

LAMINEX CONTACT ADHESIVE THINNER - MS702

Chemwatch Independent Material Safety Data Sheet

Issue Date: 24-Nov-2011

A317LP

CHEMWATCH 7051-34

Version No:4

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

LAMINEX CONTACT ADHESIVE THINNER - MS702

PROPER SHIPPING NAME

FLAMMABLE LIQUID, N.O.S.(contains toluene)

PRODUCT USE

■ The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. Contact adhesive thinner.

SUPPLIER

Company: The Laminex Group

Address:

PO Box 407

Doncaster

VIC, 3108

Australia

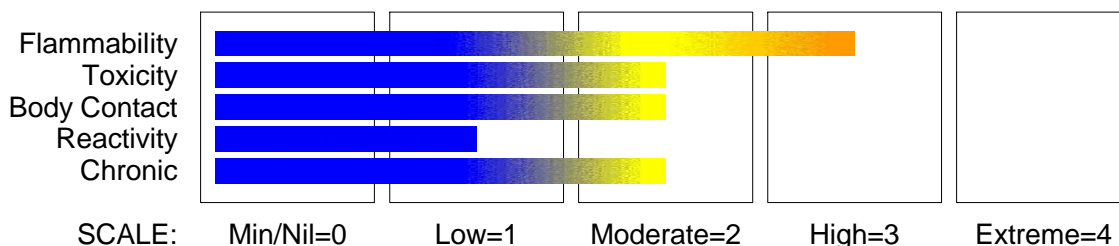
Website: www.thelaminexgroup.com.au

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

Risk Codes

R11

R22

R36/38

Risk Phrases

- Highly flammable.
- Harmful if swallowed.
- Irritating to eyes and skin.

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Section 2 - HAZARDS IDENTIFICATION

- R48/20/21/22
- Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
- R51/53
- Toxic to aquatic organisms, may cause long- term adverse effects in the aquatic environment.
- R62(3)
- Possible risk of impaired fertility.
- R63(3)
- Possible risk of harm to the unborn child.
- R65
- HARMFUL- May cause lung damage if swallowed.
- R67
- Vapours may cause drowsiness and dizziness.

SAFETY

Safety Codes

Safety Phrases

- S16
- Keep away from sources of ignition. No smoking.
- S23
- Do not breathe gas/fumes/vapour/spray.
- S24
- Avoid contact with skin.
- S25
- Avoid contact with eyes.
- S36
- Wear suitable protective clothing.
- S37
- Wear suitable gloves.
- S39
- Wear eye/face protection.
- S51
- Use only in well ventilated areas.
- S09
- Keep container in a well ventilated place.
- S53
- Avoid exposure - obtain special instructions before use.
- S29
- Do not empty into drains.
- S401
- To clean the floor and all objects contaminated by this material, use water and detergent.
- S07
- Keep container tightly closed.
- S35
- This material and its container must be disposed of in a safe way.
- S13
- Keep away from food, drink and animal feeding stuffs.
- S26
- In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
- S46
- If swallowed, IMMEDIATELY contact Doctor or Poisons Information Centre. (show this container or label).
- S57
- Use appropriate container to avoid environmental contamination.
- S61
- Avoid release to the environment. Refer to special instructions/Safety data sheets.
- S60
- This material and its container must be disposed of as hazardous waste.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
toluene	108-88-3	30-60
naphtha petroleum, light, hydrotreated	64742-49-0.	30-60
methyl ethyl ketone	78-93-3	1-9
n- hexane	110-54-3	1-9
nonhazardous ingredients		10-30

Section 4 - FIRST AID MEASURES

SWALLOWED

- - 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.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming

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Section 4 - FIRST AID MEASURES

unconscious.

- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.
- Avoid giving milk or oils.
- Avoid giving alcohol.

EYE

■ If this product comes in contact with the eyes:

- Wash out immediately with fresh 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.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- 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

■ - If fumes or combustion products are inhaled remove from contaminated area.

- Lay patient down. Keep warm and rested.
- Prosthesis 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.

NOTES TO PHYSICIAN

■ Following acute or short term repeated exposures to toluene:

- Toluene is absorbed across the alveolar barrier, the blood/air mixture being 11.2/15.6 (at 37 degrees C.) The concentration of toluene, in expired breath, is of the order of 18 ppm following sustained exposure to 100 ppm. The tissue/blood proportion is 1/3 except in adipose where the proportion is 8/10.
- Metabolism by microsomal mono-oxygenation, results in the production of hippuric acid. This may be detected in the urine in amounts between 0.5 and 2.5 g/24 hr which represents, on average 0.8 gm/gm of creatinine. The biological half-life of hippuric acid is in the order of 1-2 hours.
- Primary threat to life from ingestion and/or inhalation is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (eg cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ <50 mm Hg or pCO₂ > 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial damage has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenaline) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- Lavage is indicated in patients who require decontamination; ensure use.

BIOLOGICAL EXPOSURE INDEX - BEI

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

Determinant	Index	Sampling Time	Comments
o- Cresol in urine	0.5 mg/L	End of shift	B
Hippuric acid in urine	1.6 g/g creatinine	End of shift	B, NS

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Section 4 - FIRST AID MEASURES

Toluene in blood	0.05 mg/L	Prior to last shift of workweek
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NS: Non-specific determinant; also observed after exposure to other material
B: Background levels occur in specimens collected from subjects NOT exposed.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Do not use a water jet to fight fire.

FIRE FIGHTING

- - Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- 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 the 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.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

FIRE/EXPLOSION HAZARD

- - Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- 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 (CO₂), 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.

HAZCHEM

•3YE

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 by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

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Section 6 - ACCIDENTAL RELEASE MEASURES

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 breathing apparatus plus protective gloves.
- 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 /absorb vapour.
- Contain spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

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:

toluene 1000ppm

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

toluene 300ppm

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

toluene 50ppm

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.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Contains low boiling substance:
Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.
- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.

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Section 7 - HANDLING AND STORAGE

- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights, heat or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Vapour may ignite on pumping or pouring due to static electricity.
- DO NOT use plastic buckets.
- Earth and secure metal containers when dispensing or pouring product.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.
- Keep containers securely sealed.
- 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 storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
- DO NOT allow clothing wet with material to stay in contact with skin.

SUITABLE CONTAINER

- - 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.
- For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C)
- For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)
- Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C)
- (i) : Removable head packaging;
- (ii) : Cans with friction closures and
- (iii) : low pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages
- In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

STORAGE INCOMPATIBILITY

- - 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 storing and handling recommendations.
- Store on wooden pallet between 0 to 30 deg C.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Notes
Australia Exposure Standards	toluene (Toluene)	50	191	150	574	Sk
Australia Exposure Standards	naphtha petroleum, light, hydrotreated (Petrol (gasoline))		900			(see Chapter 16)
Australia Exposure Standards	methyl ethyl ketone (Methyl ethyl ketone (MEK))	150	445	300	890	
Australia Exposure Standards	n- hexane (Hexane (n-Hexane))	20	72			

EMERGENCY EXPOSURE LIMITS

Material	Revised	IDLH
toluene	84	500
methyl ethyl ketone	395	3, 000 [Unch]
n- hexane	173	1, 100 [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

N-HEXANE:

TOLUENE:

■ 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.

LAMINEX CONTACT ADHESIVE THINNER - MS702:

Not available

TOLUENE:

■ For toluene:

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

NOTE: Detector tubes measuring in excess of 5 ppm, are available.

High concentrations of toluene in the air produce depression of the central nervous system (CNS) in humans. Intentional toluene exposure (glue-sniffing) at maternally-intoxicating concentration has also produced birth defects. Foetotoxicity appears at levels associated with CNS narcosis and probably occurs only in those with chronic toluene-induced kidney failure. Exposure at or below the recommended TLV-TWA is thought to prevent transient headache and irritation, to provide a measure of safety for possible disturbances to human reproduction, the prevention of reductions in cognitive responses reported amongst humans inhaling greater than 40 ppm, and the significant risks of hepatotoxic, behavioural and nervous system effects (including impaired reaction time and incoordination). Although toluene/ethanol interactions are well recognised, the degree of protection afforded by the TLV-TWA among drinkers is not known.

Odour Safety Factor(OSF)

OSF=17 (TOLUENE).

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ for benzene

Odour Threshold Value: 34 ppm (detection), 97 ppm (recognition)

NOTE: Detector tubes for benzene, measuring in excess of 0.5 ppm, are commercially available. The relative quality of epidemiological data and quantitative health risk assessments related to documented and theoretical leukaemic deaths constitute the basis of the TLV-recommendation.

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One study [Dow Chemical] demonstrates a significant fourfold increase in myelogenous leukaemia for workers exposed to average benzene concentrations of about 5 ppm for an average of 9 years and that 2 out of four individuals in the study who died from leukaemia were characterised as having been exposed to average benzene levels below 2 ppm. Based on such findings the estimated risk of leukaemia in workers exposed at daily benzene concentrations of 10 ppm for 40 years is 155 times that of unexposed workers; at 1 ppm the risk falls to 1.7 times whilst at 0.1 ppm the risk is about the same in the two groups. A revision of the TLV-TWA to 0.1 ppm was proposed in 1990 but this has been revised upwards as result of industry initiatives.

Typical toxicities displayed following inhalation:

- At 25 ppm (8 hours): no effect
- 50-150 ppm: signs of intoxication within 5 hours
- 500-1500 ppm: signs of intoxication within 1 hour
- 7500 ppm: severe intoxication within 30-60 minutes
- 20000 ppm: fatal within 5-10 minutes

Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. Some surveillance should emphasise (i) demography, occupational and medical history and health advice (ii) baseline blood sample for haematological profile (iii) records of personal exposure.

for heptane (all isomers)

The TLV-TWA is protective against narcotic and irritant effects which are greater than those of pentane or n-hexane but less than those of octane. The TLV-TWA applies to all isomers.

Inhalation by humans of 1000 ppm for 6 minutes produced slight dizziness. Higher concentrations for shorter periods produce marked vertigo, incoordination and hilarity. Signs of central nervous system depression occur in the absence of mucous membrane irritation. Brief exposures to high levels (5000 ppm for 4 minutes) produce nausea, loss of appetite and a "gasoline-like" taste in the mouth that persists for many hours after exposure ceases.

Odour threshold: 0.25 ppm.

The TLV-TWA is protective against ocular and upper respiratory tract irritation and is recommended for bulk handling of gasoline based on calculations of hydrocarbon content of gasoline vapour. A STEL is recommended to prevent mucous membrane and ocular irritation and prevention of acute depression of the central nervous system. Because of the wide variation in molecular weights of its components, the conversion of ppm to mg/m³ is approximate. Sweden recommends hexane type limits of 100 ppm and heptane and octane type limits of 300 ppm. Germany does not assign a value because of the widely differing compositions and resultant differences in toxic properties.

Odour Safety Factor (OSF)

OSF=0.042 (gasoline).

for petroleum distillates:

CEL TWA: 500 ppm, 2000 mg/m³ (compare OSHA TWA).

METHYL ETHYL KETONE:

■ Exposed individuals are reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class A or B.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted

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D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

Odour Threshold Value: Variously reported as 2 ppm and 4.8 ppm

Odour threshold: 2 ppm (detection); 5 ppm (recognition)

25 ppm (easy recognition); 300 ppm IRRITATING

Exposures at or below the recommended TLV-TWA are thought to prevent injurious systemic effects and to minimise objections to odour and irritation. Where synergism or potentiation may occur stringent control of the primary toxin (e.g. n-hexane or methyl butyl ketone) is desirable and additional consideration should be given to lowering MEK exposures.

N-HEXANE:

- For n-hexane:

Odour Threshold Value: 65 ppm

NOTE: Detector tubes for n-hexane, measuring in excess of 100 ppm, are available commercially.

Occupational polyneuropathy may result from exposures as low as 500 ppm (as hexane), whilst nearly continuous exposures of 250 ppm have caused neurotoxic effects in animals. Many literature reports have failed to distinguish hexane from n-hexane and on the assumption that the commercial hexane contains 30% n-hexane, a worst case recommendation for TLV is assumed to reduce the risk of peripheral neuropathies (due to the metabolites 2,5-heptanedione and 3,6-octanedione) and other adverse neuropathic effects.

Concurrent exposure to chemicals (including MEK) and drugs which induce hepatic liver oxidative metabolism can reduce the time for neuropathy to appear.

Odour Safety Factor(OSF)

OSF=0.15 (n-HEXANE).

PERSONAL PROTECTION

EYE

- - Safety glasses with side shields.

- Chemical goggles.

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

HANDS/FEET

- - Wear chemical protective gloves, eg. PVC.

- Wear safety footwear or safety gumboots, eg. Rubber.

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

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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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Water white liquid; does not mix with water.

PHYSICAL PROPERTIES

Does not mix with water.

Floats on water.

State	LIQUID	Molecular Weight	Not Applicable
Melting Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	50- 110	Solubility in water (g/L)	Immiscible
Flash Point (°C)	<- 20	pH (1% solution)	Not Applicable
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not Applicable
Autoignition Temp (°C)	Not Available	Vapour Pressure (kPa)	Not Available
Upper Explosive Limit (%)	12	Specific Gravity (water=1)	0.78 approx.
Lower Explosive Limit (%)	1.0	Relative Vapour Density (air=1)	Not Available
Volatile Component (%vol)	Not Available	Evaporation Rate	Not Available
toluene			
log Kow (Sangster 1997):		2.73	
methyl ethyl ketone			
log Kow (Prager 1995):		0.26- 0.29	
log Kow (Sangster 1997):		0.29	
n- hexane			
log Kow (Sangster 1997):		3.9	

Section 10 - STABILITY AND REACTIVITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- - Presence of incompatible materials.
- Product is considered stable.

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Section 10 - STABILITY AND REACTIVITY

- 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

■ Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

EYE

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

SKIN

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

Toxic effects may result from skin absorption.

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.

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.

INHALED

■ Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

CHRONIC HEALTH EFFECTS

■ Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.

Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.

[PATTYS].

As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

TOXICITY AND IRRITATION

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

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■ Not available. Refer to individual constituents.

TOLUENE:

TOXICITY

Oral (human) LDLo: 50 mg/kg

Oral (rat) LD50: 636 mg/kg

Inhalation (human) TClO: 100 ppm

Inhalation (man) TClO: 200 ppm

Inhalation (rat) LC50: >26700 ppm/1h

Dermal (rabbit) LD50: 12124 mg/kg

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin

IRRITATION

Skin (rabbit):20 mg/24h- Moderate

Skin (rabbit):500 mg - Moderate

Eye (rabbit):0.87 mg - Mild

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

Eye (rabbit):100 mg/30sec - Mild

continued...

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redness, swelling, the production of vesicles, scaling and thickening of the skin.

For toluene:

Acute Toxicity

Humans exposed to intermediate to high levels of toluene for short periods of time experience adverse central nervous system effects ranging from headaches to intoxication, convulsions, narcosis, and death. Similar effects are observed in short-term animal studies.

Humans - Toluene ingestion or inhalation can result in severe central nervous system depression, and in large doses, can act as a narcotic. The ingestion of about 60 mL resulted in fatal nervous system depression within 30 minutes in one reported case.

Constriction and necrosis of myocardial fibers, markedly swollen liver, congestion and haemorrhage of the lungs and acute tubular necrosis were found on autopsy.

Central nervous system effects (headaches, dizziness, intoxication) and eye irritation occurred following inhalation exposure to 100 ppm toluene 6 hours/day for 4 days.

Exposure to 600 ppm for 8 hours resulted in the same and more serious symptoms including euphoria, dilated pupils, convulsions, and nausea. Exposure to 10,000-30,000 ppm has been reported to cause narcosis and death. Toluene can also strip the skin of lipids causing dermatitis.

Animals - The initial effects are instability and incoordination, lachrymation and sniffles (respiratory exposure), followed by narcosis. Animals die of respiratory failure from severe nervous system depression. Cloudy swelling of the kidneys was reported in rats following inhalation exposure to 1600 ppm, 18-20

hours/day for 3 days

Subchronic/Chronic Effects:

Repeat doses of toluene cause adverse central nervous system effects and can damage the upper respiratory system, the liver, and the kidney. Adverse effects occur as a result from both oral and the inhalation exposures. A reported lowest-observed-effect level in humans for adverse neurobehavioral effects is 88 ppm.

Humans - Chronic occupational exposure and incidences of toluene abuse have resulted in hepatomegaly and liver function changes. It has also resulted in nephrotoxicity and, in one case, was a cardiac sensitizer and fatal cardiotoxin.

Neural and cerebellar dystrophy were reported in several cases of habitual "glue sniffing." An epidemiological study in France on workers chronically exposed to toluene fumes reported leukopenia and neutropenia. Exposure levels were not given in the secondary reference; however, the average urinary excretion of hippuric acid, a metabolite of toluene, was given as 4 g/L compared to a normal level of 0.6 g/L.

Animals - The major target organs for the subchronic/chronic toxicity of toluene are the nervous system, liver, and kidney. Depressed immune response has been reported in male mice given doses of 105 mg/kg/day for 28 days. Toluene in corn oil administered to F344 male and female rats by gavage 5 days/week for 13 weeks, induced prostration, hypoactivity, ataxia, piloerection, lachrymation, excess salivation, and body tremors at doses 2500 mg/kg. Liver, kidney, and heart weights were also increased at this dose and histopathologic lesions were seen in the liver, kidneys, brain and urinary bladder. The no-observed-adverse effect level (NOAEL) for the study was 312 mg/kg (223 mg/kg/day) and the lowest-observed-adverse effect level (LOAEL) for the study was 625 mg/kg (446 mg/kg/day).

Developmental/Reproductive Toxicity

Exposures to high levels of toluene can result in adverse effects in the developing human foetus. Several studies have indicated that high levels of toluene can also adversely effect the developing offspring in laboratory animals.

Humans - Variable growth, microcephaly, CNS dysfunction, attentional deficits, minor craniofacial and limb abnormalities, and developmental delay were seen in three children exposed to toluene in utero as a result of maternal solvent abuse before and during pregnancy.

Animals - Sternebral alterations, extra ribs, and missing tails were reported following treatment of rats with 1500 mg/m³ toluene 24 hours/day during days 9-14 of gestation. Two of the dams died during the exposure. Another group of rats received 1000 mg/m³ 8 hours/day during days 1-21 of gestation. No maternal deaths or toxicity occurred, however, minor skeletal retardation was present in the exposed fetuses. CFLP Mice were exposed to 500 or 1500 mg/m³ toluene continuously during days 6-13 of pregnancy. All dams died at the high dose during the first 24 hours of exposure, however none died at 500 mg/m³. Decreased foetal weight was reported, but there were no differences in the incidences of skeletal malformations or anomalies between the treated and control offspring.

Absorption - Studies in humans and animals have demonstrated that toluene is readily absorbed via the lungs and the gastrointestinal tract. Absorption through the skin is estimated at about 1% of that absorbed by the lungs when exposed to toluene vapor.

Dermal absorption is expected to be higher upon exposure to the liquid; however, exposure is limited by the rapid evaporation of toluene.

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Distribution - In studies with mice exposed to radiolabeled toluene by inhalation, high levels of radioactivity were present in body fat, bone marrow, spinal nerves, spinal cord, and brain white matter. Lower levels of radioactivity were present in blood, kidney, and liver. Accumulation of toluene has generally been found in adipose tissue, other tissues with high fat content, and in highly vascularised tissues .

Metabolism - The metabolites of inhaled or ingested toluene include benzyl alcohol resulting from the hydroxylation of the methyl group. Further oxidation results in the formation of benzaldehyde and benzoic acid. The latter is conjugated with glycine to yield hippuric acid or reacted with glucuronic acid to form benzoyl glucuronide. o-cresol and p-cresol formed by ring hydroxylation are considered minor metabolites

Excretion - Toluene is primarily (60-70%) excreted through the urine as hippuric acid. The excretion of benzoyl glucuronide accounts for 10-20%, and excretion of unchanged toluene through the lungs also accounts for 10-20%. Excretion of hippuric acid is usually complete within 24 hours after exposure.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ No significant acute toxicological data identified in literature search.

The High Benzene Naphthas (HBNs) contain mainly benzene but its adverse health effect is more with other components, which may cause adverse health effects involving a variety of organs. They may produce genetic damage as well as effects on reproduction and the unborn baby (generally at levels toxic to the mother). They may also cause cancers.

for petroleum:

This product contains benzene which is known to cause acute myeloid leukaemia and n-hexane which has been shown to metabolize to compounds which are neuropathic.

This product contains toluene. There are indications from animal studies that prolonged exposure to high concentrations of toluene may lead to hearing loss.

This product contains ethyl benzene and naphthalene from which there is evidence of tumours in rodents

Carcinogenicity: Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans. Inhalation exposure to rats causes kidney tumours which are not considered relevant to humans.

Mutagenicity: There is a large database of mutagenicity studies on gasoline and gasoline blending streams, which use a wide variety of endpoints and give predominantly negative results. All in vivo studies in animals and recent studies in exposed humans (e.g. petrol service station attendants) have shown negative results in mutagenicity assays.

Reproductive Toxicity: Repeated exposure of pregnant rats to high concentrations of toluene (around or exceeding 1000 ppm) can cause developmental effects, such as lower birth weight and developmental neurotoxicity, on the foetus. However, in a two-generation reproductive study in rats exposed to gasoline vapour condensate, no adverse effects on the foetus were observed.

Human Effects: Prolonged/ repeated contact may cause defatting of the skin which can lead to dermatitis and may make the skin more susceptible to irritation and penetration by other materials.

Lifetime exposure of rodents to gasoline produces carcinogenicity although the relevance to humans has been questioned. Gasoline induces kidney cancer in male rats as a consequence of accumulation of the alpha2-microglobulin protein in hyaline droplets in the male (but not female) rat kidney. Such abnormal accumulation represents lysosomal overload and leads to chronic renal tubular cell degeneration, accumulation of cell debris, mineralisation of renal medullary tubules and necrosis. A sustained regenerative proliferation occurs in epithelial cells with subsequent neoplastic transformation with continued exposure. The alpha2-microglobulin is produced under the influence of hormonal controls in male rats but not in females and, more importantly, not in humans.

METHYL ETHYL KETONE:

TOXICITY

Oral (rat) LD50: 2737 mg/kg

Inhalation (human) TClO: 100 ppm/5 m

Inhalation (rat) LD50: 23500 mg/m³/8 hr

Dermal (rabbit) LD50: 6480 mg/kg

Inhalation (man) TClO: 10 mg/m³/6 hr - Mild

Inhalation (rat) LC50: 50100 mg/m³/8 hr

Dermal (rabbit) LD50: 20000 mg/kg

IRRITATION

Eye (human): 350 ppm - Irritant

Eye (rabbit): 80 mg - Irritant

Skin (rabbit): 402 mg/24 hr - Mild

Skin (rabbit): 13.78mg/24 hr Open

N-HEXANE:

TOXICITY

IRRITATION

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Oral (rat) LD50: 28710 mg/kg

Eye(rabbit): 10 mg - Mild

Inhalation (human) TClO: 190 ppm/8W

Inhalation (rat) LD50: 48000 ppm/4h

■ The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

CARCINOGEN

Toluene	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
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REPROTOXIN

toluene	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility
methyl ethyl ketone	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility

SKIN

toluene	Australia Exposure Standards - Skin	Notes	Sk
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Section 12 - ECOLOGICAL INFORMATION

N-HEXANE:

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

■ Toxic to aquatic organisms.

■ 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.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

METHYL ETHYL KETONE:

N-HEXANE:

TOLUENE:

■ DO NOT discharge into sewer or waterways.

TOLUENE:

■ For Toluene:

log Kow : 2.1-3;

log Koc : 1.12-2.85;

Koc : 37-260;

log Kom : 1.39-2.89;

Half-life (hr) air : 2.4-104;

Half-life (hr) H2O surface water : 5.55-528;

Half-life (hr) H2O ground : 168-2628;

Half-life (hr) soil : <48-240;

Henry's Pa m3 /mol : 518-694;

Henry's atm m3 /mol : 5.94;

E-03BOD 5 0.86-2.12, 5%COD - 0.7-2.52,21-27%;

ThOD - 3.13 ; BCF - 1.67-380;

log BCF - 0.22-3.28.

Atmospheric Fate: The majority of toluene evaporates to the atmosphere from the water and soil. The main

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degradation pathway for toluene in the atmosphere is reaction with photochemically produced hydroxyl radicals. The estimated atmospheric half life for toluene is about 13 hours. Toluene is also oxidized by reactions with atmospheric nitrogen dioxide, oxygen, and ozone, but these are minor degradation pathways. Photolysis is not considered a significant degradative pathway for toluene.

Terrestrial Fate: Toluene is moderately retarded by adsorption to soils rich in organic material, therefore, transport to ground water is dependent on soil composition. In unsaturated topsoil containing organic material, it has been estimated that 97% of the toluene is adsorbed to the soil and only about 2% is in the soil-water phase and transported with flowing groundwater. There is little retardation in sandy soils and 2-13% of the toluene was estimated to migrate with flowing water; the remainder was volatilized, biodegraded, or unaccounted for. In saturated deep soils with no soil-air phase, about 48% may be transported with flowing groundwater. In surface soil, volatilization to air is an important fate process for toluene. In the environment, biodegradation of toluene to carbon dioxide occurs with a typical half life of 1-7 days.

Aquatic Fate: An important fate process for toluene is volatilization, the rate of which depends on the amount of turbulence in the surface water. The volatilization of toluene from static water has a half life of 1-16 days, whereas from turbulent water the half life is 5-6 hours. Degradation of toluene in surface water occurs primarily by biodegradation with a half life of less than one day under favorable conditions (presence of microorganisms, microbial adaptation, and optimum temperature). Biodegradation also occurs in shallow groundwater and in salt water (at a reduced rate). No data are available on anaerobic degradation of toluene in deep ground water conditions where aerobic degradation would be minimal.

Ecotoxicity: Bioaccumulation in the food chain is predicted to be low. Toluene has moderate acute toxicity to aquatic organisms. Toluene is, on the average, slightly toxic to fathead minnow, guppies and goldfish and not acutely toxic to bluegill or channel catfish and crab. Toluene, on the average, is slightly toxic to crustaceans specifically, shrimp species including grass shrimp and daggerblade grass shrimp. Toluene has a negative effect on green algae during their growth phase.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

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

For Aromatic Substances Series:

Environmental Fate: Large, molecularly complex polycyclic aromatic hydrocarbons, or PAHs, are persistent in the environment longer than smaller PAHs.

Atmospheric Fate: PAHs are 'semi-volatile substances' which can move between the atmosphere and the Earth's surface in repeated, temperature-driven cycles of deposition and volatilization. **Terrestrial Fate:** BTEX compounds have the potential to move through soil and contaminate ground water, and their vapors are highly flammable and explosive.

Ecotoxicity - Within an aromatic series, acute toxicity increases with increasing alkyl substitution on the aromatic nucleus. The order of most toxic to least in a study using grass shrimp and brown shrimp was dimethylnaphthalenes > methylnaphthalenes > naphthalenes. Anthracene is a phototoxic PAH. UV light greatly increases the toxicity of anthracene to bluegill sunfish. Biological resources in strong sunlight are at more risk than those that are not. PAHs in general are more frequently associated with chronic risks.

For High Benzene Naphthas (HBNs) category:

Environmental fate:

The chemical components in HBNs are relatively volatile, and if released they would be expected to partition to the air phase to a significant extent. In the air, they are subject to rapid physical degradation through hydroxyl radical attack. Therefore, as a result of both biological and physical degradation processes, these products are not expected to persist in the environment

Read across biodegradation data show that products in the HBNs have the potential to exhibit a high extent of biodegradability. The carbon number of products in this category ranges primarily between C5 to C11. Results for several chemicals, including benzene, with carbon numbers in this range that are contained by these products have been shown to biodegrade from 63 to 100% after 14 or 28 days, while results for several comparable, complex products containing several components range from 21 to 96% after 28 days.

Hydrocarbons are not expected to hydrolyse at a measurable rate.

Ecotoxicity:

Read across aquatic toxicity data show that HBNs have the potential to produce a moderate level of toxicity in freshwater algae and acute toxicity in freshwater fish and invertebrates. The aquatic toxicity data within a narrow range of values regardless of their varying chemical class content and carbon number range. This is not unexpected, because the constituent chemicals of products in this category are neutral organic hydrocarbons whose toxic mode of action is non-polar narcosis. The mechanism of short-term toxicity for these chemicals is disruption of biological membrane function. The existing fish toxicity database for narcotic chemicals supports a critical body residue (CBR, the internal concentration that causes mortality) of between

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approximately 2-8 mmol/kg fish (wet weight), supporting the assessment that these chemicals have equal potencies. When normalized to lipid content, the CBR is approximately 50 μmol of hydrocarbon/g of lipid for most organisms. Because the products in this category are all complex mixtures containing relatively similar series of homologous chemicals, their short-term toxicities are expected to fall within the range of toxicity demonstrated by the individual chemicals.

The fish and invertebrate acute and alga toxicity values for individual chemicals and complex products similar to those in this category fall within a range of approximately 1-64 mg/L and overlap between the three trophic levels. Because HBNs will range in paraffin, alkene, and/or aromatic carbon number content within approximately C5 to C11, a range in toxicity for products in this category is expected. Experimental data, this category will exhibit a moderate range of acute toxicity to fish and invertebrates and a moderate range of toxicity to algae. For representative chemicals and products, experimental acute fish toxicity values range between 2.5 to 46 mg/L for two species while acute invertebrate toxicity values range between 0.9 to 32 mg/L for one species. In comparison, alga toxicity values for one species range between 1.0 to 64 mg/L (for biomass and growth rate endpoints), while alga NOELR values range between 1.0 to 51 mg/L (for biomass or growth rate endpoints).

For n-heptane:

log Kow : 4.66

Koc : 2400-8100

Half-life (hr) air : 52.8

Half-life (hr) H₂O surface water : 2.9-312

Henry's atm m³/mol: 2.06

BOD 5 if unstated: 1.92

COD : 0.06

BCF : 340-2000

log BCF : 2.53-3.31

Environmental fate:

Photolysis or hydrolysis of n-heptane are not expected to be important environmental fate processes.

Biodegradation of n-heptane may occur in soil and water, however volatilisation and adsorption are expected to be more important fate processes. A high Koc (2400-8200) indicates n-heptane will be slightly mobile to immobile in soil. In aquatic systems n-heptane may partition from the water column to organic matter in sediments and suspended solids. The bioconcentration of n-heptane may be important in aquatic environments. The Henry's Law constant suggests rapid volatilisation from environmental waters and surface soils. The volatilisation half-lives from a model river and a model pond (the latter considers the effect of adsorption) have been estimated to be 2.9 hr and 13 days, respectively.

n-Heptane is expected to exist entirely in the vapour phase in ambient air. Reactions with photochemically produced hydroxyl radicals in the atmosphere have been shown to be important (estimated half-life of 2.4 days calculated from its rate constant of 7.15×10^{-12} cu cm/molecule-sec at 25 deg C). Data also suggests that night-time reactions with nitrate radicals may contribute to the atmospheric transformation of n-heptane, especially in urban environments. n-Heptane does not contain chromophores that absorb at wavelengths >290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight

An estimated BCF of 2,000 using log Kow suggests the potential for bioconcentration in aquatic organisms is very high. Based on 100% degradation after 4 days in water inoculated with gasoline contaminated soil and 100% degradation after 25 days in water inoculated with activated sewage sludge, biodegradation is expected to be an important fate process for n-heptane in water.

Ecotoxicity:

Fish LC₅₀ (48 h): goldfish (*Carrasius auratus*) 4 mg/l; golden orfe (*Idus melanotus*) 2940 mg/l; western mosquitofish (*Gambusia affinis*) 4924 mg/l

Daphnia LC₅₀ (24 h): >10 mg/l

Daphnia EC₅₀ (96 h): 82 mg/l (immobilisation)

Opposum shrimp (*Mysidopsis bahia*) LC₅₀ (96 h): 0.1 mg/l

Snail EC₅₀ (96 h): 472 mg/l.

For benzene:

log Kow: 1.95-2.15

log Koc: 1.7-2

Koc: 85

log Kom: 1.04-2.56

Half-life (hr) air: 2.4-501

Half-life (hr) H₂O surface water: 4.81-384

Half-life (hr) H₂O ground: 240-17280

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Half-life (hr) soil: 48-922

Henry's Pa m³ /mol: 441-595

Henry's atm m³ /mol: 5.43E-03

BOD 5 if unstated: 2.18

COD: 0.25-2.8

ThOD: 3.1

BCF: 3.5-3.9

Log BCF: 0.54-1.48

Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.); benzene: 10 ug/l (WHO guideline)

Soil Guidelines: Dutch Criteria: 0.05 mg/kg (detection limit) target; 1 mg/kg (intervention)

Air Quality Standards: 1 ppb averaging time 1 year (UK)

No safe level recommended due to carcinogenic properties (WHO Guideline)

If benzene is released to the atmosphere it remains predominantly in the vapour phase.

Vapour phase benzene is not subject to direct photolysis but reacts with photochemically produced hydroxyl radicals (half-life approximately 13.4 days). Reaction time in polluted atmospheres which contain nitrogen oxide (NO) or sulfur dioxide (SO₂) is accelerated (half-life 4-6 hours); products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrates.

In water, benzene is rapidly volatilised (half-life 2.7 hours).

In soil benzene undergoes rapid volatilisation; it is not absorbed, to any appreciable degree, by sediments.

Benzene does not bioaccumulate in the food chain.

Environmental Fate

Terrestrial fate: Benzene is expected to have high mobility in soil. Volatilisation of benzene from moist soil surfaces is expected to be an important fate process, and there is also some potential for volatilisation of benzene from dry soil. Benzene is expected to biodegrade in soils.

Aquatic fate: Benzene is not expected to adsorb to sediment and suspended solids in water. Volatilisation from water surfaces is expected, with volatilisation half-lives for a model river and model lake estimated to be 1 hr and 3.5 days, respectively. Anaerobic degradation of benzene in water is not expected to be an important loss process. In aqueous solution, benzene will react with hydroxyl radical with an anticipated half-life of 103 days. A BCF ranging from 1.1-20 suggests the potential for bioconcentration in aquatic organisms is low.

Aquatic fate: Simulated experiments indicate evaporation to be the primary loss mechanism in winter with a half-life of 13 days. In spring and summer the half-lives were 23 and 3.1 days, respectively. In these cases biodegradation plays a major role and takes about 2 days. However, acclimation is critical and this takes much longer in the colder water in spring. According to one experiment, benzene has a half-life of 17 days due to photodegradation which could contribute to benzene's removal. In situations of cold water, poor nutrients, or other conditions less conducive to microbial growth, photolysis will play an important role in degradation. The half-life of benzene in sea water is expected to be about 5 hrs.

Atmospheric fate: Models predict benzene to exist solely as a vapor in the ambient atmosphere, where it is degraded by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days. The half-life in polluted atmospheres which contain nitrogen oxides or sulfur dioxide has been observed to shorten to 4-6 hrs. Vapour-phase benzene is also degraded in the atmosphere by atmospheric ozone radicals at an extremely slow rate; the half-life for this reaction in air is estimated to be 170,000 days. The half-life of the reaction of benzene with nitrate radical in the atmosphere is estimated to be greater than or equal to 111 days. Direct photolysis is not likely to be an important degradation process of benzene. Due to benzene's high water solubility, it may be removed from the atmosphere by rainfall.

Ecotoxicity:

Fish LC₅₀ (96 h): bass (*Morone saxatilis*) 5.8-11 mg/l

Fish LC₅₀ 24-96 h) fathead minnow (*Pimephales promelus*) 33-35 mg/l (softwater); 24-32 mg/l (hardwater);

bluegill sunfish (*Lepomis macrochirus*) 22 mg/l; goldfish (*Carassius auratus*) 36 mg/l (softwater); mosquito fish (*Gambusia affinis*) 395 mg/l

Fish LC₅₀ (24-48 h): bluegill sunfish (*Lepomis macrochirus*) 20 mg/l

Fish LC₅₀ (24 h): goldfish (*Carassius auratus*) 46 mg/l; blue gill sunfish (*Lepomis macrochirus*) 34 mg/l

Fish LC₁₀₀ (2 h): blue gill sunfish (*Lepomis macrochirus*) 60 mg/l

Fish LC₅₀ (14 d): guppy (*Poecilia reticulata*) 63 mg/l

Fish LC₅₀ (1 h): brown trout yearlings (*Salmo trutta*) 12 mg/l (static assay)

Ciliate LC₁₀₀ (24 h): *Tetrahymena pyriformis* 12.8 mmole/l

Grass shrimp (*Palaemonetes pugio*) LC₅₀ (96 h): 27 ppm

Shrimp (*Crangon francorum*) LC₅₀ (96 h): 20 mg/l

Crab larvae (*Cancer magister*) LC₅₀ (96 h): 108 ppm

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Mexican axolotl (*Ambystoma mexicanum*) LC50 (48 h): 370 mg/l (3-4 weeks after hatching)

Clawed toad LC50 (48 h): 190 mg/l (3-4 weeks after hatching).

METHYL ETHYL KETONE:

log Kow: 0.26-0.69

log Koc: 0.69

Koc: 34

Half-life (hr) air: 2.3

Half-life (hr) H2O surface water: 72-288

Henry's atm m³ /mol: 1.05E-05

BOD 5 if unstated: 1.5-2.24,46%

COD: 2.2-2.31,100%

ThOD: 2.44

BCF: 1

Toxicity Fish: LC50(96)13.16-277.8mg/L

Toxicity invertebrate: LD0 1g/L

Bioaccumulation: not sig

Anaerobic effects: some degrad

Effects on algae and plankton: algae LD0 125mg/L

Degradation Biological: sig

processes Abiotic: photox,RxnOH*,hydrl photol/deg notsig

N-HEXANE:

/53#90hexane

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
toluene	LOW	MED	LOW	MED
naphtha petroleum, light, hydrotreated	No Data Available	No Data Available		
methyl ethyl ketone	LOW	HIGH	LOW	HIGH
n- hexane	HIGH	No Data Available	MED	MED

Section 13 - DISPOSAL CONSIDERATIONS

■ - Containers may still present a chemical hazard/ danger when empty.

- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.

- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Section 14 - TRANSPORTATION INFORMATION

Labels Required: FLAMMABLE LIQUID

HAZCHEM:

•3YE (ADG7)

ADG7:

Class or Division:

3

Subsidiary Risk:

None

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UN No.:	1993	Packing Group:	II
Special Provision:	274	Limited Quantity:	1 L
Portable Tanks & Bulk Containers - Instruction:	T7	Portable Tanks & Bulk Containers - Special Provision:	TP1, TP8, TP28
Packagings & IBCs - Packing Instruction:	None	Packagings & IBCs - Special Packing Provision:	P001, IBC02

Name and Description: FLAMMABLE LIQUID, N.O.S. (contains toluene)

Land Transport UNDG:

Class or division:	3	Subsidiary risk:	None
UN No.:	1993	UN packing group:	II

Shipping Name: FLAMMABLE LIQUID, N.O.S. (contains toluene)

Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	None
UN/ID Number:	1993	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	364	Maximum Qty/Pack:	60 L
Passenger and Cargo			
Packing Instructions:	353	Maximum Qty/Pack:	5 L
Passenger and Cargo			
Limited Quantity			
Packing Instructions:	Y341	Maximum Qty/Pack:	1 L

Shipping name: FLAMMABLE LIQUID, N.O.S. (contains toluene)

Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	None
UN Number:	1993	Packing Group:	II
EMS Number:	F- E, S- E	Special provisions:	274
Limited Quantities:	1 L	Marine Pollutant:	Yes

Shipping name: FLAMMABLE LIQUID, N.O.S. (contains toluene)

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE S5

REGULATIONS

Regulations for ingredients

toluene (CAS: 108-88-3) is found on the following regulatory lists;

"Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (AQUA/1 to 6 - non-pesticide anthropogenic organics)", "Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - organic compounds)", "Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Aquatic habitat)", "Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Domestic water supply quality)", "Australia Customs (Prohibited Exports) Regulations 1958 - Schedule 9 Precursor substances - Part 2", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Illicit Drug Reagents/Essential Chemicals - Category III", "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) - Schedule 6", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "IMO Provisional Categorization of Liquid Substances - List 3: (Trade-named) mixtures containing at least 99% by weight of components already assessed by IMO, presenting safety hazards", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Fragrance Association (IFRA) Standards Prohibited", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

naphtha petroleum, light, hydrotreated (CAS: 64742-49-0) is found on the following regulatory lists;

"Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "International Council of Chemical Associations (ICCA) - High Production Volume List"

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methyl ethyl ketone (CAS: 78-93-3) is found on the following regulatory lists;

"Australia Customs (Prohibited Exports) Regulations 1958 - Schedule 9 Precursor substances - Part 2", "Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Illicit Drug Reagents/Essential Chemicals - Category III", "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)", "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 Fragrance Association (IFRA) Survey: Transparency List"

n-hexane (CAS: 110-54-3) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia National Pollutant Inventory", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances"

No data for Laminex Contact Adhesive Thinner - MS702 (CW: 7051-34)

Section 16 - OTHER INFORMATION

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for the reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
toluene	9.6 mg/m ³	10	D	NA	-
methyl ethyl ketone	590 mg/m ³	NA	NA	NA	Yes
n- hexane	176 mg/m ³	NA	NA	NA	Yes

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

American Industrial Hygiene Association Journal 57: 641-649 (1996).

■ 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.

■ 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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Section 16 - OTHER INFORMATION

This is the end of the MSDS.