and skin sensitiser in humans. Its actions are similar to p-phenylenediamine and the recommendation for a TLV-C is derived by analogy. Exposure at or below this value is thought to protect workers against the risk of skin irritation, percutaneous absorption and systemic injury. It should be noted however that individuals might be hypersusceptible or otherwise unusually responsive to the certain chemicals and this value may not be adequate to provide effective protection against adverse health effects.

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The skin notation is currently undergoing review.

The TLV value is listed only in mg/m<sup>3</sup> although it is anticipated that at this concentration the compound should exist largely as vapour.

### 2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

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.

CEL TWA: 5 ppm, 54 mg/m<sup>3</sup> SKIN

[Rohm & Haas]

### PINE OIL:

for camphor

Odour Threshold Value: 0.079 ppm (detection)

The TLV-TWA is thought to be protective against physical irritation of the eyes and nose and anosmia (loss of smell) which occurred in workers at concentrations above 2 ppm. Anosmia may occur in concentrations ranging from 35-194 mg/m<sup>3</sup>. In addition the limit is thought to be sufficiently low to prevent irritation of the central nervous system (which produces nausea, vomiting, excitement and confusion).

Odour Safety Factor(OSF)

OSF=7.4 (CAMPBOR).

for d-Limonene:

CEL TWA: 30 ppm, 165.6 mg/m<sup>3</sup> (compare WEEL-TWA\*)

(CEL = Chemwatch Exposure Limit)

A Workplace Environmental Exposure Level\* has been established by AIHA (American Industrial Hygiene Association) who have produced the following rationale:

d-Limonene is not acutely toxic. In its pure form it is not a sensitiser but is irritating to the skin.

Although there is clear evidence of carcinogenicity in male rats, the effect has been attributed to an alpha-2u-globin (a2u-G) renal toxicity which is both species and gender specific. Humans do not synthesise a2u-G, and metabolism studies indicate that 75% to 95% of d-limonene is excreted in 2-3 days with different metabolites identified between humans and rats. In a 2-year study, liver effects were noted in male mice at 500 mg/kg and reduced survival was noted in female rats at 600 mg/kg. The no observable effect levels (NOELs) were 250 and 300 mg/kg, respectively. A WEEL of 30 ppm is recommended to protect against these effects.

## PERSONAL PROTECTION



## EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers

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have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent].

### HANDS/FEET

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

#### NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

### OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

### RESPIRATOR

- Type AK-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

### ENGINEERING CONTROLS

■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Refer also to protective measures for the other component used with the product. Read both MSDS before using; store and attach MSDS together.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE

Pale, flammable liquid; partly soluble in water.

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## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Liquid.

Corrosive.

Alkaline.

State	Liquid	Molecular Weight	Not Applicable
Melting Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	70 approx	Solubility in water (g/L)	Partly Miscible
Flash Point (°C)	<60	pH (1% solution)	Not Available
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not Available
Autoignition Temp (°C)	Not Available	Vapour Pressure (kPa)	6 @ 20 deg C
Upper Explosive Limit (%)	15	Specific Gravity (water=1)	Not Available
Lower Explosive Limit (%)	3.5	Relative Vapour Density (air=1)	>1
Volatile Component (%vol)	>30	Evaporation Rate	Not Available

## Section 10 - STABILITY AND REACTIVITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

*For incompatible materials - refer to Section 7 - Handling and Storage.*

## Section 11 - TOXICOLOGICAL INFORMATION

### POTENTIAL HEALTH EFFECTS

#### ACUTE HEALTH EFFECTS

##### SWALLOWED

- Accidental ingestion of the material may be damaging to the health of the individual.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Ingestion of amine epoxy-curing agents (hardeners) may cause severe abdominal pain, nausea, vomiting or diarrhoea. The vomitus may contain blood and mucous. If death does not occur within 24 hours there may be an improvement in the patients condition for 2-4 days only to be followed by the sudden onset of abdominal pain, boardlike abdominal rigidity or hypo-tension; this indicates that delayed gastric or oesophageal corrosive damage has occurred.

##### EYE

- The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

Vapours of volatile amines irritate the eyes, causing excessive secretion of tears, inflammation of the conjunctiva and slight swelling of the cornea, resulting in "halos" around lights. This effect is temporary, lasting only for a few hours. However this condition can reduce the efficiency of undertaking skilled tasks, such as driving a car. Direct eye contact with liquid volatile amines may produce eye damage, permanent for the lighter species.

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## Section 11 - TOXICOLOGICAL INFORMATION

### SKIN

■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

Volatile amine vapours produce irritation and inflammation of the skin. Direct contact can cause burns. They may be absorbed through the skin and cause similar effects to swallowing, leading to death. The skin may exhibit whiteness, redness and wheals.

The material may accentuate any pre-existing dermatitis condition.

### INHALED

■ Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

Inhalation of epoxy resin amine hardeners (including polyamines and amine adducts) may produce bronchospasm and coughing episodes lasting several days after cessation of the exposure. Even faint traces of these vapours may trigger an intense reaction in individuals showing "amine asthma". The literature records several instances of systemic intoxications following the use of amines in epoxy resin systems.

### CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.

### TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

BENZENE-1,3-DIMETHANAMINE:

PINE OIL:

TRIMETHYLHEXAMETHYLENE DIAMINE:

■ The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

TRIMETHYLHEXAMETHYLENE DIAMINE:

BENZENE-1,3-DIMETHANAMINE:

NONYLPHENOL:

2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

PINE OIL:

P-TERT-BUTYLPHENOL:

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur

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following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

NONYLPHENOL:

2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

PINE OIL:

BENZENE-1,3-DIMETHANAMINE:

■ The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

TRIMETHYLHEXAMETHYLENE DIAMINE:

■ While it is difficult to generalise about the full range of potential health effects posed by exposure to the many different amine compounds, characterised by those used in the manufacture of polyurethane and polyisocyanurate foams, it is agreed that overexposure to the majority of these materials may cause adverse health effects.

- Many amine-based compounds can induce histamine liberation, which, in turn, can trigger allergic and other physiological effects, including bronchoconstriction or bronchial asthma and rhinitis.
- Systemic symptoms include headache, nausea, faintness, anxiety, a decrease in blood pressure, tachycardia (rapid heartbeat), itching, erythema (reddening of the skin), urticaria (hives), and facial edema (swelling). Systemic effects (those affecting the body) that are related to the pharmacological action of amines are usually transient.

Typically, there are four routes of possible or potential exposure: inhalation, skin contact, eye contact, and ingestion.

Inhalation:

Inhalation of vapors may, depending upon the physical and chemical properties of the specific product and the degree and length of exposure, result in moderate to severe irritation of the tissues of the nose and throat and can irritate the lungs.

Products with higher vapour pressures have a greater potential for higher airborne concentrations. This increases the probability of worker exposure.

Higher concentrations of certain amines can produce severe respiratory irritation, characterised by nasal discharge, coughing, difficulty in breathing, and chest pains.

Chronic exposure via inhalation may cause headache, nausea, vomiting, drowsiness, sore throat, bronchopneumonia, and possible lung damage. Also, repeated and/or prolonged exposure to some amines may result in liver disorders, jaundice, and liver enlargement. Some amines have been shown to cause kidney, blood, and central nervous system disorders in laboratory animal studies.

While most polyurethane amine catalysts are not sensitizers, some certain individuals may also become sensitized to amines and may experience respiratory distress, including asthma-like attacks, whenever they are subsequently exposed to even very small amounts of vapor. Once sensitized, these individuals must avoid any further exposure to amines. Although chronic or repeated inhalation of vapor concentrations below hazardous or recommended exposure limits should not ordinarily affect healthy individuals, chronic overexposure may lead to permanent pulmonary injury, including a reduction in lung function, breathlessness, chronic bronchitis, and immunologic lung disease.

Inhalation hazards are increased when exposure to amine catalysts occurs in situations that produce aerosols, mists, or heated vapors. Such situations include leaks in fitting or transfer lines. Medical conditions

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generally aggravated by inhalation exposure

include asthma, bronchitis, and emphysema.

### Skin Contact:

Skin contact with amine catalysts poses a number of concerns. Direct skin contact can cause moderate to severe irritation and injury-i.e., from simple redness and swelling to painful blistering, ulceration, and chemical burns. Repeated or prolonged exposure may also result in severe cumulative dermatitis.

Skin contact with some amines may result in allergic sensitisation. Sensitised persons should avoid all contact with amine catalysts. Systemic effects resulting from the absorption of the amines through skin exposure may include headaches, nausea, faintness, anxiety, decrease in blood pressure, reddening of the skin, hives, and facial swelling. These symptoms may be related to the pharmacological action of the amines, and they are usually transient.

### Eye Contact:

Amine catalysts are alkaline in nature and their vapours are irritating to the eyes, even at low concentrations.

Direct contact with the liquid amine may cause severe irritation and tissue injury, and the "burning" may lead to blindness. (Contact with solid products may result in mechanical irritation, pain, and corneal injury.)

Exposed persons may experience excessive tearing, burning, conjunctivitis, and corneal swelling.

The corneal swelling may manifest itself in visual disturbances such as blurred or "foggy" vision with a blue tint ("blue haze") and sometimes a halo phenomenon around lights. These symptoms are transient and usually disappear when exposure ceases.

Some individuals may experience this effect even when exposed to concentrations below doses that ordinarily cause respiratory irritation.

### Ingestion:

The oral toxicity of amine catalysts varies from moderately to very toxic.

Some amines can cause severe irritation, ulceration, or burns of the mouth, throat, esophagus, and gastrointestinal tract.

Material aspirated (due to vomiting) can damage the bronchial tubes and the lungs.

Affected persons also may experience pain in the chest or abdomen, nausea, bleeding of the throat and the gastrointestinal tract, diarrhea, dizziness, drowsiness, thirst, circulatory collapse, coma, and even death.

Polyurethane Amine Catalysts: Guidelines for Safe Handling and Disposal;

Technical Bulletin June 2000

Alliance for Polyurethanes Industry.

P-TERT-BUTYLPHENOL:

BENZENE-1,3-DIMETHANAMINE:

NONYLPHENOL:

2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

ALCOHOL, DENATURED:

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

NONYLPHENOL:

P-TERT-BUTYLPHENOL:

■ These substances are intravenous anaesthetic agents. They have a very low level of acute toxicity; they may cause skin irritation. Repeated exposure may irritate the stomach. There is no evidence of this group of substances causing mutation or adverse effects on reproduction. However, at high doses, there may be reduction of newborn weight and reduced survival in early lactation period.

TRIMETHYLHEXAMETHYLENE DIAMINE:

P-TERT-BUTYLPHENOL:

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

HYCHEM E100 HARDENER:

■ Not available. Refer to individual constituents.

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### ALCOHOL, DENATURED:

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

### P-TERT-BUTYLPHENOL:

#### TOXICITY

Oral (rat) LD50:2951 mg/kg

Dermal (rabbit) LD50:2288 mg/kg

Eye (rabbit) 0.05 mg/24h - SEVERE

#### IRRITATION

Skin (rabbit):500 mg/4h - Mild

Eye (rabbit):10 mg - SEVERE

■ For p-tert-butylphenol: p-tert-butylphenol has low acute toxicity via all routes. It irritates the skin, eyes and airway. It may cause skin sensitisation in humans. Exposure by all routes can lead to loss of pigment from the skin. It does not appear to cause chronic systemic or reproductive toxicity in animals. Except in one test, it has not caused genetic toxicity, however the possibility of this occurring cannot be ruled out. Although there is no evidence of p-tert-butylphenol inducing cancer in manufacturing workers, animal testing shows that it can promote cancer of the forestomach, therefore the cancer-causing potential of this chemical could not be ruled out.

### TRIMETHYLHEXAMETHYLENE DIAMINE:

#### TOXICITY

Oral (rat) LD50:910 mg/kg

#### IRRITATION

Skin (rabbit):Corrosive \*

Eye (rabbit):Corrosive \*

Sensitiser \*\*

[\* = Manufacturer CG]

[\*\* = Manufacturer Degussa]

■ The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

### BENZENE-1,3-DIMETHANAMINE:

#### TOXICITY

Oral (rat) LD50:930 mg/kg

Inhalation (rat) LC50:700 ppm/1h

Dermal (rabbit) LD50:2000 mg/kg

#### IRRITATION

Skin (rabbit):0.75 mg/24h SEVERE

Eye (rabbit):0.05 mg/24h SEVERE

■ Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema.

Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.

For benzene-1,3-dimethanamine (m-xylene-alpha,alpha'- diamine)

The toxicity via oral administration and inhalation was tissue damage in the digestive and respiratory organs, respectively, which are the first contact sites. The chemical is corrosive to rat and mouse skin and a sensitiser in the guinea pig maximisation test.

In the 28-day repeated dose toxicity study [OECD TG 407], the chemical was given to rats by gavage at doses of 0, 10, 40, 150 and 600 mg/kg b.w/day. One male and four females died, and salivation, low locomotor activity and piloerection were noted in the 600 mg/kg group. Furthermore, ulceration, acanthosis with hyperkeratosis and submucosal inflammation were observed in the forestomach. No adverse effects were observed in the 150 mg/kg and the lower dose groups.

A reproductive /developmental toxicity screening test [OECD TG 421] of rats by gavage at 50, 150 and 450

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mg/kg b.w/day for at least 41 days resulted in death in one male in the 150 mg/kg group, and three males and one female in the 450 mg/kg group. In almost all 450 mg/kg animals, the same histopathological changes as the above 28-day study were observed in the forestomach. No adverse effects were found at 50 mg/kg b.w/day. Based on this information, the NOAEL for repeated dose toxicity is considered to be 50 mg/kg b.w/day.

In the above reproductive/developmental toxicity screening test [OECD TG 421] the substance was administered from 14 days before mating to 20 days after mating in males and to day 3 of lactation in females. No adverse effects were observed in terms of copulation, fertility, delivery and nursing of parents, and the viability, body weight and morphology of offspring. The NOAEL for reproductive/developmental toxicity (F1 offspring) was 450 mg/kg b.w/day.

The chemical was not mutagenic in bacteria [OECD TG 471 & 472]. It induced neither chromosomal aberrations in mammalian cells in vitro [OECD TG 473] nor micronuclei in mouse bone marrow in vivo [OECD TG 474].

In clinical observation of workers during the manufacturing process, the chemical appears to act as a gastrointestinal irritant. It has also been shown to cause contact sensitisation reactions in workers at concentrations equal to and below 0.1 mg/m<sup>3</sup>.

### NONYLPHENOL:

#### TOXICITY

Oral (rat) LD50:1620 mg/kg

#### IRRITATION

Skin(rabbit):10mg/24h(open)- SEVERE

Skin (rabbit) LD50:2140 mg/kg Skin (rabbit): 500 mg(open)-  
Moderate

Eye (rabbit):0.5 mg (open)- SEVERE

#### ■ for nonylphenol:

Nonylphenol was studied for oral toxicity in rats in a 28-day repeat dose toxicity test at doses of 0, 4, 15, 60 and 250 mg/kg/day. Changes suggesting renal dysfunction were mainly noted in both sexes given 250 mg/kg. Liver weights were increased in males given 60 mg/kg and in both sexes given 250 mg/kg group.

Histopathologically, hypertrophy of the centrilobular hepatocytes was noted in both sexes given 250 mg/kg. Kidney weights were increased in males given 250 mg/kg and macroscopically, disseminated white spots, enlargement and pelvic dilatation were noted in females given 250 mg/kg. Histopathologically, the following lesions were noted in the 250 mg/kg group: basophilic change of the proximal tubules in both sexes, single cell necrosis of the proximal tubules, inflammatory cell infiltration in the interstitium and casts in females, basophilic change and dilatation of the collecting tubules in both sexes, simple hyperplasia of the pelvic mucosa and pelvic dilatation in females. In the urinary bladder, simple hyperplasia was noted in both sexes given 250 mg/kg. In the caecum, macroscopic dilatation was noted in both sexes given 250 mg/kg. Almost all changes except those in the kidney disappeared after a 14-day recovery period. The NOELs for males and females are considered to be 15 mg/kg/day and 60 mg/kg/day, respectively, under the conditions of the present study.

Nonylphenol was not mutagenic to *Salmonella typhimurium*, TA100, TA1535, TA98, TA1537 and *Escherichia coli* WP2 *uvrA*, with or without an exogenous metabolic activation system.

Nonylphenol induced neither structural chromosomal aberrations nor polyploidy in CHL/IU cells, in the absence or presence of an exogenous metabolic activation system.

### 2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

#### TOXICITY

Oral (rat) LD50:1200 mg/kg

Oral (rat) LD50:2500 mg/kg \*

Dermal (rabbit) LD50:1280 mg/kg [Rohm & Haas, Henkel]\*

Inhalation (rat) LC50:>0.5 mg/l/1 hr. [Ciba]

■ No significant acute toxicological data identified in literature search.

#### IRRITATION

Skin (rabbit):2 mg/24h - SEVERE

Eye (rabbit):0.05 mg/24h - SEVERE

### PINE OIL:

#### TOXICITY

Oral (human) TDLo:4700 mg/kg

Oral (rat) LD50:3200 mg/kg

#### IRRITATION

Skin (rabbit):500 mg/24h- SEVERE

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Dermal (rabbit) LD50:5000 mg/kg

■ Camphor appears to have moderate acute oral toxicity, and a higher toxicity when inhaled. Long term inhalation may cause emphysema. There is no observed tumour potential. Reproductive toxicity studies were not available for camphor, however, in developmental toxicity studies, it demonstrated no foetal toxicity.

d-Limonene is readily absorbed by inhalation and ingestion. Dermal absorption is reported to be lower than by the inhalation route. d-Limonene is rapidly distributed to different tissues in the body, readily metabolised and eliminated primarily through the urine.

Limonene exhibits low acute toxicity by all three routes in animals. Limonene is a skin irritant in both experimental animals and humans. Limited data are available on the potential to cause eye and respiratory irritation. Autooxidised products of d-limonene have the potential to be skin sensitisers. Limited data are available in humans on the potential to cause respiratory sensitisation. Autooxidation of limonene occurs readily in the presence of light and air forming a variety of oxygenated monocyclic terpenes. Risk of skin sensitisation is high in situations where contact with oxidation products of limonene occurs.

Renal tumours induced by limonene in male rats is thought to be sex and species specific and are not considered relevant to humans. Repeated exposure affects the amount and activity of liver enzymes, liver weight, blood cholesterol levels and bile flow in animals. Increase in liver weight is considered a physiological adaption as no toxic effects on the liver have been reported. From available data it is not possible to identify an NOAEL for these effects. Limonene is neither genotoxic or teratogenic nor toxic to the reproductive system.

For terpenoid tertiary alcohols and their related esters:

These substances are metabolised in the liver and excreted primarily in the urine and faeces. A portion is also excreted unchanged. They have low short term toxicity when ingested or applied on the skin. However, repeated and long term use may cause dose dependent harm to both the foetus and mother.

### SKIN

alcohol, denatured	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	1
p- tert- butylphenol	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	3
benzene- 1, 3- dimethanamine	Australia Exposure Standards - Skin	Notes	Sk
nonylphenol	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	3
pine oil	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	(1)

## Section 12 - ECOLOGICAL INFORMATION

BENZENE-1,3-DIMETHANAMINE:

PINE OIL:

P-TERT-BUTYLPHENOL:

Toxic to aquatic organisms.

TRIMETHYLHEXAMETHYLENE DIAMINE:

BENZENE-1,3-DIMETHANAMINE:

NONYLPHENOL:

PINE OIL:

P-TERT-BUTYLPHENOL:

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

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P-TERT-BUTYLPHENOL:  
TRIMETHYLHEXAMETHYLENE DIAMINE:  
BENZENE-1,3-DIMETHANAMINE:  
NONYLPHENOL:  
2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:  
PINE OIL:  
ALCOHOL, DENATURED:  
DO NOT discharge into sewer or waterways.

TRIMETHYLHEXAMETHYLENE DIAMINE:  
BENZENE-1,3-DIMETHANAMINE:  
NONYLPHENOL:  
2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:  
P-TERT-BUTYLPHENOL:  
Prevent, by any means available, spillage from entering drains or water courses.

NONYLPHENOL:  
P-TERT-BUTYLPHENOL:

For Phenols:

Ecotoxicity - Phenols with log Pow >7.4 are expected to exhibit low toxicity to aquatic organisms however; the toxicity of phenols with a lower log Pow is variable. Dinitrophenols are more toxic than predicted from QSAR estimates. Hazard information for these groups is not generally available.

For Alkylphenols and their Ethoxylates, or Propoxylates (APE):

Environmental fate: Alkylphenols are found everywhere in the environment, when released. Releases are generally as wastes; they are extensively used throughout industry and in the home. Alkylphenol ethoxylates are widely used surfactants in domestic and industrial products, which are commonly found in wastewater discharges and in sewage treatment plant effluents. These substances can "load" considerably in various environmental compartments.

Atmospheric Fate: Alkylphenols released to the atmosphere will exist in the vapor phase and are thought to be degraded by reaction with hydroxyl radicals, with a calculated half-life, for nonylphenol, of 0.3 days.

However, emissions to the air will be limited.

Terrestrial Fate: These substances will adsorb to organic soil substances. Adsorption decreases as certain chains in the chemical get longer and increases if water is present.

Aquatic Fate: These substances will partition to the sediment if they are released to water. These substances are expected to undergo primary breakdown in oxygenated river water at a relatively fast rate. Nonylphenols are susceptible to breakdown by sunlight in water. Light breakdown of with ethoxylated nonylphenol in water is much slower and is not expected to be an important fate process. The non-biological breakdown of these substances is negligible and biological breakdown of these substances does not readily take place. The half-life in surface water may be around 30 days.

Ecotoxicology: There is concern that APE metabolites, (NP, OP, NPE1-3), can mimic natural hormones and that the levels of the substances present in the environment may be sufficient to disrupt endocrine function in wildlife and humans. Organisms in different levels of the food chain may experience different responses to the natural hormone mimics found in these substances. These substances are not expected to be toxic to *Daphnia magna* water fleas; however, negative impacts on male fathead minnow reproduction have been noted. These substances may have a profound negative affect on reproduction in adult fishes. Alkylphenols are not readily biodegradable. The full breakdown pathway for APES has not yet been determined.

Biodegradation of APES produces less biodegradable products: alkylphenol mono- and di-ethoxylates, alkylphenoxy acetic/alkylphenoxy polyethoxy acetic acids, and alkylphenols. These metabolites frequently persist through sewage treatment and in rivers. Alkylphenols will accumulate in low oxygen conditions. Metabolites of APES accumulate in organisms and are more toxic than the original compound. Estrogen mimicking effects have been seen in rainbow trout, mice, and chicken embryos. The insecticide chlordecone, (Kepone), shows similar behavior to alkylphenols, accumulating in liver and fat tissue, and eliciting estrogen mimicking activity. Green algae are the most sensitive species.

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## Section 12 - ECOLOGICAL INFORMATION

For Alkylphenols:

Environmental Fate: The alkylphenolics may be divided into three groups. Group I: Ortho-substituted mono-alkylphenols. Group II: Para-substituted mono-alkylphenols. Group III: Di- and tri-substituted mixed alkyl phenols. None of the alkylphenols will be ionized significantly at environmental or physiological pHs. Water solubility and vapor pressure decreases with increasing molecular weight and with increasing octanol/water partition coefficient (log Kow). A few lower molecular weight phenols will be present in significant quantities (>10%) in the air and water compartments.

Atmospheric Fate: Direct photolysis is not expected to be a significant route of loss for any of the alkylphenols; however, indirect photolysis (atmospheric oxidation) has been estimated for all substances.

Terrestrial Fate: The vast majority of the alkylphenols will be located in the soil compartment with a few exceptions. This is especially evident in the Group II and Group III materials.

Aquatic Fate: None of the alkylphenols are expected to be susceptible to abiotic hydrolysis under environmental conditions.

Ecotoxicity: The aquatic toxicities for the alkylphenols appear to be related to their degree of absorption in fats and increase basically in line with log Kow. It is reasonable to assume (where experimentally determined data are not available) that the toxicity of a particular alkylphenol will be comparable to that of another with like fat absorbability.

BENZENE-1,3-DIMETHANAMINE:

P-TERT-BUTYLPHENOL:

May cause long-term adverse effects in the aquatic environment.

ALCOHOL, DENATURED:

For Ethanol:

log Kow: -0.31 to -0.32;

Koc 1: Estimated BCF= 3;

Half-life (hr) air: 144;

Half-life (hr) H<sub>2</sub>O surface water: 144;

Henry's atm m<sup>3</sup> /mol: 6.29E-06;

BOD 5 if unstated: 0.93-1.67,63%

COD: 1.99-2.11,97%;

ThOD : 2.1.

Environmental Fate: Terrestrial - Ethanol quickly biodegrades in soil but may leach into ground water; most is lost by evaporation. Ethanol is expected to have very high mobility in soil. Volatilization of ethanol from moist soil surfaces is expected to be an important fate process. The potential for volatilization of ethanol from dry soil surfaces may exist. Biodegradation is expected to be an important fate process for ethanol based on half-lives on the order of a few days for ethanol in sandy soil/groundwater microcosms.

Atmospheric Fate: Ethanol is expected to exist solely as a vapour in the ambient atmosphere. Vapour-phase ethanol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 5 days. Ethanol readily degraded by reaction with photochemically produced hydroxy radicals; release into air will result in photodegradation and wet deposition.

Aquatic Fate: When released into water ethanol readily evaporates and is biodegradable. Ethanol is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected and volatilization half-lives for a model river and model lake are 3 and 39 days, respectively. Bioconcentration in aquatic organisms is considered to be low. Hydrolysis and photolysis in sunlit surface waters is not expected to be an important environmental fate process for ethanol and is unlikely to be persistent in aquatic environments.

P-TERT-BUTYLPHENOL:

Marine Pollutant

Yes

log Pow (Verschueren 1983):

3.31

For p-tert-butylphenol

log Kow : 3.31-3.65

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**Environmental Fate:** If p-tert-butyl phenol is released into water or soil, it is unlikely to be distributed into other compartments. If p-t-butyl phenol is released into air, it is likely to be transported to other compartments. p-tert-Butylphenol is a stable solid and is classified as a readily biodegradable chemical (OECD TG 301). Bioaccumulation factors range from 34-120.

### Ecotoxicity:

Fish LC50 (96 h): *Oryzias latipes* 5.1 mg/l (OECD TG 203)

*Daphnia magna* EC50 (24 h): 7.3 mg/l; (48 h): 3.4 mg/l (OECD TG 202)

*Daphnia magna* ErC50 (21 d): 2 mg/l (reproduction); NOEC 0.73 mg/l (reproduction) (OECD TG 202)

Algae EC50 (72 h): *Selenastrum capricornutum* 22.7 mg/l; NOEC 9.53 mg/l (OECD TG 201)

The lowest acute and chronic toxicity data were 48 h EC50 (3.4 mg/l) of *Daphnia magna* and 21-d NOEC (0.73 mg/l) of *Daphnia magna*, respectively. An assessment factor of 100 was chosen and applied to the chronic toxicity data (NOEC), because only two NOEC values (algae and *Daphnia*) were available. Thus, PNEC of p-tert-butylphenol is  $7.3 \times 10^{-3}$  mg/l in this report. (OECD classification categories for substances hazardous to the aquatic environment; Class: Acute II). p-tert-butylphenol may have potential chronic toxicity to aquatic organisms, because NOEC of *Daphnia* is relatively low and the chemical has moderately bioaccumulative potential.

### TRIMETHYLHEXAMETHYLENE DIAMINE:

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Fish LC50 (48 h): *Leuciscus idus melanotus* 174 mg/L; LC0 150 mg/l \*\*

*Daphnia major* EC50 (24 h): 31.5 mg/L. \*\*

Bacterial EC10 (16 h): *Pseudomonas putida* 72 mg/L. Bacteria \*\*

Algae EC50 (72 h): *Scenedesmus subspicatus* 29.5 mg/L.

\*\* = Degussa

Algae multiplication inhibitr.

### BENZENE-1,3-DIMETHANAMINE:

Marine Pollutant Yes

For benzene-1,3-dimethanamine (m-xylene-alpha,alpha'- diamine)

#### Environmental fate:

The chemical has a log Pow value of 0.18 at 2 a vapour pressure 5 C, of 0.04 hPa at 25 C, and a water solubility of > 100 000 mg/L. Fugacity model Mackay level III calculations suggest that the majority of the chemical would distribute to soil if released to soil and/or air compartment(s), and water if released to aquatic compartment.

The chemical is not readily biodegradable (49% after 28 d) or inherently biodegradable (BOD = 22%, TOC = 6% and analysis in HPLC = 21%) and it does not hydrolyse (half-life >1 y at 25 C). However, the chemical does not bioaccumulate (BCF < 2.7 at 0.2 mg/L). The chemical will react with carbon dioxide to form the carbamate acid, and will undergo indirect photo-oxidation with hydroxy radicals (T1/2= 5.39 h), and will therefore not persist in the atmosphere.

#### Ecotoxicity:

Fish LC50 (96 h): Medaka 87.6 mg/l; golden orfe 75 mg/l; rainbow trout >100 mg/l

*Daphnia magna* EC50 (48 h): 15.2 - 16 mg/l

*Daphnia magna* EC50 (21 d): 6.77 mg/l (reproduction inhibition); NOEC 4.7 mg/l (reproduction inhibition)

*Daphnia magna* LC50 (21 d): 8.4 mg/l (parental toxicity)

Algae EbC50: *Scenedesmus subspicatus* 12 g/l; NOEC 6.25 mg/l; EbC50 *Selenastrum capricornutum* 20.3 mg/l; NOEC (0-72 h) 10.5 mg/l.

Toxic to fish

### NONYLPHENOL:

Marine Pollutant Yes

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

The material is classified as an ecotoxin\* because the *Daphnia* EC50 (48 hours) is less than or equal to 0.1 mg/l

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\* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

For nonylphenol:

BCF: mussel 8-12

Fish LD50 (96 h): 7 mg/L

2,4,6-TRIS[(DIMETHYLAMINO)METHYL]PHENOL:

Fish toxicity:

Fish LC50 (96 h): 1000 mg/l

Daphnia EC50 (24 h): 280 mg/l

Rainbow trout (salmo gairdneri) TL50: 222 (174-283) mg/l/24hr

Rainbow trout (salmo gairdneri) TL50: 180-240 mg/l/96hr

Rainbow trout (salmo gairdneri) No effect level: 180 mg/l

Mud crab TL50: 750-1000 mg/l/24hr

Mud crab TL50: 750-1000 mg/l/96hr

Mud crab TL50: No effect level: 750 mg/l

Carp TL50: 249 (204-305) mg/l/24hr

Carp TL50: 175 (131-235) mg/l/96hr

Carp No effect level: 140 mg/l

Grass shrimp TL50: 750-1000 mg/l/24

[Air Products & Chemicals]

PINE OIL:

Marine Pollutant

Yes

For Tertiary Terpenoid Alcohols and their Esters: Linalool – log Kow: 2.9; alpha-Terpeneol – log Kow: 2.9; Pinol – log Kow: 2.98.

Environmental Fate: All the substances in this chemical category are liquids at ambient temperature. Pine oil (alpha-terpeneol) has a slightly higher boiling point than myrcenol and linalool.

Atmospheric Fate: The calculated photodegradation half-lives for the ternary terpenoid alcohols and esters are in the range from 1.07 to 9.08 hours. Half-lives for linalool and myrcenol are shorter than those for tetrahydrolinalool and dimyrcenol. Generally, more stable ternary alcohols in this category have longer half-lives than those for more reactive primary terpenoid alcohols (i.e. citronellol, geraniol and nerol) with half-lives ranging from 19 minutes to 1.3 hours.

Aquatic Fate: Solubility values increase as temperature increases. The esters undergo hydrolysis (to their corresponding alcohol) and exhibit pH-dependent half-lives which increase at pH 8 and are typically in the range of months or years. At very low pH, hydrolysis may occur in minutes. Hydrolysis is not possible for the tertiary alcohols in this category.

Effects on Aquatic Plants: Linalool is naturally occurring therefore, not harmful to aquatic plants including green algae.

Ecotoxicity: Linalool is readily biodegradable. Tetrahydrolinalool, dihydromyrcenol and linalyl acetate are 103%, 72% and 75% degraded, respectively, within 28 days and myrcenol is 66% degraded within 20 days. Two tertiary terpenoid esters have also been shown to be readily biodegradable. Linalyl acetate undergoes 75% biodegradation after 28 days and alpha-terpeneol acetate exhibits 87.3% and 63% biodegradation. Phenyl acetate was only 6% degraded in a 28-day test. Pinanol hydroperoxide should be considered to be readily biodegradable. Pine oil underwent appreciably biodegradation as measured by 5-day testing. Pine oil is slightly toxic to rainbow trout and bluegill sunfish and is moderately toxic to coho salmon and rainbow trout. Myrcene is not acutely to slightly toxic to Daphnia magna water fleas. Higher substances in this chemical category are products of plant biosynthesis and are, therefore, commonly found in the environment. Most have been shown to be readily and/or ultimately biodegradable, and the remainder would be expected to behave similarly in the environment.

For Terpenes such as Limonene and Isoprene:

Atmospheric Fate: Contribute to aerosol and photochemical smog formation. When terpenes are introduced to

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the atmosphere, may either decrease ozone concentrations when oxides of nitrogen are low or, if emissions take place in polluted air (i.e. containing high concentrations of nitrogen oxides), leads to an increase in ozone concentrations. Lower terpenoids can react with unstable reactive gases and may act as precursors of photochemical smog therefore indirectly influencing community and ecosystem properties. The reactions of ozone with larger unsaturated compounds, such as the terpenes can give rise to oxygenated species with low vapour pressures that subsequently condense to form secondary organic aerosol.

Aquatic Fate: Complex chlorinated terpenes such as toxaphene (a persistent, mobile and toxic insecticide) and its degradation products were produced by photoinitiated reactions in an aqueous system, initially containing limonene and other monoterpenes, simulating pulp bleach conditions.

Substances containing unsaturated carbons are ubiquitous in indoor environments. They result from many sources (see below). Most are reactive with environmental ozone and many produce stable products which are thought to adversely affect human health. The potential for surfaces in an enclosed space to facilitate reactions should be considered.

Source of unsaturated substances	Unsaturated substances (Reactive Emissions)	Major Stable Products produced following reaction with ozone.
Occupants (exhaled breath, ski oils, personal care products)	Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products	Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid.
Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants	Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes	Formaldehyde, 4- AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles
Carpets and carpet backing	4- Phenylcyclohexene, 4- vinylcyclohexene, styrene, 2- ethylhexyl acrylate, unsaturated fatty acids and esters	Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2- nonenal
Linoleum and paints/polishes containing linseed oil	Linoleic acid, linolenic acid	Propanal, hexanal, nonanal, 2- heptenal, 2- nonenal, 2- decenal, 1- pentene- 3- one, propionic acid, n- butyric acid
Latex paint Certain cleaning products, polishes, waxes, air fresheners	Residual monomers Limonene, alpha- pinene, terpinolene, alpha- terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes	Formaldehyde Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H)- furanone, 4- AMC, SOAs including ultrafine particles
Natural rubber adhesive	Isoprene, terpenes	Formaldehyde, methacrolein, methyl vinyl ketone
Photocopier toner, printed paper, styrene polymers	Styrene	Formaldehyde, benzaldehyde

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Environmental tobacco smoke	Styrene, acrolein, nicotine	Formaldehyde, benzaldehyde, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, cotinine
Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	Acetone, geranyl acetone, 6MHO, 40PA, formaldehyde, nonanal, decanal, 9- oxo- nonanoic acid, azelaic acid, nonanoic acid
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	Formaldehyde, nonanal, and other aldehydes; azelaic acid; nonanoic acid; 9- oxo- nonanoic acid and other oxo- acids; compounds with mixed functional groups (=O, - OH, and - COOH) C5 to C10 aldehydes
Ventilation ducts and duct liners	Unsaturated fatty acids and esters, unsaturated oils, neoprene	
" Urban grime"	Polycyclic aromatic hydrocarbons	Oxidized polycyclic aromatic hydrocarbons
Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)	Limonene, alpha- pinene, linalool, linalyl acetate, terpinene- 4- ol, gamma- terpinene	Formaldehyde, 4- AMC, acetone, 4- hydroxy- 4- methyl- 5- hexen- 1- al, 5- ethenyl- dihydro- 5- methyl- 2(3H) furanone, SOAs including ultrafine particles
Overall home emissions	Limonene, alpha- pinene, styrene	Formaldehyde, 4- AMC, pinonaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles

Abbreviations: 4-AMC, 4-acetyl-1-methylcyclohexene; 6MHQ, 6-methyl-5-heptene-2-one, 4OPA, 4-oxopentanal, SOA, Secondary Organic Aerosols

Reference: Charles J Weschler; Environmental Health Perspectives, Vol 114, October 2006.

### Environmental fate:

Camphor is expected to quickly volatilise into the ambient air where it is expected to rapidly photodegrade

Therefore, the camphor residues that leach from the soil into water are not expected to be at concentrations that would pose a risk concern, especially to nontarget plant and animal species.

An estimate bioconcentration factor of 38 suggests the potential for bioconcentration of camphor in aquatic organisms is moderate.

### Ecotoxicity:

There were no deaths in sea lamprey (*Petromyzon marinus*) exposed to freshwater with a concentration of 5000 ug/L (5 mg/L) of camphor for 24 hours, but stress behavior was observed.

Fish LC50 (96 h): Fathead minnow (*Pimephales promelas*) 110 mg/L ( static bioassay); zebra fish (*Brachydanio rerio*) 35-50 mg/l.

### For Limonenes:

**Atmospheric Fate:** Due to the high volatility of limonene, the atmosphere is expected to be the major environmental sink for this chemical. The oxidation of limonene may contribute to aerosol and photochemical smog formation. The daytime atmospheric lifetime of d-limonene is estimated to range from 12 to 48 minutes depending upon local hydroxyl rate and ozone concentrations. Ozonolysis of limonene may also lead to the formation of hydrogen peroxide and organic peroxides, which have various toxic effects on plant cells and may damage forests. Reactions with nitrogen oxides produce aerosol formation as well as lower molecular weight products such as formaldehyde, acetaldehyde, formic acid, acetone and peroxyacetyl nitrate.

**Terrestrial fate:** When released to the ground, limonene is expected to have low to very low mobility in soil based on its physicochemical properties. It is expected that limonene will rapidly volatilize from both dry

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and moist soil, however; its absorption to soil may slow the process.

Aquatic fate: In the aquatic environment, limonene is expected to evaporate to a significant extent owing to its high volatility. The estimated half-life for volatilisation of limonene from a model river 1 m deep is 3.4 h. Some limonene is expected to absorb to sediment and suspended organic matter. Hydrolysis of limonene is not expected in terrestrial or in aquatic environments. The hydrolytic half-life of d-limonene is estimated to be >1000 days.

Ecotoxicity: Biotic degradation of limonene has been shown with some species of microorganisms such as *Penicillium digitatum*, *Corynespora cassiicola*, *Diplodia gossypina* and a soil strain of *Pseudomonas* sp (SL strain). Limonene is readily biodegradable under aerobic conditions. Biodegradation has been assessed under anaerobic conditions; there was no indication of any metabolisms, possibly because of the toxicity to microorganisms. Limonene may bioaccumulate in fish and other aquatic species. Technical limonene is practically nontoxic to birds and is slightly toxic to freshwater fish and invertebrates on an acute basis. Limonene has low subacute toxicity to bobwhite quail.

### Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
alcohol, denatured	LOW	MED	LOW	HIGH
p- tert- butylphenol	HIGH	No Data Available	LOW	MED
trimethylhexamethylene diamine	HIGH	No Data Available	LOW	MED
benzene- 1, 3- dimethanamine	HIGH	No Data Available	LOW	MED
nonylphenol	HIGH	No Data Available	LOW	LOW
2, 4, 6- tris[(dimethylamino)methyl]pheno l	HIGH	No Data Available	LOW	LOW
pine oil	No Data Available	No Data Available	No Data Available	No Data Available

## Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Material may be disposed of by controlled burning in an approved incinerator or buried in an approved landfill.
- Prior to disposal in a landfill the material should be mixed with the other component and reacted to render the material inert.
- Extreme caution should be taken when heating the resin/curing agent mix.
- Recycle containers where possible, or dispose of in an authorised landfill.

## Section 14 - TRANSPORTATION INFORMATION

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## Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE,FLAMMABLE LIQUID

### HAZCHEM:

•3W (ADG7)

### ADG7:

Class or Division:	8	Subsidiary Risk:	3
UN No.:	2920	Packing Group:	II
Special Provision:	274	Limited Quantity:	1 L
Portable Tanks & Bulk Containers - Instruction:	T11	Portable Tanks & Bulk Containers - Special Provision:	TP2 TP27
Packagings & IBCs - Packing Instruction:	P001 IBC02	Packagings & IBCs - Special Packing Provision:	None
Name and Description: CORROSIVE LIQUID, FLAMMABLE, N.O.S.			

### Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	3
UN/ID Number:	2920	Packing Group:	II
Special provisions:	None		
Cargo Only			
Packing Instructions:	855	Maximum Qty/Pack:	30 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	851	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y840	Maximum Qty/Pack:	0.5 L

Shipping name:CORROSIVE LIQUID, FLAMMABLE, N.O.S.(contains p-tert-butylphenol trimethylhexamethylene diamine benzene-1,3-dimethanamine nonylphenol 2,4,6-tris[(dimethylamino)methyl]phenol)

### Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	3
UN Number:	2920	Packing Group:	II
EMS Number:	F-E,S-C	Special provisions:	274
Limited Quantities:	1 L		

Shipping name:CORROSIVE LIQUID, FLAMMABLE, N.O.S.(contains p-tert-butylphenol trimethylhexamethylene diamine benzene-1,3-dimethanamine nonylphenol 2,4,6-tris[(dimethylamino)methyl]phenol)

## Section 15 - REGULATORY INFORMATION

### Indications of Danger:

C Corrosive

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## Section 15 - REGULATORY INFORMATION

### POISONS SCHEDULE

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### REGULATIONS

#### Regulations for ingredients

##### **alcohol, denatured (CAS: 64-17-5) is found on the following regulatory lists;**

"Acros Transport Information", "Australia Exposure Standards", "Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "FEMA Generally Recognized as Safe (GRAS) Flavoring Substances 23 - Examples of FEMA GRAS Substances with Non-Flavor Functions", "FisherTransport Information", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO", "International Air Transport Association (IATA) Dangerous Goods Regulations", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR National List of Candidates for Substitution – Norway", "Sigma-AldrichTransport Information", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Competition (German)", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports (French)", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports (Korean)", "World Anti-Doping Agency - The 2012 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports"

##### **p-tert-butylphenol (CAS: 98-54-4) is found on the following regulatory lists;**

"Acros Transport Information", "Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "International Chemical Secretariat (ChemSec) SIN List (\*Substitute It Now!)", "International Fragrance Association (IFRA) Standards Prohibited", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR List of Substances of Possible Concern", "Sigma-AldrichTransport Information"

##### **trimethylhexamethylene diamine (CAS: 25620-58-0, 25513-64-8) is found on the following regulatory lists;**

"Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information"

##### **benzene-1, 3-dimethanamine (CAS: 1477-55-0) is found on the following regulatory lists;**

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "FisherTransport Information", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information"

##### **nonylphenol (CAS: 25154-52-3, 84852-15-3, 139-84-4, 136-83-4) is found on the following regulatory lists;**

"Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions", "Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "Australia Standard

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for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Chemical Secretariat (ChemSec) SIN List (\*Substitute It Now!)", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR List of Substances of Possible Concern", "Sigma-AldrichTransport Information", "United Nations Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or Not Approved by Governments"

**2, 4, 6-tris[(dimethylamino)methyl]phenol (CAS: 90-72-2) is found on the following regulatory lists;**

"Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information"

**pine oil (CAS: 8002-09-3) is found on the following regulatory lists;**

"Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions", "Australia Inventory of Chemical Substances (AICS)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information"

**No data for Hychem E100 Hardener (CW: 6558-70)**

## Section 16 - OTHER INFORMATION

### Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
p- tert- butylphenol	98- 54- 4	R43
trimethylhexamethylene diamine	25620- 58- 0	Xn; R22 Xi; R38
trimethylhexamethylene diamine	25513- 64- 8	Xn; R22 Xi; R38
benzene- 1, 3- dimethanamine	1477- 55- 0	Xn; R22 R43 Xi; R38
nonylphenol	25154- 52- 3	R43
nonylphenol	139- 84- 4	Xn; R22 R43 N; R50/53
nonylphenol	136- 83- 4	R43

### INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
trimethylhexamethylene diamine	25620-58-0, 25513-64-8
nonylphenol	25154-52-3, 84852-15-3, 139-84-4, 136-83-4

### EXPOSURE STANDARD FOR MIXTURES

- "Worst Case" computer-aided prediction of vapour components/concentrations:
- Composite Exposure Standard for Mixture (TWA) (mg/m<sup>3</sup>): 54 mg/m<sup>3</sup>
- If the breathing zone concentration of ANY of the components listed below is exceeded, "Worst Case" considerations deem the individual to be overexposed.

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## Section 16 - OTHER INFORMATION

Component Breathing Zone ppm Breathing Zone mg/m3 Mixture Conc: (%).

Component	Breathing zone (ppm)	Breathing zone (mg/m3)	Mixture Conc (%)
2, 4, 6-tris[(dimethylamino)methyl]phenol	5.00	54.0000	10.0
2, 4, 6-tris[(dimethylamino)methyl]phenol	0.00	0.0000	0.0

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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*This is the end of the MSDS.*