








Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
  	<p>Flammable material; avoid heat and sources of ignition. Environmental hazard. This material is harmful to aquatic organisms and may cause long term adverse effects to the aquatic environment. Harmful compound, minimize exposure. Irritating to skin, eyes, and the respiratory system. Hygroscopic -- keep container tightly sealed. Store under argon.</p>	   

Section I. Chemical Product and Company Identification

Chemical Name	1,4-Diazabicyclo[2.2.2]octane		
Catalog Number	D0134	Supplier	TCI America 9211 N. Harbortgate St. Portland OR 1-800-423-8616
Synonym	1,4-Diazabicyclo[2.2.2]octane (CA INDEX NAME)		
Chemical Formula	C ₆ H ₁₂ N ₂		
CAS Number	280-57-9	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
1,4-Diazabicyclo[2.2.2]octane	280-57-9	Min. 98.0 (T)	Not available.	Rat LD ₅₀ (oral) 1400 mg/kg Mouse LD ₅₀ (oral) 859 mg/kg Rabbit LD ₅₀ (oral) 1100 mg/kg

Section III. Hazards Identification

Acute Health Effects	Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury 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. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Not available. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

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. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
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	Flammable.	Auto-Ignition	Not available.
Flash Points	70°C (158°F).	Flammable Limits	Not available.
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.		
Fire Fighting Media and Instructions	Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Continued on Next Page

Emergency phone number (800) 424-9300

Section VI. Accidental Release Measures

Spill Cleanup Instructions Flammable material. Environmentally hazardous material. Harmful material. Irritating material. Hygroscopic material. Stop leak if without risk. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. 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.

Section VII. Handling and Storage

Handling and Storage Information FLAMMABLE. ENVIRONMENTAL HAZARD. HARMFUL. IRRITANT. HYGROSCOPIC. STORE UNDER ARGON. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe dust.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection Splash goggles. Lab coat. Dust respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.



Exposure Limits Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Solid. (Crystal, powder. White - slightly pale yellow.)	Solubility	Soluble in water (45g/100g @ 25°C), Ethanol, Benzene, Acetone, Methyl ethyl ketone.
Specific Gravity	1.14 (water=1)		
Molecular Weight	112.17	Partition Coefficient	LOG P _{ow} : -0.83
Boiling Point	174°C (345.2°F)	Vapor Pressure	0.4 kPa @ 50°C
Melting Point	155°C (311°F)	Vapor Density	Not available.
Refractive Index	Not available.	Volatility	Not available.
Critical Temperature	Not available.	Odor	Not available.
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. Hygroscopic; keep container tightly closed.

Incompatibilities Reactive with strong oxidizing agents, strong acids.

Section XI. Toxicological Information

RTECS Number HM0354200

Routes of Exposure Eye Contact. Ingestion. Inhalation.

Toxicity Data
Rat LD₅₀ (oral) 1400 mg/kg
Mouse LD₅₀ (oral) 859 mg/kg
Rabbit LD₅₀ (oral) 1100 mg/kg

Chronic Toxic Effects
CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Acute Toxic Effects Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury 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.
Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity Not available.

Environmental Fate Triethylenediamine's production and use as a catalyst in the manufacture of urethane foams may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 0.742 mm Hg at 25 deg C indicates triethylenediamine does not contain chromophores that absorb at wavelengths 290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight. If released to soil, triethylenediamine is expected to have very high mobility based upon an estimated Koc of 3.4. The pKa1 and pKa2 of triethylenediamine are 3.0 and 8.7, respectively, indicating that this compound will primarily exist in the cation form in the environment and cations generally have lower mobility in soils than their neutral counterparts. Volatilization from moist soil surfaces is not expected to be an important fate process since triethylenediamine primarily exists in the cation form in the environment. Triethylenediamine may volatilize from dry soil surfaces slowly based upon its vapor pressure. A 0% theoretical BOD using the Japanese MITI test suggests that biodegradation is not an important environmental fate process. If released into water, triethylenediamine is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. The pKa1 and pKa2 values of 3.0 and 8.71, respectively, indicate triethylenediamine will exist almost entirely in the cation form at pH values of 5 to 9 and therefore volatilization from water surfaces is not expected to be an important fate process. Measured BCF values of <1.3 and <13 suggests bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions. Occupational exposure to triethylenediamine may occur through inhalation and dermal contact with this compound at workplaces where triethylenediamine is produced or used.

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 4.1: Flammable solid.

PIN Number UN1325

Proper Shipping Name Flammable solids, organic, n.o.s.

Packing Group (PG) II

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 B-4: Flammable solid.
On DSL.

EINECS Number (EEC) 205-999-9

EEC Risk Statements
R10- Flammable.
R18- In use, may form flammable/explosive vapor-air mixture.
R52- Harmful to aquatic organisms.
R53- May cause long-term adverse effects in the aquatic environment.
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.
R36/37/38- Irritating to eyes, respiratory system and skin.

Japanese Regulatory Data ENCS no.: 5-1141

Section XVI. Other Information

Version 1.0
Validated on 9/16/2011.
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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.