1. Identification

Product Name  Chlorobenzene
Cat No. :  B254-4; B254-4LC; B254-20; B254RS-200; B255-1; B255-500
CAS-No  108-90-7
Synonyms  Monochlorobenzene; Benzene chloride (Laboratory/Certified)
Recommended Use  Laboratory chemicals.
Uses advised against  Food, drug, pesticide or biocidal product use

2. Hazard(s) Identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Flammable liquids</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Inhalation Toxicity - Vapors</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin Corrosion/irritation</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Label Elements

Signal Word  Warning

Hazard Statements
Flammable liquid and vapor
Causes skin irritation
Harmful if inhaled
Precautionary Statements
Prevention
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep cool
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>108-90-7</td>
<td>&gt;95</td>
</tr>
</tbody>
</table>

4. First-aid measures

General Advice
If symptoms persist, call a physician.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation
Move to fresh air. If not breathing, give artificial respiration. Get medical attention if
symptoms occur.

**Ingestion**
Clean mouth with water and drink afterwards plenty of water.

**Most important symptoms and effects**
None reasonably foreseeable. Causes central nervous system depression: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

**Notes to Physician**
Treat symptomatically

### 5. Fire-fighting measures

**Suitable Extinguishing Media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable Extinguishing Media**
Water may be ineffective

**Flash Point**
23 °C / 73.4 °F

**Method**
No information available

**Autoignition Temperature**
590 °C / 1094 °F

**Explosion Limits**

<table>
<thead>
<tr>
<th></th>
<th>Upper</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.6 vol %</td>
<td>1.8 vol %</td>
</tr>
</tbody>
</table>

**Sensitivity to Mechanical Impact**
No information available

**Sensitivity to Static Discharge**
No information available

### Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

**Hazardous Combustion Products**
Carbon monoxide (CO) Carbon dioxide (CO₂) Hydrogen chloride gas Phosgene

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

### 6. Accidental release measures

**Personal Precautions**
Use personal protective equipment. Ensure adequate ventilation.

**Environmental Precautions**
Should not be released into the environment.

**Methods for Containment and Clean Up**
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

### 7. Handling and storage

**Handling**
Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation.

**Storage**
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

### 8. Exposure controls / personal protection

**Exposure Guidelines**

---

Page 3 / 8
Physical and chemical properties

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
<th>Mexico OEL (TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>TWA: 10 ppm</td>
<td>(Vacated) TWA: 75 ppm</td>
<td>IDLH: 1000 ppm</td>
<td>TWA: 75 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 350 mg/m³</td>
<td></td>
<td>TWA: 350 mg/m³</td>
</tr>
</tbody>
</table>

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists  
OSHA - Occupational Safety and Health Administration  
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

**Eye/face Protection**  
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection**  
Long sleeved clothing.

**Respiratory Protection**  
No protective equipment is needed under normal use conditions.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

### 9. 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>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>bitter almond</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-45 °C / -49 °F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>131 °C / 267.8 °F</td>
</tr>
<tr>
<td>Flash Point</td>
<td>23 °C / 73.4 °F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>1 (Butyl Acetate = 1.0)</td>
</tr>
<tr>
<td>Flammability (solid,gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>9.6 vol %</td>
</tr>
<tr>
<td>Lower</td>
<td>1.8 vol %</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>12 mbar @ 20°C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>3.9</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.108</td>
</tr>
<tr>
<td>Solubility</td>
<td>moderately soluble</td>
</tr>
<tr>
<td>Partition coefficient; n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>590 °C / 1094 °F</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>&gt; 132°C</td>
</tr>
<tr>
<td>Viscosity</td>
<td>0.8 mPa.s @ 20°C</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C6 H5 Cl</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>112.56</td>
</tr>
</tbody>
</table>

### 10. Stability and reactivity

**Reactive Hazard**  
None known, based on information available

**Stability**  
Stable under recommended storage conditions.
Chlorobenzene

Revision Date 01-Oct-2018

Conditions to Avoid

Incompatible Materials
Strong oxidizing agents, Bases, Strong reducing agents, Metals

Hazardous Decomposition Products
Carbon monoxide (CO), Carbon dioxide (CO₂), Hydrogen chloride gas, Phosgene

Hazardous Polymerization
Hazardous polymerization does not occur.

Hazardous Reactions
None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral (Rat)</th>
<th>LD50 Dermal (Rabbit)</th>
<th>LC50 Inhalation (Rat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>LD50 2000 - 4000 mg/kg</td>
<td>LD50 &gt; 7940 mg/kg</td>
<td>LC50 = 13.5 mg/L</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products
No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation
Irritating to skin

Sensitization
No information available

Carcinogenicity

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>108-90-7</td>
<td>Not listed</td>
<td>Not listed</td>
<td>A3</td>
<td>Not listed</td>
<td>A3</td>
</tr>
</tbody>
</table>

ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)
Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects
No information available

Reproductive Effects
No information available.

Developmental Effects
No information available.

Teratogenicity
No information available.

STOT - single exposure
None known

STOT - repeated exposure
None known

Aspiration hazard
No information available

Symptoms / effects, both acute and delayed
Causes central nervous system depression: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information
No information available

Other Adverse Effects
Tumorigenic effects have been reported in experimental animals.
12. Ecological information

Ecotoxicity
The product contains following substances which are hazardous for the environment. Contains a substance which is: Very toxic to aquatic organisms.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>EC50: = 12.5 mg/L, 96h static (Pseudokirchneriella subcapitata)</td>
<td>LC50: = 91 mg/L, 96h static (Brachydanio rerio)</td>
<td>EC50 = 11.26 mg/L 30 min</td>
<td>EC50: = 0.59 mg/L, 48h (Daphnia magna)</td>
</tr>
<tr>
<td></td>
<td>EC50: 2.55 - 420 mg/L, 96h (Pseudokirchneriella subcapitata)</td>
<td>LC50: 4.1 - 5.3 mg/L, 96h flow-through (Oncorhynchus mykiss)</td>
<td>LC50 = 11.3 mg/L 30 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: 36.35 - 58.19 mg/L, 96h static (Poecilia reticulata)</td>
<td>LC50 = 11.3 mg/L 30 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: 4.1 - 4.9 mg/L, 96h static (Lepomis macrochirus)</td>
<td>LC50 = 11.5 mg/L 15 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: 7 - 8.5 mg/L, 96h flow-through (Pimephales promelas)</td>
<td>LC50 = 20 mg/L 10 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: 6.9 - 7.9 mg/L, 96h flow-through (Lepomis macrolepis)</td>
<td>LC50 = 9.96 mg/L 5 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: = 4.5 mg/L, 96h static (Pimephales promelas)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and Degradability
Persistence is unlikely

Bioaccumulation/ Accumulation
No information available.

Mobility
Will likely be mobile in the environment due to its water solubility.

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>2.8</td>
</tr>
</tbody>
</table>

13. Disposal considerations

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

<table>
<thead>
<tr>
<th>Component</th>
<th>RCRA - U Series Wastes</th>
<th>RCRA - P Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene - 108-90-7</td>
<td>U037</td>
<td>-</td>
</tr>
</tbody>
</table>

14. Transport information

DOT
- UN-No: UN1134
- Proper Shipping Name: CHLOROBENZENE
- Hazard Class: 3
- Packing Group: III

TDG
- UN-No: UN1134
- Proper Shipping Name: CHLOROBENZENE
- Hazard Class: 3
- Packing Group: III

IATA
- UN-No: UN1134
- Proper Shipping Name: CHLOROBENZENE
- Hazard Class: 3
- Packing Group: III

IMDG/IMO
- UN-No: UN1134
15. Regulatory information

All of the components in the product are on the following Inventory lists: The product is classified and labeled according to EC directives or corresponding national laws The product is classified and labeled in accordance with Directive 1999/45/EC Europe China Canada TSCA Korea Japan X = listed Australia U.S.A. (TSCA) Canada (DSL/NDSL) Europe (EINECS/ELINCS/NLP) Australia (AICS) Korea (ECL) China (IECSC) Japan (ENCS) Philippines (PICCS) Philippines Complete Regulatory Information contained in following SDS's

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IECSC</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>X</td>
<td></td>
<td>203-628-5</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Legend:
- X - Listed
- E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
- F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
- N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P - Indicates a commenced PMN substance
- R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
- S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
- XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
- Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
- Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>108-90-7</td>
<td>&gt;95</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories  See section 2 for more information

CWA (Clean Water Act)

<table>
<thead>
<tr>
<th>Component</th>
<th>CWA - Hazardous Substances</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>X</td>
<td>100 lb</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

Clean Air Act

<table>
<thead>
<tr>
<th>Component</th>
<th>HAPS Data</th>
<th>Class 1 Ozone Depleters</th>
<th>Class 2 Ozone Depleters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>100 lb 1 lb</td>
<td>-</td>
</tr>
</tbody>
</table>

California Proposition 65 This product does not contain any Proposition 65 chemicals
Chlorobenzene

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorobenzene</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant: N
DOT Severe Marine Pollutant: N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: Serious risk, Grade 3

16. Other information

Prepared By: Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date: 10-Sep-2009
Revision Date: 01-Oct-2018
Print Date: 01-Oct-2018
Revision Summary: This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS