



Material Safety Data Sheet

Hazardous Substance, NON - Dangerous Goods

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product name: Tufflon-D60 Part A (for use with Tufflon-D60 Part B)

Recommended use: Component of a 2 part Polyurea system.
Spray-applied, abrasion-resistant, membrane.

Supplier: LIQUIMIX PTY LTD
ABN: 32 062 887 585

Street Address: Unit 1, 29 Collinsvale Street
Rocklea Qld 4106
Australia

Telephone: (07) 3277 6655
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Emergency telephone number: Australia: 1 800 786 152 (ALL HOURS) NZ: 0800 767 376

2. HAZARDS IDENTIFICATION

Australia

Hazard classification

Classified as hazardous according to criteria of ASCC Australia.

Hazard Category

Xn Harmful
Xi Irritant

Risk phrase(s)

R20 Harmful by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R42/43 May cause sensitisation by inhalation and skin contact.

Safety phrase(s)

S23 Do not breathe vapours/spray.
S36/37 Wear suitable protective clothing and gloves.
S38 In case of insufficient ventilation, wear suitable equipment.
S45 In case of accident or if you feel unwell, seek advice immediately (show the label where possible).

Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail.

Poisons schedule (Aust): None Allocated.



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3. COMPOSITION/INFORMATION ON INGREDIENTS

Appearance: Liquid.

CHEMICAL ENTITY (%weight/weight)	CAS NO.	PROPORTION
Isocyanates, reaction product of polyol with Methylenediphenyl diisocyanate		>60
Methylenediphenyldiisocyanate(mixed isomers)	26447-40-5	30-60

All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

4. FIRST AID MEASURES

Ingestion: Do NOT induce vomiting. Do not swallow. Provided the patient is conscious, wash out mouth with water. Obtain immediate medical attention.

Eye contact: Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 15 minutes. Obtain immediate medical attention.

Skin contact: Remove contaminated clothing. After contact with skin, wash immediately with plenty of warm soapy water. If symptoms develop, obtain medical attention. Contaminated clothing should be thoroughly cleaned. An MDI study has demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

Inhalation: Remove patient from exposure-avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If breathing laboured and patient cyanotic (blue), ensure airways are clear and have qualified person give oxygen through a face mask. If breathing has stopped apply artificial respiration ant once. In event of cardiac arrest, apply external cardiac massage. Seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately. Show the Safety Data Sheet.

First Aid Facilities:

Provide eye baths and safety showers close to areas where there is potential for eye and skin contact.

Medical attention and special treatment: Treat symptomatically. Effects may be delayed. Following severe exposures the patient should be kept under medical supervision for at least 48 hours. (1)

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Combustible liquid, foam, dry agent (carbon dioxide, dry chemical powder). Water fog (or if unavailable fine water spray) may be used if no other extinguishing medium is available, and then in copious quantities. Prevent washings from entering water courses, keep fire exposed containers cool by spraying with water.

Hazards from combustion products: On burning will emit toxic fumes including those of carbon monoxide and carbon dioxide, nitrogen oxides, isocyanate vapours and hydrogen cyanide.

Precautions for fire fighters and special protective equipment: Fire fighters to wear self-contained breathing apparatus if risk of exposure to vapour or products of combustion. Due to the



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reaction with water producing carbon dioxide gas, a hazardous build-up of pressure could result if contaminated drums are resealed.

Hazchem code: None assigned.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures: Evacuate the area. Keep upwind avoiding inhalation of vapours. Clean-up should only be performed by trained personnel. Splash goggles. Full suit, Boots, Gloves to prevent skin and eye contamination. Self contained breathing apparatus should be used to avoid inhalation of the product.

Methods and materials for containment and clean up procedures: Prevent further leakage, spillage or entry into drains. Absorb spillages onto sand, earth or any suitable adsorbent material. Leave to react for at least 30 minutes. Do not absorb onto sawdust or other combustible materials. Shovel into open-top drums for further decontamination. Wash the spillage area with water. Test atmosphere for MDI vapour. Neutralise small spillages with decontaminant. Remove and dispose of residues. The compositions of liquid decontaminants are given in Section 16. See also brochure PU 193-1 (see section 16).

7. HANDLING AND STORAGE

Precautions for safe handling: Do not breathe vapour/spray. Avoid contact with skin and eyes. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit. The efficiency of the ventilation system must be monitored regularly because of the possibility of blockage. When the product is sprayed or heated, suitable respiratory protection equipment with positive air supply may be required. Keep equipment clean. A basic essential in sampling, handling and storage is the prevention of contact with water. Keep stocks of decontaminant readily available. The compositions of liquid decontaminants are given in Section 16. See also brochure PU 193-1 (see section 16).

Conditions for safe storage: Keep containers properly sealed and store indoors in a well ventilated area. Keep away from frost. Keep away from moisture. If a container is contaminated, do not reseal it. Due to reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Unsuitable containers: Copper, copper alloy and galvanised surfaces. Suitable containers: stainless steel or mild steel. Storage temperature: See Product Data Sheet Storage Life: See Product Data Sheet

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National exposure standards

No value assigned for this specific material by the Australian Safety and Compensation Council (ASCC). However, exposure standard for the constituents:

	8-hr TWA		STEL (15 min)		Peak Limitation		Carcinogen Category	Notices
	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³		
Isocyanates, all (as – NCO)	-	0.02	-	0.07	-	-	-	'Sen'



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TWA - the Time-Weighted Average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

STEL (Short Term Exposure Limit) - the average airborne concentration over a 15 minute period which should not be exceeded at any time during a normal eight-hour work day. According to current knowledge these concentrations should neither impair the health of, nor cause undue discomfort to, nearly all workers.

'Sen' notice - sensitiser. The substance can cause a specific immune response in some people. An affected individual may subsequently react to exposure to minute levels of that substance.

Keep exposures as low as practicable below the exposure standards.

Biological limit values

Not Relevant.

Engineering controls: Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Exposure Standards. Use with local exhaust ventilation or while wearing air supplied mask. Vapour heavier than air - prevent concentration in hollows or sumps. DO NOT enter confined spaces where vapour may have collected. Keep containers closed when not in use.

MDI can only be smelt if the occupational exposure limit has been exceeded considerably.

Personal protective equipment: OVERALLS, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).

Wear suitable protective clothing, gloves and eye/face protection.

* Respirators: Suitable respiratory equipment with positive air supply should be used in cases of insufficient ventilation or where operational procedures demand it.

* Eye Protection: Chemical safety glasses. Full face shield if splashing is possible.

* Gloves: The following protective materials are recommended:
- Neoprene
- Nitrile butadiene rubber
- Butyl rubber
- PVC (Heavy duty.)

Thin disposable gloves should be avoided for repeated or long term use.

* Other: Overall (preferably heavy cotton) or Tyvek-Pro Tech 'C', Tyvek-Pro 'F' disposable coverall.

Contaminated clothing should be thoroughly cleaned before re-use.



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9. PHYSICAL AND CHEMICAL PROPERTIES

Form / colour / odour: Brown liquid with earthy odour.

Solubility: Insoluble in water. Soluble in many organic solvents

Specific Gravity (water=1):	1.23	Melting Point (°C):	N Av
Rel Vapour Density (air= 1):	8.5	Boiling Point (°C):	>300 decomposes
Vapour Pressure at 20°C (mmHg):	N Av	Decomp. Point (°C):	N Av
Flash Point (Open Cup) (°C):	230	Sublimation Point (°C):	N App
Flammability Limits (%):	N AP	pH (neat):	N App
Autoignition Temp (°C):	>600	Viscosity (25°C):	N Av
% Volatile by weight:	N Av	Evaporation Rate:	N Av
Solubility in water:	Insoluble,	Odour Threshold (ppm)	N Av

(Typical values only - consult specification sheet)
N Av = Not available N App = Not applicable

10. STABILITY AND REACTIVITY

Chemical stability: Stable at room temperature. Reacts with water (moisture). Produces CO₂-gas. Reacts exothermically with water and all organic compounds containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.

Conditions to avoid: Avoid high temperatures

Incompatible materials: Water, alcohols, amines, bases and acids

Hazardous decomposition products: Carbon monoxide and carbon dioxide.

Hazardous reactions: as above

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms that may arise if the product is mishandled are:

Acute Effects

Ingestion: Swallowing may result in irritation of the gastrointestinal tract.

Eye contact: Both vapour and liquid are eye irritants.

Skin contact: Contact with skin will result in moderate irritation. Repeated or prolonged contact may cause skin sensitisation. Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitisers including diisocyanates. These results emphasise the need for protective clothing including gloves to be worn when handling these chemicals or in maintenance work. (1)

Inhalation: A respiratory irritant and potential respiratory sensitiser; repeated inhalation of vapour or aerosol at levels above the occupational exposure standard could cause respiratory sensitisation.

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Symptoms may include irritation of the eyes, nose, throat and lungs, possibly with dryness of the throat, tightness of the chest and difficulty in breathing. Onset of respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response may develop to even minimal concentrations of MDI in sensitised individuals. (1)

Long Term Effects:

There are reports that chronic exposure by inhalation may result in a permanent decrease in lung function.
(1)

Acute toxicity / Chronic toxicity

Diphenylmethane 4,4- diisocyanate
Dermal LD50 (Rabbit); >5000mg/kg
Oral LD50 (rat): >5000 mg/kg.
Dermal LD50 (rabbit): >5000 mg/kg.
Inhalation LC50 (rat): 0.49 mg/m³ 4 hour. Dust and Mists

Rats were exposed for two years to a respirable aerosol of polymeric MDI. Chronic pulmonary irritation was observed where rats were exposed to high levels of MDI. Only at the 6mg/m³ was there a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours at 1 mg/m³ and no effects at 0.2 mg/m³. The increased incidence of lung tumours was associated with prolonged respiratory irritation and a concurrent accumulation of yellow material in the lung.

In the absence of prolonged, high levels of exposure causing chronic irritation and lung damage, it is highly unlikely that tumour formation could occur. Industrial experience in humans has not shown a correlation between MDI exposure and cancer development. No birth defects were seen in two independent animal (rat) studies.

Foetotoxicity was observed, only at maternally toxic doses. The doses used in these studies were maximal, respirable concentrations, which were well in excess of defined occupational exposure limits. There is no substantial evidence of a mutagenic potential for MDI.
Respiratory hypersensitivity in guinea pigs has resulted from dermal exposure to MDI.

12. ECOLOGICAL INFORMATION

Ecotoxicity

By comparison with an analogous product, the following values are anticipated. The measured ecotoxicity is that of the hydrolysed product, generally under conditions maximising production of soluble species. Even so, the observed ecotoxicity is low/very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora in all trophic levels (including fish), no detectable diaminodiphenylmethane (MDA), and no evidence of

Ingredient Name	Species	Period	Result
Diphenylmethane 4, 4' - diisocyanate	Zebra Fish (LC50)	96 hours	>100 mg/l
	Daphnia magna (EC50)	48 hours	>100 mg/l

Persistence/degradability

Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino- diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, by calculation and by analogy with related diisocyanates

Mobility

By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise.

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13. DISPOSAL CONSIDERATIONS

Disposal method

Australia

Refer to State/Territory Land Waste Management Authority. Empty containers MUST BE decontaminated.

Dispose of material through a licensed waste contractor.

The generation of waste should be avoided or minimised wherever possible. Untreated material is not suitable for disposal. Waste, even small quantities, should never be poured down drains, sewers or water courses. Small quantities and empty drums - pretreat to neutralise prior to disposal. Large quantities - incinerate under approved controlled conditions, using incinerators suitable for the disposal of hazardous chemical waste. Empty drums should be decontaminated and either passed to an approved drum reconditioner or destroyed. See also brochure PU 193-1 (see section 16).

Special precautions for landfill or incineration: Small quantities and empty drums - pretreat to neutralise prior to disposal. Large quantities - incinerate under approved controlled conditions, using incinerators suitable for the disposal of hazardous chemical waste

14. TRANSPORT INFORMATION

Road and Rail Transport

Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail.

Marine Transport

Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

Air Transport

Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.

15. REGULATORY INFORMATION

Country/Region	Inventory	Status
Australia	AICS	Listed

Hazard classification

Classified as hazardous according to criteria of NOHSC Australia.

Classified as hazardous according to the Hazardous Substances (Classifications) Regulations 2001 (NZ).

Hazard Category

Xn Harmful

Xi Irritant

Risk phrase(s)

R20 Harmful by inhalation.

R36/37/38 Irritating to eyes, respiratory system and skin.

R42/43 May cause sensitisation by inhalation and skin contact.



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Safety phrase(s)

- S23 Do not breathe vapours/spray.
S36/37 Wear suitable protective clothing and gloves.
S38 In case of insufficient ventilation, wear suitable equipment.
S45 In case of accident or if you feel unwell, seek advice immediately (show the label where possible).

Poisons schedule (Aust): None Allocated.

16. OTHER INFORMATION

Reason(s) for issue: First Issue

Literary reference

1) 'Huntsman MDI-Based Compositions: Hazards and Safe-Handling Procedures'. No. PU 193-1E (4ed)/2001.

(2) In Registry of Toxic Effects of Chemical Substances 1998' (Ed. D. Sweet), (U.S. Dept. of Health & Human Services: Cincinnati) 1998.

(3) International Isocyanate Institute Inc. Scientific Office, Compendium of Technical Information, Volume 2 1990- (Ed. III) p 1.4, 1992.

LIQUID MDI DECONTAMINANTS

Decontaminant 1:

- Water 90%
- Concentrated sodium hydroxide solution 8%
- Liquid detergent 2%

Decontaminant 2:

- Water 90-95%
- Sodium carbonate 5-10%
- Liquid detergent 0.2-0.5%

* Note Decontaminant 2 reacts slower with MDI but is more environmentally friendly than Decontaminant 1.

SOLID MDI DECONAMINANTS

- Sand
- Sawdust
- Kitty litter

Material Safety Data Sheets are updated frequently. Please ensure that you have a current copy.

This MSDS summarises at the date of issue our best knowledge of the health and safety hazard information of the product, and in particular how to safely handle and use the product in the workplace. Since LIQUIMIX Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, review this MSDS in the context of how the user intends to handle and use the product in the workplace.

If clarification or further information is needed to ensure that an appropriate assessment can be made, the user should contact this company.

Our responsibility for product as sold is subject to our standard terms and conditions, a copy of which is sent to our customers and is also available upon request.

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