1. PRODUCT AND COMPANY IDENTIFICATION

Product name: \( p \)-Phenylenediamine

Product Number: P6001

Brand: Sigma

Supplier: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone: +1 800-325-5832
Fax: +1 800-325-5052
Emergency Phone #: (314) 776-6555

Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Toxic by ingestion, Toxic by skin absorption, Skin sensitiser, Irritant

Target Organs
Liver, Kidney

GHS Classification
Acute toxicity, Dermal (Category 3)
Acute toxicity, Oral (Category 3)
Skin irritation (Category 3)
Eye irritation (Category 2A)
Skin sensitization (Category 1)
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H301 + H311: Toxic if swallowed or in contact with skin
H316: Causes mild skin irritation.
H317: May cause an allergic skin reaction.
H319: Causes serious eye irritation.
H400: Very toxic to aquatic life.

Precautionary statement(s)
P273: Avoid release to the environment.
P280: Wear protective gloves/ protective clothing.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Call a POISON CENTER or doctor/physician if you feel unwell.

HMIS Classification
- Health hazard: 3
- Chronic Health Hazard: *
- Flammability: 1
- Physical hazards: 0

NFPA Rating
- Health hazard: 4
- Fire: 1
- Reactivity Hazard: 0

Potential Health Effects
- Inhalation: May be harmful if inhaled. Causes respiratory tract irritation.
- Skin: Toxic if absorbed through skin. Causes skin irritation.
- Eyes: Causes eye irritation.
- Ingestion: Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Synonyms | 1,4-Diaminobenzene
|          | 1,4-Benzenediamine
|          | 1,4-Phenylenediamine
| Formula  | C6H8N2
| Molecular Weight | 108.14 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-Phenylenediamine</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>106-50-3</td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-404-7</td>
</tr>
<tr>
<td>Index-No.</td>
<td>612-028-00-6</td>
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</tbody>
</table>

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)

6. ACCIDENTAL RELEASE MEASURES
Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
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
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-Phenylenediamine</td>
<td>106-50-3</td>
<td>TWA</td>
<td>0.1 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
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</table>

Remarks

<table>
<thead>
<tr>
<th>Value</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
</tbody>
</table>

Potential for dermal absorption

<table>
<thead>
<tr>
<th>Value</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Skin and body protection

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup 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 (US) or CEN (EU).

Hand protection
Handle with gloves. 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 contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the
concentration and amount of the dangerous substance at the specific workplace.

**Hygiene measures**
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td></td>
</tr>
<tr>
<td>Form</td>
<td>solid</td>
</tr>
<tr>
<td>Colour</td>
<td>no data available</td>
</tr>
<tr>
<td><strong>Safety data</strong></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>9 at 50 g/l at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Melting point/range: 138 - 143 °C (280 - 289 °F) - lit.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>267 °C (513 °F) - lit.</td>
</tr>
<tr>
<td>Flash point</td>
<td>110 °C (230 °F) - closed cup</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
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</tr>
<tr>
<td>Lower explosion limit</td>
<td>1.5 % (V)</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>1.44 hPa (1.08 mmHg) at 100 °C (212 °F)</td>
</tr>
<tr>
<td>Density</td>
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<tr>
<td>Water solubility</td>
<td>ca.10 g/l at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: -0.25</td>
</tr>
<tr>
<td>Relative vapour density</td>
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</tr>
<tr>
<td>Odour</td>
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</tr>
<tr>
<td>Odour Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
</tbody>
</table>

## 10. STABILITY AND REACTIVITY

**Chemical stability**
Stable under recommended storage conditions.

**Possibility of hazardous reactions**
no data available

**Conditions to avoid**
no data available

**Materials to avoid**
acids, Acid chlorides, Acid anhydrides, Chloroformates, Strong oxidizing agents

**Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)
Other decomposition products - no data available

## 11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

**Oral LD50**
LD50 Oral - rat - 80 mg/kg
Inhalation LC50
no data available

Dermal LD50
Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
May cause allergic skin reaction.

Germ cell mutagenicity
Genotoxicity in vitro - rat - Embryo
Morphological transformation.
Genotoxicity in vitro - Hamster - ovary
Cytogenetic analysis
Genotoxicity in vivo - mouse - Oral
DNA inhibition

Carcinogenicity
Carcinogenicity - rat - Subcutaneous
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site or application.

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 (p-Phenylenediamine)
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects
Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion
Toxic if swallowed.

Skin
Toxic if absorbed through skin. Causes skin irritation.

Eyes
Causes eye irritation.

Signs and Symptoms of Exposure
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

Synergistic effects
no data available

Additional Information
RTECS: SS8050000

12. ECOLOGICAL INFORMATION

Toxicity
Toxicity to fish
LC50 - Pimephales promelas (fathead minnow) - 0.06 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 0.28 mg/l - 48 h

Persistence and degradability
Biodegradability Biotic/Aerobic

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1673 Class: 6.1 Packing group: III
Proper shipping name: Phenylenediamines
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1673 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: PHENYLENEDIAMINES (o-, m-, p-)
Marine pollutant: No

IATA
UN number: 1673 Class: 6.1 Packing group: III
Proper shipping name: Phenylenediamines

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Toxic by ingestion, Toxic by skin absorption, Skin sensitiser, Irritant

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

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

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SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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