Material Safety Data Sheet

Section 1 - Product and Company Information

Product Name: Morpholine, 99+% A.C.S. reagent
Product Number: 292990
Brand: Sigma-Aldrich
Company: Sigma-Aldrich
Street Address: 3030 Spruce Street
City, State, Zip, Country: St. Louis, MO 63103 US
Technical Phone: 660-325-5632
Fax: 660-326-5632
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name: MORPHOLINE
CAS #: 110-91-8
SARA 313 - No
EC no: 200-815-1
Annex I Index Number: 813-028-00-9

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

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.

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 explosion-resistant 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 (insipient) 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 (foaming) 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 Protection(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.

Sigma-Aldrich - 252360
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 multipurpose 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 chemically resistant gloves

Eye
Chemical safety goggle

**General Hygiene Measures**
Wash thoroughly after handling. Wash contaminated clothing before reuse.

**Exposure Limits**

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>ND5</td>
<td>70 MG/M³</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>ND8Ch</td>
<td>100 MG/M³</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>ND8P</td>
<td>-</td>
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</table>

**Exposure Limits, RTECS**

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>USA</td>
<td>AG9H</td>
<td>TWA</td>
<td>20 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-std</td>
<td>TWA</td>
<td>20 PPM (70 mg/m³) (SKIN)</td>
</tr>
<tr>
<td>USA</td>
<td>CGHA.</td>
<td>PEL</td>
<td>20 PPM (70 mg/m³) (SKIN)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td>TWASTEL</td>
<td>20 PPM (SKN 30 PPM (SKN)</td>
</tr>
</tbody>
</table>

**Section 9 - Physical/Chemical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td><strong>Molecular Weight</strong></td>
<td>67.12 AMU</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>1.0-6</td>
</tr>
<tr>
<td><strong>BP/BP Range</strong></td>
<td>127-129 °C</td>
</tr>
<tr>
<td><strong>MP/MP Range</strong></td>
<td>-7 to -6 °C</td>
</tr>
<tr>
<td><strong>Freezing Point</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Vapor Pressure</strong></td>
<td>7 mmHg</td>
</tr>
<tr>
<td><strong>Vapor Density</strong></td>
<td>3 g/l</td>
</tr>
<tr>
<td><strong>Saturated Vapor Conc.</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Section 10 - Stability and Reactivity**

**Stability**
Stable in dry and well-sealed containers.

**Conditions of Instability**
Hygroscopic.

**Materials to Avoid**
Strong oxidizing agents.

**Hazardous Decomposition Products**
Carbon monoxide, Carbon dioxide, Nitrogen oxides.

**Hazardous Polymerization**
Will not occur.

**Section 11 - Toxicological Information**

**Route of Exposure**

**Skin Contact**
Caused 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 spasms, 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. Exposure can cause stomach pain, vomiting, diarrhea.

RTECS Number: QO6475000

Toxicity Data
Oral - Rat: 1400 mg/kg (LD50)
Inhalation - Rat: 8,000 ppm (LC50)
Oral - Mouse: 520 mg/kg (LD50)
Remarks: Behavioral Sleep
Behavioral: Somnolence (general depressed activity).
Inhalation - Mouse: 1,320 mg/m^3 (LC50)
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) Eye: Irritation
Behavioral: Ataxia
Lungs: Thorax, or Respiratory: Cyanosis.
Intrapitoneal - Mouse: 413 MG/KG (LD50)
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: 9.5% mg 24H
Remarks: Severe irritation effect
Skin - Rabbit: 50 mg
Remarks: Open irritation test
Eyes - Rabbit: 2 mg
Remarks: Severe irritation effect

Chronic Exposure - Carcinogen
Result: This product is not known to contain 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

IARC Carcinogen List
Rating: Group 3

ACGIH Carcinogen List
Rating: A2

Chronic Exposure - Mutagen
Species: Dose: Cell Type: Mutation test:
Mouse: 125 MG/L: liver, blood: Morphological transformation.
Mouse: 1 UL/L: lymphocyte: Morphological transformation.
Mouse: 1 GML: lymphocyte: Mutation in mammalian somatic cells.
Hamster: 180 MG/L: ovary: Sister chromatid exchange

Section 12 - Ecological Information

Acute Ecotoxicity Tests
Test Type: LC50 Fish

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 a 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: Mopholine
UN: 2054
Class: 8
Packing Group: Packing Group I
Hazard Label: Corrosive
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Mopholine
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 37
Do not breathe vapor. Wear suitable protective clothing. In case of accident or if you feel unwell, seek medical advice immediately.

US Classification and Label Text
Indication of Danger: Flammable, Corrosive.
Risk Statements: Harmful by inhalation, in contact with skin and if swallowed. Causes burns.
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.

DRL: Yes
NDRL: No

Section 16 - Other Information

Disclaimer
For R&D use only. Not for dis, 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.