

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	<p>Highly toxic compound, do not ingest or inhale. Avoid all contact with this material.</p> <p>Irritating to skin, eyes, and the respiratory system.</p> <p>This compound is a skin and respiratory sensitizer.</p> <p>Lachrymator.</p> <p>Moisture sensitive material.</p> <p>May develop pressure.</p> <p>Store under argon.</p>	

Section I. Chemical Product and Company Identification

Chemical Name	Hexamethylene Diisocyanate		
Catalog Number	H0324	Supplier	TCI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
Synonym	Hexane, 1,6-diisocyanato- (CA INDEX NAME); 1,6-Diisocyanatohexane		
Chemical Formula	C ₈ H ₁₂ N ₂ O ₂		
CAS Number	822-06-0	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Hexamethylene Diisocyanate	822-06-0	Min. 98.0 (GC)	Not available.	Rat LD ₅₀ (oral) 710 µL/kg Rabbit LD ₅₀ (dermal) 570 µL/kg Rat LD ₅₀ (inhalation) 124 mg/m ³ /4H

Section III. Hazards Identification

Acute Health Effects	<p>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.</p> <p>Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. 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.</p> <p>Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.</p>
Chronic Health Effects	<p>CARCINOGENIC EFFECTS : Not available.</p> <p>MUTAGENIC EFFECTS : Not available.</p> <p>TERATOGENIC EFFECTS : Not available.</p> <p>DEVELOPMENTAL TOXICITY: Not available.</p> <p>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. 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	454 °C (849.2 °F)
Flash Points	138 °C (280.4 °F)	Flammable Limits	LOWER: 0.9% UPPER: 9.5%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂).		
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.		

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Emergency phone number (800) 424-9300

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. This material is a skin and respiratory sensitizer. Lachrymatory material. Moisture sensitive material.
Stop leak if without risk. DO NOT get water inside container. 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. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information

HIGHLY TOXIC. IRRITANT. SKIN AND RESPIRATORY SENSITIZER. LACHRYMATORY. MOISTURE SENSITIVE. MAY DEVELOP PRESSURE. STORE UNDER ARGON. 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, alkalis (bases), moisture.

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

Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, colorless ~ light yellow.)	Solubility	Very soluble in ether. Soluble in benzene, toluene, acetone, chlorobenzene, ethyl acetate.
Specific Gravity	1.05 (water=1)		
Molecular Weight	168.19	Partition Coefficient	LOG P _{ow} : 1.08
Boiling Point	255°C (491 °F)	Vapor Pressure	7 Pa (@ 25 °C)
Melting Point	-67°C (-88.6°F)	Vapor Density	5.8 (Air = 1)
Refractive Index	1.45	Volatility	Not available.
Critical Temperature	Not available.	Odor	Pungent.
Viscosity	Not available.	Taste	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 oxidizing agents, alkalis (bases), moisture, alcohols, amines.

Section XI. Toxicological Information

RTECS Number	MO1740000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 710 µL/kg Rabbit LD ₅₀ (dermal) 570 µL/kg Rat LD ₅₀ (inhalation) 124 mg/m ³ /4H
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : 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	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. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. 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.

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Section XII. Ecological Information

Ecotoxicity Not available.

Environmental Fate Hexamethylene diisocyanate's production and use as a chemical intermediate in polyurethanes may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 0.5 mm Hg at 24 deg C indicates that hexamethylene diisocyanate will exist solely in the vapor phase in the ambient atmosphere. Vapor-phase hexamethylene 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 16 hours. Atmospheric degradation may also occur through contact with clouds, fog or rain. Hexamethylene diisocyanate reacts readily with water to form amines and polyureas. If released to water or moist soil, hexamethylene diisocyanate is not expected to leach or adsorb to solids due to its rapid degradation reaction with water. Since hexamethylene diisocyanate reacts with water to form amines and urea, there is very little chance that it will accumulate in the food chain as monomeric hexamethylene diisocyanate. Occupational exposure to hexamethylene diisocyanate may occur through inhalation of vapors and aerosols and through dermal contact with this compound and other products that contain hexamethylene diisocyanate.

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.

Section XIV. Transport Information

DOT Classification DOT CLASS 6.1: Toxic material

PIN Number UN2281

Proper Shipping Name Hexamethylene 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 **ON** 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) 212-485-8

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.
R42/43- May cause sensitization by inhalation and skin contact.

Japanese Regulatory Data ENCS No. 2-2863

Section XVI. Other Information

Version 1.0
Validated on 3/23/2011.
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Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, household, 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.