TCI AMERICA

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	**THIS MATERIAL IS TOXIC BY INHALATION.** **Highly toxic; do not ingest or inhale.** **Flammable material; avoid heat and sources of ignition.** **Corrosive to eyes and skin on contact.** **CARCINOGEN. MINIMIZE EXPOSURE.** **Environmental hazard.** **This material is toxic to aquatic organisms and may cause long term adverse effects to the aquatic environment.** **Hygroscopic -- keep container tightly sealed.** **Refrigerate.**	

Section I. Chemical Product and Company Identification

Chemical Name: **1,1-Dimethylhydrazine**

Catalog Number	D0740
Synonym	Not available.
Chemical Formula	$C_2H_8N_2$
CAS Number	57-14-7

Supplier: TCI America
9211 N. Harborgate St.
Portland OR
1-800-423-8616

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
1,1-Dimethylhydrazine	57-14-7	Min. 97.0 (GC,T)	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD_{50} (oral) 122 mg/kg Rabbit LD_{50} (dermal) 1060 mg/kg Rat LD_{50} (inhalation) 252 ppm/4H

Section III. Hazards Identification

Acute Health Effects

Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested.
Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Chronic Health Effects

CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Tumorigenic effects.
Rat TDLo Oral 150 mg/kg for 7 weeks intermittent
TOXIC EFFECTS:
Tumorigenic - Equivocal tumorigenic agent by RTECS criteria
Sense Organs and Special Senses - Tumors
Gastrointestinal - Colon tumors
Mouse TDLo Oral 5880 mg/kg for 42 weeks continuous
TOXIC EFFECTS:
Tumorigenic - Carcinogenic by RTECS criteria
Vascular - Tumors
Lung, Thorax, or Respiration - Tumors
Mouse TDLo Subcutaneous 420 mg/kg for 21 weeks intermittent
TOXIC EFFECTS:
Tumorigenic - Neoplastic by RTECS criteria
Gastrointestinal - Colon tumors
DEVELOPMENTAL TOXICITY: Reproductive effects.
Rat TDLo Intraperitoneal 600 mg/kg, female 6-15 days of pregnancy
TOXIC EFFECTS:
Effects on Fertility - Post-implantation mortality
Effects on Embryo or Fetus - Fetotoxicity
Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

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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	DO NOT INDUCE VOMITING. 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	249°C (480.2°F)
Flash Points	-15°C (5°F)	Flammable Limits	LOWER: 2% UPPER: 95%
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 liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	This material is toxic by inhalation. Highly toxic material. Flammable material. Corrosive material. Carcinogenic material. Environmentally hazardous material. Hygroscopic material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information	TOXIC BY INHALATION. HIGHLY TOXIC. FLAMMABLE. CORROSIVE. CARCINOGEN. ENVIRONMENTAL HAZARD. HYGROSCOPIC. REFRIGERATE. Keep locked up. Keep container dry. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. 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.

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	Face shield. 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 carcinogen. There is no acceptable exposure limit for a carcinogen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Light yellow.)	Solubility	Miscible with water with evolution of heat. Also miscible with alcohol, ether, dimethylformamide, hydrocarbons.
Specific Gravity	0.79 (water=1)		
Molecular Weight	60.10	Partition Coefficient	Not available.
Boiling Point	64°C (147.2°F)	Vapor Pressure	20.93 kPa (@ 25°C)
Melting Point	-58°C (-72.4°F)	Vapor Density	1.94 (Air = 1)
Refractive Index	1.41	Volatility	Not available.
Critical Temperature	Not available.	Odor	Characteristic ammonia-like, fishy odor of aliphatic hydrazines.
Viscosity	Not available.	Taste	Not available.

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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 oxidizing agents, moisture.

Section XI. Toxicological Information

RTECS Number	MV2450000
Routes of Exposure	Eye Contact. Ingestion. Inhalation. Skin contact.
Toxicity Data	Rat LD_{50} (oral) 122 mg/kg Rabbit LD_{50} (dermal) 1060 mg/kg Rat LD_{50} (inhalation) 252 ppm/4H
Chronic Toxic Effects	**CARCINOGENIC EFFECTS** : Carcinogenic by RTECS criteria. **MUTAGENIC EFFECTS** : Not available. **TERATOGENIC EFFECTS** : Tumorigenic effects. Rat TDLo Oral 150 mg/kg for 7 weeks intermittent TOXIC EFFECTS: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Sense Organs and Special Senses - Tumors Gastrointestinal - Colon tumors Mouse TDLo Oral 5880 mg/kg for 42 weeks continuous TOXIC EFFECTS: Tumorigenic - Carcinogenic by RTECS criteria Vascular - Tumors Lung, Thorax, or Respiration - Tumors Mouse TDLo Subcutaneous 420 mg/kg for 21 weeks intermittent TOXIC EFFECTS: Tumorigenic - Neoplastic by RTECS criteria Gastrointestinal - Colon tumors **DEVELOPMENTAL TOXICITY**: Reproductive effects. Rat TDLo Intraperitoneal 600 mg/kg, female 6-15 days of pregnancy TOXIC EFFECTS: Effects on Fertility - Post-implantation mortality Effects on Embryo or Fetus - Fetotoxicity Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. 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. Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	1,1-Dimethylhydrazine's production and use as a component of jet and rocket fuels, in chemical synthesis, as a stabilizer for organic fuel additives, as an absorbent for acid gases, and in photography may result in its release to the environment through various waste streams. 1,1-Dimethylhydrazine is also formed as a degradation product of daminozide, a plant growth regulator. If released to the atmosphere, 1,1-dimethylhydrazine will exist solely in the vapor phase in the ambient atmosphere, based on a measured vapor pressure of 167 mm Hg at 25 deg C. 1,1-Dimethylhydrazine is expected to react very quickly with ozone in the troposphere with an estimated half-life of 16.5 minutes. Vapor-phase 1,1-dimethylhydrazine is also degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals with an estimated half-life of about 6 days. If released to soil, 1,1-dimethylhydrazine is expected to have very high mobility based on an estimated Koc of 20. 1,1-Dimethylhydrazine is a weak base with pKa of 7.21, suggesting that it will partially exist in the protonated form in water and moist soils and the protonated form may adsorb to soils more than the free base. Volatilization from moist soil surfaces is not expected for the protonated species since cations do not volatilize. Volatilization may occur for the neutral species based on an estimated Henry's Law constant of 1.3X10-5 atm-cu m/mole. The potential for volatilization of 1,1-dimethylhydrazine from dry soil surfaces may exist based on its vapor pressure. 1,1-Dimethylhydrazine degrades in soils through a combination of biotic and abiotic processes; however, at high concentrations 1,1-dimethylhydrazine is toxic to microbial organisms. 1,1-Dimethylhydrazine was degraded 0, 11, 11, and 50% in cleaned sand (100% sand), sandy soil, organic soil, and clay soil, respectively in a 1 hour soil column study. If released to water, the neutral species is not expected to adsorb to suspended solids and sediment based on the estimated Koc value; however, the protonated form may have greater adsorption. The protonated form will not volatilize, but the neutral species may volatilize based on the estimated Henry's Law constant. Volatilization half-lives of 36 hours and 19 days were estimated for a model pond and lake, respectively for the free base. The half-life of 1,1-dimethylhydrazine in pond water ranged from 16 to 22 days and the half-life in sea water was about 13 days. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Occupational exposure to 1,1-dimethylhydrazine occurs through inhalation and dermal contact at workplaces where this compound is produced and used. Monitoring data suggest the general population may be exposed to 1,1-dimethylhydrazine through the inhalation of tobacco smoke or ingestion of food items containing this compound.

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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 DOT CLASS 3: Flammable liquid DOT CLASS 8: Corrosive material
PIN Number	UN1163
Proper Shipping Name	Dimethylhydrazine, unsymmetrical
Packing Group (PG)	I **ZONE B** **MARINE POLLUTANT** **RQ = 10 (4.54)**
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-2: Flammable liquid with a flash point lower than 37.8℃ (100℉). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC). CLASS E: Corrosive liquid. On NDSL.
EINECS Number (EEC)	200-316-0
EEC Risk Statements	R11- Highly flammable. R18- In use, may form flammable/explosive vapor-air mixture. R26/27/28- Very toxic by inhalation, in contact with skin and if swallowed. R34- Causes burns. 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. 2-200

Section XVI. Other Information

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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, 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.