

1,4-DICHLOROBENZENE

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1. Product Identification

Synonyms: p-Dichlorobenzene; Paradichlorobenzene; para-Dichlorobenzene

CAS No.: 106-46-7

Molecular Weight: 97.45

Chemical Formula: C₆H₄Cl₂

Product Codes: CHEM-600 and others

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
1,4-Dichlorobenzene	106-46-7	99.4-100	Yes

3. Hazards Identification

Emergency Overview

Warning! Causes irritation to eyes, skin and respiratory tract irritation. Harmful if swallowed. Keep out of reach of children. Keep away from food. Combustible vapor and material. Marine pollutant. Molten material can cause severe burns. Excessive exposure may cause liver and kidney damage. **Warning!** This material has been shown to cause cancer when administered orally to rodents at high levels.

SAF-T-DATA^(tm) Ratings

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 0 - None

Contact Rating: 1 Slight

Lab Protective Equip: GOGGLES; LAB COAT, PROPER GLOVES

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to paradichlorobenzene (PDCB). Eye contact with PDCB has been reported to produce pain in the eyes, but has not been reported to cause serious injury to the eyes. This material produces a burning sensation when held in contact with skin, though injury to the skin is minimal. Minor eye and nasal irritation have been reported with exposure to PDCB in air at concentrations as low as 50 ppm. Exposure to PDCB above recommended airborne exposure limits may result in headache, swelling around the eyes, inflammation of the mucous membranes of the nose, loss of appetite, nausea and vomiting. Though composition data was limited, several reports in the literature indicate jaundice and liver toxicity as a result of overexposure. Toxicity studies indicate high doses

of PDCB produce liver and kidney injury in laboratory animals.

4. First Aid Measures

Eyes:

Remove material from eyes, skin and clothing. Flush Eyes for at least 15 min., call physician.

Skin:

Immediately flush with water, remove contaminated clothing. If hot, treat for thermal effects.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing difficult, give oxygen. Call physician.

Ingestion:

Immediately get medical attention. Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person.

5. Fire Fighting Measures

Flash Point (Method Used):

150°F (Tagliabue Closed Cup)

Extinguishing Media:

Water spray, foam, CO₂, dry chemical or any Class B extinguishing agent.

Special Firefighting Procedures:

Wear full protective clothing and self-contained breather apparatus where exposure to vapor or gases is possible. Firefighting equipment should be thoroughly decontaminated after use.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Maintain a constant temperature not to exceed 24 degrees centigrade (75 degrees fahrenheit).

8. Exposure Controls/Personal Protection

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Use face shield and chemical resistant clothing such as a rubber apron when splashing is likely. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before re-use. Wash thoroughly after handling.

Respiratory Protection: Avoid breathing vapor, mist or dust. Use NIOSH/MSHA approved respiratory protection equipment (full facepiece recommended) when airborne exposure limits are exceeded (see below). If used, full facepiece replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29C.F.R.1910.134.

Ventilation: Provide ventilation to control exposure levels below airborne exposure limits. Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult NFPA Standard 91 for design of exhaust systems.

Airbourne Exposure Limits:

para-Dichlorobenzene (99.4 -100% by wt. of product). **OSHA PEL:** 75 ppm 8-Hour TWA; 110 ppm short term exposure limit. **ACGIH TLV:** 10 ppm 8-Hour TWA.

NOTE: The National Toxicology Program finding of tumors in laboratory animals was not available when these airborne exposure limits were set for para-Dichlorobenzene by OSHA and ACGTH.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White crystals

Odor:

Penetrating "mothball odor"

Solubility:

0.008/100 g water @ 25°C

Spec. Gravity @ 55°/4°C:

1.25

pH:

No information found.

Boiling Point:

174°C (345.2°F)

Melting Point:

53°C (127.4°F)

Vapor Density (Air=1):

5.1

Vapor Pressure (mm Hg):

6 @ 20°C

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under normal conditions; avoid strong oxidizers, oxidizing agents.

Incompatibility:

None known

Hazardous Decomposition:

Carbon monoxide (CO), carbon dioxide (CO₂), smoke, soot, chlorides and phosgene.

Hazardous Polymerization:

Does not occur.

11. Toxicological Information

Data from laboratory studies and from the scientific literature on PDCB are summarized hereby:

Single exposure (acute) studies indicate:

Oral-Slightly Toxic; (Rat LD₅₀ 3,826 mg/kg) Category III **Dermal**-Practically Nontoxic; (Rabbit L₅₀ >5,010 mg/kg) Category IV

Vapor Inhalation-Practically Nontoxic; (Rat 4-hr LC₅₀ > 6.0 mg/l)

Eye Irritation-Sever irritation, clearing in 13 days; (Rabbit) Category 1

Skin Irritation-Slightly irritating; (Rabbit, 4-hr exposure 2,9/8.0) Category III

Repeated inhalation studies (up to 14 weeks) with PDCS, conducted in rats, rabbits, guinea pigs and dogs, have resulted in liver, kidney and lung damage, reversible eye changes (rabbits only), reduced body weights and number of white blood cells, clinical signs and animal deaths at high exposure levels, while no effects were reported in monkeys. No adverse effects were observed in rats following repeated skin exposure (3 weeks) to PDCS. In repeat oral dosing studies (4 to 31 weeks), rodents given PDCB exhibited changes in body weight, some organ weights and clinical parameters, porphyria and kidney damage (male rats only) with liver toxicity. Changes in bone marrow, spleen, thymus, and nasal turbinates were also observed in rats at dosages which produced some deaths. No teratogenic effects were reported in the offspring of rats administered PDCB. Exposure of pregnant rats and rabbits to PDCB in inhalation produced no increase in treatment-related birth defects. No effects were seen on the ability of male or female rats to reproduce when exposed to PDCB in inhalation for 2 successive generations; kidney toxicity (male rat only) and liver toxicity with reductions in body weight and pup survival during days 0-4 of nursing were observed. PDCB has generally produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells. A positive response was reported in one assay using animals and mixed responses were reported in another assay using animal cells. PDCB has been shown to bind to nucleic acids in mouse organs, but not to bind nucleic acids in rat organs and to increase cell replication in male rat kidneys.

12. Ecological Information

Environmental Toxicity Information:

Oral LD₅₀ Bobwhite quail: 1,608 mg/kg, Slightly Toxic

48-hr EC₅₀ Daphnia magna: 7.4 mg/l, Moderately Toxic

96-hr LC₅₀ Fathead minnow: 4.2-30 mg/l, Moderately Toxic

96-hr LC₅₀ Grass shrimp: 60 mg/l, Slightly Toxic

Fathead minnow eggs were exposed to PDCB at concentration of 1, 0.57, 1.0, 2.0, 4.1 and 8.7 mg/l. Fry did not survive the 32-day exposure at 2.0 mg/l and higher. Survival and weight of the fry was reduced at 1.0 mg/l. PDCB was evaluated in a 24-hour semi-continuous activated sludge (SCAS) test and in the Thompson Duthle-Sturm biodegradability assay. Primary degradation was greater than 95% in the SCAS test. Theoretical CO₂ evolution was approximately 58% using the Thompson-Duthle-Sturm method. PDCB was intermediate to readily biodegradable in both assays.

13. Disposal Considerations

Keep people away. Shut off or extinguish all sources of ignition. Shut off lead if without risk. Small spills, keep upwind. Large spills, evacuate area. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Sweep up or shovel into clean metal containers. Run-off to sewers may create health and explosion hazards; notify fire, health and pollution control authorities. Release of more than 100 pounds to the environment in a 24-hour period requires notification of the National Response Center, 1-800-424-8802. Notification of state authorities may also be required.

Disposal Information: This product can become a hazardous waste as designated by the Environmental Protection Agency under the authority of the Resource Conservation and Recovery Act (RCRA). Product (or waste) has RCRA Hazardous Waste Number U072 as designated in 40 CFR 268. Disposal by incineration is Best Available Demonstrated Treatment (BDAT). All federal, state, and local regulations should be followed in disposing of this substance.

14. Transport Information

DOT Proper Shipping Name: Environmentally Hazardous Substance, Solid, N.O.S., (p-Dichlorobenzene)

DOT Hazard Class/ID No./Packing Group: CL 9, UN 3077, PG - III

DOT Label(s): Not required, limited quantities

US. Surface Freight Classification: para-Dichlorobenzene., Reportable Quantity (RQ) Under US EPA Para Dichlorobenzene 100 lbs. (45.4 kg) CERCLA Regulations

15. Regulatory Information

Section 313 Toxic Chemical(s):

This product contains the following substances(s) which is defined as toxic chemicals under, and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372: p-Dichlorobenzene.

Hazard Categories Under Criteria of SARA Title 111 (40 CFR Part 370):

Immediate, Delayed, Fire

TSCA Inventory:

1,4-dichlorobenzene (para-Dichlorobenzene) appears on the inventory of Chemical Substances published by the US Environmental Protection Agency (EPA) under authority of the Toxic Substances Control Act (TSCA).

Hazardous Chemical(s) under OSHA Hazard Communication Standards:

This product is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910:1200).

16. Other Information

NFPA Ratings: Health: 2 Flammability: 2 Reactivity: 0 Personal Protection: E

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER.

Label Precautions:

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Avoid breathing dust.

Keep container closed.

Use only with adequate ventilation.

Product Use:

Laboratory Reagent and Consumer Hobby

Revision Information:

No Changes.

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