

SAFETY INFORMATION

Properties, Hazards and Safety Information for TDI

(For more details see the supplier's Safety Data Sheet)

Toluene-2,4-diisocyanate	CAS No.: 584-84-9
Toluene-2,4 / 2,6-diisocyanate mixture	CAS No.: 26471-62-5

Typical Physical and Chemical Data

Appearance	liquid
Colour	colourless to pale yellow
Odour	sharp, pungent
Specific gravity (EEC A3 method)	1.22 g/cm ³ (at 20 °C)
Viscosity	3 mPa s (at 25 °C)
Vapour density	6 (air = 1)
Vapour pressure	0.03 hPa (at 25 °C)
Saturated vapour concentration	160 mg/m ³ (at 25 °C)
Solubility in water	not soluble; reacts with water and generates CO ₂
Boiling point (EEC A2 method)	approx. 250 °C (at 1013 hPa)
Freezing point 2,4-TDI	22 °C
2,4 / 2,6-TDI 80/20	10 °C
2,4 / 2,6-TDI 65/35	6 °C
Flash point (EEC A9 method)	132 °C
Auto-ignition temperature (EEC A15 method)	> 595 °C
Explosion limits (2,4-TDI)	Lower: 0.9% v/v (118 °C) Upper: 9.5% v/v (150 °C) Not explosive by the EEC A14 method
Thermal degradation	Above 250 °C
Hazardous degradation products	CO, CO ₂ , NO _x , HCN and other toxic products
Hazardous reactions with	water, alcohols, amines, acids, bases



CLASSIFICATION AND LABELLING ACCORDING TO REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended up to third Adaptation to Technical Progress COMMISSION REGULATION (EU) No 618/2012

Signal Word

Danger

Labelling

Hazard symbol	GHS06: skull and crossbones	
	GHS08: health hazard	
Chemical name	Toluene-2,4-di-isocyanate (4-methyl-m-phenylene diisocyanate)	

Hazard Statements

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

Precautionary Statements

P273	Avoid release to the environment
P280	Wear protective gloves/protective clothing/eye protection.
P284	Wear respiratory protection .
P308+P313	If exposed or concerned: Get medical advice/attention
P403+P233	Store in well-ventilated place. Keep container tightly closed
P501	Dispose of contents/container to hazardous or special waste collection point

Additional labeling requirements (CLP supplemental hazard statement):

EUH204	Contains isocyanates. May produce an allergic reaction.
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Toxicology / Health Hazard Data

Short-Term Exposure

Inhalation	<p>LC₅₀ (4 hours rat): 100 - 360 mg/m³ (aerosol and vapour). Vapour and aerosols can cause severe irritation of the respiratory tract with a burning sensation to the nose and throat. High exposure concentration can result in inflammation of lung tissue and fluid in the lungs. In hyper-reactive or hyper-sensitive people very low concentrations may lead to bronchoconstriction (asthmatic signs and symptoms). The onset of symptoms may be delayed for several hours after exposure.</p>
Eye contact	<p>May cause irritation and reversible corneal injury. Vapours may irritate eyes.</p>
Skin contact	<p>Dermal LD₅₀ (rabbit) >9000 mg/kg. According to human experience, the material may cause moderate irritation. Animal studies have shown that skin contact, with MDI / TDI, may play a role in respiratory sensitisation. This emphasises the need to ensure protective clothing and gloves be worn when handling diisocyanate products.</p>
Ingestion	<p>Single dose oral toxicity is low: LD₅₀ (oral rat) >5000 mg/kg. Ingestion may cause irritation to the gastro-intestinal tract.</p>

Repeated and Long-Term Exposure

Inhalation & skin contact	<p>May cause sensitisation by inhalation. Chronic exposure by inhalation may result in permanent decrease in lung function. May cause sensitisation by skin contact.</p>
Carcinogenicity	<p>Long term inhalation studies (rat, mouse) reveal no indications of carcinogenic potential; intragastric intubation of high and toxic doses of TDI led to increased incidence of tumours. However since intra gastric intubation is not an occupational route of exposure, the inhalation study is of more biological relevance to man. Industrial experience in humans has not shown any link between TDI exposure and cancer development.</p>
Reproductive Toxicity	<p>There is no observation or demonstration of adverse effects of TDI on reproduction. TDI has shown not to induce birth defects.</p>

First Aid Procedures

Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to medical facility. Exposed persons should be kept under medical observation for at least 48 hours because delayed effects may occur.
Eye contact	In case of contact with eyes, rinse immediately with plenty of water for not less than 10 minutes and seek medical advice.
Skin contact	Remove contaminated clothing. Immediate washing after skin exposure is important. Wash skin with warm water using soap. An MDI study has demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. This may also apply to TDI.
Ingestion	DO NOT INDUCE VOMITING. Wash out the mouth with water; do not swallow. Obtain medical attention immediately.
Advice to Physicians	TDI containing compositions are respiratory irritants and potential respiratory and skin sensitizers. Treatment is essentially symptomatic for primary irritations or bronchospasm. Exposed persons should be kept under medical observation for at least 48 hours because delayed effects may occur.

Ecology

Ecotoxicology	Measured ecotoxicity is that of hydrolysed product, generally under conditions maximizing production of soluble species. The observed ecotoxicity to fish, bacteria and invertebrates is low / slight and to worms and plants is very low. Harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
Degradation	Reacts with water to form, predominantly insoluble polyureas, which are chemically and biologically inert. Conversion to soluble products, including toluene diamine, is only appreciable under well-dispersed, low concentration conditions more typical of laboratory tests than of environmental spillages. In air, the predominant degradation process is OH radical attack and is relatively rapid.

Transport Classification

United Nations

UN number	2078
Class	6.1
Packing Group	II
Proper Shipping Name	TOLUENE DIISOCYANATE

Sea (IMDG - Code)

UN number	2078
Class	6.1
Packaging group	II
Label	Toxic (skull and crossbones)
Proper shipping name	TOLUENE DIISOCYANATE

Road / Rail (ADR - RID)

UN number	2078
Class	6.1
Packing group	II
Label	Toxic (skull and crossbones)
Proper shipping name	TOLUENE DIISOCYANATE
Orange-coloured plate:	60 2078

Air (ICAO - TI)

UN number	2078
Class	6.1
Packing group	II
Label	Toxic (skull and crossbones)
Proper shipping name	TOLUENE DIISOCYANATE

Further information

If you have questions or would like further information, please contact the ISOPA secretariat.



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ISOPA is an affiliated organisation within the European Chemical Industry Council (Cefic)

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