## Section 1. Identification

**Product Identity** Morpholine
**Other means of identification** Tetrahydro-2H-1,4-oxazine; Tetrahydro-1,4-oxazine; Diethylenimide oxide.

**Relevant identified uses of the substance or mixture and uses advised against**

Recommended use: Corrosion inhibitor; chemical intermediate; industrial and laboratory applications.
Restrictions on use: For industrial and professional use only.

**Details of the supplier of the safety data sheet**

**Company Name**
Silver Fern Chemical, Inc.
121 W. De La Guerra Street, Suite B
Santa Barbara, CA 93101 USA
info@silverfernchemical.com
Website - www.silverfernchemical.com

**24-hour Emergency Telephone No.**
**Emergency telephone number:**
**Infotrac: 1-800-535-5053**
**Outside USA & Canada +1-352-323-3500**

**Customer Service:** Customer Service: 1-866-282-3384

## Section 2. Hazard(s) identification

**Classification of the substance or mixture under OSHA's Hazard Communication Standard (1910.1200) revised 2024 (GHS revision 7)**

| | |
|---|---|
| Flammable Liquid, category 3;H226 | Flammable liquid and vapor. |
| Acute toxicity(oral), category 4;H302 | Harmful if swallowed. |
| Acute toxicity(dermal), category 3;H311 | Toxic in contact with skin. |
| Acute toxicity(inhalation), category 3;H331 | Toxic if inhaled. |
| Skin corrosion/irritation category 1B;H314 | Causes severe skin burns and eye damage. |
| Serious eye damage / eye irritation, category 1;H318 | Causes serious eye damage. |
| Reproductive toxicity, category 2;H361 | Suspected of damaging fertility or the unborn child. |
| Short-term (acute) aquatic hazard, category 3;H402 (not an OSHA HCS hazard class; provided for information) | Harmful to aquatic life. |

**Label elements**



**Danger**

H226 Flammable liquid and vapor.
H302 Harmful if swallowed.
H311 + H331 Toxic in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.
H361 Suspected of damaging fertility or the unborn child.

H402 Harmful to aquatic life.

**[Prevention]**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P235 Keep cool.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical, ventilating, lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P260 Do not breathe mist, vapors or spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves, protective clothing, eye protection, face protection.
**[Response]**

P303+361+353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304+340+310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor.
P305+351+338+310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.
P310 Immediately call a POISON CENTER, doctor or physician.

P301+330+331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P308+313 IF exposed or concerned: Get medical advice/attention.
P361+364 Take off immediately all contaminated clothing and wash it before reuse.

P370+378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
**[Storage]**
P403+233 Store in a well-ventilated place. Keep container tightly closed.

P403+235 Store in a well ventilated place. Keep cool.
P405 Store locked up.
**[Disposal]**
P501 Dispose of contents/container to an approved facility in accordance with local, state and federal regulations.

**Other hazards**

This product contains no PBT/vPvB/vPvM chemicals.
This product contains no endocrine disrupting chemicals.

Does NOT contain component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS) per the US EPA PFASMASTER combined list of PFAS chemicals.

## Section 3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the OSHA's Hazard Communication Standard (1910.1200) revised 2024 (GHS revision 7).

| Ingredient/Chemical Designations | Weight % | GHS Classification | Notes |
|---|---|---|---|
| **Morpholine**<br>**CAS Number: 110-91-8**<br>**Synonyms: Tetrahydro-2H-1,4-oxazine; Tetrahydro-1,4-oxazine** | **100** | **Flammable Liquid, category 3;H226**<br>**Acute toxicity(inhalation), category 3;H331**<br>**Acute toxicity(dermal), category 3;H311**<br>**Acute toxicity(oral), category 4;H302**<br>**Skin corrosion/irritation category 1B;H314**<br>**Serious eye damage, category 1;H318**<br>**Reproductive toxicity, category 2;H361** | **No data available** |

The exact percentage (concentration) of composition may be withheld as a trade secret.
*PBT/vPvB - PBT, vPvM or vPvB-substance.
The full texts of the phrases are shown in Section 16.

## Section 4. First aid measures

### Description of first aid measures

**General** In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. Show this safety data sheet to the doctor in attendance.

**Inhalation** Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious, place in the recovery position and obtain immediate medical attention. Give nothing by mouth. Toxic if inhaled: obtain medical attention.

**Eyes** Small amounts splashed into eyes can cause irreversible tissue damage and blindness. Rinse immediately with plenty of water for at least 15 minutes, keeping the eye wide open. Remove contact lenses. Continue rinsing during transport to hospital. Obtain immediate medical attention.

**Skin** Take off immediately all contaminated clothing. Rinse skin well with water/shower. Immediate medical treatment is necessary, as untreated wounds from corrosion of the skin heal slowly and with difficulty. Toxic in contact with skin.

**Ingestion** Rinse mouth with water, then drink plenty of water. Do NOT induce vomiting. Keep respiratory tract clear. Never give anything by mouth to an unconscious person. Take victim immediately to hospital.

### Most important symptoms and effects, both acute and delayed

**Overview** Corrosive: causes severe burns of skin, eyes, mucous membranes and the respiratory and digestive tracts; eye splashes may cause irreversible damage and blindness. Toxic in contact with skin or if inhaled. Suspected of damaging fertility or the unborn child.

Notes to physician: Treat symptomatically. See section 2 for further details.

**Inhalation** Toxic if inhaled. May cause burns of the respiratory tract.

**Eyes** Causes serious eye damage.

**Skin** Toxic in contact with skin. Causes severe skin burns and eye damage.

**Ingestion** Harmful if swallowed.

## Section 5. Fire-fighting measures

### Extinguishing media

Recommended extinguishing media; alcohol resistant foam, $CO_2$, powder, water spray.
Unsuitable extinguishing media: Exercise caution when using a high volume water jet, as it may scatter and spread fire.

**Special hazards arising from the substance or mixture**

Hazardous combustion products: carbon oxides, nitrogen oxides (NOx).
Vapors may form explosive mixtures with air and can accumulate in low areas. Use water spray to cool fully closed containers. Collect contaminated fire-extinguishing water separately; do not allow run-off to enter drains or water courses.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Keep cool.
Ground and bond container and receiving equipment.
Use explosion-proof electrical, ventilating, lighting equipment.
Use non-sparking tools.
Take action to prevent static discharges.
Do not breathe mist, vapors or spray.

**Advice for fire-fighters**

As with all fires, wear positive pressure, self-contained breathing apparatus, (SCBA) with a full face piece and protective clothing. Persons without respiratory protection should leave area. Wear SCBA during clean-up immediately after fire. No smoking.

**ERG Guide No.** 132

## Section 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

Put on appropriate personal protective equipment (see section 8).
Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations; vapors can accumulate in low areas.
Use good personal hygiene practices. Wash hands before eating, drinking, smoking or

using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

**Environmental precautions**

Do not allow spills to enter drains or waterways. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers, lakes or drains, inform the respective authorities.

**Methods and material for containment and cleaning up**

Ventilate the area and avoid breathing vapors. Take the personal protective measures listed in section 8.
Contain and absorb spillage with non-combustible materials e.g. sand, earth, and vermiculite. Place in closed containers outside buildings and dispose of in accordance with local, state and federal regulations (see Section 13).

## Section 7. Handling and storage

**Precautions for safe handling**
Handle containers carefully to prevent damage and spillage.
Avoid contact with skin and eyes. Do not breathe vapors. Take precautionary measures against static discharges. Open drum carefully as content may be under pressure.
Smoking, eating and drinking should be prohibited in the application area.
See section 2 for further details. - [Prevention]

**Conditions for safe storage, including any incompatibilities**
Incompatible materials: Do not store near acids. Keep away from strong oxidizing agents and nitrosating agents (nitrites, nitrates, nitrous acid).
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Product is hygroscopic.
See section 2 for further details. - [Storage]

**Specific end use(s)**
No available information

## Section 8. Exposure controls / personal protection

### Control parameters

**Exposure Limits**

| CAS No. | Ingredient | Source | Value |
|---|---|---|---|
| 110-91-8 | Morpholine | OSHA | TWA 20 ppm (70 mg/m$^{3)\ [skin]}$ |
| | | ACGIH | TWA: 20 ppm [skin]; A4 |
| | | NIOSH | TWA 20 ppm (70 mg/m$^3$) STEL: 30 ppm (105 mg/m$^3$) [skin] |

**Exposure controls**

**Respiratory** If workers are exposed to concentrations above the exposure limit, or in the case of vapor formation, use a NIOSH-approved respirator with organic vapor cartridges.

**Eyes** Tightly fitting safety goggles. Wear a face shield and protective suit for abnormal processing problems. Eyewash station or eye wash bottle with pure water should be available.

**Skin** Impervious clothing. Chemical-resistant gloves tested to ASTM F739: butyl rubber (breakthrough time > 480 min) or Silver Shield® (breakthrough time > 480 min).

**Engineering Controls** Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of vapor below occupational exposure limits suitable respiratory protection must be worn.

**Other Work Practices** Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details.

## Section 9. Physical and chemical properties

### Information on basic physical and chemical properties

| | |
|---|---|
| **Physical State** | Liquid |
| **Color** | Clear, Colorless |
| **Odor** | Ammoniacal |
| **Odor threshold** | No available information |
| **Melting point / freezing point** | 23.2 °F / -4.9 °C |
| **Initial boiling point and boiling range** | 264 °F / 129 °C (1,013 hPa) |
| **Flammability (solid, gas)** | Not Applicable |
| **Upper/lower flammability or explosive limits** | Lower Explosive Limit: 1.4 - 1.8 %(V)<br>Upper Explosive Limit: 11.2 - 15.2 %(V) |
| **Flash Point** | 90 °F / 32 °C Method: DIN 51755 Part 1, closed cup |
| **Auto-ignition temperature** | 491 °F / 255 °C 1,013 hPa Method: DIN 51794 |
| **Decomposition temperature** | > 626 °F / > 330 °C |
| **pH** | 10.6 at 5 g/l at 20 °C; 11 (250 g/l) |
| **Kinematic viscosity** | Viscosity, kinematic: 2.2 mm2/s at 20 °C Viscosity, dynamic: 2.23 mPa.s at 20 °C |
| **Solubility in Water** | Completely miscible |
| **Partition coefficient n-octanol/water (Log Kow)** | log Pow: -0.84 at 25 °C (pH 10.3); log Pow: -2.55 at 25 °C (pH 7). Bioaccumulation is not expected. |
| **Vapor pressure** | 9.8 hPa at 20.3 °C (OECD Test Guideline 104) |
| **Relative Density** | 1.0007 (68 °F / 20 °C); density 1.0007 g/cm3 (68 °F / 20 °C) |
| **Vapor Density** | 3 - (Air = 1.0) |
| **Evaporation rate (Ether = 1)** | No available information |
| **Oxidizing properties** | None. |
| **Explosive properties** | No available information |
| **Molecular Weight** | 87.1 g/mol |

**Other information**
No other relevant information.

## Section 10. Stability and reactivity

**Reactivity**

Hazardous Polymerization will not occur.

**Chemical stability**

Stable under normal circumstances.

**Possibility of hazardous reactions**

Vapors may form explosive mixtures with air. Reacts exothermically with acids and strong oxidizing agents. Contact with nitrites, nitrates or nitrous acid may form N-nitrosomorpholine (a nitrosamine).

**Conditions to avoid**

Heat, flames and sparks. Contact with incompatible materials.

**Incompatible materials**

Acids, strong oxidizing agents, nitrosating agents (nitrites, nitrates, nitrous acid).

**Hazardous decomposition products**

Carbon monoxide, carbon dioxide, nitrogen oxides (NOx). No decomposition if stored and applied as directed.

## Section 11. Toxicological information

### Acute toxicity

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

| Ingredient | Oral LD50, mg/kg | Skin LD50, mg/kg | Inhalation Vapor LC50, mg/L/4hr | Inhalation Dust/Mist LC50, mg/L/4hr | Inhalation Gas LC50, ppm |
|---|---|---|---|---|---|
| Morpholine - (110-91-8) | 1,900.00, Rat - Category: 4 | ATE 501.25 (LD50 Rabbit ~500) - Category: 3 | ATE 3.01 - Category: 3 | No data available. | No data available. |

### Carcinogen Data

| CAS No. | Ingredient | Source | Value |
|---|---|---|---|
| 110-91-8 | Morpholine | OSHA | Regulated Carcinogen: No; |
| | | NTP | Known: No; Suspected: No; |
| | | IARC | Group 3 |
| | | ACGIH | A4 |

| Classification | Category | Hazard Description |
|---|---|---|

| | | |
|---|---|---|
| Acute toxicity (oral) | 4 | Harmful if swallowed. |
| Acute toxicity (dermal) | 3 | Toxic in contact with skin. |
| Acute toxicity (inhalation) | 3 | Toxic if inhaled. |
| Skin corrosion/irritation | 1B | Causes severe skin burns and eye damage. |
| Serious eye damage/irritation | 1 | Causes serious eye damage. |
| Respiratory sensitization | --- | Not classified |
| Skin sensitization | --- | Not classified |
| Germ cell mutagenicity | --- | Not classified |
| Carcinogenicity | --- | Not classified |
| Reproductive toxicity | 2 | Suspected of damaging fertility or the unborn child. |
| STOT-single exposure | --- | Not classified |
| STOT-repeated exposure | --- | Not classified |
| Aspiration hazard | --- | Not classified |

**Possible routes of entry:**
Inhalation, ingestion, skin contact, and skin absorption.
**Symptoms and effects, both acute and delayed:**
Causes severe burns of skin, eyes and mucous membranes. Toxic in contact with skin or if inhaled.
Repeated dose: NOEC 36 mg/m3 (rat, inhalation, 104 weeks). Carcinogenicity: rat 52-week inhalation study negative (OECD 453). Reproductive toxicity: some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments. Treat symptomatically.

**Inhalation** Toxic if inhaled.
**Eyes** Causes serious eye damage.
**Skin** Toxic in contact with skin. Causes severe skin burns and eye damage.
**Ingestion** Harmful if swallowed.

## Section 12. Ecological information

**Toxicity**
No additional information provided for this product. See Section 3 for chemical specific data.
**Aquatic Ecotoxicity**

| Ingredient | 96 hr LC50 fish, mg/L | 48 hr EC50 crustacea, mg/L | ErC50 algae, mg/L |
|---|---|---|---|
| Morpholine - (110-91-8) | > 100, Oryzias latipes | 45.00, Daphnia magna | 64.6 (EC50, 72 h), Pseudokirchneriella subcapitata |

**Persistence and degradability**
Readily biodegradable: 93% in 25 days (OECD Test Guideline 301E).
**Bioaccumulative potential**
Bioconcentration factor (BCF) < 2.8 (Cyprinus carpio, 42 d). Bioaccumulation is unlikely.
**Mobility in soil**
Koc: 0.24 - 7.36.
**Results of PBT and vPvB assessment**
This product contains no PBT/vPvB/vPvM chemicals.
**Other adverse effects**
Harmful to aquatic life. Chronic: EC10 (Daphnia magna, 21 d) 8.134 mg/L; NOEC (fish) > 1 mg/L. Activated sludge EC20 > 1,000 mg/L.

## Section 13. Disposal considerations

**Waste treatment methods**
Dispose of contents and container in accordance with all local, state and federal regulations. Do not dispose of waste into sewer. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum. Discarded product is expected to be an ignitable hazardous waste (RCRA D001).

## Section 14. Transport information






| | US DOT (Domestic Surface Transportation) | IMO / IMDG (Ocean Transportation) | ICAO/IATA |
|---|---|---|---|
| **UN number** | UN2054 | UN2054 | UN2054 |
| **UN proper shipping name** | Morpholine | Morpholine | Morpholine |
| **Transport hazard class(es)** | Class: 8<br>Sub Class: 3 | Class: 8<br>Sub Class: 3 | Class: 8<br>Sub Class: 3 |
| **Packing group** | I | I | I |

**Environmental hazards**

IMDG Marine Pollutant: No;

**Special precautions for user**

IMDG EmS: F-E, S-C. IATA packing instructions: 850 (passenger aircraft), 854 (cargo aircraft).

## Section 15. Regulatory information

**Regulatory Overview** The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

SARA 311/312 Hazard Categories: Flammable (gases, aerosols, liquids, or solids); Acute toxicity (any route of exposure); Reproductive toxicity; Skin corrosion or irritation; Serious eye damage or eye irritation.

### Toxic Substance Control Act (TSCA)

| CAS Number | Ingredient | Toxic Substance Control Act (TSCA) | Comments | Status |
|---|---|---|---|---|
| 110-91-8 | Morpholine | Yes | | ACTIVE |

The following flags are used:
•Active - indicates commercial status designation of active
•E - indicates a substance that is the subject of a Section 5(e) Consent Order under TSCA.

•F - indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
•N - indicates a polymeric substance containing no free-radical initiator in its Inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
•P - indicates a commenced Premanufacture Notice (PMN) substance.
•R - indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
•S - indicates a substance that is identified in a final Significant New Uses Rule.
•SP - indicates a substance that is identified in a proposed Significant New Uses Rule.
•T - indicates a substance that is the subject of a final Section 4 test rule under TSCA.
•UVCB Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials •XU - indicates a substance exempt from reporting under the Chemical Data Reporting Rule, (40 CFR 711).
•Y1 - indicates a polymer that has a number-average molecular weight greater than 1,000 and that was exempt under the 1984 polymer exemption rule.
•Y2 - indicates a polymer that is a polyester and that was exempt under the 1984 polymer exemption rule.

**EPCRA 302 Extremely Hazardous:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**EPCRA 313 Toxic Chemicals:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**Proposition 65 - Carcinogens (>0.0%):**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**Proposition 65 - Developmental Toxins (>0.0%):**
2-Methoxyethanol (CAS 109-86-4) – may be present as a trace impurity.

**Proposition 65 - Female Repro Toxins (>0.0%):**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**Proposition 65 - Male Repro Toxins (>0.0%):**
2-Methoxyethanol (CAS 109-86-4) – may be present as a trace impurity.

**Proposition 65 Label Warning:**
WARNING: This product can expose you to chemicals including 2-methoxyethanol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**Mass RTK Substances (>1%) :**

**Mass RTK Substances (>1%) :**

Morpholine

**New Jersey RTK Substances (>1%):**

Morpholine

**Pennsylvania RTK Substances (>1%):**

Morpholine

**OSHA Process Safety Management Standard Highly Hazardous Chemicals, Toxics and Reactives:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**US EPA List of Regulated Substances under the Risk Management Plan (RMP) Program:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**US EPA Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) under the Minimum Risk Exemption:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**U.S. - DEA List II or Essential Chemicals:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**U.S. - DEA - Exempt Chemical Mixtures - List 1 and 2:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**US DHS Chemical Facility Anti-Terrorism Standards (CFATS):**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

**CERCLA Chemicals and RQs:**
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

## Section 16. Other information

**Revision Date** 26 October, 2026

**DISCLAIMER OF RESPONSIBILITY**

The information on this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this SDS information may not be applicable.

The full text of the phrases appearing in section 3 is:

H226 Flammable liquid and vapor.

H302 Harmful if swallowed.

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H331 Toxic if inhaled.

H361 Suspected of damaging fertility or the unborn child.