

MATERIAL SAFETY DATA SHEET**CHLOROBENZENE**

PRODUCT CODE NUMBER(S): 2990-5

PRODUCT IDENTIFICATION**Chemical Name and Synonyms:** Chlorobenzene; Phenyl chloride; Monochlorobenzene**Chemical Family:** Halogenated aromatic hydrocarbon**Chemical Formula:** C₆H₅Cl**Product Use:** Laboratory reagent**Manufacturer's Name and Address:**

Caledon Laboratories Ltd.

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Telephone No: (905) 877-0101**Fax No:** (905) 877-6666**Emergency Telephone No:** CANUTEC (613) 996-6666**HAZARDOUS INGREDIENTS OF MATERIALS**

Ingredients	%	TLV Units	CAS No.
Chlorobenzene	>99	10 ppm	108-90-7

PHYSICAL DATA**Physical State:** Liquid**Odour and Appearance:** Clear, colourless, volatile liquid; almond-like or mothball odour**Odour Threshold (ppm):** 1.3 ppm (detection). Good warning properties, threshold about 8x TLV.**Vapour Pressure (mm Hg):** 8.8 mm Hg @ 20°C**Vapour Density (Air = 1):** 3.88 @ 25°**Evaporation Rate:** 1 (butyl acetate = 1)**Boiling Point (degrees C):** 131-132°C**Freezing Point (degrees C):** -45°C**pH:** Not applicable**Specific Gravity:** 1.106 @ 20°C**Coefficient of Water/Oil distribution:** LogP(oct)=2.84**SHIPPING DESCRIPTION****UN:** 1134**T.D.G. Class:** 3**Pkg. Group:** III**REACTIVITY DATA****Chemical Stability:** Normally stable. Slowly decomposes on exposure to sunlight, forming monochlorobiphenyl and hydrogen chloride gas.**Incompatibility with other substances:** Reacts violently or explosively with alkali metals (sodium, potassium and their alloys) or alkaline earth metals (calcium, magnesium) strong oxidizers, strong reducing agents. DMSO decomposes violently on contact with chlorobenzene. Forms shock-sensitive salt with silver perchlorate and acetic acid. May explode with phosphorus trichloride and sodium. Not corrosive to metals when dry; when moist, corrodes many metals, including cast iron, some stainless steels, copper bronze, brass, lead. Attacks some forms of rubbers, plastics, and coatings.**Reactivity:** Avoid heat, flame, sparks and all ignition sources, all incompatible materials, generation of mist.**Hazardous Decomposition Products:** Highly toxic phosgene and hydrogen chloride gas, CO**FIRE AND EXPLOSION DATA****Flammability:** Flammable liquid and vapour. Vapours forms explosive mixtures with air at, or above 28°C. Vapours are heavier than air and may travel to distant ignition source and flash back. Vapours may float on water and spread fire. May accumulate in low areas, creating fire or toxicity hazard. Closed containers may rupture violently when exposed to fire.**Extinguishing Media:** Carbon dioxide, dry chemical, alcohol or polymer foam. Water is ineffective for fighting fire, but gently applied, as a spray or fog, it may be used to blanket the fire, to disperse vapours, cool containers, and to flush spill away from ignition sources. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment (positive-pressure, full face-piece self-contained breathing apparatus) and chemical splash suit (Bunker Gear is not sufficient). Containers may explode in heat of fire; withdraw immediately in case of rising sound from vent or discoloration of tank.**Flash Point (Method Used):** 28-29°C (CC)**Autoignition Temperature:** 593°C**Upper Flammable Limit (% by volume):** 7.1**Lower Flammable Limit (% by volume):** 1.3**Hazardous Combustion Products:** CO_x, hydrogen chloride gas, phosgene**Sensitivity to Impact:** None identified**Sensitivity to Static discharge:** Liquid may accumulate static charge by flow or agitation. Mixtures of vapour and air at concentrations in the flammable range may be ignited by a static discharge of sufficient energy.**TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****LD₅₀:** (oral, rat) 1,100 mg/kg; (dermal, rabbit) >2g/kg**LC₅₀:** (rat) 2,964 ppm/6h; (female mouse) 2,310/4h**Effects of Acute Exposure to Product:****Inhaled:** Readily forms vapour concentrations at room temperature, creating a significant inhalation hazard. Irritating and harmful. Inhalation may cause CNS effects with symptoms such as nausea, dizziness, headache, drowsiness, incoordination, central nervous system depression and unconsciousness, cardiac arrhythmia. Severe overexposure may also cause methemoglobinemia, the formation of methemoglobin which decreases the ability of the blood to carry oxygen, causing cyanosis, possible convulsions, coma, and death. Onset may be delayed for several hours. Liver or kidney damage may occur after short-term exposure at high levels. Risk of irreversible effects.**In contact with skin:** No human information available. Moderate irritant, based on animal testing. May cause defatting, drying and cracking of the skin. May be absorbed, but not expected to cause significant toxic effects by absorption.**In contact with eyes:** Moderate eye irritant, causing temporary redness and pain.**Ingested:** Irritating and harmful. See "Inhaled". There have been reports of methemoglobinemia developing after ingestion. Methemoglobinemia occurs when the oxygen-carrying

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component of the blood, hemoglobin, is converted to methemoglobin, reducing the ability of the blood to carry oxygen, and causing dangerously low tissue levels of oxygen. Symptoms are cyanosis (bluish coloration of lips and skin), headache, shortness of breath. It can progress to nausea, vomiting, dizziness, rapid heartbeat, convulsions, coma and even death. Onset may be delayed for 2 to 4 hours after exposure. Symptoms usually disappear within 24 hours after exposure stops, but there may be residual liver damage, if the exposure was severe. If aspirated, which can occur readily during ingestion or vomiting, can cause severe lung irritation, and possibly pulmonary edema, respiratory failure, cardiac arrest and death.

Effects of Chronic Exposure to Product:

Prolonged or repeated exposures can cause kidney, liver, and respiratory system damage.

Carcinogenicity: Confirmed animal carcinogen in (RTECS No. CZ0175000). Relevance to humans unknown. Classified as A3 (animal carcinogen) by ACGIH.

Teratogenicity: No human information available; teratogenic in animal tests only at doses which are toxic to the mother.

Reproductive Effects: Insufficient animal information available. No human information available.

Mutagenicity: No human information available; mutagenic in studies with live animals; negative in cultured human cells.

Synergistic Products: May increase toxicity of chlorinated solvents.

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required

Respiratory Protection: Up to 1000 ppm: NIOSH/MSHA approved powered air-purifying respirator equipped with organic vapour cartridges, or continuous-flow supplied-air respirator, or full face-piece chemical cartridge respirator with organic vapour cartridges. Higher or unknown concentrations, as in fire or spill conditions: positive-pressure, full face-piece self-contained breathing apparatus, or positive-pressure, full face-piece supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles or face shield.

Skin Protection: Viton, Viton /butyl rubber, Barrier (PE/PA/PE), Responder, Trelchem HPS, Tychem BR/LV, Tychem TK gloves. Impermeable apron, boots, overalls as required to prevent contact.

Other Personal Protective Equipment: Safety shower and eyebath in work area.

Leak and Spill Procedure: Evacuate area. Ventilate area before re-entering. Eliminate all sources of ignition. Cleanup personnel must be thoroughly trained in the hazards of this material and its safe use, and must wear protective equipment and clothing sufficient to prevent inhalation of mist of vapours and contact with skin, eyes and clothing. Do not touch spilled material. Prevent from entering sewers and waterways. Stop or reduce discharge if safe to do so. Dike and collect spill using inert absorbent. Transfer to container for removal by disposal company. Contaminated absorbent may pose the same hazards as the spilled product; treat with caution. Wash site of spill thoroughly with water.

Waste Disposal: Follow all federal, provincial, and local regulations.

Handling Procedures and Equipment: FLAMMABLE LIQUID & VAPOUR; TOXIC; POSSIBLE MUTAGEN. Eliminate all sources of ignition and have all engineering controls operating before handling. Personnel working with this chemical must be thoroughly trained regarding its hazards and its safe use. Ground and bond all equipment to prevent static charge accumulation. Use non-sparking tools. Post "No Smoking" signs.

Use smallest amount possible for the purpose in a designated area with appropriate ventilation. Avoid generating vapour or mist. Keep work area free of extraneous, combustible, or incompatible materials. Keep containers closed when not in use. Avoid all contact with eyes, skin or clothing. Treat empty containers with caution: they may contain hazardous residues.

Storage Requirements: Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight and away from incompatible materials, heat, sparks, flames, and all ignition sources. Storage facilities should be made of fire-resistant materials with sealed floors to prevent absorption. Provide raised sills and trenches to drain to a safe area. Protect from damage, and inspect frequently for signs of leaking.

FIRST AID MEASURES**Specific Measures:**

Eyes: IMMEDIATELY flush eyes with warm, gently running water for at least twenty (20) minutes, holding eyelids open during flushing. Take care not to flush contaminated water into unaffected eye. Get medical attention immediately.

Skin: Immediately remove contaminated clothing (including rings, watches, belts and shoes). Flush exposed area with large amounts of warm running water and non-abrasive soap for at least twenty (20) minutes or until chemical is removed. Get medical attention. Decontaminate clothing before reuse, or discard.

Inhalation: Immediately remove casualty to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Eliminate ignition sources. Give oxygen for breathing difficulty. Begin artificial respiration if breathing has STOPPED. If breathing and pulse are ABSENT give CPR. Obtain medical attention immediately. Stay with casualty until medical assistance is reached. Symptoms of methemoglobinemia may be delayed; if exposure was severe, monitor victim carefully for several hours.

Ingestion: DO NOT INDUCE VOMITING. If the casualty is alert and not convulsing, give 2 to 4 glasses of water to drink to dilute the material. If spontaneous vomiting occurs, have casualty lean forward to avoid breathing in of emesis. Rinse mouth and administer more water. Get medical attention immediately. If breathing is difficult, or if cyanosis occurs, give oxygen.

REFERENCES USED

CCINFO disc: MSDS's, May 2007

Budavari: The Merck Index, 12th ed., 1997

Royal Society of Chemistry: Material Safety Data Sheets, Vol. 1, 1992

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987

Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: May 27, 1991

Revision: May 2010

MSDS: 2990-5

Proposed WHMIS Designation: B2; D2B

Prepared by: Caledon Laboratories Ltd. (905) 877-0101
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