MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product Name: CHLOROBENZENE
Material Number: 4807405
Chemical Name: Chlorobenzene
CAS-No.: 108-90-7

2. Hazards Identification

Emergency Overview

WARNING! Color: Colorless  Form: Liquid  Odor: Characteristic.
Flammable. Vapors may spread long distances and ignite. Vapors or mist may be a fire
and explosion hazard when exposed to high temperature or ignition. Use cold water
spray to cool fire-exposed containers to minimize the risk of rupture. Inhalation may
cause nausea or dizziness. May cause respiratory tract irritation. May cause skin
irritation.

Potential Health Effects

Primary Routes of Entry: Skin Contact, Eye Contact, Ingestion, Inhalation
Medical Conditions Aggravated by Exposure: Skin disorders, Respiratory disorders, Eye disorders

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Inhalation
Acute Inhalation
For Component: Monochlorobenzene
May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion. May cause respiratory tract irritation with symptoms of coughing, sore throat and runny nose.
Skin
Acute Skin
For Component: Monochlorobenzene
May cause irritation with symptoms of reddening and itching.

Eye
Acute Eye
For Component: Monochlorobenzene
Not expected to be irritating.

Ingestion
Acute Ingestion
For Component: Monochlorobenzene
May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion. Moderately toxic by ingestion.

General Effects of Exposure
Chronic Effects of Exposure
For Component: Monochlorobenzene
May cause kidney damage. May cause liver damage.

Carcinogenicity:
No Carcinogenic substances as defined by IARC, NTP and/or OSHA.

3. Composition/Information on Ingredients

<table>
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<tr>
<th>Weight %</th>
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4. First Aid Measures

Eye Contact
In case of contact, flush eyes with plenty of lukewarm water. Get medical attention if irritation develops.

Skin Contact
In case of skin contact, wash affected areas with soap and water. Immediately remove contaminated clothing and shoes. Get medical attention if irritation develops.

Inhalation
If inhaled, remove to fresh air. Get medical attention if irritation develops.

Ingestion
If ingested, do not induce vomiting unless directed to do so by medical personnel. Get medical attention.

5. Fire-Fighting Measures

Suitable Extinguishing Media: All extinguishing media are suitable.

Special Fire Fighting Procedures
Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes. Use cold water spray to cool fire-exposed containers to minimize risk of rupture.

**Unusual Fire/Explosion Hazards**
Flammable Liquid. Vapors may spread long distances and ignite. Vapors or mist may be a fire and explosion hazard when exposed to high temperature or ignition. Toxic and irritating gases/fumes may be given off during burning or thermal decomposition.

### 6. Accidental release measures

**Spill and Leak Procedures**
Cleanup personnel must use appropriate personal protective equipment. Cover spill with inert material (e.g., dry sand or earth) and collect for proper disposal. Remove all sources of ignition, including flames, heat, and sparks.

### 7. Handling and Storage

**Storage Temperature:**
- **maximum:** 25 °C (77 °F)

**Storage Period:**
24 Months

**Handling/Storage Precautions**
Keep away from heat, sparks and open flames. Ground and bond containers and equipment before transferring to avoid static sparks. Avoid breathing dust, vapor, or mist. Avoid contact with skin or clothing. Avoid contact with eyes. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Keep container closed when not in use.

### 8. Exposure Controls / Personal Protection

**Monochlorobenzene (108-90-7)**
- **US. ACGIH Threshold Limit Values**
  - Time Weighted Average (TWA): 10 ppm
- **US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**
  - PEL: 75 ppm, 350 mg/m3
- **US. ACGIH Threshold Limit Values**
  - Hazard Designation: Group A3 Confirmed animal carcinogen with unknown relevance to humans.

**Industrial Hygiene/Ventilation Measures**
General dilution and local exhaust as necessary to control airborne vapors, mists, dusts and thermal decomposition products below appropriate airborne concentration standards/guidelines.

**Respiratory Protection**
In case of insufficient ventilation wear suitable respiratory equipment., NIOSH approved, air-purifying organic vapor respirator.
Hand Protection
Permeation resistant gloves.

Eye Protection
Safety glasses with side-shields.

Skin and body protection
Wear cloth work clothing including long pants and long-sleeved shirts.

Additional Protective Measures
Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product. Emergency showers and eye wash stations should be available.

9. Physical and chemical properties

Form: Liquid
Color: Colorless
Odor: Characteristic
pH: Not Established
Boiling Point/Range: approximately 132 °C (269.6 °F)
Flash Point: 27 °C (80.6 °F) (Tagliabue Closed Cup (ASTM D-56))
Lower Explosion Limit: 1.3 %(V)
Upper Explosion Limit: 7.1 %(V)
Vapor Pressure: approximately 11.7 hPa @ 20 °C (68 °F)
approximately 20 hPa @ 30 °C (86 °F)
approximately 53 hPa @ 50 °C (122 °F)
Specific Gravity: 1,106 @ 20 °C (68 °F)
Solubility in Water: approximately 0.207 g/l @ 20 °C (68 °F)
approximately 0.5 g/l @ 30 °C (86 °F)
Autoignition Temperature: 590 °C (1,094 °F)
Viscosity, Dynamic: approximately 0.8 mPa.s @ 20 °C (68 °F)
approximately 0.63 mPa.s @ 40 °C (104 °F)

10. Stability and Reactivity

Hazardous Reactions
Hazardous polymerization does not occur.

Stability
Stable

Materials to avoid
Oxidizing agents, Bases

Conditions to avoid
Avoid extreme heat.

Hazardous decomposition products
By Fire and Thermal Decomposition: Carbon oxides, Hydrogen chloride gas, other potentially toxic fumes
11. Toxicological Information

**Toxicity Data for CHLOROBENZENE**

**Toxicity Note**
No data available for this product.

**Toxicity Data for Monochlorobenzene**

**Acute Oral Toxicity**
LD50: Approximately 1,427 mg/kg (Rat, Male)
LD50: Approximately 2,455 mg/kg (Rat, Female)

**Acute Inhalation Toxicity**
LC50: Approximately 13.87 mg/l, 6 hrs (Rat)
RD50: 1,054 ppm, 5 min (mouse)

**Acute dermal toxicity**
LD50: > 7,940 mg/kg (rabbit)

**Skin Irritation**
rabbit, Exposure Time: 4 hrs, Moderately irritating

**Eye Irritation**
rabbit, Non-irritating

**Sensitization**
dermal: non-sensitizer (Guinea pig, Magnusson/Kligmann (Maximization Test))

**Repeated Dose Toxicity**
24 Weeks, inhalation: NOAEL: < 75 ppm, (Rat)
168 Days, inhalation: NOAEL: < 75 ppm, (rabbit)

**Mutagenicity**
Genetic Toxicity in Vitro:
Ames: negative
Genetic Toxicity in Vivo:
Positive and negative results were seen in various in vivo studies.

**Carcinogenicity**
Rat, oral, 2 Years,
ambiguous
mouse, oral, 2 Years,
negative

**Toxicity to Reproduction/Fertility**
Two generation study, inhalation, 6 hrs/day 7 days/week, (Rat, Male/Female) NOAEL (F1): > 450 ppm,
NOAEL (F2): 50 ppm
No effects on Reproductive parameters observed at doses tested.

**Developmental Toxicity/Teratogenicity**
Rat, inhalation, 6 hrs/day 7 days/week, NOAEL (teratogenicity): 590 ppm,
No Teratogenic effects observed at doses tested.
12. Ecological Information

**Ecological Data for CHLOROBENZENE**
**Additional Ecotoxicological Remarks**
No data available for this product.

**Ecological Data for Monochlorobenzene**

**Biodegradation**
- Aerobic, 15 %, Exposure time: 28 Days
- Closed Bottle Test, 55 %, Exposure time: 28 d
- 15 %, Exposure time: 14 d
- 50 %, Exposure time: 24 d

**Biological Oxygen Demand (BOD)**
55 %

**Acute and Prolonged Toxicity to Fish**
- LC50: Approximately 16 mg/l (Bluegill (Lepomis macrochirus), 96 hrs)
- LC50: 7.4 mg/l (Bluegill (Lepomis macrochirus), 96 hrs)
- LC50: 10 mg/l (Sheepshead minnow (Cyprinodon variegatus), 96 hrs)
- LC50: 4.1 mg/l (Rainbow trout (Salmo gairdneri), 48 h)

**Acute Toxicity to Aquatic Invertebrates**
- EC50: 19.9 mg/l (Water flea (Daphnia magna), 48 hrs)

**Toxicity to Microorganisms**
- EC50: 140 mg/l, (Activated sludge microorganisms, 30 min)

13. Disposal considerations

**Waste Disposal Method**
Waste disposal should be in accordance with existing federal, state, provincial, and/or local environmental control laws.

**Empty Container Precautions**
Do not heat or cut container with electric or gas torch. Recondition or dispose of empty container in accordance with governmental regulations. Do not reuse empty container without proper cleaning. Label precautions also apply to this container when empty.

14. Transport information

**Land transport (DOT)**
- Proper Shipping Name: Chlorobenzene
- Hazard Class or Division: 3
- UN/NA Number: UN1134
- Packaging Group: III
- Hazard Label(s): Flammable Liquid
- Marine Pollutant: Marine pollutant

**RSPA/DOT Regulated Components:**
Montchlorobenzene
Reportable Quantity: 100 lb

Sea transport (IMDG)
Proper Shipping Name: CHLOROBENZENE
Hazard Class or Division: 3
UN-No: UN1134
Packaging Group: III
Hazard Label(s): Flammable liquids
Marine Pollutant: Marine pollutant

Air transport (ICAO/IATA)
Proper Shipping Name: Chlorobenzene
Hazard Class or Division: 3
UN-No: UN1134
Packaging Group: III
Hazard Label(s): Flammable liquids
Marine Pollutant: Marine pollutant

15. Regulatory Information

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory.

US. EPA CERCLA Hazardous Substances (40 CFR 302):
Components
Monochlorobenzene Reportable quantity: 100 lbs

SARA Section 311/312 Hazard Categories:
Acute Health Hazard, Chronic Health Hazard, Fire Hazard

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):
Components
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required:
Components
Monochlorobenzene

When discarded in its purchased form, this product is a listed RCRA hazardous waste and should be managed as a hazardous waste. (40 CFR 261.20-24)

RCRA Regulated Components
Monochlorobenzene U037

State Right-To-Know Information
The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

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New Jersey Environmental Hazardous Substances List and/or New Jersey RTK Special Hazardous Substances Lists:

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California Prop. 65:
To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

Foreign Chemical Inventory List(s):
- EU list of existing chemical substances - All components of this product are listed
- Australia AICS - All components of this product are listed
- Korea Existing Chemicals Inv. (KECI) - All components of this product are listed
- Japan (ENCS) List - All components of this product are listed

16. Other Information

NFPA 704M Rating

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<td>Reactivity</td>
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HMIS Rating

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LANXESS Corporation's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by LANXESS Corporation as a customer service.

Contact Person: Product Safety Department
Telephone: (800) LANXESS
MSDS Number: 000000000091
Version Date: 12/17/2009
Report Version: 3.0

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