

MATERIAL SAFETY DATA SHEET

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Version 1.4

Section 1 - Product and Company Information

Product Name 1,6-HEXANEDIAMINE
Product Number H2381
Brand SIGMA

Company Sigma-Aldrich Canada, Ltd
Street Address 2149 Winston Park Drive
City, State, Zip, Country Oakville ON L6H 6J8 CA
Technical Phone: 9058299500
Emergency Phone: 800-424-9300
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Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
HEXAMETHYLENEDIAMINE	124-09-4	No

Formula C6H16N2
Synonyms 1,6-Diaminohexane * Hexamethylenediamine *
1,6-Hexamethylenediamine * 1,6-Hexanediamine
(ACGIH) * HMDA * NCI-C61405
RTECS Number: MO1180000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Corrosive.
Harmful in contact with skin and if swallowed. Causes burns.
Irritating to respiratory system.
Combustible. Target organ(s): Liver.

HMIS RATING

HEALTH: 3*
FLAMMABILITY: 2
REACTIVITY: 1

NFPA RATING

HEALTH: 3
FLAMMABILITY: 2
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

176 °F 80 °C Method: closed cup

EXPLOSION LIMITS

Lower: 0.7 % Upper: 6.3 %

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.
Store at 2-8°C

SPECIAL REQUIREMENTS

Hygroscopic. Store under inert gas.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	2.3 MG/M3 (0.5 PPM)

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid Color: Colorless	
Property	Value	At Temperature or Pressure
Molecular Weight	116.21 AMU	
pH	12.4	25 °C Concentration: 100 g/l
BP/BP Range	204.0 - 205.0 °C	760 mmHg
MP/MP Range	39 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	4 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.799 g/cm3	60 °C
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 0.02	
Decomposition Temp.	N/A	
Flash Point	176 °F 80 °C	Method: closed cup
Explosion Limits	Lower: 0.7 % Upper: 6.3 %	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	

Solubility

Solvent: Clear 0.1 g/ml H2O

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions of Instability: Hygroscopic.

Materials to Avoid: Acids, Acid chlorides, Acid anhydrides, Strong oxidizing agents Carbon dioxide.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, and nitrogen oxides.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.

Skin Absorption: Harmful if absorbed through skin.

Eye Contact: Causes burns.

Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Liver.

SIGNS AND SYMPTOMS OF EXPOSURE

Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral

Rat

750 mg/kg

LD50

Intraperitoneal

Mouse

320 MG/KG

LD50

Subcutaneous

Mouse

1300 MG/KG

LD50

Intravenous

Mouse

180 MG/KG
LD50

Skin
Rabbit
1110 mg/kg
LD50

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 3 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Hepatobiliary system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 1840 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Mouse
Dose: 414 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (10D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 77 GM/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATION)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Rat
Dose: 66500 MG/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATION)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: *Poecilia reticulata*
Time: 48 h
Value: 100.0 - 500.0 mg/l

Test Type: LC50 Fish
Species: *Leuciscus idus*
Time: 96 h
Value: 62 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 23.4 mg/l

ELIMINATION

Elimination: 56 %

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Hexamethylenediamine, solid
UN#: 2280
Class: 8
Packing Group: Packing Group III
Hazard Label: Corrosive
PIH: Not PIH

IATA

Proper Shipping Name: Hexamethylenediamine, solid
IATA UN Number: 2280
Hazard Class: 8
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: C
Indication of Danger: Corrosive.
R: 21/22-34-37
Risk Statements: Harmful in contact with skin and if swallowed. Causes burns. Irritating to respiratory system.
S: 22-26-36/37/39-45
Safety Statements: Do not breathe dust. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive.
Risk Statements: Harmful in contact with skin and if swallowed. Causes burns. Irritating to respiratory system.
Safety Statements: Do not breathe dust. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
US Statements: Combustible. Target organ(s): Liver.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.