1. Identification

Product identifier used on the label

Piperazine app. 68%

Recommended use of the chemical and restriction on use
Recommended use*: Chemical

* The “Recommended use” identified for this product is provided solely to comply with a US Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

Telephone: +1 973 245-6000

Emergency telephone number

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Other means of identification

Chemical family: amines, aliphatic
Synonyms: Piperazine in water Use: Chemical used in synthesis and/or formulation of industrial products.

2. Hazards Identification


Classification of the product

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flam. Liq</td>
<td>4</td>
<td>Flammable liquids</td>
</tr>
<tr>
<td>Skin Corr./Irrit</td>
<td>1B</td>
<td>Skin corrosion/irritation</td>
</tr>
<tr>
<td>Eye Dam./Irrit</td>
<td>1</td>
<td>Serious eye damage/eye irritation</td>
</tr>
<tr>
<td>Resp. Sens.</td>
<td>1</td>
<td>Respiratory sensitization</td>
</tr>
<tr>
<td>Skin Sens.</td>
<td>1B</td>
<td>Skin sensitization</td>
</tr>
<tr>
<td>Repr.</td>
<td>2 (fertility)</td>
<td>Reproductive toxicity</td>
</tr>
<tr>
<td>Repr.</td>
<td>2 (unborn child)</td>
<td>Reproductive toxicity</td>
</tr>
</tbody>
</table>
Aquatic Acute 3 Hazardous to the aquatic environment - acute

**Label elements**

**Pictogram:**

![Pictogram]

**Signal Word:**

Danger

**Hazard Statement:**

H227 Combustible liquid.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H361 Suspected of damaging fertility. Suspected of damaging the unborn child.
H314 Causes severe skin burns and eye damage.
H402 Harmful to aquatic life.

**Precautionary Statements (Prevention):**

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P260 Do not breathe dust or mist.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273 Avoid release to the environment.
P201 Obtain special instructions before use.
P272 Contaminated work clothing should not be allowed out of the workplace.
P264 Wash with plenty of water and soap thoroughly after handling.

**Precautionary Statements (Response):**

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.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P362 + P364 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use water spray, dry powder, foam or carbon dioxide for extinction.

**Precautionary Statements (Storage):**

P405 Store locked up.
P403 + P235 Store in a well-ventilated place. Keep cool.

**Precautionary Statements (Disposal):**

P501 Dispose of contents/container to hazardous or special waste collection point.
Hazards not otherwise classified

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.


Emergency overview

DANGER:
CORROSIVE.
COMBUSTIBLE LIQUID.
Corrosive to skin and/or eyes.
Respiratory and skin sensitiser
Contains a suspected reproductive toxin.
Use with local exhaust ventilation.
Avoid contact with the skin, eyes and clothing.
Wear suitable protective clothing, gloves and eye/face protection.
Eye wash fountains must be easily accessible.

3. Composition / Information on Ingredients


<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Content (W/W)</th>
<th>Chemical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-85-0</td>
<td>&gt;= 50.0 - &lt;= 75.0 %</td>
<td>piperazine</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Content (W/W)</th>
<th>Chemical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-85-0</td>
<td>&gt;= 60.0 - &lt;= 80.0 %</td>
<td>piperazine</td>
</tr>
</tbody>
</table>

4. First-Aid Measures

Description of first aid measures

General advice:
Immediately remove contaminated clothing.

If inhaled:
Remove the affected individual into fresh air and keep the person calm. Seek medical attention.

If on skin:
Wash affected areas with water while removing contaminated clothing. Seek medical attention.

If in eyes:
In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Seek medical attention.

If swallowed:
Rinse mouth immediately and then drink plenty of water, seek medical attention.

Most important symptoms and effects, both acute and delayed
Symptoms: Overexposure may cause: vomiting, weakness, incoordination, nausea, diarrhea, tremors

**Indication of any immediate medical attention and special treatment needed**

**Note to physician**

**Treatment:** Treat according to symptoms (decontamination, vital functions), no known specific antidote.

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### 5. Fire-Fighting Measures

**Extinguishing media**

Suitable extinguishing media:
water spray, dry powder, foam, carbon dioxide

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

Hazards during fire-fighting:
carbon monoxide, carbon dioxide, nitrous gases

**Advice for fire-fighters**

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

**Further information:**

Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

**Impact Sensitivity:**

Remarks: Based on the chemical structure there is no shock-sensitivity.

---

### 6. Accidental release measures

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

Breathing protection required. Avoid contact with the skin, eyes and clothing.

**Environmental precautions**

Substance/product is RCRA hazardous due to its properties.

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

Spills should be contained, solidified, and placed in suitable containers for disposal.

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### 7. Handling and Storage

**Precautions for safe handling**

Ensure thorough ventilation of stores and work areas. Product solidified and/or tending to sedimentation in barrels can be liquified or homogenized by careful application of indirect heat (no naked flames or direct contact with a heat source). Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift.
Protection against fire and explosion:
The product is combustible. Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

**Conditions for safe storage, including any incompatibilities**
Segregate from acids and acid forming substances.

Further information on storage conditions: Keep container tightly closed and dry; store in a cool place. Keep away from sources of ignition - No smoking.

## 8. Exposure Controls/Personal Protection

### Components with occupational exposure limits

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>TWA value</th>
<th>Inhalable fraction and vapor (piperazine);</th>
</tr>
</thead>
<tbody>
<tr>
<td>piperazine</td>
<td></td>
<td>0.03 ppm</td>
<td></td>
</tr>
</tbody>
</table>

**Personal protective equipment**

**Respiratory protection:**
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.

**Hand protection:**
Chemical resistant protective gloves

**Eye protection:**
Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

**Body protection:**
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

Body protection must be chosen based on level of activity and exposure.

**General safety and hygiene measures:**
Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to prevent contact. Employees should shower at the end of the shift. Wash soiled clothing immediately.

## 9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form:</td>
<td>hot molten</td>
</tr>
<tr>
<td>Odour:</td>
<td>amine-like</td>
</tr>
<tr>
<td>Odour threshold:</td>
<td></td>
</tr>
<tr>
<td>Colour:</td>
<td>colourless to yellow</td>
</tr>
<tr>
<td>pH value:</td>
<td>13.7</td>
</tr>
<tr>
<td>Melting range:</td>
<td>29 - 48 °C</td>
</tr>
<tr>
<td>Boiling range:</td>
<td>100 - 148 °C</td>
</tr>
<tr>
<td>Flash point:</td>
<td>73.7 °C</td>
</tr>
<tr>
<td>Flammability:</td>
<td>Highly flammable</td>
</tr>
<tr>
<td>Flash point:</td>
<td></td>
</tr>
<tr>
<td>Flammability:</td>
<td></td>
</tr>
<tr>
<td>Lower explosion limit:</td>
<td></td>
</tr>
</tbody>
</table>

Not determined due to potential health hazard by inhalation. (45 °C)

(Directive 84/449/EEC, A.10)

For solids not relevant for classification and labelling.
10. Stability and Reactivity

Reactivity

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
not fire-propagating

Formation of flammable gases:
Remarks: Forms no flammable gases in the presence of water.

Chemical stability

Possibility of hazardous reactions
Strong exothermic reaction with acids.

Conditions to avoid

Incompatible materials
copper, acids, acid forming substances, nitrosating agents, non-ferrous metals

Hazardous decomposition products

Decomposition products:
Hazardous decomposition products: carbon monoxide, carbon dioxide, nitrogen oxides

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects
Acute toxicity
Assessment of acute toxicity: The inhalation of a highly enriched/saturated vapor-air-mixture represents an unlikely acute hazard. Of low toxicity after single ingestion. Virtually nontoxic after a single skin contact.

Oral

Information on: piperazine
Type of value: LD50
Species: rat
Value: approx. 2,600 mg/kg (BASF-Test)

Inhalation

Information on: piperazine
Type of value: LC0
Species: rat
Value: 1.16 mg/l (IRT)
Exposure time: 8 h
The vapour was tested.

Dermal

Information on: piperazine
Type of value: LD50
Species: rabbit
Value: 8,300 mg/kg (similar to OECD guideline 402)

Assessment other acute effects
Assessment of STOT single:
Apart from effects causing lethality, no specific target organ toxicity was observed in experimental studies.

Irritation / corrosion
Assessment of irritating effects: Corrosive! Damages skin and eyes.

Skin
Species: rabbit
Result: Corrosive.
Method: OECD Guideline 404
An aqueous solution was tested.

Eye
Species: rabbit
Study scientifically not justified.

Sensitization
Assessment of sensitization: The substance may cause sensitization of the respiratory tract. Sensitization after skin contact possible.

Mouse Local Lymph Node Assay (LLNA)
Species: mouse
Result: sensitizing
Method: similar to OECD guideline 429
Guinea pig maximization test
Species: guinea pig
Result: sensitizing
Method: similar to OECD guideline 406

Aspiration Hazard
No aspiration hazard expected.

**Chronic Toxicity/Effects**

**Repeated dose toxicity**
Assessment of repeated dose toxicity: May affect the liver and kidneys as indicated in animal studies.

**Genetic toxicity**
Assessment of mutagenicity: In the majority of studies performed with microorganisms and in mammalian cell culture, a mutagenic effect was not found. A mutagenic effect was also not observed in in vivo tests. Literature data.

**Carcinogenicity**
Assessment of carcinogenicity: No data was available concerning carcinogenic activity. Under certain conditions the substance can form nitrosamines. Nitrosamines are carcinogenic in animal studies.

**Reproductive toxicity**
Assessment of reproduction toxicity: The results of animal studies suggest a fertility impairing effect.

**Teratogenicity**
Assessment of teratogenicity: Indications of possible developmental toxicity/teratogenicity were seen in animal studies.

**Other Information**
Females of childbearing age should not come into contact with the product.
The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

**Symptoms of Exposure**
Overexposure may cause: vomiting, weakness, incoordination, nausea, diarrhea, tremors

---

**12. Ecological Information**

**Toxicity**

**Aquatic toxicity**
Assessment of aquatic toxicity: Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations. Acutely harmful for aquatic organisms.

**Toxicity to fish**
LC50 (96 h) > 1,800 mg/l, Poecilia reticulata (Directive 84/449/EEC, C.1, semistatic)
Nominal concentration. Literature data.

LC50 (96 h) > 391 mg/l, Cyprinodon variegatus (OECD 203; ISO 7346; 84/449/EEC, C.1, semistatic)
Nominal concentration. Limit concentration test only (LIMIT test).

Aquatic invertebrates
EC50 (48 h) 21 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
Nominal concentration.

LC50 (48 h) 391 mg/l, Arcatia tonsa (ISO 14669, static)
Nominal concentration.

Aquatic plants
No observed effect concentration (72 h) > 1,000 mg/l (growth rate), Selenastrum capricornutum (OECD Guideline 201, static)
Nominal concentration.

EC50 (72 h) 944.2 mg/l (growth rate), Skeletonema costatum (ISO/DIS 10253, static)
Nominal concentration.

Chronic toxicity to fish
Study scientifically not justified.

Chronic toxicity to aquatic invertebrates
No observed effect concentration (21 d) 12.5 mg/l, Daphnia magna (OECD Guideline 211, semistatic)
Nominal values (confirmed by concentration control analytics)

Assessment of terrestrial toxicity
Study not necessary due to exposure considerations.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms
Oxygen consumption test static
activated sludge of a predominantly domestic sewage/EC20 (30 min): > 1,600 mg/l
Nominal concentration.

Inhibition of nitrification static
nitrifying bacteria/EC50 (2 h): 633 mg/l
Nominal concentration.

Persistence and degradability

Assessment biodegradation and elimination (H2O)
Readily biodegradable (according to OECD criteria).

Elimination information

65 % BOD of the ThOD (28 d) (OECD Guideline 301 F) (activated sludge, domestic)

96 % DOC reduction (52 d) (OECD Guideline 302 A) (aerobic, activated sludge, domestic, non-adapted)

Assessment of stability in water
According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Assessment bioaccumulation potential
Does not significantly accumulate in organisms.
Mobility in soil

Assessment transport between environmental compartments

*Information on: piperazine*

The substance will not evaporate into the atmosphere from the water surface. Adsorption to solid soil phase is not expected.

Additional information

Adsorbable organically-bound halogen (AOX):
This product contains no organically-bound halogen.

Other ecotoxicological advice:
The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

13. Disposal considerations

**Waste disposal of substance:**
Dispose of in a RCRA-licensed facility. Do not discharge into waterways or sewer systems without proper authorization.

**Container disposal:**
Empty containers with less than 1 inch of residue may be landfilled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

**RCRA:** D002

14. Transport Information

**Land transport**
USDOT

- Hazard class: 8
- Packing group: III
- ID number: UN 2579
- Hazard label: 8
- Proper shipping name: PIPERAZINE MIXTURE, MOLTEN

**Sea transport**
IMDG

- Hazard class: 8
- Packing group: III
- ID number: UN 2579
- Hazard label: 8
- Marine pollutant: NO
- Proper shipping name: PIPERAZINE MIXTURE, MOLTEN

**Air transport**
IATA/ICAO
15. Regulatory Information

Federal Regulations

Registration status:
Chemical: TSCA, US released / listed

EPCRA 311/312 (Hazard categories):
Acute; Chronic; Fire

State regulations

<table>
<thead>
<tr>
<th>State RTK</th>
<th>CAS Number</th>
<th>Chemical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA, NJ, PA</td>
<td>T10-85-0</td>
<td>piperazine</td>
</tr>
</tbody>
</table>

NFPA Hazard codes:
- Health: 3
- Fire: 2
- Reactivity: 0
- Special: 0

HMIS III rating
- Health: 3
- Flammability: 2
- Physical hazard: 0

Assessment of the hazard classes according to UN GHS criteria (most recent version):

- Aquatic Acute: 3
- Skin Corr./Irrit.: 1B
- Resp. Sens.: 1
- Skin Sens.: 1B
- Acute Tox.: 5 (oral)
- Repr.: 2 (fertility)
- Repr.: 2 (unborn child)
- Flam. Liq.: 4
- Eye Dam./Irrit.: 1

16. Other Information

SDS Prepared by:
BASF NA Product Regulations
SDS Prepared on: 2015/01/14

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