



Neutron®Pharmachemical Co.
Manufacturer of Laboratory Chemical & Pharmaceutical Materials

Morpholine

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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SECTION 1: Identification

1.1. Identification

Product form	: Substance
Substance name	: Morpholine
Chemical name	: morpholine
CAS-No.	: 110-91-8
Product code	: 1.4880
Formula	: C ₄ H ₉ NO
Synonyms	: Tetrahydro-2H-1,4-oxazine / 1-Oxa-4-azacyclohexane

1.2. Recommended use and restrictions on use

Use of the substance/mixture	: For laboratory and manufacturing use only.
Recommended use	: Laboratory chemicals
Restrictions on use	: Not for food, drug or household use

1.3. Supplier

NEUTRON PHARMACHEMICAL CO
98, 9th Floor, Borjsaz Building, Azadi Ave, Tehran, Iran.
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www.neutronpharmachemical.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 125

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable liquids	H226	Flammable liquid and vapor
Category 3		
Acute toxicity (oral)	H302	Harmful if swallowed
Category 4		
Acute toxicity (dermal)	H311	Toxic in contact with skin
Category 3		
Skin corrosion/irritation	H314	Causes severe skin burns and eye damage
Category 1A		
Serious eye damage/eye irritation	H318	Causes serious eye damage
Category 1		
Hazardous to the aquatic environment - Acute	H402	Harmful to aquatic life
Hazard Category 3		

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS02

GHS05

GHS06

Signal word (GHS-US)	: Danger
Hazard statements (GHS-US)	: H226 - Flammable liquid and vapor H302 - Harmful if swallowed H311 - Toxic in contact with skin H314 - Causes severe skin burns and eye damage H402 - Harmful to aquatic life
Precautionary statements (GHS-US)	: P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking P233 - Keep container tightly closed P240 - Ground/bond container and receiving equipment

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P241 - Use explosion-proof electrical, ventilating, lighting equipment
P242 - Use only non-sparking tools
P243 - Take precautionary measures against static discharge
P260 - Do not breathe mist, vapors, spray
P264 - Wash exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a poison center or doctor/physician
P363 - Wash contaminated clothing before reuse
P370+P378 - In case of fire: Use alcohol resistant foam, carbon dioxide (CO₂), sand to extinguish
P403+P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/container to comply with local, state and federal regulations
If inhaled: Remove person to fresh air and keep comfortable for breathing

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None under normal conditions.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS-US classification
Morpholine (Main constituent)	(CAS-No.) 110-91-8	100	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Acute Tox. 3 (Dermal), H311 Skin Corr. 1A, H314 Eye Dam. 1, H318 Aquatic Acute 3, H402

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.
First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a poison center or doctor/physician. Wash contaminated clothing before reuse.
First-aid measures after eye contact : 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/physician.
First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Causes severe skin burns and eye damage.
Symptoms/effects after skin contact : Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin.
Symptoms/effects after eye contact : Causes serious eye damage.
Symptoms/effects after ingestion : Swallowing a small quantity of this material will result in serious health hazard.

4.3. Immediate medical attention and special treatment, if necessary

Obtain medical assistance.

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SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.
Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

- Fire hazard : Flammable liquid and vapor.
Explosion hazard : May form flammable/explosive vapor-air mixture.
Reactivity : Thermal decomposition generates : Corrosive vapors.

5.3. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Remove ignition sources. Use special care to avoid static electric charges. No naked lights. No smoking.

6.1.1. For non-emergency personnel

- Protective equipment : Safety glasses. Gloves. Protective clothing. Face-shield.
Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment : Equip cleanup crew with proper protection.
Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

- Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.
Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No naked lights. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Do not breathe mist, vapors, spray. Avoid contact during pregnancy/while nursing.
Hygiene measures : Do not eat, drink or smoke when using this product. Wash exposed skin thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/... equipment. Comply with applicable regulations.
Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Heat sources, Ignition sources, incompatible materials. Keep container tightly closed.
Incompatible products : Strong oxidizers.
Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Morpholine (110-91-8)

ACGIH	ACGIH TWA (mg/m³)	71 mg/m³
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Morpholine (110-91-8)		
ACGIH	ACGIH TWA (ppm)	20 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	70 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	20 ppm
IDLH	US IDLH (ppm)	1400 ppm
NIOSH	NIOSH REL (TWA) (mg/m³)	70 mg/m³
NIOSH	NIOSH REL (TWA) (ppm)	20 ppm
NIOSH	NIOSH REL (STEL) (mg/m³)	105 mg/m³
NIOSH	NIOSH REL (STEL) (ppm)	30 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Safety glasses. Protective clothing.



Hand protection:

Wear protective gloves

Eye protection:

Chemical goggles or face shield

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Respiratory protection not required in normal conditions

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Color	: Colorless
Odor	: strong
Odor threshold	: No data available
pH	: No data available
Melting point	: -5 °C
Freezing point	: No data available
Boiling point	: 128 °C
Flash point	: 32 °C
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Flammable liquid and vapor.
Vapor pressure	: 11 mbar
Relative vapor density at 20 °C	: 3 air = 1

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Relative density	: No data available
Specific gravity / density	: 0.99 g/cm ³
Molecular mass	: 87.12 g/mol
Solubility	: Miscible with water. Soluble in acetone. Soluble in ether. Soluble in ethanol. Soluble in methanol.
Log Pow	: -2.55
Auto-ignition temperature	: 255 °C
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 2.23 cP
Explosion limits	: 2 - 11.2 vol %
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Thermal decomposition generates : Corrosive vapors.

10.2. Chemical stability

Flammable liquid and vapor. May form flammable/explosive vapor-air mixture.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks.

10.5. Incompatible materials

Strong oxidizers.

10.6. Hazardous decomposition products

Nitrogen oxides. Carbon monoxide. Carbon dioxide. May release flammable gases. Thermal decomposition generates : Corrosive vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure	: Inhalation; Skin and eye contact
Acute toxicity	: Oral: Harmful if swallowed. Dermal: Toxic in contact with skin.

Morpholine (110-91-8)	
LD50 oral rat	1050 mg/kg
LD50 dermal rabbit	310 mg/kg
ATE US (oral)	1050 mg/kg body weight
ATE US (dermal)	310 mg/kg body weight

Skin corrosion/irritation	: Causes severe skin burns and eye damage.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity – single exposure	: Not classified
Specific target organ toxicity – repeated exposure	: Not classified
Aspiration hazard	: Not classified

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Potential Adverse human health effects and symptoms	: Based on available data, the classification criteria are not met. Harmful if swallowed. Toxic in contact with skin.
Symptoms/effects after skin contact	: Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin.
Symptoms/effects after eye contact	: Causes serious eye damage.
Symptoms/effects after ingestion	: Swallowing a small quantity of this material will result in serious health hazard.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Harmful to aquatic life.

Morpholine (110-91-8)	
LC50 fish 1	350 mg/l
EC50 Daphnia 1	100 mg/l
EC50 other aquatic organisms 1	28 mg/l 96 hr. Algae
LC50 fish 2	375 - 460 mg/l

12.2. Persistence and degradability

Morpholine (110-91-8)	
Persistence and degradability	Readily biodegradable in water. Not established.

12.3. Bioaccumulative potential

Morpholine (110-91-8)	
Log Pow	-2.55
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations	: Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.
Additional information	: Handle empty containers with care because residual vapors are flammable.
Ecology - waste materials	: Hazardous waste due to toxicity. Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description	: UN2054 Morpholine, 8, I
UN-No.(DOT)	: UN2054
Proper Shipping Name (DOT)	: Morpholine
Transport hazard class(es) (DOT)	: 8 - Class 8 - Corrosive material 49 CFR 173.136
Packing group (DOT)	: I - Great Danger
Hazard labels (DOT)	: 8 - Corrosive 3 - Flammable liquid



DOT Packaging Non Bulk (49 CFR 173.xxx)	: 201
DOT Packaging Bulk (49 CFR 173.xxx)	: 243

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DOT Special Provisions (49 CFR 172.102)	: A6 - For combination packaging, if plastic inner packaging are used, they must be packed in tightly closed metal receptacles before packing in outer packaging. T10 - 4 6 mm Prohibited 178.275(g)(3). TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
DOT Packaging Exceptions (49 CFR 173.xxx)	: None
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: 0.5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	: 2.5 L
DOT Vessel Stowage Location	: A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.
Other information	: No supplementary information available.

SECTION 15: Regulatory information

15.1. US Federal regulations

Morpholine (110-91-8)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Fire hazard

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

Morpholine (110-91-8)	
Listed on the Canadian DSL (Domestic Substances List)	

EU-Regulations

No additional information available

National regulations

Morpholine (110-91-8)	
Listed on the Canadian IDL (Ingredient Disclosure List)	

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Revision date	: 01/09/2018
Other information	: None.

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Full text of H-phrases: see section 16:

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
H402	Harmful to aquatic life

NFPA health hazard

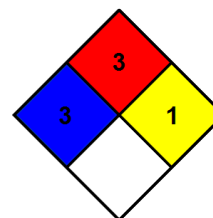
: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA fire hazard

: 3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions.

NFPA reactivity

: 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.



Hazard Rating

Health

: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability

: 3 Serious Hazard - Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 F and boiling points above 100 F. as well as liquids with flash points between 73 F and 100 F. (Classes IB & IC)

Physical

: 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Personal protection

: H
H - Splash goggles, Gloves, Synthetic apron, Vapor respirator

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