



NORTH Metal and Chemical Co.

1. Company Identification and Product Hazard Overview:

Product Name : Morpholine
Synonyms : Tetrahydro-1, 4-oxazine
Recommended Use : A chemical intermediate used in corrosion inhibitors steam boiler systems; pharmaceuticals; textiles, rubber, catalysts, plasticizers, dyes, agricultural, and photographic chemicals.
Manufactured for : **NORTH Metal and Chemical Company**
P. O. Box 1985
York, PA USA 17405
Tel: 717-845-8646
Email: north@nmc-nic.com
609 E. King St.
York, PA USA 17403
Fax: 717-846-7350
Website: www.nmc-nic.com

In Case of Emergency: Call CHEMTREC (24H): 1-800-424-9300

2. Hazard Identification:

GHS Classification:

Flammable Liquids (Category 3)
Acute Toxicity, Oral (Category 4)
Acute Toxicity, Dermal (Category 3)
Skin Corrosion (Category 1B)
Serious Eye Damage (Category 1)

Signal Word: DANGER

Pictograms: Flammable, Acute Toxicity, Corrosion



Hazard Statements:

H226 : Flammable liquid and vapor
H302 : Harmful if swallowed
H311 : Toxic in contact with skin
H314 : Causes severe skin burns and serious eye damage.
H318 : Causes serious eye damage

2. Hazard Identification:

Precautionary Statements:

Prevention:

P210	: Keep away from heat/sparks/open flames/hot surfaces - No smoking
P233	: Keep container tightly closed
P240	: Ground/Bond container and receiving equipment
P241	: Use explosion-proof electrical/ventilating/lighting equipment
P242	: Use only non-sparking tools
P243	: Take precautionary measures against static discharge
P264	: Wash contact area 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.
P281	: Use personal protective equipment as required
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
P301 + P312	: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P301 + P330 + P331	: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P304 + P340	: IF INHALED: Remove person to fresh air and keep in position comfortable for breathing
P308 + P313	: IF exposed or concerned: Get medical advice/attention
P361	: Remove/Take off immediately all contaminated clothing
P363	: Wash contaminated clothing before reuse.
P370 + P378	: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	: Store in a well-ventilated place. Keep cool.
P273 + P405	: Avoid release to the environment. Store Locked Up.
P501	: Dispose of contents/container in accordance with local/state/federal regulations.

3. Composition/Information on Ingredient:

Chemical Name	: Morpholine
Chemical Family	: Amines
Chemical Formula	: C ₄ H ₉ NO

Substance:	CAS Number:	EC	Compo. (%)
Morpholine	110-91-8	203-815-1	>99%

4. First Aid Measures:

- General Advice:** : Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
- Eyes** : Flush skin with running water for at least fifteen minutes. Remove any contact lenses. Get medical aid/attention immediately. Continue to rinse eyes during transport to the hospital.
- Skin** : Remove contaminated clothing. Wash skin with plenty of running water and soap. Take victim immediately to the hospital. Consult a physician.
- Ingestion** : If the product is swallowed, first rinse mouth. Give small amount of water to drink. Call doctor/physician/poison center immediately. Do not induce vomiting. Never give anything by mouth to an unconscious person. If a person vomits, place him/her in recovery position so the vomit does not enter lungs.
- Inhalation** : If safe to do so, remove individual from further exposure. Keep warm and at rest. If breathing has ceased, give artificial respiration. Do not give mouth to mouth resuscitation. Get medical attention/consult a physician immediately.
- Note to Physician** : Treat symptomatically.
- PPE for first responders** : Gloves and safety goggles are highly recommended.

5. Fire Fighting Measures:

- Flash Point (°C)** : 31 °C (88 °F) - closed cup; 38°C (100.4°F) - open cup
- Flammable Limits** : Upper explosion limit: 10.8% (V); Lower explosion limit: 1.8% (V)
- Auto ignition Temp.** : 255°C
- Flammable Class** : Not available.
- General Hazard** : Evacuate personnel downwind in-order to avoid inhalation of irritating and/or harmful fumes and smoke.
- Extinguishing Media** : Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.
- Special hazards arising from the substance** : Carbon oxides, Nitrogen Oxides (NOx)
- Fire Fighting Procedures:** Hazardous decomposition and combustion products such as carbon/nitrogen oxides can be formed if product is burning. Cool exposed containers with water spray to prevent over heating.
- Fire Fighting Equipment:** Respiratory and eye protection are required for fire fighting personnel. Full protective equipment (bunker gear) and self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. Evacuate area and fight fire from safe distance or a protected location. Move fire-exposed containers, if allowable without sacrificing the safety of the firefighters. If possible, firefighters should control run-off water to prevent environmental contamination.

6. Accidental Release Measures:

- Protective Gear for Personnel** : Wear respiratory protection. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
- Environmental Precaution** : Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
- Methods and materials for containment and cleaning up** : Contain spillage, and then collect with an electronically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.
- Release Notes** : If spill could potentially enter any waterway, including intermittent dry creeks, contact local authorities.

7. Handling and Storage:

- Handling** : Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep away from sources of ignition. No smoking. Take measures to prevent the build up of electrostatic charge.
- Storage** : Store in a cool, dry well-ventilated area. Keep containers closed and up right when not in use. Keep product isolated from incompatible materials/conditions

8. Exposure Controls and Personal Protection:

Component	CAS-No.	Value	Control parameters	Basis
Morpholine	110-91-8	TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye damage Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	20 ppm 70 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		STEL	30 ppm 105 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	20 ppm 70 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m ³ is approximate.		
		TWA	20 ppm 70 mg/m ³	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	30 ppm 105 mg/m ³	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		

- Engineering Controls** : Use appropriate engineering controls to avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product.

Personal Protective Equipment

- Eyes and face:** Tightly fitting safety goggles. Face shield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH.

Skin: Avoid direct contact with skin. Wear rubber gloves, apron, boots or whole bodysuit when handling this product. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of any contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection: Complete suit protecting against chemicals; flame retardant anti-static protective clothing. The type of protective equipment must be selected according to the concentration and amount of dangerous substance at the specific work place.

Respiratory: Where risk assessment shows air-purifying respirators are appropriate, use full-face respirator with multi-purpose combination respirator cartridges as a back up to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH.

- Work Hygienic Practices** : Facilities storing or using this material should be equipped with emergency eyewash, and a safety shower. Good personal hygiene practices should always be followed.

Control of Environmental Exposure

- : Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. Chemical and Physical Properties:

Appearance	: Liquid	Upper Explosive Limit	: 10.8% (V)
Odor	: Unpleasant	Vapor Pressure	: 41 hPa (31 mmHg) @ 38°C
Odor threshold	: Not available	Vapor Density	: 9 hPa (7 mmHg) @ 22°C
Color	: Colorless	Relative Density	: 3.01 - (Air = 1.0)
pH	: 10.6 @ 5 g/l @ 20°C	Solubility	: Soluble in Water
Melting Point	: -7 to -5°C - lit.	Partition coefficient (n-octanol/water)	: log POW: -2.55
Freezing Point	: -5°C	Auto Ignition Temp.	: 255°C
Boiling Range	: 129°C (264°F) - lit.	Molecular Weight	: 87.12 g/mol
Flash Point	: 31 °C (88°F) - closed cup	VOC content	: 100% by ASTM D 2369
Viscosity (cSt) @ 25 °C	: Dynamic: 2.23 mPa s (2.23cP)	Specific Gravity @20°C g/cm3	: 1.003
Decomposition Temp.	: Not available		
Evaporation Rate	: Not available		
Lower Explosive Limit	: 1.8% (V)		

10. Stability and Reactivity:

Stability : The product is stable under recommended storage conditions.

Possibility of Hazardous Reactions : Vapors may form explosive mixture in the air

Hazardous Decomposition Products : No data available

Incompatible Materials : Strong oxidizing agents, Carbon Dioxide, sodium hypochlorite, Organic acids, Mineral acids, Peroxides

Conditions to Avoid : Heat, flames, sparks

11. Toxicological Information:

Acute Toxicity Data:

LD50 Oral - Rat - 1,450 mg/kg
LC50 Inhalation - Rat - 8h - 8000 ppm
LD50 Dermal - Rabbit - 500 mg/kg

Skin corrosion/irritation:

Skin - Rabbit
Result: Severe skin irritation - 24h

Serious eye damage/eye irritation:

Eyes - Rabbit
Result: Severe eye irritation

Respiratory or skin sensitization:

No data available

Germ cell mutagenicity:

Mouse - lymphocyte and morphological transformation
Hamster - ovary and sister chromatid exchange

Carcinogenicity:

Mouse - oral: Tumorigenic: Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration: Bronchiogenic carcinoma. Liver: Tumors
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3. Not classifiable as to its carcinogenicity to humans (Morpholine)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible, or confirmed human carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible, or confirmed human carcinogen by OSHA.

Reproductive toxicity: No data available

11. Toxicological Information:

Specific target organ toxicity - single exposure:

No data available

Specific target organ toxicity - repeated exposure:

No data available

Aspiration Hazard:

No data available

Additional Information:

RTECS: QD6475000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
Cough, Shortness of breath, Headache, Nausea

Stomach - Irregularities - Based on Human Evidence

12. Ecological Information:

All work practices must be aimed at eliminating environmental contamination.

Toxicity

Toxicity to fish: LC50 - Oncorhynchus mykiss (rainbow trout) - 180 - 380 mg/l - 96h

Toxicity to daphnia and other aquatic Invertebrates:

EC50 - Daphnia magna (Water flea) - 100 mg/l - 24h

Toxicity to algae:

Growth inhibition LOEC - Desmodesmus subspicatus (green algae) - 80 mg/l - h
EC50 - Desmodesmus subspicatus (green algae) - > 310 mg/l - 72h

Biodegradability:

No data available

Bioaccumulative Potential:

No data available

Mobility in soil:

No data available

Results of PBT and vPvB assessment:

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

Other Adverse effects: No data available

13. Disposal Considerations:

Disposal Method	: Dispose of waste at an appropriate waste disposal facility according to current applicable laws and regulations.
For Large Spills	: Contain material and call local authorities for emergency assistance.
Product Disposal	: Dispose of at a supervised incineration facility or an appropriate waste disposal facility according to current applicable local, state and federal laws, regulations and product characteristics at time of disposal.
Empty Container	: Contaminated container should be labeled and disposed in accordance to local, state and federal laws and regulations.
General Comments	: Refer to section 6, accidental release measures for additional information.

14. Transport Information:

Regulatory Information	UN No.	Proper Shipping Name	UN Class	Packing Group	Labels
US DOT	2054	Corrosive Liquids, BASIC, Organic, N.O.S.	8 (3)	I	Corrosive Sticker Flammable Sticker
IMDG	2054	Corrosive Liquids, BASIC, Organic, N.O.S.	8 (3)	I	Corrosive Sticker Flammable Sticker
IATA	2054	Corrosive Liquids, BASIC, Organic, N.O.S.	8 (3)	I	Corrosive Sticker Flammable Sticker

15. Regulatory Information:

U.S. Federal Regulations:

SARA 302 Components: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313

SARA 311/312: Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right to know Components: Morpholine CAS No. 108-91-8

Pennsylvania Right to know Components: Morpholine CAS No. 108-91-8

New Jersey Right to know Components: Morpholine CAS No. 108-91-8

California Proposition 65 Components: This product does contains less than 1% of a chemical known to the state of California to cause birth defects or other productive harm:

<u>Ingredient Name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant Risk Level</u>	<u>Maximum acceptable dosage level</u>
Ethylene Glycol Monomethyl Ether	No.	Yes	No	63 µg/day (ingestion)

WHMIS Canada: Class B-2: Flammable liquid with a flash point lower than 31°C. Class D-1B: Material causing immediate and serious toxic effects (TOXIC). Class E: Corrosive liquid

OSHA Hazcom Standard Rating: Hazardous

US Toxic Substances Control Act: Listed on the TSCA inventory

US EPA CERCLA Hazardous Substances (40 CFR 302): Not listed

16. Other Information:

HMIS and NFPA Rating Scale:

HMIS: Hazardous Materials Identification System

Numeric Scale for Health (Blue), Flammability (Red), and Physical Hazard (Yellow):

HMIS Rating:*

HEALTH	3
FLAMMABILITY	3
PHYSICAL HAZARD	0
PERSONAL PROTECTION	C

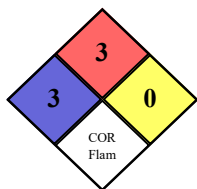
RATING	HEALTH	FIRE HAZARD	PHYSICAL HAZARD
0	No significant risk to health	Will not burn	Product stable under ambient temperature and condition.
1	Can cause irritation or minor reversible injury.	Must be preheated to burn	Product can become unstable at high temperatures and pressures.
2	Can cause temporary or residual injury	Ignites when moderately heated	Product can become unstable and cause violent chemical reaction at normal pressures and temperatures
3	Can cause serious injury	Ignition occurs at normal temperature	Product capable of forming explosive mixtures and is capable of detonation in presence of strong initiating source.
4	Can be lethal from single or repeated exposure.	Extremely flammable	Product is highly explosive and unstable. Exothermic reactions possible with decomposition, polymerization, reaction with water or self reaction

Personal Protection Code C: Gloves + Safety Goggles + Chemical Apron

NFPA: National Fire Protection Association

Numeric Scale for Health (Blue), Fire Hazard (Red), and Reactivity (Yellow): Special (White)

NFPA Rating:*



RATING	HEALTH	FIRE HAZARD	REACTIVITY
0	Minimal Hazard	Will not burn	Normally Stable
1	Can cause significant irritation	Must be preheated to burn	Unstable at high temperatures
2	Can cause temporary incapacitation or residual injury	Ignites when moderately heated	Normally unstable. Can readily go under violent chemical reaction but do not detonate.
3	Can cause permanent injury.	Ignition occurs at normal temperature	Capable of detonation, or of explosive reaction, but requires a strong ignition source.
4	Can be lethal.	Extremely flammable	May explode at normal temperatures and pressures

Revision Date: October 26, 2018

Reason for Revision: Fixed formatting

The information contained in this SDS was obtained from current and reliable sources. However, the data is provided without any warranty, expressed or implied, regarding its correctness or accuracy. Since the conditions or handling, storage and disposal of this product are beyond the control of the manufacturer/supplier, they are not held responsible for loss, injury, and expense arising out of the product's use. No warranty, expressed or inferred, regarding the product described in this SDS shall be created or inferred by any statement in this MSDS.