1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Chlorobenzene
Product Number: 319996
Brand: Sigma-Aldrich
Company: 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

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Harmful by ingestion., Carcinogen

Target Organs
Liver, Kidney, Central nervous system, Thymus., Spleen., Bone marrow, Lungs, Testes.

GHS Label elements, including precautionary statements

Signal word: Warning

Hazard statement(s)
H226 Flammable liquid and vapour.
H302 + H332 Harmful if swallowed or if inhaled.
H401 Toxic to aquatic life.
H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s) none

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

NFPA Rating
Health hazard: 2
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion Harmful if swallowed.
3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula: \( C_6H_5Cl \)
Molecular Weight: 112.56 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>108-90-7</td>
<td>203-628-5</td>
<td>602-033-00-1</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. 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
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

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

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

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
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool 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>Update</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>108-90-7</td>
<td>TWA</td>
<td>10 ppm</td>
<td>2007-01-01</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Remarks</td>
<td>Liver damage</td>
<td>Substances for which there is a Biological Exposure Index or Indices (see BEI® section)</td>
<td>Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.</td>
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<td></td>
</tr>
<tr>
<td>TWA</td>
<td>75 ppm</td>
<td>1989-01-19</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>350 mg/m³</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TWA</td>
<td>75 ppm</td>
<td>1997-08-04</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
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The value in mg/m³ is approximate.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form: liquid, clear
Colour: colourless

Safety data

pH: no data available
Melting point: -45 °C (-49 °F) - lit.
Boiling point: 132 °C (270 °F) - lit.
Flash point: 27.0 °C (80.6 °F) - closed cup
Ignition temperature: 637 °C (1,179 °F)
Lower explosion limit: 1.3 % (V)
Upper explosion limit: 7.1 % (V)
Vapour pressure 15.7 hPa (11.8 mmHg) at 25.0 °C (77.0 °F)
Density 1.106 g/cm³ at 25 °C (77 °F)
Water solubility no data available
Partition coefficient: n-octanol/water log Pow: 2.89
log Pow: 5

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LC50 Inhalation - rat - 2965 ppm

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity
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: 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

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. May cause respiratory tract irritation.
Ingestion Harmful if swallowed.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

Signs and Symptoms of Exposure
Incoordination., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: CZ0175000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish LC100 - Leuciscus idus (Golden orfe) - 0.03 - 28 mg/l - 48.0 h
LC50 - Cyprinodon variegatus (sheepshead minnow) - 10 mg/l - 96.0 h
LC50 - Lepomis macrochirus (Bluegill) - 4.5 - 7.4 mg/l - 76.0 h
NOEC - Cyprinodon variegatus (sheepshead minnow) - 6.2 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates.
EC50 - Daphnia magna (Water flea) - 4.30 - 16.00 mg/l - 24 h
EC50 - No information available. - 7.60 mg/l - 24 h
NOEC - Daphnia magna (Water flea) - < 1.4 mg/l - 11 d
LC50 - Daphnia magna (Water flea) - 10.7 mg/l - 48 h

Toxicity to algae
EC50 - No information available. - 235.00 mg/l - 48 h
EC50 - Pseudokirchneriella subcapitata (green algae) - 12.50 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential
Bioaccumulation Leuciscus idus (Golden orfe) - 3 d
Bioconcentration factor (BCF): 75

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.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.
14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1134  Class: 3  Packing group: III
Proper shipping name: Chlorobenzene
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1134  Class: 3  Packing group: III  EMS-No: F-E, S-D
Proper shipping name: CHLOROBENZENE
Marine pollutant: No

IATA
UN-Number: 1134  Class: 3  Packing group: III
Proper shipping name: Chlorobenzene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Harmful by ingestion., Carcinogen

DSL Status
All components of this product are on the Canadian DSL list.

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

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SARA 311/312 Hazards
Fire Hazard, 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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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.