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# MORPHOLINE CAS No.110-91-8

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## 1. Product Identification

**Synonyms:** Diethyleneimide oxide; tetrahydro-p-isoxazine

**CAS No.:** 110-91-8

**Molecular Weight:** 87.12

**Chemical Formula:** -NH(CH<sub>2</sub>)<sub>2</sub>O(CH<sub>2</sub>)<sub>2</sub>- (heterocyclic)

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## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Hazardous		
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Morpholine	110-91-8	99 - 100%
Yes		

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## 3. Hazards Identification

### Emergency Overview

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**DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS THE LIVER AND KIDNEYS. FLAMMABLE LIQUID AND VAPOR.**

**SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)**

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Health Rating: 2 - Moderate (Life)  
Flammability Rating: 2 - Moderate  
Reactivity Rating: 1 - Slight  
Contact Rating: 3 - Severe (Corrosive)  
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;  
PROPER GLOVES; CLASS B EXTINGUISHER  
Storage Color Code: Red (Flammable)

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### **Potential Health Effects**

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#### **Inhalation:**

Extremely destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.

#### **Ingestion:**

Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach, leading to death. Can cause sore throat, vomiting, diarrhea.

#### **Skin Contact:**

Corrosive. Caustic vapors may cause irritation, redness, and pain. Contact may cause skin burns and absorption; symptoms may include hypoactivity, tremors, lacrimation, and salivation. Death may occur from prolonged exposure.

#### **Eye Contact:**

Corrosive. Caustic vapors may cause irritation, redness, pain, foggy vision, and corneal edema. Contact may cause eye damage.

#### **Chronic Exposure:**

Prolonged or repeated exposure through any route may cause liver, kidney, and lung damage.

#### **Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

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## **4. First Aid Measures**

#### **Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

#### **Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

#### **Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

#### **Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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## 5. Fire Fighting Measures

### **Fire:**

Flash point: 38C (100F) OC

Autoignition temperature: 310C (590F)

Flammable limits in air % by volume:

lel: 1.8; uel: 11.0

Flammable. (lel value is calculated; uel is estimated).

### **Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Moderate explosion hazard when heated. Sealed containers may rupture when heated. Sensitive to static discharge.

### **Fire Extinguishing Media:**

Dry chemical, alcohol foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

### **Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

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## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):  
20 ppm (TWA).

-ACGIH Threshold Limit Value (TLV):  
20 ppm (TWA) skin

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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## 9. Physical and Chemical Properties

### **Appearance:**

Clear, colorless liquid.

### **Odor:**

Characteristic amine odor. Odor is detectable above 0.1 ppm.

**Solubility:**

Miscible in water.

**Specific Gravity:**

1.0 @ 20/4C

**pH:**

ca. 11 For 25% soln.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

128C (262F)

**Melting Point:**

-5C (23F)

**Vapor Density (Air=1):**

3.0

**Vapor Pressure (mm Hg):**

10 @ 23C (73F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Cellulose nitrate, nitromethane, other nitro compounds, strong acids, and oxidizing agents. Corrosive to metals.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 1450 mg/kg; inhalation LC50: 8000 ppm/8H; skin rabbit LD50: 1220 mg/Kg. Investigated as a tumorigen, mutagen.

-----\Cancer Lists\-----			
Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
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Morpholine (110-91-8)	No	No	3

## 12. Ecological Information

### **Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. When released into water, this material may evaporate to a moderate extent. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition. When released into the air, this material is expected to have a half-life of less than 1 day.

### **Environmental Toxicity:**

No information found.

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## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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## 14. Transport Information

### **Domestic (Land, D.O.T.)**

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**Proper Shipping Name:** MORPHOLINE

**Hazard Class:** 8, 3

**UN/NA:** UN2054

**Packing Group:** I

**Information reported for product/size:** 4L

### **International (Water, I.M.O.)**

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**Proper Shipping Name:** MORPHOLINE SOLUTION

**Hazard Class:** 8, 3

**UN/NA:** UN2054

**Packing Group:** I

**Information reported for product/size:** 4L

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan
Australia			

Morpholine (110-91-8)	Yes	Yes	Yes
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-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	DSL	--Canada-- NDSL
Phil.			

Morpholine (110-91-8)	Yes	Yes	No
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-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-	TPQ	-----SARA List
313			

Morpholine (110-91-8)	No	No	No
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-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	8 (d)
		261.33	

Morpholine (110-91-8)	No	No	No
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Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: Yes      Pressure: No  
 Reactivity: No      (Pure / Liquid)

**Australian Hazchem Code:** 2P

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 3 Reactivity: 0

**Label Hazard Warning:**

DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS THE LIVER AND KIDNEYS. FLAMMABLE LIQUID AND VAPOR.

**Label Precautions:**

Do not breathe vapor.  
Do not get in eyes, on skin, or on clothing.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Keep away from heat, sparks and flame.

**Label First Aid:**

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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