

# Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
  	<p>Highly toxic; do not ingest or inhale. Irritating to skin, eyes, and the respiratory system. Environmental hazard. This material is toxic to aquatic organisms and may cause long term adverse effects to the aquatic environment. Lachrymator. This compound is a possible skin sensitizer. Moisture sensitive material. Light sensitive. Store under inert gas. <b>POSSIBLE CARCINOGEN. MINIMIZE EXPOSURE.</b></p>	   

## Section I. Chemical Product and Company Identification

Chemical Name	<b>Tolylene 2,4-Diisocyanate</b>		
Catalog Number	T0263	Supplier	TCI America 9211 N. Harbortgate St. Portland OR 1-800-423-8616
Synonym	Benzene, 2,4-diisocyanato-1-methyl- (CA INDEX NAME); 2,4-Diisocyanatotoluene; 4-Methyl-1,3-phenylene Diisocyanate; 4-Methyl-m-phenylene Diisocyanate; Toluene-2,4-diisocyanate		
Chemical Formula	C <sub>9</sub> H <sub>6</sub> N <sub>2</sub> O <sub>2</sub>		
CAS Number	584-84-9	In case of Emergency Call <b>Chemtrec®</b> <b>(800) 424-9300 (U.S.)</b> <b>(703) 527-3887 (International)</b>	

## Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Tolylene 2,4-Diisocyanate	584-84-9	Min. 98.0 (GC)	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD <sub>50</sub> (oral) 5800 mg/kg Rat LD <sub>50</sub> (inhalation) 14 ppm/4H Mouse LD <sub>50</sub> (intravenous) 56 mg/kg

## Section III. Hazards Identification

Acute Health Effects	<p>Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.</p>
Chronic Health Effects	<p><b>CARCINOGENIC EFFECTS</b> : Not available. <b>MUTAGENIC EFFECTS</b> : Not available. <b>TERATOGENIC EFFECTS</b> : Not available. <b>DEVELOPMENTAL TOXICITY</b>: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.</p>

## Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

**Section V. Fire and Explosion Data**

Flammability	May be combustible at high temperature.	Auto-Ignition	620 °C (1148 °F)
Flash Points	132 °C (269.6 °F).	Flammable Limits	LOWER: 0.9% UPPER: 9.5%
Combustion Products	These products are toxic carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO, NO <sub>2</sub> ). WARNING: Very toxic cyanide gas may be produced in a fire. Do not inhale.		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. Consult with local fire authorities before attempting large scale fire-fighting operations.		

**Section VI. Accidental Release Measures**

Spill Cleanup Instructions	Highly toxic material. Irritating material. Environmentally hazardous material. Lachrymatory agent. Possible skin sensitizer. Possibly carcinogenic material. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: DO NOT get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. DO NOT touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.
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**Section VII. Handling and Storage**

Handling and Storage Information	HIGHLY TOXIC. IRRITANT. ENVIRONMENTAL HAZARD. LACHRYMATORY. POSSIBLE SENSITIZER. POSSIBLE CARCINOGEN. LIGHT AND MOISTURE SENSITIVE MATERIAL. STORE UNDER INERT GAS. Keep locked up.. Keep away from heat. Mechanical exhaust required. When not in use, tightly seal the container and store in a dry, cool place. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, acids, alkalis (bases), moisture.
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**Section VIII. Exposure Controls/Personal Protection**

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.

**Section IX. Physical and Chemical Properties**

Physical state @ 20°C	Liquid. (Clear, colorless.)	Solubility	Miscible with acetone, alcohol (decomposition), benzene, carbon tetrachloride, chlorobenzene, diglycol monomethyl ether, ether, kerosene, olive oil. Soluble in ethyl acetate. Insoluble in water.
Specific Gravity	1.2244 (water=1)	Partition Coefficient	LOG P <sub>ow</sub> : 0.21
Molecular Weight	174.16	Vapor Pressure	1.3 Pa (@ 20 °C)
Boiling Point	251 °C (483.8 °F)	Vapor Density	6.0 (Air = 1)
Melting Point	19.5 to 21.5 °C (67.1 to 70.7 °F)	Volatility	Not available.
Refractive Index	1.5689	Odor	Pungent,fruity.
Critical Temperature	Not available.	Taste	Not available.
Viscosity	Not available.		

**Section X. Stability and Reactivity Data**

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light. Moisture sensitive.
Incompatibilities	Reactive with strong oxidizing agents, acids, alkalis (bases), moisture, water, alcohols, amines.

**Section XI. Toxicological Information**

RTECS Number	CZ6300000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD <sub>50</sub> (oral) 5800 mg/kg Rat LD <sub>50</sub> (inhalation) 14 ppm/4H Mouse LD <sub>50</sub> (intravenous) 56 mg/kg
Chronic Toxic Effects	<b>CARCINOGENIC EFFECTS</b> : Not available. <b>MUTAGENIC EFFECTS</b> : Not available. <b>TERATOGENIC EFFECTS</b> : Not available. <b>DEVELOPMENTAL TOXICITY</b> : Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Acute Toxic Effects	Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

**Section XII. Ecological Information**

Ecotoxicity	Not available.
Environmental Fate	2,4-Toluene diisocyanate's production and use in the manufacture of polyurethane foam products and coatings, in sprays, insulation materials, and polyurethane foam coated fabrics may result in its release to the environment through various waste streams. Commercial toluene diisocyanate (TDI) typically contains 80% of 2,4-toluene diisocyanate. If released to air, a vapor pressure of 8X10 <sup>-3</sup> mm Hg at 25 deg C indicates 2,4-toluene diisocyanate will exist solely as a vapor in the ambient atmosphere. Vapor-phase 2,4-toluene diisocyanate will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 1.7 days. Atmospheric degradation may also occur through contact with clouds, fog or rain. If released to water or moist soil, 2,4-toluene diisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. 2,4-Toluene diisocyanate is not expected to volatilize from dry soil surfaces based upon its vapor pressure. If spilled on wet land, TDI is rapidly degraded. If released into water, a crust forms around the liquid TDI and less than 0.5% of the original material remains after 35 days. Low concentrations of TDI hydrolyze in the aqueous environment in approximately a day. In the atmosphere, TDI reacts with photochemically produced hydroxyl radicals (half-life 3.3 hr) and is also removed by dry deposition. Human exposure is primarily occupational via inhalation and dermal contact.

**Section XIII. Disposal Considerations**

Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.
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**Section XIV. Transport Information**

DOT Classification	DOT CLASS 6.1: Toxic material.
PIN Number	UN2078
Proper Shipping Name	Toluene diisocyanate
Packing Group (PG)	II RQ = 100 (45.4)
DOT Pictograms	

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA)	This compound is <b>ON</b> the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). On DSL.
EINECS Number (EEC)	209-544-5
EEC Risk Statements	R26/27/28- Very toxic by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin. R45- May cause cancer. R51- Toxic to aquatic organisms. R53- May cause long-term adverse effects in the aquatic environment.
Japanese Regulatory Data	ENCS No. 3-2214

**Section XVI. Other Information**

**Version 1.0**  
**Validated on 9/8/2008.**  
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**Notice to Reader**

TCl laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.

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