

Material Safety Data Sheet

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Version 1.5

According to 91/155/EEC

1 - Product and Company Information

Product Name 2,4'-TDI
 Product Number 33427

Company Sigma-Aldrich Company Ltd.
 The Old Brickyard
 New Road, Gillingham SP8 4XT
 United Kingdom

Technical Phone # 44-(0)-1747-833000
 Fax 44-(0)-1747-833313
 Emergency Phone # 44-(0)-1747-833100

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
TOLYLENE 2,4-DIISOCYANATE	584-84-9	209-544-5	615-006-00-4

Formula C9H6N2O2
 Molecular Weight 174.16 AMU
 Synonyms Cresorcinol diisocyanate * Desmodur T80 *
 Di-isocyanate de toluylene (French) *
 Di-iso-cyanatoluene *
 2,4-Diisocyanato-1-methylbenzene (9CI) *
 2,4-Diisocyanatotoluene * Diisocyanat-toluol
 (German) * Hylene T * Isocyanic acid,
 4-methyl-m-phenylene ester * 4-Methyl-phenylene
 diisocyanate * 4-Methyl-phenylene isocyanate *
 Mondur TD * Mondur TD-80 * Mondur TDS *
 Nacconate IOO * NCI-C50533 * RCRA waste number
 U223 * TDI * 2,4-TDI * TDI-80 * TDI (OSHA) *
 Tolueen-diisocyanaat (Dutch) *
 Toluen-disocianato (Italian) * Toluene
 diisocyanate * Toluene-2,4-diisocyanate *
 2,4-Toluenediisocyanate *
 Toluene-2,4-diisocyanate (ACGIH:OSHA) *
 Toluilenodwizocyjanian (Polish) *
 Tuluylendiisocyanat (German) *
 Toluylene-2,4-diisocyanate * Tolyene
 2,4-diisocyanate * Tolylene-2,4-diisocyanate *
 2,4-Tolylenediisocyanate

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT

Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Carc. Cat.3

4 - First Aid Measures

AFTER INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

AFTER EYE CONTACT

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA

Suitable: Carbon dioxide. Dry chemical powder.

SPECIAL RISKS

Specific Hazard(s): Emits toxic fumes under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP

Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

Directions for Safe Handling: Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure. Do not breathe vapor.

STORAGE

Conditions of Storage: Keep tightly closed. Store under nitrogen.

SPECIAL REQUIREMENTS: Store under inert gas. Light and moisture sensitive.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.035 MG/M3
Poland		NDSCh	0.07 MG/M3
Poland		NDSP	-

EXPOSURE LIMITS - DENMARK

Source	Type	Value
OEL	TWA	0.035 mg/m3
		0.005 ppm

Remarks: K

EXPOSURE LIMITS - GERMANY

Source	Type	Value
TRGS 900	OEL	0.07 mg/m3
		0.01 ppm

Remarks: =1=

EXPOSURE LIMITS - NORWAY

Source	Type	Value
	OEL	0.035 mg/m3
		0.005 ppm

Remarks: AK 3)

EXPOSURE LIMITS - SWEDEN

Source	Type	Value
	LLV (Level)	0.04 mg/m3
		0.005 ppm

Remarks: K, S

EXPOSURE LIMITS - UNITED KINGDOM

Source	Type	Value
OEL	TWA	0.02MG(NCO)/M3
OEL	STEL	0.07 mg(NCO)/m3

PERSONAL PROTECTIVE EQUIPMENT

Special Protective Measures: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing. Faceshield (8-inch minimum).

9 - Physical and Chemical Properties

Appearance	Physical State: Clear liquid	
	Color: Colorless	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	124.0 - 126.0 °C	18 mmHg
MP/MP Range	20 °C	
Flash Point	132 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	> 620 °C	
Oxidizing Properties	N/A	

Explosive Properties	N/A	
Explosion Limits	Lower: 0.9 %	
	Upper: 9.5 %	
Vapor Pressure	0.03 mmHg	25 °C
SG/Density	1.21 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	6 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	25 mN/m	25 °C
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	Other Solvents: ETHYL ACETATE	

10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions of Instability: Light sensitive. Moisture sensitive.

Conditions to Avoid: Heat.

Materials to Avoid: Alcohols, Strong bases, Amines, Acids, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides, Hydrogen cyanide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: CZ6300000

ACUTE TOXICITY

LD50

Oral

Rat

5800 mg/kg

Remarks: Gastrointestinal:Other changes.

LC50

Inhalation

Rat

14 ppm

4H

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Behavioral:Excitement. Lungs, Thorax, or Respiration:Dyspnea.

LC50

Inhalation

Mouse

10 ppm

4H

Remarks: Lungs, Thorax, or Respiration:Structural or functional

change in trachea or bronchi. Lungs, Thorax, or
Respiration:Changes in pulmonary vascular resistance.

LD50
Intravenous
Mouse
56 MG/KG

LC50
Inhalation
Rabbit
11 ppm
4H
Remarks: Behavioral:Excitement. Lungs, Thorax, or
Respiration:Dyspnea. Gastrointestinal:Changes in structure or
function of salivary glands.

LD50
Skin
Rabbit
>16 ML/KG

LC50
Inhalation
Guinea pig
13 ppm
4H
Remarks: Lungs, Thorax, or Respiration:Changes in pulmonary
vascular resistance. Lungs, Thorax, or Respiration:Structural or
functional change in trachea or bronchi. Lungs, Thorax, or
Respiration:Pleural effusion.

LD50
Oral
Bird (wild)
100 mg/kg

IRRITATION DATA

Skin
Rabbit
500 mg
Remarks: Open irritation test

Skin
Rabbit
500 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
100 mg
Remarks: Severe irritation effect

SENSITIZATION

Sensitization: May cause allergic respiratory and skin reactions
Causes dermatitis.

SIGNS AND SYMPTOMS OF EXPOSURE

Symptoms of exposure may include burning sensation, coughing,
wheezing, laryngitis, shortness of breath, headache, nausea, and

vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Repeated exposure may cause asthma.

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation. Lachrymator.
Inhalation: Vapor or mist is irritating to the mucous membranes and upper respiratory tract. May be fatal if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN INFORMATION

Lungs. Nerves.

CONDITIONS AGGRAVATED BY EXPOSURE

Acts as a mild acetyl cholinesterase inhibitor.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC CARCINOGEN LIST

Rating: Group 2B

CHRONIC EXPOSURE - MUTAGEN

Mouse
75 MG/L
Cell Type: lymphocyte
specific locus test

Hamster
300 MG/L
Cell Type: ovary
Sister chromatid exchange
CMR CAT.: Carc. Cat.3

12 - Ecological Information

No data available.

ECOTOXICOLOGICAL EFFECTS

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 108.8 - 240.4 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR

UN#: 2078
Class: 6.1
PG: II
Proper Shipping Name: Toluene diisocyanate

IMDG

UN#: 2078
Class: 6.1
PG: II
Proper Shipping Name: Toluene diisocyanate
Marine Pollutant: No
Severe Marine Pollutant: No

IATA

UN#: 2078
Class: 6.1
PG: II
Proper Shipping Name: Toluene diisocyanate
Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 615-006-00-4

NOTA: C

INDICATION OF DANGER: T+

Very toxic.

R-PHRASES: 26-36/37/38-40-42/43-52/53

Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-PHRASES: 23-36/37-45-61

Do not breathe vapor. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 2
ID-Number: 511
KBwS-Decision

16 - Other Information

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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