### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier
- **Product form**: Substance
- **Substance name**: Morpholine
- **Chemical name**: morpholine
- **CAS No**: 110-91-8
- **Product code**: LC17440
- **Formula**: C4H9NO
- **Synonyms**: Tetrahydro-2H-1,4-oxazin / 1-Oxa-4-azacyclohexane

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against
- **Use of the substance/mixture**: For laboratory and manufacturing use only.

#### 1.3. Details of the supplier of the safety data sheet
- **LabChem Inc**
  - Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
  - Zelienople, PA 16063 - USA
  - T 412-826-5230 - F 724-473-0647
  - info@labchem.com - www.labchem.com

#### 1.4. Emergency telephone number
- **Emergency number**: CHEMTREC: 1-800-424-9300 or 011-703-527-3887

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture
- **GHS-US classification**
  - Flam. Liq. 3: H226
  - Acute Tox. 4 (Oral): H302
  - Acute Tox. 3 (Dermal): H311
  - Skin Corr. 1A: H314
  - Eye Dam.: H318
  - Aquatic Acute 3: H402

#### 2.2. Label elements
- **Signal word (GHS-US)**: Danger
- **Hazard pictograms (GHS-US)**: ![GHS02](image), ![GHS05](image), ![GHS06](image)
- **Hazard statements (GHS-US)**
  - H226 - Flammable liquid and vapour
  - 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
  - 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, vapours, 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
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2.3. Other hazards
Other hazards not contributing to the classification: None under normal conditions.

2.4. Unknown acute toxicity (GHS-US)
No data available

SECTION 3: Composition/information on ingredients

3.1. Substance
Substance type: Mono-constituent
Name: Morpholine
CAS No: 110-91-8
EC no: 203-815-1
EC index no: 613-028-00-9

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morpholine (Main constituent)</td>
<td>(CAS No) 110-91-8</td>
<td>100</td>
<td>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</td>
</tr>
</tbody>
</table>

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

4.3. Indication of any immediate medical attention and special treatment needed
Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media
5.2. Special hazards arising from the substance or mixture

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

5.3. Advice for firefighters

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

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 vapours 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 vapour. No naked lights. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Do not breathe mist, vapours, 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.

7.3. Specific end use(s)

No additional information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th></th>
<th>USA ACGIH ACGIH TWA (mg/m³)</th>
<th>USA ACGIH ACGIH TWA (ppm)</th>
<th>USA OSHA OSHA PEL (TWA) (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morpholine (110-91-8)</td>
<td>71 mg/m³</td>
<td>20 ppm</td>
<td>70 mg/m³</td>
</tr>
</tbody>
</table>

05/13/2014 EN (English)
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<table>
<thead>
<tr>
<th>Morpholine (110-91-8)</th>
<th>USA OSHA OSHA PEL (TWA) (ppm)</th>
<th>20 ppm</th>
</tr>
</thead>
</table>

8.2. Exposure controls
Appropriate engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation.

Personal protective equipment: Avoid all unnecessary exposure.

Hand protection: Wear protective gloves.

Eye protection: Chemical goggles or face shield.

Skin and body protection: Wear suitable protective clothing.

Respiratory protection: Wear appropriate mask.

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>87.12 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>strong</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>-5 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>128 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>32 °C</td>
</tr>
<tr>
<td>Self ignition temperature</td>
<td>255 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>11 mbar</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>3 air = 1</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Density</td>
<td>0.99 g/cm³</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water:</td>
</tr>
<tr>
<td>Log Pow</td>
<td>-2.55</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>2.23 cP</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>2 - 11.2 vol %</td>
</tr>
</tbody>
</table>

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
Thermal decomposition generates: Corrosive vapours.

10.2. Chemical stability
Flammable liquid and vapour. May form flammable/explosive vapour-air mixture.

10.3. Possibility of hazardous reactions
Not established.

10.4. Conditions to avoid
10.5. Incompatible materials
Strong oxidizers.

10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Compound (if)</th>
<th>LD50 oral rat</th>
<th>LD50 dermal rabbit</th>
<th>ATE US (oral)</th>
<th>ATE US (dermal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morpholine (110-91-8)</td>
<td>1050 mg/kg</td>
<td>310 mg/kg</td>
<td>1050.00000000 mg/kg bodyweight</td>
<td>310.00000000 mg/kg bodyweight</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Causes severe skin burns and eye damage.
Serious eye damage/irritation: Causes serious eye damage.
Respiratory or skin sensitisation: 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
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/injuries after skin contact: Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin.
Symptoms/injuries after eye contact: Causes serious eye damage.
Symptoms/injuries 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.

<table>
<thead>
<tr>
<th>Compound (110-91-8)</th>
<th>LC50 fishes</th>
<th>EC50 Daphnia</th>
<th>EC50 other aquatic organisms</th>
<th>LC50 fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morpholine (110-91-8)</td>
<td>350 mg/l</td>
<td>100 mg/l</td>
<td>28 mg/l 96 hr. Algae</td>
<td>375 - 460 mg/l</td>
</tr>
</tbody>
</table>

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
Effect on ozone layer: No additional information available
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SECTION 13: Disposal considerations

13.1. Waste treatment 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 vapours are flammable.

Ecology - waste materials : Hazardous waste due to toxicity. Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT
Transport document description : UN2054 Morpholine, 8, I

UN-No.(DOT) : 2054
DOT NA no. : UN2054
DOT Proper Shipping Name : Morpholine
Department of Transportation (DOT) Hazard Classes : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive
3 - Flammable liquid

Packing group (DOT) : I - Great Danger

DOT Special Provisions (49 CFR 172.102) : A6 - For combination packagings, if plastic inner packagings are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.
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: \(d_{15}\) and \(d_{50}\) 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 Packaging Non Bulk (49 CFR 173.xxx) : 201
DOT Packaging Bulk (49 CFR 173.xxx) : 243
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 0.5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 173.75) : 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.

Additional information
Other information : No supplementary information available.

ADR
Transport document description :

Transport by sea
No additional information available

Air transport
No additional information available
### SECTION 15: Regulatory information

#### 15.1. US Federal regulations

<table>
<thead>
<tr>
<th>Morpholine (110-91-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Listed on the United States TSCA (Toxic Substances Control Act) inventory</strong></td>
<td></td>
</tr>
<tr>
<td>SARA Section 311/312 Hazard Classes</td>
<td>Immediate (acute) health hazard Fire hazard</td>
</tr>
</tbody>
</table>

#### 15.2. International regulations

**CANADA**

<table>
<thead>
<tr>
<th>Morpholine (110-91-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Listed on the Canadian DSL (Domestic Sustances List) inventory.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>WHMIS Classification</strong></td>
<td>Class B Division 3 - Combustible Liquid</td>
</tr>
<tr>
<td></td>
<td>Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects</td>
</tr>
<tr>
<td></td>
<td>Class E - Corrosive Material</td>
</tr>
</tbody>
</table>

**EU-Regulations**

No additional information available

**Classification according to Regulation (EC) No. 1272/2008 [CLP]**

| Flam. Liq. 3 | H226 |
| Acute Tox. 4 (Inhalation) | H332 |
| Acute Tox. 4 (Dermal) | H312 |
| Acute Tox. 4 (Oral) | H302 |
| Skin Corr. 1B | H314 |

Full text of H-phrases: see section 16

**Classification according to Directive 67/548/EEC or 1999/45/EC**

| R10 | Xn; R20/21/22 |
| C; R34 |

Full text of R-phrases: see section 16

#### 15.2.2. National regulations

<table>
<thead>
<tr>
<th>Morpholine (110-91-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Listed on the Canadian Ingredient Disclosure List</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### 15.3. US State regulations

No additional information available

### SECTION 16: Other information

Other information: None.

Full text of H-phrases: see section 16:

| Acute Tox. 3 (Dermal) | Acute toxicity (dermal), Category 3 |
| Acute Tox. 4 (Oral) | Acute toxicity (oral), Category 4 |
| Aquatic Acute 3 | Hazardous to the aquatic environment — AcuteHazard, Category 3 |
| Eye Dam. 1 | Serious eye damage/eye irritation, Category 1 |
| Flam. Liq. 3 | Flammable liquids, Category 3 |
| Skin Corr. 1A | Skin corrosion/irritation, Category 1A |
| H226 | Flammable liquid and vapour |
| 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 |
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NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.

NFPA reactivity : 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

HMIS III Rating
Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability : 3 Serious Hazard
Physical : 1 Slight Hazard
Personal Protection : H

SDS US (GHS HazCom 2012)

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