United States Environmental Protection Agency | Office of Water 4601 | EPA 811-F-95-003s-T October 1995

National Primary Drinking Water Regulations

Hexachlorobenzene

Chemical/ Physical Properties

CAS Number: 118-74-1

Color/ Form/Odor: White needles

M.P.: 231° C **B.P.:** 323-326° C

Vapor Pressure: 1.09×10^{-5} mm Hg, 25° C

Octanol/Water Partition (Kow): Log Kow = 5.31

Density/Spec. Grav.: 1.57 at 23.6° C

Solubility: 0.035 mg/L of water; Insoluble in water

Soil sorption coefficient: Koc estimated at 4-5; low soil mobility

Odor/Taste Thresholds: N/A

Bioconcentration Factor: Log BCF=3.1 to 4.5 in fish; expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: 0.03 to 0.07 atm-cu m/mole; rapid evaporation from water

Trade Names/Synonyms: Hexa CB, HCB, Phenyl perchloryl, Perchlorobenzene, Pentachlorophenyl chloride, Anticarie, Bunt-cure, Co-op hexa, Julin's carbon chloride, No bunt 40, No bunt 80, Sanocide, Snieciotox, Smut-go, Granox nm, Voronit C

Drinking Water Standards

MCLG: zero mg/L

MCL: 0.001 mg/L

HAL(child): 1 day: 0.05 mg/L

Longer-term: 0.05 mg/L

Health Effects Summary

Acute: EPA has found hexachlorobenzene (HCB) to potentially cause the following health effects from acute exposures at levels above the MCL: skin lesions, nerve and liver damage

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day, upto a 7-year exposure to 0.05 mg/L.

Chronic: HCB has the potential to cause the following health effects from long-term exposures at levels above the MCL: damage to liver and kidney tissue; reproductive effects; benign tumors of endocrine glands.

Cancer: There is some evidence that HCB may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

HCB is produced as a by-product or waste material in the production of tetrachloroethylene, trichloroethylene, carbon tetrachloride, chlorine, dimethyl tetrachloroterephthalate, vinyl chloride, atrazine, propazine, simazine, pentachloronitrobenzene, and mirex. It is a contaminant in several pesticides including dimethyl tetrachlorophthalate and pentachloronitrobenzene.

Production data on hexachlorobenzene is limited. In 1982, imports were reported to be 38,000 lbs, with no evidence of commercial domestic production. However, 2 to 5 million lbs may be generated each year as a waste by-product of chlorination processes in chemical manufacture.

The greatest use of HCB is in making other organic compounds such as rubber, dyes, wood preservatives. Other uses of include: an additive in explosives, in electrode manufacture, and as a fungicide on grains, especially wheat.

Release Patterns

Major environmental releases of HCB are due to air

Toxic Release Inventory - Releases to Water and Land: 1987 to 1993

	Water	Land
TOTALS (in pounds)	1,286	1
Top States		
LA	677	1
TX	609	0
Major Industries		
Alkalies, chlorine	854	1
Agricultural chemicals	297	0

and water discharges from its production as a by-product of chemical manufacture, or from pesticide applications. It is also released by some waste incineration processes. It has been detected in treated waste water from non-ferrous metal manufacturing.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, HCB releases to land and water totalled 1,287 lbs., all of which was to water. These releases were primarily from alkali, chlorine and agricultural chemical industries. The largest releases occurred in Louisiana and Texas.

Environmental Fate

HCB is a very persistent environmental chemical due to its chemical stability and resistance to biodegradation.

If released to the atmosphere, HCB will exist primarily in the vapor phase and degradation will be extremely slow (estimated half-life with hydroxyl radicals is 2 years). Long range global transport is possible. Physical removal from the atmosphere can occur via washout by rainfall and dry deposition.

If released to water, HCB will significantly partition from the water column to sediment and suspended matter. Volatilization from the water column is rapid (half-life of about 8 hrs has been measured in the laboratory); however, the strong adsorption to sediment can result in long periods of persistence. Hydrolysis and biodegradation will not be significant processes in water.

If released to soil, HCB will be strongly adsorbed and not generally susceptible to leaching (a half-life of 1530 days has been reported). Little biodegradation will occur and transport to groundwater is expected to be slow, depending upon the organic carbon content of the soil; some evaporation from surface soil to air may occur, the extent of which is dependent upon the organic content of the soil.

Hexachlorobenzene will bioconcentrate in fish and enter into the food chain (has been detected in food during market basket surveys). Log BCF in trout, 3.7-4.3; sunfish, 3.1-4.3; and fathead minnow, 4.2-4.5. Similar high BCF values (log BCF 2-3) have been measured in aquatic microcosms.

Human exposure will be from ambient air, contaminated drinking water and food, as well as contact with contaminated soil or occupational atmospheres.

Other Regulatory Information

Monitoring:

For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- If no detections during initial round:
2 quarterly per year if serving >3300 persons;
1 sample per 3 years for smaller systems

Triggers - Return to Initial Freq. if detect at > 0.0001 mg/L

Analysis:

Reference Source	Method Numbers
EPA 600/4-88-039	505; 508; 508.1; 525.2

Treatment:

Best Available Technologies

Granular Activated Charcoal

For Additional Information:

- EPA can provide further regulatory and other general information:
  - EPA Safe Drinking Water Hotline - 800/426-4791

- Other sources of toxicological and environmental fate data include:
  - Toxic Substance Control Act Information Line - 202/554-1404
  - Toxics Release Inventory, National Library of Medicine - 301/496-6531
  - Agency for Toxic Substances and Disease Registry - 404/639-6000
  - National Pesticide Hotline - 800/858-7378