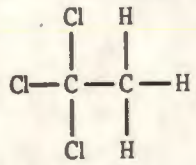
1,1,1-Trichloroethane

SUBSTANCE IDENTIFICATION

Synonyms: Methyl chloroform

Structure:



CAS Registry Number: 71-55-6

Molecular Formula: $C_2H_3Cl_3$

Wiswesser Line Notation: GXGG1

CHEMICAL AND PHYSICAL PROPERTIES

Boiling Point: 74.1 °C at 760 mm Hg

Melting Point: -30.4 °C

Molecular Weight: 133.42

Dissociation Constants:

Log Octanol/Water Partition Coefficient: 2.49 [28]

Water Solubility: 347 mg/L at 25 °C [31]

Vapor Pressure: 123.7 mm Hg at 25 °C [50]

Henry's Law Constant: 8 x 10^{-3} atm-m^3/mole [36]

ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Summary: 1,1,1-Trichloroethane is likely to enter the environment from air emissions, in wastewater from its production, or from use in vapor degreasing, metal cleaning, etc. Releases to surface water will

decrease in concentration almost entirely due to evaporation. Spills on land will decrease in concentration almost entirely due to volatilization and percolation into ground water. Releases to air will be transported long distances and partially return to earth in rain. In the troposphere, 1,1,1-trichloroethane will degrade very slowly by photooxidation and also slowly diffuse to the stratosphere where photodegradation will be rapid. Major human exposure is from air and drinking water. Exposure can be high near sources of emission or where drinking water is contaminated.

Natural Sources: 1,1,1-Trichloroethane is not known to occur as a natural product [33].

Artificial Sources: Wastewater and stack and fugitive emissions from production. Volatilization losses from its use in the cold cleaning of metals, in vapor degreasing, and as a solvent and aerosol, etc. [63]. Mean emissions rate of 1,1,1-trichloroethane that would contribute to its presence in indoor air are (source - rate ng/min-sq m): cleaning agents and pesticides - 37,000; painted sheetrock - 31; glued wallpaper - 84; glued carpet - 260 [66].

Terrestrial Fate: Evaporates fairly rapidly into the atmosphere because of its high vapor pressure. Passes rapidly through soil into ground water [51].

Aquatic Fate: Primary loss will be by evaporation into the atmosphere. Half-life will range from hours to a few weeks depending on wind and mixing conditions. Half-lives in a mesocosm simulating the conditions in Narragansett Bay were 24, 12, and 11 days under spring, summer, and winter conditions, respectively [65]. Biodegradation and adsorption onto particulate matter will be insignificant relative to volatilization [65]. Turbulence in microcosm tanks are substantially less than in the bay or the open ocean so volatilization may be significantly (up to an order of magnitude) faster in the bay or open water than measured in the mesocosms.

Atmospheric Fate: 1,1,1-Trichloroethane is fairly stable in the atmosphere and is transported long distances, being found even at the South Pole [5,35,48]. It is transported to Point Barrow, Alaska from the mid-latitudes [35]. It is slowly degraded principally by reaction with hydroxyl radicals and has a half-life of 6 months to 25 years [5,12]. The rate of degradation is increased by the presence of chlorine

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The following individuals from the Syracuse Research Corporation's Chemical Hazard Assessment Division either were authors of the individual chemical records prepared for the Hazardous Substances Data Bank or edited the expanded and updated chemical chapters in this volume. The order of names, which will vary in each volume, is by the number of chemicals for which the individual was responsible.

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