

MATERIAL SAFETY DATA SHEET

Date Printed: 06/19/2008

Date Updated: 02/05/2006

Version 1.7

Section 1 - Product and Company Information

Product Name PIPERIDINE, REDISTILLED, 99.5+%

Product Number 411027

Brand ALDRICH

Company Sigma-Aldrich

Address 3050 Spruce Street
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832

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Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
PIPERIDINE	110-89-4	Yes

Formula C5H11N

Synonyms Azacyclohexane * Cyclopentimine * Cypentil *
Hexahydropyridine * Hexazane *
Pentamethyleneimine * Pentamethylenimine *
Piperidin (German) * Pyridine, hexahydro-

RTECS Number: TM3500000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Toxic.
Harmful if swallowed. Toxic by inhalation and in contact with
skin. Causes burns.

HMIS RATING

HEALTH: 3
FLAMMABILITY: 3
REACTIVITY: 1

NFPA RATING

HEALTH: 3
FLAMMABILITY: 3
REACTIVITY: 1

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

FLAMMABLE HAZARDS

Flammable Hazards: Yes

EXPLOSION HAZARDS

Container explosion may occur under fire conditions. Forms explosive mixtures in air.

FLASH POINT

60.8 °F 16 °C Method: closed cup

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions. Vapor may travel considerable distance to source of ignition and flash back. Flammable liquid.
Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

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

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. 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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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 thoroughly after handling. Remove and wash contaminated clothing promptly.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless	
Property	Value	At Temperature or Pressure
Molecular Weight	85.15 AMU	
BP/BP Range	104.0 - 106.0 °C	
MP/MP Range	- 11.0 °C	
Freezing Point	N/A	
Vapor Pressure	63.6 mmHg	37.8 °C
Vapor Density	2.94 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.862 g/cm ³	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	< 0.3 %	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 0.84	
Decomposition Temp.	N/A	
Flash Point	60.8 °F 16 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	1.453	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:soluble	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents, Dicyanofurazan, N-nitrosoacetanilide, N-perchlorylpiperazine.

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: Toxic if absorbed through skin.

Eye Contact: Causes burns.

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

Ingestion: Harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

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.

TOXICITY DATA

Oral
Rat
400 mg/kg
LD50

Oral
Mouse
30 mg/kg
LD50

Inhalation
Mouse
6,000 mg/m³
LC50

Intraperitoneal
Mouse
50 MG/KG
LD50

Oral
Rabbit

145 mg/kg
LD50

Skin
Rabbit
276 mg/kg
LD50

Oral
Mammal
22.4 mg/kg
LD50

Inhalation
Mammal
6,500 mg/m³
LC50

IRRITATION DATA

Skin
Rabbit
0.1 mg
24H
Remarks: Open irritation test

Skin
Rabbit
5 mg
24H
Remarks: Severe irritation effect

Eyes
Rabbit
0.25 mg
24H
Remarks: Severe irritation effect

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 3 MG/M³/24H
Route of Application: Inhalation
Exposure Time: (4D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death,
e.g., stunted fetus).

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse
Dose: 8020 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

Species: Mouse
Dose: 5050 UMOL/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat

Dose: 100 MG/M3/24H
Route of Application: Inhalation
Exposure Time: (4D PREG)
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: Leuciscus idus
Time: 96 h
Value: 46.0 - 100.0 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Piperidine
UN#: 2401
Class: 8
Packing Group: Packing Group I
Hazard Label: Corrosive
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Piperidine
IATA UN Number: 2401
Hazard Class: 8
Packing Group: I

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F-T
Indication of Danger: Highly Flammable. Toxic.
R: 11-23/24-34
Risk Statements: Highly flammable. Toxic by inhalation and in contact with skin. Causes burns.
S: 16-26-27-45
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take off immediately all contaminated clothing. 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: Flammable (USA) Highly Flammable (EU). Toxic.
Risk Statements: Harmful if swallowed. Toxic by inhalation and in contact with skin. Causes burns.

Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take off immediately all contaminated clothing. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

NOTES: This product is subject to SARA section 313 reporting requirements.

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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.