

Material Safety Data Sheet

Toluene Diisocyanate

Section 1 - Product Identification

Synonyms : TDI, 4-Methyl-1,3-phenylene diisocyanate, Toluene 2,4-diisocyanate
Molecular Weight : 174.2 g/mol
Chemical Formula : $C_9H_6N_2O_2$
Company Identification : Tradeasia International Pte. Limited
Address : 133 Cecil Street # 12-03 Keck Seng Tower, Singapore
Tel: +65-6227 6365
Fax: +65-6225 6286
Email: contact@chemtradeasia.com

Recommended use of the chemical and restrictions on use:

Laboratory Chemicals, Manufacture of Substances

Section 2 – Composition/Information on Ingredients

Product Name	EC/CAS No	Concentration
Toluene Diisocyanate	209-544-5/584-84-9	>= 99.7%

Section 3 – Hazards Identification

3.1 GHS Classification

Acute toxicity, Inhalation (Category 1), H330

Skin corrosion/irritation (Category 2), H315

Serious eye damage/eye irritation (Category 2), H319

Respiratory sensitisation (Category 1), H334

Skin sensitisation (Category 1), H317

Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Label elements

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.

Precautionary statement(s)

Prevention

P201 Obtain special instructions before use.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P284 Wear respiratory protection.

Response

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Immediately call a POISON CENTER/doctor.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage

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

3.3 Other hazards

Lachrymator

Section 4 – First-Aid Measures

4.1. Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

Skin contact

Wash off with soap and plenty of water, do not rub the skin. If irritation persists, obtain medical attention.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Inhalation

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Rinse mouth with water. Do not induce vomiting. Drink as much water as possible. If large amounts are swallowed (i.e. more than one teaspoon), contact a doctor or toxicity centre immediately.

4.2. Most important symptoms and effects, both acute and delayed

Most important known symptoms and effects are described in the labelling (section 2.2) and/or in section 11.

4.3. Indication of any immediate medical attention and special treatment needed

N.A.

Section 5 – Fire Fighting Measures

5.1. Suitable Extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2. Specific hazards arising from the chemical

Carbon oxides, Nitrogen oxides (NO_x)

5.3. Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information

Use water spray to cool unopened containers

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed

containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

Section 7 – Handling and Storage

7.1. Precautions for safe Handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Recommended storage temperature 2 - 8 °C

Store under inert gas. Product is sensitive to light and moisture.

Section 8 – Exposure Controls/Personal Protection

8.1. Control parameters

Dimethyl Formamide: PEL (long term), 0.005ppm, 0.036mg/m³ – Basis: Singapore Workplace Safety and Health Act, First Schedule Permissible Exposure Limits of Toxic Substances.

Dimethyl Formamide: PEL (short term), 0.02ppm, 0.14mg/m³ – Basis: Singapore Workplace Safety and Health Act, First Schedule Permissible Exposure Limits of Toxic Substances.

8.2. Appropriate engineering controls

General industrial hygiene practice. Wash hands before breaks and at the end of workday.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Respirator:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Clothing:

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Gloves:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection:

Wear safety goggles or face shield which are tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance : clear, colourless liquid

Odour : N.A.

Odour threshold : N.A.

pH @ 20°C : N.A.

Melting point : 20-22°C – lit.

Boiling point : 115°C to 120°C at 13hPa – lit.

Flash point : 132°C – closed cup

Evaporation rate : N.A.

Flammability : N.A.

Upper/lower flammability or explosive limits : UFL – 9.5% (V), LFL – 20.9% (V)

Vapour pressure : 0.03 hPa at 25°C

Vapour density : 6.01 (Air = 1.0)

Relative density : 1.214 g/cm³ at 25°C

Solubility in water : N.A.

Partition coefficient, n-octanol/water: log Po/w = 3.43 at 22°C

Section 10 – Stability and Reactivity

10.1. Reactivity

N.A.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

N.A.

10.4. Conditions to avoid:

Heat.

10.5. Incompatible materials

Strong oxidizing agents, alcohols, strong bases, amines, acids.

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions – carbon oxides and nitrogen oxides.

Section 11 – Toxicological Information

Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 5.110 mg/kg (Toluene Diisocyanate) (OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 1 h - 0,48 mg/l (Toluene Diisocyanate)

LD50 Dermal - Rabbit - male and female - > 9.400 mg/kg (Toluene Diisocyanate) (OECD Test Guideline 402)

Skin corrosion/irritation

Skin – Rabbit (Toluene Diisocyanate)

Result: Skin irritation - 24 h

Remarks: Moderate skin irritation

Serious eye damage/eye irritation

Eyes – Rabbit (Toluene Diisocyanate)

Result: Irritating to eyes.

(Draize Test)

Respiratory or skin sensitisation

- Guinea pig (Toluene Diisocyanate)

Result: May cause sensitisation by inhalation.

- Guinea pig (Toluene Diisocyanate)

Result: May cause sensitisation by skin contact

Germ cell mutagenicity

Ames test (Toluene Diisocyanate)

S. typhimurium

Result: positive

Mutagenicity (micronucleus test) (Toluene Diisocyanate)

Mouse - male and female

Result: negative

Carcinogenicity

This product is or contains a component that has been reported to be possi-classification.(Toluene-2,4-diisocyanate)

Limited evidence of carcinogenicity in animal studies (Toluene Diisocyanate)
(Toluene Diisocyanate)

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Toluene Diisocyanate)

Reproductive toxicity

No data available (Toluene Diisocyanate)

Specific target organ toxicity - single exposure

May cause respiratory irritation. (Toluene Diisocyanate)
(Toluene Diisocyanate)

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available (Toluene Diisocyanate)

Additional Information

RTECS: CZ6300000

Cough, Shortness of breath, Headache, Nausea, Vomiting (Toluene Diisocyanate)

Section 12 – Ecological Information

12.1.Toxicity

Toxicity to fish static test LC50 - Oncorhynchus mykiss (rainbow trout) - 133 mg/l - 96H (Toluene Diisocyanate)
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - 12,5 mg/l - 48 h (Toluene-2,4- di-isocyanate) (OECD Test Guideline 202)

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 4.300 mg/l - 96 h (Toluene-2,4- di-isocyanate) (OECD Test Guideline 201)

Toxicity to bacteria EC50 - Sludge Treatment - > 100 mg/l - 3 h (Toluene Diisocyanate) (OECD Test Guideline 209)

12.2. Persistence and degradability

Biodegradability aerobic: Biochemical oxygen demand - Exposure time 28 d (Toluene-2,4-diisocyanate) Result: 0 % - Not biodegradable

12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil

No data available

12.5. Other adverse effects

Harmful to aquatic life with long lasting effects

Section 13 – Disposal Considerations

13.1. Disposal methods

Product:

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging:

Dispose of as unused product

Section 14 – Transport Information

14.1. UN number : ADR/RID: 2078 IMDG: 2078 IATA-DGR: 2078

14.2. UN proper shipping name: ADR/RID, IMDG, IATA-DGR – Toluene Diisocyanate

14.3. Transport of hazard classes : ADR/RID: 6.1 IMDG: 6.1 IATA-DGR: 6.1

14.4. Packing group : ADR/RID: II IMDG: II IATA-DGR: II

14.5. Environmental hazards : ADR/RID: no IMDG Marine pollutant: no IATA-DGR: no

14.6. Special precautions for user : No data available

14.7. Incompatible materials: N.A.

Section 15 – Regulatory Information

15.1. Safety, health and environmental regulations for the substance/mixture:

No data available

Section 16 : Additional Information

16.1. Full text of H-Statements referred to under sections 3:

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

16.2. Disclaimer of Liability

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its accuracy, reliability or completeness. The conditions or methods of handling, storage use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.