

MATERIAL SAFETY DATA SHEET**HYDRAZINE HYDRATE**

PRODUCT CODE NUMBER(S): 3930-5

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: *Hydrazine hydrate*
Chemical Family: *Hydrazines*
Chemical Formula: $NH_2NH_2 \cdot H_2O$
Product Use: *Laboratory reagent*
Manufacturer's Name and Address:
Caledon Laboratories Ltd.
40 Armstrong Avenue
Georgetown, Ontario L7G 4R9
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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
Hydrazine hydrate	>97	0.03 ppm (as N_2H_4)	7803-57-8

(skin exposure can contribute to overall exposure)

PHYSICAL DATA

Physical State: *Liquid*
Odour and Appearance: *Colourless, fuming, oily liquid with an ammonia-like odour*
Odour Threshold (ppm): *3.7 ppm (detection); poor warning properties*
Vapour Pressure (mm Hg): *10.4 mm Hg at 20°C*
Vapour Density (Air = 1): *1.1*
Evaporation Rate: *Not available*
Boiling Point (degrees C): *120°C*
Freezing Point (degrees C): *-51.7°C*
pH: *Not available*
Specific Gravity: *1.1011*
Coefficient of Water/Oil distribution: *LogP (oct) = -1.1*

SHIPPING DESCRIPTION

UN: 2030
T.D.G. Class: 8
Pkg. Group: II

REACTIVITY DATA

Chemical Stability: *Thermally unstable. Can ignite spontaneously on contact with oxidizers or porous materials (earth, wood, cloth), or metal oxides.*
Incompatibility with other substances: *May react violently or explosively, with release of toxic and/or flammable gases, with oxidizing agents, oxygen, copper, zinc, organic materials. Some metals and alloys, including monel, bronze, brass, cadmium, gold, molybdenum and stainless steel with more than 0.5% molybdenum or rust, cause decomposition of hydrazine. Attacks glass, rubber, cork.*
Reactivity: *Avoid heat, sparks, all ignition sources. Capable of detonation or explosive reaction, but requires a strong initiating source, or must be heated under confinement. Reacts explosively with water.*
Hazardous Decomposition Products: NO_x

FIRE AND EXPLOSION DATA

Flammability: *Flammable liquid. Can be ignited under almost all normal temperature conditions. May react explosively with water. May release vapours that form explosive mixtures with air at, or above 38°C. Can detonate or explode when preheated under confinement or in contact with strong initiating source. Hydrazine vapour is a severe explosion hazard.*
Extinguishing Media: *Foam, CO_2 , dry chemical. Water as spray or fog can be used, with great care, to cool containers and disperse vapours, but should be kept away from contact with the chemical. Fight fire from a distance, from upwind direction. Firefighters must wear NIOSH approved full face-piece, positive-pressure self-contained breathing apparatus and encapsulating chemical splash suit (Bunker Gear is not adequate). Containers may explode in heat of fire; withdraw immediately in case of rising sound from vent or bulging or discoloration of container.*
Flash Point (Method Used): *38°C (CC)*
Autoignition Temperature: *270°C (glass surface). May be as low as 23°C depending on surface contacted.*
Upper Flammable Limit (% by volume): 98
Lower Flammable Limit (% by volume): 2.9
Hazardous Combustion Products: *Hydrazine gas, NO_x*
Sensitivity to Impact: *None identified*
Sensitivity to Static discharge: *Vapour or liquid may be ignited by static charge of sufficient energy.*

TOXICOLOGICAL PROPERTIES AND HEALTH DATA**Toxicological Data:**

LD₅₀: (oral, rat) 129 mg/kg; (oral, mouse) 83 mg/kg; (dermal, rabbit) 91 mg/kg
LC₅₀: (rat) 570 ppm/4h (anhydrous)

Effects of Acute Exposure to Product:

Inhaled: *Toxic. May be fatal if inhaled. Causes respiratory tract irritation and burns, resulting in coughing, wheezing, shortness of breath, inflammation of the larynx and bronchi, nausea and vomiting. May be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of pulmonary edema may be delayed for several hours, or even days. Can cause liver and kidney damage, destruction of red blood cells, pneumonia.*

In contact with skin: *Toxic and corrosive. Can cause chemical burns. Readily absorbed through skin and may be fatal through absorption, causing liver and kidney damage, destruction of red blood cells, central nervous system effects. May cause allergic skin reaction.*

In contact with eyes: *Corrosive. Extremely destructive to tissue of eyes. May cause severe burns, temporary or permanent blindness.*

Ingested: *Toxic and corrosive. May cause severe irritation of the gastrointestinal tract, burns to mouth, throat and esophagus, abdominal pain. May cause damage to liver and destruction of red blood cells. May be fatal by ingestion. Suspected carcinogen of lung, nervous system, liver, kidney, breast and subcutaneous tissues.*

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Effects of Chronic Exposure to Product:

Chronic exposure can cause damage to blood, liver, kidneys and central nervous system (RTECS No. MV8050000). Persons with preexisting eye, skin or respiratory tract conditions, or impaired liver or kidney function may be more susceptible to the effects of this substance. Repeated exposure may cause sensitization dermatitis.

Carcinogenicity: Demonstrated animal carcinogen; assumed human carcinogen, Group 2B (IARC)

Teratogenicity: Causes pre and post implantation mortality and biochemical and metabolic effects on newborn in animal testing.

Reproductive Effects: May cause adverse reproductive effects.

Mutagenicity: Mutagenic in bacterial tests, and induced cell aberrations in *in vitro*, and *in vivo* tests in animals.

Synergistic Products: None found

PREVENTIVE MEASURES

Engineering Controls: Corrosion-resistant, non-sparking, grounded exhaust ventilation, separate from other ventilation systems.

Respiratory Protection: Use only in a fumehood. Up to 10x TLV, or the maximum use specified by the respirator supplier, whichever is lowest, NIOSH approved half-face high-efficiency dust/mist filter respirator. Up to 50x TLV, or the maximum use specified by the respirator supplier, whichever is lowest, NIOSH approved full face-piece high-efficiency dust/mist filter respirator. Higher or unknown concentrations, or for fire or spill conditions, self-contained breathing apparatus, or full face-piece, positive-pressure supplied-air respirator.

Eye Protection: Face shield (8-inch minimum).

Skin Protection: Butyl or nitrile rubber, neoprene, PVC, Saranex, Barricade, Reslonder, or Teflon gauntlet gloves. Other impervious protective clothing (apron, sleeves, coveralls, splash suit, boots) sufficient to prevent any contact.

Other Personal Protective Equipment: Safety shower and eye-wash fountain in work area.

Leak and Spill Procedure: Evacuate area. Ventilate area and eliminate all sources of ignition. DO NOT TOUCH SPILLED MATERIAL. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Contain spill by diking with inert absorbent. Absorb on inert **non-flammable** absorbent. Transfer contaminated absorbent carefully into container and arrange removal by disposal company. Contaminated absorbent may have the same hazards as the product; treat with extreme caution. After collecting and removing spilled material, wash site of spillage thoroughly with weak solution of household bleach or calcium hypochlorite to oxidize residual hydrazine. Ventilate area to dispel residual vapour.

Waste Disposal: Follow all federal, provincial and local regulations for disposal.

Handling Procedures and Equipment: FLAMMABLE, CORROSIVE, TOXIC LIQUID; POSSIBLE CARCINOGEN, TERATOGEN, MUTAGEN. Workers must be thoroughly trained in the hazards of this substance and in its safe use, and must wear appropriate protective equipment and clothing. Engineering controls must be in place and operating during any operations involving this product. Workers must recognize that the product can cause severe injury or death if improperly handled. Use the smallest amount possible for the purpose in designated areas with adequate ventilation. Keep away from heat, hot surfaces, sparks, flames, and all sources of ignition, and from all combustible

or incompatible materials. Use non-sparking tools. Handle under nitrogen. Avoid generating or inhaling vapours or mists. Avoid all contact and any inhalation of vapours or fumes. Keep work area clean and free of incompatible or combustible materials. Caution: empty containers may contain hazardous residues; treat with extreme caution.

Storage Requirements: Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight, and away from ignition sources and incompatible or combustible materials. Note incompatibilities when selecting storage containers. Keep containers tightly closed when not in use and when empty. Store under nitrogen. Storage facilities should be made of fire-resistant materials, and have raised sills and a trench which drains to a safe location. Protect from damage, and inspect regularly for signs of leaking, bulging, or damage.

FIRST AID MEASURES**Specific Measures:**

Eyes: IMMEDIATELY flush eyes with gently running water for at least thirty (30) minutes, holding eyelids open while flushing. Take care not to flush contaminated water into unaffected eye. Wear protective gloves to avoid contact with material. GET MEDICAL ATTENTION IMMEDIATELY.

Skin: Remove contaminated clothing under running water (including shoes, watches, belts, and rings). IMMEDIATELY flush the exposed area with large amounts of cool, running water for at least twenty (20) minutes. Wear protective gloves to avoid contact with material. Take care to completely clean folds, creases, groin, under fingernails. GET MEDICAL ATTENTION IMMEDIATELY. Discard contaminated clothing and shoes.

Inhalation: IMMEDIATELY remove to fresh air (caution must be used by rescuers to avoid exposure to the contaminating fumes). Give oxygen for breathing difficulty. If breathing has STOPPED give artificial respiration. Avoid direct contact; use a mouth guard. If breathing and pulse are ABSENT, give CPR. IMMEDIATELY CONTACT A PHYSICIAN. Stay with casualty until medical help arrives.

Ingestion: DO NOT INDUCE VOMITING. If casualty is alert and NOT convulsing; rinse mouth with water and give 1/2 to 1 cup of water or milk to dilute material. IMMEDIATELY OBTAIN MEDICAL ATTENTION. If spontaneous vomiting occurs; have casualty lean forward with head down to avoid breathing in of vomitus. Rinse mouth and administer 1/2 cup of water or milk.

REFERENCES USED

- CCINFO disc: Cheminfo, MSDS
Budavari: The Merck Index, 12th ed., 1997
Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 4a, 1991
Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: June 10, 1991

Revision: January 2011

MSDS: 3930-5

Proposed WHMIS Designation: B2; D1A; D2A; E; F

Prepared by: Caledon Laboratories Ltd. (905) 877-0101
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