

MATERIAL SAFETY DATA SHEET



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PIPERIDINE

MSDS No. M0171

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Piperidine

Product Catalog Number(s): PR1447

Synonyms: Hexahydropyridine; Azacyclohexane; Cycloptimine; Hexazine

Chemical Formula: (CH₂)₅NH

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Piperidine	110-89-4	>98%	Yes

3. HAZARDS IDENTIFICATION

DANGER! CAUSES SEVERE EYE, SKIN, DIGESTIVE TRACT AND THE RESPIRATORY TRACT BURNS. HARMFUL IF ABSORBED THROUGH THE SKIN OR IF INHALED. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. HIGHLY FLAMMABLE LIQUID AND VAPOR. TARGET ORGANS: EYES, CENTRAL NERVOUS SYSTEM, SKIN, MUCOUS MEMBRANES.



Acute Exposure Hazards:

Inhalation Hazard: May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. May cause effects similar to those described for ingestion. Damage may be delayed. May cause bronchial pneumonia.

Ingestion Hazard: Harmful if swallowed. May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. Can cause nervous system damage. May cause tremors and convulsions.

Skin Contact Hazard: Harmful if absorbed through the skin. May be absorbed through the skin. If absorbed, causes symptoms similar to those of ingestion. Penetration may continue for several days. Causes severe skin irritation and burns.

Eye Contact Hazard: Contact with liquid or vapor causes severe burns and possible irreversible eye damage. Contact may cause ulceration of the conjunctiva and cornea. Eye damage may be delayed. May cause conjunctivitis. May cause blindness.

Clear focus. Consistent results. Complete confidence.

Chronic Exposure Hazards: Repeated inhalation may cause chronic bronchitis. Prolonged or repeated contact may cause skin necrosis and/or ulceration of the skin. May cause chronic cough.

HMIS Rating:

Health – 3 Flammability – 3 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

4. FIRST-AID MEASURES

Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Skin Contact: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure. Destroy contaminated shoes.

Eye Contact: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Gently lift eyelids and flush continuously with water. Extensive irrigation with water is required (at least 30 minutes).

Notes to Physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Highly flammable liquid and vapor (GHS Category 2)

Auto-ignition Temperature: 320° C (608° F)

Flash Point: 16° C (60.8° F)

Flammable Limits: Lower Limit – Not available, Upper Limit – Not available.

Products of Combustion: Will decompose into irritating fumes and gases, nitrogen oxides, nitrogen gas, carbon monoxide, and carbon dioxide under fire conditions.

Specific Fire Hazards: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapor may explode if ignited in a confined area. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

Specific Explosion Hazards: May polymerize explosively when involved in a fire. Containers may explode when heated.

Fire Fighting Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Do NOT get water inside containers. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water. Cool containers with flooding quantities of water until well after fire is out.

National Fire Protective Association: Health - 3, Flammability - 3, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Cover with sand, dry lime or soda ash and place in a closed container for disposal.

Remove all sources of ignition. Provide ventilation. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from heat, sparks, and flame. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong acids. Flammables-area. Corrosives area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear chemical splash goggles or other appropriate eye protection. Use appropriate protective gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

ACGIH – None

NIOSH – None

OSHA Final PELs – None

AIHA WEL – 1 ppm (3.5 mg/m³) skin

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear to slight yellow liquid.

Odor: pepper-like odor

Molecular Formula: (CH₂)₅NH

Molecular Weight: 85.15

pH: 12.6.

Boiling Point: 106° C @ 760 mm Hg

Freezing/Melting Point: -13° C

Decomposition Temperature: 500° C

Specific Gravity: 0.8622 g/cm³ @ 20° C

Vapor Density (Air=1): 3.0

Vapor Pressure: 40 mm Hg @ 29.9° C.

Evaporation Rate (Butyl acetate = 1): Not available

Viscosity: 1.46 mPa 20° C

Solubility: Completely miscible in water

Conductivity at 25°C: Conductive; Conductivity = 2×10^4 pS/m; Dielectric Constant = NA; Relaxation Time Constant = NA

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat.

Incompatibility With Various Substances: Acids; acid chlorides; acid anhydrides; carbon dioxide; strong oxidizing agents; dicyanofurazan; N-nitrosoacetanilide; 1-Perchlorylpiperidine .

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

Hazardous Polymerization: Has not been reported.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Animal Toxicity:

Draize test, rabbit, eye: 250 ug/24H Severe;

Draize test, rabbit, skin: 5 mg/24H Severe;

Inhalation, mouse: LC50 = 6000 mg/m³/2H;

Oral, mouse: LD50 = 30 mg/kg;

Oral, rabbit: LD50 = 145 mg/kg;

Oral, rat: LD50 = 400 mg/kg;

Skin, rabbit: LD50 = 276 mg/kg;

Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Epidemiology: No information found.

Teratogenicity: No information found.

Reproductive Effects: Inhalation, Rat: TClO = 3 mg/m³/24H - fetotoxic effects. Inhalation, rat: TClO = 100 mg/m³/24H - effected litter size.

Mutagenicity: Mutagenic at 5050 æmol/L in mouse lymphocyte.

Neurotoxicity: Intravenous, rabbit: LDLo = 160 mg/kg. Caused spastic paralysis and convulsions or effect on seizure threshold.

12. ECOLOGICAL INFORMATION

Ecotoxicity: No data available.

Environmental Fate: No data available.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Piperidine

Hazard Class: 8 (3)

UN Number: UN2401

Packing Group: I

Canada TDG

Proper Shipping Name: Piperidine

Hazard Class: 8 (3)

UN Number: UN2401

Packing Group: I

Additional Information: Flash Point 16 C

International (Water, I.M.O.)

Proper Shipping Name: Piperidine

Hazard Class: 8 (3)

UN Number: UN2401

Packing Group: I
International (Air, I.C.A.O.)
 Proper Shipping Name: Piperidine
 Hazard Class: 8 (3)
 UN Number: UN2401
 Packing Group: I

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: CAS# 110-89-4 is listed on the TSCA Inventory.
 Health and Safety Reporting List: CAS# 110-89-4 is not listed.
 Chemical Test Rules: CAS# 110-89-4 is not listed.
 Section 12b: CAS# 110-89-4 is not listed.
 TSCA Significant New Use Rule: Does not have an SNUR under TSCA.
 CERCLA Hazardous Substances: CAS# 110-89-4 does not have a RQ
 SARA Section 302: CAS# 110-89-4 TPQ: 1000 lbs
 SARA Codes: CAS# 110-89-4 – immediate, fire
 Section 313: Not reportable.
 Clean Air Act: CAS# 110-89-4 is not listed as a hazardous air pollutant (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.
 Clean Water Act: CAS# 110-89-4 is not listed as a Hazardous Substance. It is not a Priority Pollutant. It is not a Toxic Pollutant.
 OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

CAS# 110-89-4 is on the following state right-to-know lists: New Jersey, Pennsylvania, Minnesota, and Massachusetts

Canada:

DSL/NDSL: CAS# 110-89-4 is listed on Canada's DSL list.
 WHMIS: WHMIS classification: B2, D1B, E. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations.
 Ingredient Disclosure List:

DSCL (EEC):

Hazard Symbols: C, T, F
 Risk Phrases: R11 – Highly Flammable; R34 – Causes burns.
 Safety Phrases: S16 – Keep away from sources of ignition-no smoking; S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice; S27 – Immediately remove all contaminated clothing; S45 – In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
 WGK (Water Danger/protection): CAS# 110-89-4: 1

16. OTHER INFORMATION

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The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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