

Safety Data Sheet



1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **TOLUENE DIISOCYANATE (TDI)**

Other name(s): Methylphenylene diisocyanate * Tolylene diisocyanate * Toluene diisocyanate 80/20 * TDI 80/20 * Toluene diisocyanate 100 * TDI 100 * Toluene diisocyanate 65 * TDI 65 * Lupranate T80

Recommended Use of the Chemical and Restrictions on Use Component for the manufacture of urethane polymers.

Supplier: Ixom Operations Pty Ltd
ABN: 51 600 546 512
Street Address: Level 8, 1 Nicholson Street
Melbourne 3000
Australia

Telephone Number: +61 3 9906 3000
Emergency Telephone: **1 800 033 111 (ALL HOURS)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Skin Irritation - Category 2
Skin Sensitisation - Category 1
Eye Irritation - Category 2A
Acute Inhalation Toxicity - Category 1
Respiratory Sensitisation - Category 1
Specific target organ toxicity (single exposure) - Category 3
Carcinogenicity - Category 2
Acute Aquatic Toxicity - Category 3
Chronic Aquatic Toxicity - Category 3

SIGNAL WORD: DANGER



Hazard Statement(s):

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H412 Harmful to aquatic life with long lasting effects.

Product Name: TOLUENE DIISOCYANATE (TDI)
Substance No: 000030115101

Issued: 05/12/2016
Version: 5

Safety Data Sheet



Precautionary Statement(s):

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist, vapours, spray.
P264 Wash hands thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves / protective clothing / eye protection / face protection.
P281 Use personal protective equipment as required.
P284 Wear respiratory protection.
P285 In case of inadequate ventilation wear respiratory protection.

Response:

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310 Immediately call a POISON CENTER or doctor/physician.
P320 Specific treatment is urgent (see First Aid Measures on this Safety Data Sheet).
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P363 Wash contaminated clothing before re-use.
P321 Specific treatment (see First Aid Measures on Safety Data Sheet).
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P304+P341 IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P308+P313 IF exposed or concerned: Get medical advice/attention.

Storage:

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 Dispose of contents and container in accordance with local, regional, national, international regulations.

Poisons Schedule (SUSMP): S6 Poison.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Toluene diisocyanate	26471-62-5	>99.5%	H351 H330 H319 H335 H315 H334 H317 H412

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor. Urgent hospital treatment is likely to be needed.

Safety Data Sheet



Inhalation:

Remove victim from area of 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 patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:

If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water and soap. If swelling, redness, blistering or irritation occurs seek medical assistance.

Eye Contact:

If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes.

Ingestion:

Rinse mouth with water. If swallowed, give a glass of water to drink. If vomiting occurs give further water. Seek medical advice.

Indication of immediate medical attention and special treatment needed:

Treat symptomatically. Effects may be delayed. Medical monitoring for at least 24 hours. No known specific antidote.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Water fog (or if unavailable fine water spray). Alcohol-resistant foam. Dry agent (carbon dioxide, dry chemical powder).

Unsuitable Extinguishing Media:

Solid water jet/stream may scatter and spread the fire. Most foams will react with the material and release corrosive/toxic gases.

Hazchem or Emergency Action Code: 2Z

Specific hazards arising from the chemical:

Combustible liquid. Toxic substance.

Special protective equipment and precautions for fire-fighters:

Keep people away from and upwind of fire. On burning will emit toxic fumes, including those of oxides of carbon. If safe to do so, remove containers from path of fire. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to vapour or products of combustion. Keep containers cool with water spray. Ensure that there is no direct contact between the water and the product.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:

Clear area of all unprotected personnel. Evacuate personnel from downwind areas. Do not allow container or product to get into drains, sewers, streams or ponds. If contamination of sewers or waterways has occurred advise local emergency services.

Safety Data Sheet



Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Wear protective equipment to prevent skin and eye contact and breathing in vapours. Air-supplied masks are recommended to avoid inhalation of toxic material. Contain - prevent run off into drains and waterways. Use absorbent (soil, sand or other inert material). Collect in properly labelled containers, with loose fitting lids, for disposal. Contact with water results in chemical reaction, which may result in rupture of the container. For large amounts, pump off product. Decontaminant: sodium carbonate 5-10%, liquid detergent 0.2-2%, water to 100%.

7. HANDLING AND STORAGE

Classified as a C1 (COMBUSTIBLE LIQUID) for the purpose of storage and handling, in accordance with the requirements of AS 1940. Refer to State Regulations for storage and transport requirements.

This material is a Scheduled Poison S6 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:

Avoid skin and eye contact and breathing in vapour, mists and aerosols. Keep out of reach of children. Never add water to this product. When using do not eat, drink or smoke. Wash hands thoroughly after handling.

Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well ventilated place. Store away from foodstuffs. Store away from sources of heat or ignition. Store below 40°C. Store away from incompatible materials described in Section 10. Protect from moisture. Do not store in galvanised containers. Do not store in aluminium containers. Suitable containers: stainless steel. Keep containers closed when not in use - check regularly for leaks.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for constituent(s):

Isocyanates, all (as -NCO): 8hr TWA = 0.02 mg/m³, 15 min STEL = 0.07 mg/m³, Sen

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration 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 and should not be further exposed to the substance.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Safety Data Sheet



Appropriate engineering controls:

Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Workplace Exposure Standards. Keep containers closed when not in use.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).

* Not required if wearing air supplied mask.



Wear overalls, chemical goggles and impervious gloves. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an air supplied respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.

Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Colour:	Colourless to Pale Yellow
Odour:	Pungent
Solubility:	Reacts with water.
Specific Gravity:	ca. 1.22 @20°C
Relative Vapour Density (air=1):	Not applicable
Vapour Pressure (20 °C):	0.014-0.021 hPa
Flash Point (°C):	131
Flammability Limits (%):	Lower limit may be 5-15°C below the flash point.
Autoignition Temperature (°C):	>595
Boiling Point/Range (°C):	252-254
Decomposition Point (°C):	230
pH:	Not applicable
Viscosity:	3 mPa.s @25°C
Freezing Point/Range (°C):	9.5-10

10. STABILITY AND REACTIVITY

Reactivity: Reacts with water.

Safety Data Sheet



Chemical stability:	Isocyanates react, often violently, with solvents containing active hydrogen including water and alcohols. Also reacts with many materials such as bases, ammonia, primary and secondary amines, acids and metal compounds. May polymerise if heated above 177 °C or above 45 °C for prolonged periods. Carbon dioxide and heat are generated during the polymerisation process resulting in pressure build-up which could rupture closed containers.
Possibility of hazardous reactions:	Hazardous polymerisation may occur. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. Sinks in water and reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed by liberating carbon dioxide gas.
Conditions to avoid:	Avoid contact with water. Avoid exposure to moisture. Avoid exposure to humidity. Avoid temperatures above 40 °C. Avoid temperatures below 16°C. Avoid exposure to heat, sources of ignition, and open flame. Avoid aerosol formation.
Incompatible materials:	Acids, amines, ammonia, alcohols, water, aqueous solutions, galvanised metals, copper, copper alloys, tin, zinc, bases, polymerisation initiators, strong oxidising agents, protic solvents.
Hazardous decomposition products:	Oxides of carbon. Oxides of nitrogen. Hydrogen cyanide.

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 or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:	Swallowing may result in nausea, vomiting, and abdominal pain.
Eye contact:	An eye irritant.
Skin contact:	Contact with skin will result in irritation. A skin sensitizer. Repeated or prolonged skin contact may lead to allergic contact dermatitis.
Inhalation:	Material is irritant to the mucous membranes of the respiratory tract (airways). A respiratory sensitizer. Can cause possible allergic reactions, producing asthma-like symptoms. Symptoms include nasal and throat irritation with increased secretion, headache, nausea and vomiting. Higher levels may lead to bronchitis, constriction of the chest, bronchospasm and pulmonary oedema.

Acute toxicity:

Oral LD50 (rat): 4130-5110 mg/kg (female, male)

Dermal LD50 (rabbit): >9400 mg/kg

Inhalation LC50 (rat): 0.48 mg/L/1h

Skin corrosion/irritation:	Severe irritant (rabbit).
Serious eye damage/irritation:	Severe irritant (rabbit).
Respiratory or skin sensitisation:	A respiratory sensitizer. A skin sensitizer.

Chronic effects: Available evidence from animal studies indicate that repeated or prolonged exposure to this material could result in effects on the lungs.

Carcinogenicity: Suspected of causing cancer.

Safety Data Sheet



Toluene diisocyanate has been reported to have gastrointestinal effects and effects on the liver and kidney when given to animals orally. Rats, guinea pigs and rabbits exposed via the respiratory tract to 0.1 ppm of TDI, 6 hours/day 5 days/week for 58 exposures or 6 hours/day for 38 consecutive days, developed lung inflammation. Lung damage generally increased in severity for several days after exposure ended. Concentration dependent respiratory sensitisation has been produced in guinea pigs. Skin and respiratory sensitisation has occurred following skin application in test animals.

For industrial grade TDI, long-term inhalation studies in rat and mice reveal no indications of carcinogenic potential. Intragastric intubation of high doses of TDI led to increased incidence of tumours. Industrial experience in humans has not shown any link between TDI exposure and cancer development.

This material has been classified by the International Agency for Research on Cancer (IARC) as a Group 2B. Group 2B - The agent is possibly carcinogenic to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicity	Avoid contaminating waterways.
Persistence/degradability:	The material is poorly biodegradable.
Aquatic toxicity:	Harmful to aquatic organisms. May cause long lasting harmful effects to aquatic life.
48hr EC50 (Daphnia magna):	12.5 mg/L (static)
96hr LC50 (fish):	133 mg/L (Oncorhynchus mykiss)

13. DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Normally suitable for incineration by an approved agent.

14. TRANSPORT INFORMATION

Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.



UN No:	2078
Transport Hazard Class:	6.1 Toxic
Packing Group:	II
Proper Shipping Name or Technical Name:	TOLUENE DIISOCYANATE
Hazchem or Emergency Action Code:	2Z

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

Safety Data Sheet



UN No: 2078
Transport Hazard Class: 6.1 Toxic
Packing Group: II
Proper Shipping Name or Technical Name: TOLUENE DIISOCYANATE

IMDG EMS Fire: F-A
IMDG EMS Spill: S-A

Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS.

UN No: 2078
Transport Hazard Class: 6.1 Toxic
Packing Group: II
Proper Shipping Name or Technical Name: TOLUENE DIISOCYANATE

15. REGULATORY INFORMATION

Classification:

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Skin Irritation - Category 2
Skin Sensitisation - Category 1
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H351 Suspected of causing cancer.
H412 Harmful to aquatic life with long lasting effects.

Poisons Schedule (SUSMP): S6 Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

In Australia this substance is on a list for which health surveillance is required: Isocyanates.

16. OTHER INFORMATION

Safety Data Sheet



Supplier Safety Data Sheet; 10/ 2015.

'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2012.

International Agency for Research on Cancer. In: 'IARC Monographs on the Evaluation of Carcinogenic Risk to Humans'. World Health Organisation, 1999.

Reason(s) for Issue:

Revised Primary SDS

Addition/Change of synonymous name(s)

Change in First Aid Measures

Change in Physical Properties

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.