Safety data sheet
Morpholine

1. Substance/preparation and company identification

Company
BASF CORPORATION
100 Campus Drive
Florham Park, NJ 07932, USA

24 Hour Emergency Response Information
CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP

Molecular formula: C(4)H(9)NO
Chemical family: secondary amines, aliphatic
Synonyms: Morpholine

2. Composition/information on ingredients

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Content (W/W)</th>
<th>Chemical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-91-8</td>
<td>&gt; 99.0 %</td>
<td>morpholine</td>
</tr>
<tr>
<td>100-74-3</td>
<td>&lt; 0.2 %</td>
<td>4-ethylmorpholine</td>
</tr>
<tr>
<td>107-15-3</td>
<td>&lt; 0.3 %</td>
<td>ethylenediamine</td>
</tr>
<tr>
<td>7732-18-5</td>
<td>&lt; 0.2 %</td>
<td>Water</td>
</tr>
<tr>
<td>108-86-4</td>
<td>&lt; 0.5 %</td>
<td>2-methoxyethanol</td>
</tr>
</tbody>
</table>

3. Hazard identification

Emergency overview
DANGER: CORROSIVE. FLAMMABLE LIQUID. HARMFUL IF SWALLOWED.
HARMFUL IF ABSORBED THROUGH SKIN.
HARMFUL IF INHALED.
Corrosive to the skin, eyes and respiratory system.
CAUSES SEVERE BURNS.
RISK OF SERIOUS DAMAGE TO EYES.
INGESTION MAY CAUSE GASTRIC DISTURBANCES.
Avoid contact with the skin, eyes and clothing.
Use with local exhaust ventilation.
Avoid inhalation of mists/vapours.
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.
Wear NIOSH-certified chemical goggles.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.
Wear chemical resistant protective gloves.
Wear full face shield if splashing hazard exists.

Potential health effects

Primary routes of exposure
Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

**Acute toxicity:**
Harmful by inhalation, in contact with skin and if swallowed.

**Irritation:**
Causes burns. Irritating to eyes, respiratory system and skin.

**Sensitization:**
Skin sensitizing effects were not observed in animal studies.

**Repeated dose toxicity:**
The substance may cause damage to the lung after repeated inhalation. May affect the liver and kidneys as indicated in animal studies.

**Medical conditions aggravated by overexposure:**
Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See MSDS section 11 - Toxicological information.

**Potential environmental effects**

**Aquatic toxicity:**
Acutely harmful for aquatic organisms.
The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

### 4. First-aid measures

**General advice:**
Remove contaminated clothing.

**If inhaled:**
Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

**If on skin:**
Wash affected areas thoroughly with soap and water. Immediate medical attention required.

**If in eyes:**
In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

**If swallowed:**
Do not induce vomiting. Rinse mouth and then drink plenty of water. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

**Note to physician**
Symptoms: Overexposure may cause: nausea, diarrhea, coughing, headache

### 5. Fire-fighting measures

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>32 °C (DIN 51755)</td>
</tr>
<tr>
<td>Autoignition</td>
<td>275 °C (DIN 51794)</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>1.4 %(V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>13.1 %(V)</td>
</tr>
</tbody>
</table>
Suitable extinguishing media:
water, dry extinguishing media, foam, carbon dioxide

Hazards during fire-fighting:
Substance/product is dangerous when exposed to heat or flames. If product is heated above decomposition temperature, toxic vapours will be released.

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:
If exposed to fire, keep containers cool by spraying with water. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

NFPA Hazard codes:
Health: 3  Fire: 3  Reactivity: 0  Special:

6. Accidental release measures

Personal precautions:
Wear appropriate respiratory protection. Use personal protective clothing. Ensure adequate ventilation.

Environmental precautions:
Substance/product is RCRA hazardous due to its properties.

Cleanup:
Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and storage

Handling
General advice:
Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. Ensure thorough ventilation of stores and work areas.

Protection against fire and explosion:
Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

Storage
General advice:
Containers should be stored tightly sealed in a dry place. Avoid extreme heat. Keep container tightly closed. Keep away from sources of ignition - No smoking.

Storage incompatibility:
General: Segregate from acids and acid forming substances.

Storage stability:
Storage duration: 24 Months

8. Exposure controls and personal protection

Components with workplace control parameters
**Personal protective equipment**

**Respiratory protection:**
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator. Do not exceed the maximum use concentration for the respirator facepiece/cartridge combination. For emergency or non-routine, high exposure situations, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

**Hand protection:**
Chemical resistant protective gloves

**Eye protection:**
Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

**Body protection:**
Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

**General safety and hygiene measures:**
Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to prevent contact.

### 9. Physical and chemical properties

- **Form:** liquid
- **Odour:** amine-like
- **Colour:** colourless to yellow
- **pH value:** 10.1 (5 g/l)
- **Melting point:** -5 °C
- **Boiling point:** 128 - 130 °C
- **Vapour pressure:** 10 mbar (20 °C)
- **Density:** 1.00 g/cm³ (20 °C)
- **Partitioning coefficient n-octanol/water (log Pow):** -2.55
- **Viscosity, dynamic:** 2.3 mPa.s (20 °C)
- **Solubility in water:** (20 °C) miscible
- **Solubility (qualitative):** solvent(s): organic solvents,

### 10. Stability and reactivity

**Conditions to avoid:**
Avoid all sources of ignition: heat, sparks, open flame.

**Substances to avoid:**
oxidizing agents, mineral acids
Hazardous reactions:
The product is chemically stable.
Reacts with oxidizing agents.

Corrosion to metals:
No corrosive effect on metal.

11. Toxicological information

Acute toxicity

Oral:
LD50/rat: approx. 1,910 mg/kg (BASF-Test)

Inhalation:
rat: / 1 h(RT)
No Mortality within the stated exposition time as shown in animal studies, however, deaths occurred after longer exposure.

Dermal:
LD50/rabbit: approx. 500 mg/kg
Literature data.

Skin irritation:
rabbit: Corrosive. (BASF-Test)

Eye irritation:
rabbit: Risk of serious damage to eyes. (BASF-Test)

Sensitization:
Buehler test/guinea pig: Non-sensitizing.
Literature data.

Chronic toxicity

Carcinogenicity:
Under certain conditions the substance can form nitrosamines. Nitrosamines are carcinogenic in animal studies.

In long-term studies in rats and mice in which the substance was given by inhalation, a carcinogenic effect was not observed.

12. Ecological information

Environmental fate and transport

Biodegradation:
Method of analysis: DOC reduction
Degree of elimination: 90 - 100 % (25 d)
Evaluation: Readily biodegradable (according to OECD criteria).

Bioaccumulation:
OECD Guideline 305 C
carp (42 d) Bioconcentration factor < 2.8
Accumulation in organisms is not to be expected.

**Environmental toxicity**

**Acute and prolonged toxicity to fish:**
trout, rainbow/LC50 (96 h): 180 mg/l
The statement of the toxic effect relates to the analytically determined concentration. The study was carried out in soft water. Literature data.

**Acute toxicity to aquatic invertebrates:**
DIN 38412 Part 11 Daphnia magna/EC50 (24 h): 100 mg/l
The details of the toxic effect relate to the nominal concentration. Literature data.

**Toxicity to aquatic plants:**
Growth Inhibition Test green algae/EC50 (96 h): 28 mg/l
The statement of the toxic effect relates to the analytically determined concentration. Literature data.

**Toxicity to microorganisms:**
OECD Guideline 209 activated sludge, industrial/EC20 (0.5 h): > 1,000 mg/l
The details of the toxic effect relate to the nominal concentration.

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### 13. Disposal considerations

**Waste disposal of substance:**
Dispose of in a RCRA-licensed facility.
Do not discharge into waterways or sewer systems without proper authorization.
Dispose of in accordance with national, state and local regulations.

**Container disposal:**
Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

**RCRA:**
D001

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### 14. Transport information

**Land transport**

*USDOT*

- Hazard class: 8
- Packing group: I
- ID number: UN 2054
- Hazard label: 8, 3
- Proper shipping name: MORPHOLINE

**Sea transport**

*IMDG*

- Hazard class: 8
- Packing group: I
- ID number: UN 2054
- Hazard label: 8, 3
- Marine pollutant: NO
- Proper shipping name: MORPHOLINE
Air transport
IATA/ICAO

Hazard class: 8
Packing group: I
ID number: UN 2054
Hazard label: 8, 3
Proper shipping name: MORPHOLINE

15. Regulatory information

Federal Regulations

Registration status:
TSCA, US released / listed

Unspecified
TSCA § 5 final Significant New Use Restriction (SNUR)

OSHA hazard category: Flammable Liquid, Corrosive to skin and/or eyes, Acute target organ effects reported, Chronic target organ effects reported, Toxic - dermal, OSHA PEL established, ACGIH TLV established

CERCLA RQ | CAS Number | Chemical name
--- | --- | ---
5000 LBS | 107-15-3 | ethylenediamine
100 LBS | 100-74-3; 110-91-8 | 4-ethylmorpholine; morpholine

SARA hazard categories (EPCRA 311/312): Acute, Chronic, Fire

State regulations

State RTK

| CAS Number | Chemical name | State RTK |
--- | --- | ---
110-91-8 | morpholine | MA, PA |
100-74-3 | 4-ethylmorpholine | MA, NJ, PA |
107-15-3 | ethylenediamine | MA, NJ, PA |
109-86-4 | 2-methoxyethanol | MA, NJ, PA |

CA Prop. 65:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

16. Other information

HMIS III rating
Health: 3 Flammability: 3 Physical hazard: 0

HMIS uses a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates high hazard.

Local contact information
prod_reg@basf.com

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