TCI AMERICA

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	**Corrosive to eyes and skin on contact.** **Combustible material; avoid heat and sources of ignition.** **Toxic compound, do not ingest or inhale. Avoid all contact with this material.** **Environmental hazard.** **This material is toxic to aquatic organisms and may cause long term adverse effects to the aquatic environment.** **CARCINOGEN. MINIMIZE EXPOSURE.** **POSSIBLE MUTAGEN. MINIMIZE EXPOSURE.** **This compound is a skin sensitizer.** **Possible Reproductive Effector; suspected of damaging fertility or the unborn child.** **Handle and store under argon.**	

Section I. Chemical Product and Company Identification

Chemical Name **Hydrazine, Anhydrous**

Catalog Number	H0697
Synonym	Not available.
Chemical Formula	H_4N_2
CAS Number	302-01-2

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
Hydrazine, Anhydrous	302-01-2	Min. 98.0 (T)	U.S. - OSHA - Final PELs (TWA): 1 ppm; 1.3 mg/m3 This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen. This compound is classified as a possible mutagen. There is no acceptable exposure limit for a mutagen.	Rat LD_{50} (oral) 60 mg/kg Mouse LD_{50} (oral) 59 mg/kg Rabbit LD_{50} (dermal) 91 mg/kg Rat LC_{50} (inhalation) 570 ppm/4H

Section III. Hazards Identification

Acute Health Effects

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.
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.

Chronic Health Effects

CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Tumorigenic Effects.
Rat TCLo Inhalation 5ppm/6 hours/1 year intermittent
TOXIC Effects:
Tumorigenic - Carcinogenic by RTECS criteria
Endocrine - Thyroid tumors
Rat TDLo Oral 900 mg/kg/2 years continuous
TOXIC Effects:
Tumorigenic - Neoplastic by RTECS criteria
Liver - Tumors
Mouse TDLo Intraperitoneal 400 mg/kg/ 5 weeks intermittent
TOXIC Effects:
Tumorigenic - Carcinogenic by RTECS criteria
Blood - Tumors
Bood - Leukemia
DEVELOPMENTAL TOXICITY: Reproductive Effects.
Rat TDLo Intraperitoneal 30 mg/kg, female 7-9 days of pregnancy
TOXIC Effects:
Specific Developmental Abnormalities - Central nervous system
Specific Developmental Abnormalities - Musculoskeletal system
Specific Developmental Abnormalities - Urogenital system
Rat TDLo Subcutaneous 80 mg/kg, female 11-20 days of pregnancy
TOXIC Effects:
Effects on Embryo or Fetus - Fetotoxicity
Effects on Embryo or Fetus - Fetal death
Effects on Newborn - Viability index

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Hamster TCLo Inhalation 1ppm/6 hours, male 1 year prior to mating
TOXIC Effects:
Paternal Effects - Testes, epididymis, sperm duct
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.

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 immediately.

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	Combustible.	Auto-Ignition	270°C (518°F)
Flash Points	52°C (125.6°F).	Flammable Limits	LOWER: 4.7% UPPER: 99.9%

Combustion Products
These products include toxic nitrogen oxides (NO_x).

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
Combustible liquid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, 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.

Section VI. Accidental Release Measures

Spill Cleanup Instructions
Corrosive material. Toxic material. Combustible material. Carcinogenic material. Possibly mutagenic material. Possibly reproductive effecting material. Envrionmentally hazardous material. Skin sensitizing 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. **Neutralize the residue with a dilute solution of acetic acid.** Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information
CORROSIVE. TOXIC. COMBUSTIBLE. CARCINOGEN. POSSIBLE MUTAGEN. POSSIBLE REPRODUCTIVE EFFECTOR. ENVIRONMENTAL HAZARD. SKIN SENSITIZER. HANDLE AND STORE UNDER INERT GAS. 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, organic materials, metals, acids.

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. 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
U.S. - OSHA - Final PELs (TWA): 1 ppm; 1.3 mg/m3
This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.
This compound is classified as a possible mutagen. There is no acceptable exposure limit for a mutagen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, colorless ~ yellow.)	Solubility	Miscible with water, alcohol. Slightly soluble soluble in hydrocarbons. Insoluble in chloroform, ether.
Specific Gravity	1.01 (water=1)		
Molecular Weight	32.05	Partition Coefficient	Log P_{ow} = -1.37
Boiling Point	113.5°C (236.3°F)	Vapor Pressure	1.4 kPa (@ 20°C)
Melting Point	1.4°C (34.5°F)	Vapor Density	1.1 (Air = 1)

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Refractive Index	1.47	Volatility	Not available.
Critical Temperature	Not available.	Odor	Pungent. Odor Threshold: 3.7 ppm
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.

Incompatibilities
Reactive with oxidizing agents, organic materials, metals, acids, Oxygen, Copper, Zinc.

Section XI. Toxicological Information

RTECS Number
MU7175000

Routes of Exposure
Eye Contact. Ingestion. Inhalation. Skin contact.

Toxicity Data
Rat LD_{50} (oral) 60 mg/kg
Mouse LD_{50} (oral) 59 mg/kg
Rabbit LD_{50} (dermal) 91 mg/kg
Rat LC_{50} (inhalation) 570 ppm/4H

Chronic Toxic Effects
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Section XII. Ecological Information

Ecotoxicity
Not available.

Environmental Fate
Hydrazine's production and use as a chemical intermediate, reducing agent, as rocket fuel and as a boiler water treatment agent may result in its release to the environment through various waste streams. Hydrazine is also naturally produced by Azotobacter agile during nitrogen fixation. If released to air, a vapor pressure of 14.4 mm Hg at 25 deg C indicates that hydrazine will exist solely in the vapor phase in the ambient atmosphere. Vapor-phase hydrazine is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals and ozone with estimated half-lives of about 6 and 9 hours, respectively. If released to soil, hydrazine is expected to have very high mobility based on an estimated Koc of 2. Hydrazine is a weak base with a pKa of 7.96, suggesting that it will partitally 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 since cations do not volatilize and the estimated Henry's Law constant of the free base is 6.1X10-7 atm-cu m/mole. The potential for volatilization of hydrazine from dry soil surfaces may exist based on the vapor pressure of this compound. Hydrazine degrades in soils through a combination of biotic and abiotic processes with observed half-lives in a fine sandy loam of about 1.5 hours to 8 days, depending upon the initial concentration of hydrazine in the soil. 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

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protonated form may have greater adsorption. Volatilization in water is not expected to be an important environmental fate process for either the free base or the protonated species given the estimated Henry's law constant and the fact that cations do not volatilize. The half-life of hydrazine in pond water was about 8.3 days and degradation occurred through a combination of abiotic and biotic mechanisms. Hard water and water rich in dissolved organic matter tend to degrade hydrazine more rapidly than water containing lower amounts of organic matter and calcium carbonate. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Occupational exposure may occur through inhalation or dermal contact at workplaces where hydrazine is produced or used. The general population may be exposed to hydrazine through inhalation of cigarette smoke.

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 8: Corrosive material DOT Class 3: Flammable liquid DOT Class 6.1: Toxic material.
PIN Number	UN2029
Proper Shipping Name	Hydrazine, anyhdrous
Packing Group (PG)	I RQ: 1 lb (0.454 Kg)
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-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC). CLASS E: Corrosive liquid. On DSL
EINECS Number (EEC)	206-114-9
EEC Risk Statements	R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R34- Causes burns. R45- May cause cancer. R46- May cause heritable genetic damage. R47- May cause birth defects. R43- May cause sensitization by skin contact. R51- Toxic to aquatic organisms. R53- May cause long-term adverse effects in the aquatic environment.
Japanese Regulatory Data	ENCS No. 1-374

Section XVI. Other Information

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Notice to Reader