1. PRODUCT AND COMPANY IDENTIFICATION

Product name : o-Phenylenediamine

Product Number : P9029
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 # (For both supplier and manufacturer) : (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 inhalation, Toxic by ingestion, Harmful by skin absorption, Skin sensitizer, Irritant, Mutagen

Target Organs
Bladder, Liver, Kidney

GHS Classification
Acute toxicity, Oral (Category 3)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Dermal (Category 4)
Eye irritation (Category 2A)
Skin sensitization (Category 1)
Germ cell mutagenicity (Category 2)
Carcinogenicity (Category 2)
Specific target organ toxicity - single exposure (Category 2)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 + H332 Harmful in contact with skin or if inhaled
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H341 Suspected of causing genetic defects.
H351 Suspected of causing cancer.
H371 May cause damage to organs.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
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.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification
Health hazard: 2
Chronic Health Hazard: *
Flammability: 1
Physical hazards: 0

NFPA Rating
Health hazard: 2
Fire: 1
Reactivity Hazard: 0

Potential Health Effects
Inhalation Toxic if inhaled. Causes respiratory tract irritation.
Skin Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: OPD
1,2-Diaminobenzene
1,2-Phenylenediamine

Formula: \( \text{C}_6\text{H}_8\text{N}_2 \)
Molecular Weight: 108.14 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-Phenylenediamine</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>95-54-5</td>
</tr>
<tr>
<td>EC-No.</td>
<td>202-430-6</td>
</tr>
<tr>
<td>Index-No.</td>
<td>612-145-00-2</td>
</tr>
<tr>
<td></td>
<td>90 - 100 %</td>
</tr>
</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.

Recommended storage temperature: 2 - 8 °C

Moisture sensitive. Store under nitrogen. May darken on storage

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>α-Phenylenediamine</td>
<td>95-54-5</td>
<td>TWA</td>
<td>0.1 mg/m3</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks
Anemia Confirmed animal carcinogen with unknown relevance to humans

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**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

**Appearance**
- Form: solid
- Colour: white, tan

**Safety data**
- pH: 8.7
- Melting point/Freezing point: 98 - 102 °C (208 - 216 °F)
- Boiling point: 256 - 258 °C (493 - 496 °F)
- Flash point: 136 °C (277 °F) - closed cup
- Ignition temperature: no data available
- Auto-ignition temperature: no data available
- Lower explosion limit: 1.5 %(V)
- Vapour pressure: 3.27 hPa (2.45 mmHg) at 100 °C (212 °F)
- Density: 1.030 g/cm³
- Water solubility: soluble
- Partition coefficient: log Pow: 0.15
- Relative vapor density: no data available
- Odour: no data available
- Odour Threshold: no data available
- Evaporation rate: no data available

### 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**  
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 - 510 mg/kg  

LD50 Oral - mouse - 366 mg/kg  
LD50 Oral - rat - 1,070 mg/kg

**Inhalation LC50**  
LC50 Inhalation - rat - 4 h - 3.4 mg/l

**Dermal LD50**

**Other information on acute toxicity**  
no data available

**Skin corrosion/irritation**  
no data available

**Serious eye damage/eye irritation**  
no data available

**Respiratory or skin sensitization**  
May cause allergic skin reaction.

The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

**Germ cell mutagenicity**  
In vitro tests showed mutagenic effects

Genotoxicity in vitro - rat - Liver  
 Unscheduled DNA synthesis
Genotoxicity in vitro - Human - lymphocyte  
 DNA damage
Genotoxicity in vitro - Human - HeLa cell  
 DNA inhibition
Genotoxicity in vitro - Human - lymphocyte  
 Sister chromatid exchange
Genotoxicity in vivo - mouse - Oral  
 DNA inhibition
Genotoxicity in vivo - mouse - Oral  
 Micronucleus test

**Carcinogenicity**
Limited evidence of carcinogenicity in animal studies

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

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)
May cause damage to organs.

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

Aspiration hazard
no data available

Potential health effects

Inhalation Toxic if inhaled. Causes respiratory tract irritation.
Ingestion Toxic if swallowed.
Skin Causes skin irritation.
Eyes Causes eye irritation.

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity
Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 1.4 mg/l - 48 h

Persistence and degradability
no data available

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 with long lasting effects.

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: Phenylendiamines
Reportable Quantity (RQ): Marine Pollutant: No
Poison Inhalation Hazard: No

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

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

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Toxic by inhalation., Toxic by ingestion, Harmful by skin absorption., Skin sensitiser, Irritant, Mutagen

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:

<table>
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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

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<th>Revision Date</th>
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<tbody>
<tr>
<td>WARNING! This product contains a chemical known to the State of California to cause cancer. o-Phenylendiamine</td>
<td>95-54-5</td>
<td>2007-09-28</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Further information
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