# MATERIAL SAFETY DATA SHEET

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Monochlorobenzene
**Product ID:** 0029
**SYNONYMS:** Chlorobenzene; MCB; aromatic chlorohydrocarbon; $C_6H_5Cl$
**ISSUE DATE:** 03/18/2006
**EDITION NO.:** 11


**PPG Industries, Inc.**
**One PPG Place, Pittsburgh, PA 15272, USA**
**24-hour Emergency Telephone Number: 1-412-434-4515**
**For Product Information (8am-5pm Eastern time):**
1-800-243-6774 (C/A)


**PREPARER:** Product Safety, Chemicals

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Material/CAS Number | Percent |
|---|---|
| Monochlorobenzene<br>108-90-7 | 99.9 |

## 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:**

DANGER! Flammable. Vapor and liquid extremely irritating to eyes and skin. May be absorbed through the skin. May cause respiratory tract irritation. Harmful or fatal if inhaled. Harmful or fatal if swallowed. Avoid contact with aluminum. Do not ship in aluminum trailers. Very toxic to aquatic organisms. Keep away from heat, sparks, flames and other sources of ignition.

**Precautions:** Avoid contact with eyes and skin. Can cause irritation, pain, and in some cases, blistering of the skin. Do not breathe vapors. High vapor concentrations can cause dizziness, unconsciousness, central nervous system depression or death. Long-term overexposure may cause liver/kidney injury. Do not use in poorly ventilated or confined spaces without proper respiratory protection. Ventilation must be sufficient to limit employee exposure to this product below permissible exposure limits. Do not swallow. Wash thoroughly every day after work. Remove and wash contaminated clothing before reuse. Do not eat, drink or smoke in work area.

## 4. FIRST AID MEASURES

**INHALATION:** Remove from area to fresh air. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

**EYE/SKIN CONTACT:** EYE: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact a poison control center, emergency room or physician right away as further treatment will be necessary. SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

**INGESTION:** Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

**NOTES TO PHYSICIAN:**
Only administer adrenaline after careful consideration following overexposure. Increased sensitivity of the heart to adrenaline may be caused by overexposure to this product.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** 81.5°F (27.5°C) (Closed Cup)

**AUTOIGNITION TEMPERATURE:** 1094°F (590°C)

**FLAMMABLE LIMITS IN AIR - LOWER (%):** 1.3

**FLAMMABLE LIMITS IN AIR - UPPER (%):** 11

**EXTINGUISHING MEDIA:** Water fog, carbon dioxide, foam, dry chemical.

**SPECIAL FIREFIGHTING PROCEDURES:** Emits toxic fumes under fire conditions. When this product is involved in fires, it can decompose to toxic, corrosive hydrogen chloride and possible traces of phosgene. Fire-fighters must wear NIOSH approved pressure demand, self-contained breathing apparatus and full protective clothing when fighting chemical fires. Vapor concentration in a confined or poorly ventilated area can be ignited upon contact with a high energy spark, flame, or high intensity source of heat. This can occur at concentrations ranging between the lower and upper limits (by volume) listed above.

## 6. ACCIDENTAL RELEASE MEASURES

**ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**
Immediately evacuate the area. Provide maximum ventilation. Remove sources of ignition. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and eye/skin protection should be permitted in the area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover spilled material on adsorbents, such as sawdust or vermiculite, and sweep into closed containers for disposal. After all

visible traces, including ignitable vapors, have been removed, thoroughly wet vacuum the area. Do not flush to sewer. If area of spill is porous, remove as much earth and gravel, etc. as necessary and place in closed containers for disposal.

## 7. HANDLING AND STORAGE

**PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:**
Store in a cool, dry, well-ventilated place. Store only in closed, properly labeled containers. Vapors are heavier than air and will collect in low areas. Keep away from heat, sparks, flames, direct sunlight, and other sources of heat. Keep container closed when not in use. Do not use in poorly ventilated or confined spaces without proper respiratory protection. Adequate ventilation must be maintained in storage areas to reduce fire hazard in the event of a leak. This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and possible traces of phosgene. Avoid contamination of water supplies. Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected. Do not use cutting or welding torches on drums that contained this product unless properly purged and cleaned. Do not store or stack aluminum in contact with this product to prevent possible solvent decomposition (stacking corrosion). Liquid oxygen or other strong oxidants may form explosive mixtures with this product. Caution should be taken not to use in pressurized or totally enclosed system of aluminum construction (example - paint or adhesive spray system). Do not ship in aluminum trailers. Chlorinated solvents can damage aluminum trailers which could ultimately result in an environmental spill. Container and system must be electrically grounded before unloading.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure Limits:**
**8-hour Time Weighted Average (TWA); 15-minute Short-Term Exposure Limit (STEL)**

**OSHA:** The OSHA exposure limit(s) for Monochlorobenzene: 75 ppm TWA.

**ACGIH:** The ACGIH exposure limit(s) for Monochlorobenzene: 10 ppm TWA.

**ONTARIO:** The Ontario Exposure limit(s) for Monochlorobenzene: 10 ppm TWAEV

**RESPIRATORY PROTECTION:** Where ventilation is inadequate, use a regulatory compliant full facepiece air purifying respirator with the appropriate chemical cartridges or positive-pressure, air-supplied respirator. Carefully read and follow the respirator manufacturer's instructions and information.

**VENTILATION:** Use local exhaust or general room/dilution ventilation sufficient to maintain employee exposure below permissible exposure limits.

**EYE AND FACE PROTECTION:** Chemical safety goggles.

**PROTECTIVE GLOVES:** Impervious gloves. Viton®. Polyvinyl alcohol (degrades in water).

**OTHER PROTECTIVE EQUIPMENT:** Boots, aprons, or chemical suits should be used when necessary to prevent skin contact.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Boiling Point:** 268.9°F (131.6°C)
**Vapor Density (Air=1):** 3.88 (heavier)
**Specific Gravity (Water=1):** 1.1071 @ 20°C
**pH:** Neutral
**FREEZING/MELTING POINT:** -49.4°F (-45.2°C)
**SOLUBILITY (wt.% in water):** 0.0488 @ 30°C (210 mg/L @ 20°C)
**Bulk Density (kg/M3):** 9.18 lbs/gal at 25°C
**VOLUME % VOLATILE:** 100
**VAPOR PRESSURE:** 11.8 mm Hg @ 20°C
**Evaporation Rate:** 1 (Butyl Acetate = 1)
**HEAT OF SOLUTION:** Negligible
**Physical State:** Liquid.
**Odor:** Mild mothball-like odor
**COLOR:** Colorless

## 10. STABILITY AND REACTIVITY

**Stability:** Stable.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**INCOMPATIBILITY (CONDITIONS/MATERIALS TO AVOID):**
Open flames, hot glowing surfaces or electric arcs. Strong acids, strong oxidizers, corrosive to aluminum. Contact with oxidizing materials, aluminum, potassium, sodium, magnesium, and aluminum spray equipment.

**HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:**
Carbon monoxide. Carbon dioxide. Hydrogen chloride gas. Possible traces of phosgene.

## 11. TOXICOLOGICAL INFORMATION

**ACUTE INHALATION LC50:** 2965 ppm (rat) Slight to very low toxicity.
**ACUTE DERMAL LD50:** >7940 mg/kg (rabbit) Slight to very low toxicity.
**SKIN IRRITATION:** Severely irritating.
**EYE IRRITATION:** Severely irritating.
**ACUTE ORAL LD50:** 1540 mg/kg (rat) Moderate toxicity.
**GENETIC/AMES TEST:** Ames Test - Negative. Not mutagenic. Chromosomal Aberration - Negative. Not cytogenetic toxicants. Sister Chromatid Exchange Test - Negative.

**CARCINOGENICITY STATUS:** This product is NOT listed as a carcinogen or

suspected carcinogen by NTP, IARC, ACGIH, or OSHA.

**MEDICAL CONDITIONS AGGRAVATED:** None known.

**EFFECTS OF OVEREXPOSURE:**

ACUTE:

Inhalation: Mono- and Di- chlorobenzenes are central nervous system depressants. Inhalation at concentrations in excess of the OSHA permissible exposure limits can cause headache, dizziness, eye, nose and throat irritation, nausea, feeling of drunkenness, unconsciousness and even death in confined or poorly ventilated areas.

Eye/Skin: Animal studies and human experience indicate that short exposures can result in minor eye and skin irritation and pain; however, prolonged or repeated contact may result in mild skin burns. Mono- and Di- chlorobenzenes may be absorbed through the skin.

Ingestion: Although swallowing is not a likely route of exposure in industrial applications, accidental ingestion of large quantities of Mono- and/or Di- chlorobenzenes can cause illness similar to those described above for inhalation. Small amounts of these products aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, including death.

SUBCHRONIC: Repeated dose studies identified liver and kidney as target organs in rats and mice from both oral and inhalation exposure to Mono- and/or Di- chlorobenzenes. Damage to hematopoetic tissue (such as bone marrow, thymus, and spleen) and the thyroid was generally observed at higher doses (greater than 100 mg/kg/day). Suble and subjectively graded changes in the pituitary have been noted in rats treated with 1,3-dichlorobenzene (the meta isomer) but not other chlorobenzenes.

CHRONIC: Monochlorobenzene (MCB) was not tumorigenic in male and female mice and female rats. However, male rats given 120 mg/kg/day had an increased incidence of benign neoplastic liver nodules. The NTP deemed this evidence as equivocal.

MUTAGENICITY: Monochlorobenzene tested negative for mutagenicity in the Ames test, the chromosomal aberration and sister chromatid exchange assays. In vivo tests were also negative. These studies indicate that MCB is not mutagenetic or genotoxic.

REPRODUCTIVE/DEVELOPMENTAL TOXICITY: Two generation reproductive and developmental studies, in animals, show that Mono- and Di- chlorobenzenes have no effect on fertility and are not toxic to reproductive organs at concentrations at or below those levels which result in significant toxicity to target organs (approximately 500 ppm). Further animal studies indicate that chlorobenzenes are not embryo or fetotoxic at the doses tested except where maternally toxic effects were noted. Based on these studies, chlorobenzenes are not reproductive nor developmental toxicants.

## 12. ECOLOGICAL INFORMATION

**ECOTOXICOLOGICAL INFORMATION:**
The following information is for monochlorobenzene (MCB) (CAS # 108-90-7):
LC50: 4.1 - 10.5 mg/L (24-96 hr, fish) - High Toxicity.
LC50: 4.3 mg/L (24 hr, Daphnia) - High Toxicity.
EC50: 12.5 mg/L (96 hr, Algae) - Moderate Toxicity.

**ENVIRONMENTAL FATE:**

**Mobility:**
Fugacity studies (environmental transport) predict that if Monochlorobenzene were emitted to air it would tend to remain in the atmosphere and undergo photodegradation. When MCB would be emitted to water, being relatively insoluble, it would volatilize to the atmosphere and then undergo photodegradation.

**Biodegradation:**
> 90% after 15 days (respirometer test with sludge)
50-60% after 20 days (OECD 301D: Closed Bottle Test).
0-15% after 28 days (modified MITI test).

**ADDITIONAL INFORMATION:**
Hydrolysis: Does not typically hydrolyze. Henry's Law Constant (atm-m3/mole): 0.00311
Photodegradation OH Radical Rate Constant (cm3/molecule-sec): 0.77E-12

## 13. DISPOSAL CONSIDERATIONS

**DISPOSAL METHOD:**
Waste material must be disposed of in accordance with federal, state, provincial, and local environmental control regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

## 14. TRANSPORT INFORMATION

**Proper Shipping Name:** Chlorobenzene
**Hazard Class:** 3 (Flammable Liquid)
**UN Number:** UN1134
**Packing Group:** III
**USA-RQ, Hazardous Substance and Quantity:** 100 lbs./45.4 kg. (chlorobenzene, 108-90-7)
**Marine Pollutant:** None
**Additional Information:** This product is incompatible with aluminum and aluminum alloys; hence, this product should not be packaged or shipped in contact with aluminum. USA Shipments Only - Hazardous Substances are regulated in the USA when shipped above their Reportable Quantity (RQ).

## 15. REGULATORY INFORMATION

**USA TSCA:** All components of this product are listed on the TSCA Inventory.

**EU EINECS:** All components in this product are listed on EINECS or meet the polymer definition.
**CANADA DOMESTIC SUBSTANCES LIST (DSL):** This product and/or all of its components are listed on the Canadian DSL.
**AUSTRALIA AICS:** All components of this product are listed on AICS.
**KOREA ECL:** All components in this product are listed on the Korean Existing Chemicals Inventory (KECI).
**JAPAN MITI (ENCS):** All components in this product are listed on the Japanese Existing and New Chemical Substances (ENCS) chemical inventory.
**PHILIPPINES PICCS:** All of the components in this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).
**CHINA IECSC:** All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC) or otherwise exempt.

**SARA TITLE III:**
**SARA (311, 312) Hazard Class:**
Acute Health Hazard. Chronic Health Hazard. Fire Hazard.
**SARA (313) Chemicals:**
This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirement of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
Monochlorobenzene//108-90-7
**SARA Extremely Hazardous Substance:**
Not listed.

**CERCLA Hazardous Substance:**
The following materials are listed as CERCLA Hazardous Substances in Table 302.4 of 40 CFR Part 302: Monochlorobenzene (108-90-7) RQ = 100 lbs./45.4 kg.

**CALIFORNIA PROPOSITION 65:** Warning: This product contains a chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

**CANADA REGULATIONS (WHMIS):** Class B2 - Flammable Liquids. Class D1B - Toxic Materials. Class D2B - Toxic Materials.

## 16. OTHER INFORMATION

**The following has been revised since the last issue of this MSDS:**
Date. Edition. Section 1 has been updated. Section 3 has been updated. Section 5 has been updated. Section 8 has been updated. Section 9 has been updated. Section 11 has been updated. Section 12 has been updated. Section 15 has been updated. Section 16 has been updated.

**Previous revision date:** 07/02/2003
**Previous edition number:** 010

**NA = Not Available**