Monochlorobenzene (MCB), one of the earliest organic chemicals to be produced in large quantities, formed a link between the coal tar and chloralkali industries at the beginning of the century.

MCB is used as a chemical intermediate in the production of many organic chemicals ranging from pesticides to perfume, as a solvent in the production of various plastics and coatings, and as a carrier for dyes and pesticides.

Properties and Characteristics
PPG Industries produces monochlorobenzene with a typical purity of 99.99% at its Natrium, West Virginia, plant. Water content and residue typically are shown in parts per million, and a sulfur content of less than 0.2 ppm insures against contamination of catalysts used in the production of herbicides and other chemicals.

General Applications
Because of its high purity, PPG monochlorobenzene is commonly used as an intermediate in chemical synthesis as well as a processing solvent. Intermediate—PPG monochlorobenzene is used as an intermediate to chloronitrobenzene, agricultural pesticides, dyes, drugs, perfumes, and many other organic chemicals. It readily takes part in reactions such as nitration, aminolysis, and sulfonation.

Solvent—One method of producing polyurethanes utilizes the solvent properties of monochlorobenzene as a reactant carrier of isocyanates. Monochlorobenzene dissolves many natural and synthetic resins including vinyl and phenolic resins; ethyl cellulose; aromatic polysulfones; polycarbonates and polyolefins; adhesives; and coatings such as rosin, dammar, colophony and soft copal. For these formulating purposes, the solvent power of monochlorobenzene may be enhanced by adding amyl, butyl, ethyl or methyl alcohol or their acetate esters. Monochlorobenzene is also an effective solvent for fats, oils, waxes, carbon, tars and rubber.

Besides these uses as a processing and formulating solvent, monochlorobenzene is also used for solvent extractions; as a solvent or carrier for pesticides; and as a carrier of dyes for synthetic fabrics, where it promotes fabric-dyeing by swelling certain fibers, thus allowing the dyes to penetrate.

Typical Properties
- **Chemical Names**: Monochlorobenzene; chlorobenzene; chlorobenzol; phenyl chloride
- **Chemical Formula**: \( \text{C}_6\text{H}_5\text{Cl} \)
- **Molecular Weight**: 112.56
- **Description**: Water-white, volatile, flammable, liquid at ordinary handling temperatures. It has a pleasant, almond-like odor.
- **Boiling Point, °C**: 131.6
- **Freezing Point, °C**: -45.2
- **Flash Point, Tag closed cup, °C**: 24
- **Density, pounds per gallon at 25°C (77°F)**: 9.18
- **Vapor Density, air =1**: 3.88
- **Vapor Pressure, mm Hg at 25°C**: 11.8
- **Heat of Vaporization, cal/g**: 75.5
- **Specific Heat, cal (g)(°C) from -3.9 to 94°C**: 0.2988 + (7.4 x 10^-4)t
- **Coefficient of Cubical Expansion of 30°C, per °C**: 0.00098
- **Surface Tension, dynes/cm at 75°C(167°F)**: 26.7
- **Refractive Index, nD at 20°C**: 1.5247
- **Dielectric Constant at 21°C(69.8°F)**: 5.670
- **Solubility of Water in C₆H₅Cl, g/100g at 25°C**: 0.04
- **Solubility of C₆H₅Cl in Water, g/100g at 30°C**: 0.0488
- **Solubility**: Monochlorobenzene is miscible with most organic solvents.

Specification and Typical Analysis
- **Monochlorobenzene, weight % (by gas chromatography on an anhydrous basis)**: 99.90 minimum 99.99
- **Distillation Range including 131.6°C at standard pressure on dry sample**: 1°C max 0.6°C
- **Water, weight %**: 0.0200 maximum 0.0060
- **Color, APHA**: 30 maximum 10 to 15
- **Acidity and Alkalinity**: - Neutral
- **Flash Point, Cleveland open cup**: 86°F minimum 90 to 91°F
- **Appearance**: Clear and free of suspended matter
- **Residue, weight %**: 0.005 max 0.0007

PPG Industries
Monochlorobenzene

Government Specifications
PPG monochlorobenzene meets the quality requirements of Military Specification MIL-C-12038, Technical Grade for chlorobenzene (monochlorobenzene).

Health Hazards
The major hazard in the use of monochlorobenzene is prolonged breathing of abnormally high levels of the vapors. The permissible exposure limit for monochlorobenzene published in Title 29 of the Code of Federal Regulations (1910.1000, Table Z-1, is 75 ppm.

Inhalation of Vapor—Monochlorobenzene has an aromatic odor. High concentrations of the vapor are irritating to the upper respiratory system.

Vapor exposure chamber tests show that monochlorobenzene is capable of producing an anesthetic effect if excessive amounts are inhaled. Overexposure causes depression of the central nervous system, the effects varying with the amount of vapor inhaled and, of course the duration of such overexposure.

The initial effects encountered at lower concentrations or for short periods of time at high concentrations are lightheadedness, dizziness, mental dullness, headache, nausea and lack of coordination. The chief hazard associated with such an overexposure lies with impaired judgement and lack of muscular coordination. Exposure to extremely high vapor concentrations may cause unconsciousness or even death. Concentrations capable of causing serious effects such as unconsciousness, or in extreme cases death, may be expected only under certain circumstances such as working in inadequately ventilated or confined spaces, or bending over a pool of spilled chemical without proper protective equipment. Routine exposure, day after day, to concentrations higher than the permissible—that is, disregard of good practice or common sense—could produce liver or kidney damage in some individuals. Therefore, care should be taken to avoid exposure of personnel to levels cited herein as being hazardous to health. More information appears in the manual PPG Chlorinated Benzenes available on request.

Additional health and safety information is contained in the Material Safety Data Sheet (MSDS) available on request.

In Case of Emergency
In case of an emergency, call the PPG Industries Emergency Response Center at 412-434-4515. In Canada, call Canutec at 613-996-6666.

Handling and Storage
Fire Hazard—Monochlorobenzene is volatile and flammable and should be kept away from heat and open flames. The flash point (tag closed cup) of the PPG product is 24°C (75°F). Like other chlorinated hydrocarbons, monochlorobenzene will decompose and give off toxic and corrosive gases if exposed to open flames, open electric elements, electrical arcs or temperatures above 700°C (1300°F).

Unloading Tank Cars—When a tank car is unloaded, the car tank, the unloading pump, and the storage tank should be electrically grounded. Information, including a diagram of the grounding arrangement, appears in the manual PPG Chlorinated Benzenes available on request.

Packaging and Shipping
PPG Industries ships monochlorobenzene in 55-gallon drums, and in bulk by tank truck, tank car and barge from its Natrium, West Virginia, plant.

PPG maintains a fleet of 10,000-and 20,000-gallon, single-compartmented tank cars, equipped for top and bottom unloading, for chlorinated benzene service.

Customer Service
Samples are available in various sizes upon request. For more information regarding PPG’s monochlorobenzene, contact our customer service department by calling 800-CHEM-PPG (800-243-6774).

PPG’s technical and product safety staff is available to provide additional information on technical issues, applications, handling and storage, and health and safety concerns.

Statements and methods presented are based upon the best available information and practices known to PPG Industries at present, but are not representations or warranties of performance, result or comprehensiveness, nor do they imply any recommendations to infringe any patent or an offer of license under any patent. The products mentioned herein can be hazardous if not used properly. Any health hazard and safety information contained herein should be passed on to your customers or employees, as the case may be. PPG Industries also recommends that, before use, anyone using or handling this product thoroughly read and understand the information and precautions on the label, as well as in other product safety publications such as the Material Safety Data Sheet.

Like all potentially hazardous materials, this product must be kept out of the reach of children.