



SIGMA-ALDRICH

Material Safety Data Sheet

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Section 1 - Product and Company Information

Product Name	Morpholine, 99+% A.C.S. reagent
Product Number	252360
Brand	Sigma-Aldrich
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS, MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
MORPHOLINE	110-91-8	No	203-815-1	613-028-00-9

Formula C₄H₉NO
Synonyms BASF 238, Diethyleneimide oxide, Diethylene imidoxide, Diethylene oximide, Diethylenimide oxide, Drewamine, p-Isloxazine, tetrahydro-, Morpholine (ACGIH:OSHA), 1-Oxa-4-azacyclohexane, 2H-1,4-Oxazine, tetrahydro-, 4H-1,4-Oxazine, tetrahydro-, Tetrahydro-1,4-isoxazine, Tetrahydro-1,4-oxazine, Tetrahydro-2H-1,4-oxazine

Section 3 - Hazards Identification

Emergency Overview

Flammable, Corrosive.
Harmful by inhalation, in contact with skin and if swallowed. Causes burns.
Readily absorbed through skin. Target organ(s): Liver, Kidneys.

HMIS Rating
Health: 3* Flammability: 3 Reactivity: 1

NFPA Rating
Health: 3 Flammability: 3 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.

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 Yes

Explosion Hazards

Vapor may travel considerable distance to source of ignition and flash back.
Container explosion can occur under fire conditions. In advanced or massive fires the area should be evacuated and the fire should be fought from a remote explosionresistant location.

Conditions of Flammability

Under fire conditions, material may decompose to form flammable and/or explosive mixtures in air.

Flash Point: 87.8 °F 31 °C

Explosion Limits: Lower: 1.8 % Upper: 10.8 %

Autoignition Temp: 310 °C **Flammability:** Yes

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 effective. 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)

Flammable 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

Cover with dry-lime, sand, or soda ash. Place in covered containers using nonsparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

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.

Special Requirements

Hygroscopic.

Section 8 - Exposure Controls / PPE**Engineering Controls**

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

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 fullface 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 fullface supplied air respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Exposure Limits

Country	Type	Value
Poland	NDS	70 MG/M3
Poland	NDSch	100 MG/M3
Poland	NDSP	-

Exposure Limits, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	20 PPM
USA	MSHA Standard-air	TWA	20 PPM (70 MG/M3) (SKIN)
USA	OSHA	PEL	8H TWA 20 PPM (70 MG/M3) (SKIN)
New Zealand	OEL		
USA	NIOSH	TWSTEL	20 PPM (SK) 30 PPM (SK)

Section 9 - Physical/Chemical Properties

Appearance	Color	Odor
Physical State	Colorless	Unpleasant odor.
Liquid		
Molecular Weight	87.12 AMU	
pH	10.6	Concentration: 5 g/l
BP/BP Range	127 - 129 °C	
MP/MP Range	-7 - -5 °C	
Freezing Point	N/A	
Vapor Pressure	7 mmHg	20 °C
Vapor Density	3 g/l	
Saturated Vapor Conc.	N/A	

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SG/Density	1 g/cm3
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
Partition Coefficient	Log Kow: -2.55
Decomposition Temp.	N/A
Flash Point °F	87.8 °F
Flash Point °C	31 °C

Method: closed cup

Method: closed cup

Explosion Limits	Lower: 1.8 % Upper: 10.8 %
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Flammability	N/A
Autoignition Temp	310 °C
Refractive Index	1.455

Solubility
Solubility in Water: Miscible.
Other Solvents: ORGANIC SOLVENTS.

N/A = not available

Section 10 - Stability and Reactivity**Stability**

Stable
Stable.

Conditions of Instability

Hygroscopic.

Materials to Avoid

Strong oxidizing agents

Hazardous Decomposition Products**Hazardous Decomposition Products**

Carbon monoxide, Carbon dioxide, Nitrogen oxides

Hazardous Polymerization**Hazardous Polymerization**

Will not occur.

Section 11 - Toxicological Information**Route of Exposure****Skin Contact**

Causes burns.

Skin Absorption

Readily absorbed through skin.

Eye Contact

Causes burns.

Inhalation

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

Multiple Routes

Harmful if swallowed, inhaled, or absorbed through skin.

Target Organ(s) or System(s)

Liver. Kidneys.

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

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may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause: Stomach pains, vomiting, diarrhea.

RTECS Number: QD6475000

Toxicity Data

Oral - Rat: 1450 mg/kg (LD50)

Inhalation - Rat: 8,000 ppm (LC50)

Oral - Mouse: 525 mg/kg (LD50)

Remarks: Behavioral: Sleep.
Behavioral: Somnolence (general depressed activity).

Inhalation - Mouse: 1,320 mg/m³ (LC50)

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Lacrimation.
Behavioral: Ataxia.
Lungs, Thorax, or Respiration: Cyanosis.

Intraperitoneal - Mouse: 413 MG/KG (LD50)

Remarks: Paternal Effects: Testes, epididymis, sperm duct.

Subcutaneous - Mouse: 458 MG/KG (LD50)

Skin - Rabbit: 500 UL/KG (LD50)

Oral - Mammal: 1220 mg/kg (LD50)

Inhalation - Mammal: 12,000 mg/m³ (LC50)

Irritation Data

Skin - Rabbit: 995 mg 24H

Remarks: Severe irritation effect

Skin - Rabbit: 500 mg

Remarks: Open irritation test

Eyes - Rabbit: 2 mg

Remarks: Severe irritation effect

Chronic Exposure - Carcinogen

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse - Oral: 2560 MG/KG Y C

Result: Tumorigenic: Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration: Bronchiogenic carcinoma. Liver: Tumors.

IARC Carcinogen List

Rating

Group 3

ACGIH Carcinogen List

Rating

A4

Chronic Exposure - Mutagen

<u>Species</u>	<u>Dose</u>	<u>Cell Type</u>	<u>Mutation test</u>
Mouse	125 MG/L	fibroblast	Morphological transformation.
Mouse	1 UL/L	lymphocyte	Morphological transformation.
Mouse	1 GM/L	lymphocyte	Mutation in mammalian somatic cells.
Hamster	160 MG/L	ovary	Sister chromatid exchange

Section 12 - Ecological Information

Acute Ecotoxicity Tests

Test Type

LC50 Fish

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Species

Onchorhynchus mykiss (Rainbow trout)

Time: 96.0 h

Value: 180 - 380 mg/l

Test Type

EC50 Daphnia

Species

Daphnia magna

Time: 24.0 h

Value: 100 mg/l

Test Type

EC50 Algae

Species

Scenedesmus subspicatus

Time: 72.0 h

Value: > 310 mg/l

Elimination

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

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

Section 14 - Transport Information

DOT

Proper Shipping Name: Morpholine

UN#: 2054

Class: 8

Packing Group: Packing Group I

Hazard Label: Corrosive

Hazard Label: Flammable liquid

PIH: Not PIH

IATA

Proper Shipping Name: Morpholine

IATA UN Number: 2054

Hazard Class: 8

Packing Group: I

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: C

Indication of Danger

Corrosive.

Risk Statements R: 10 20/21/22 34

Flammable. Harmful by inhalation, in contact with skin and if swallowed. Causes burns.

Safety Statements S: 23 36 45

Do not breathe vapor. Wear suitable protective 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. Corrosive.

Risk Statements

Harmful by inhalation, in contact with skin and if swallowed. Causes burns.

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Safety Statements

Do not breathe vapor. Wear suitable protective clothing. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Statements

Readily absorbed through skin. Target organ(s): Liver. Kidneys.

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. SigmaAldrich Inc., shall not be held liable for any damage resulting from handling or fom 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.