

US EPA ARCHIVE DOCUMENT

Technical Factsheet on: 1,1,2-TRICHLOROETHANE

[List of Contaminants](#)

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: 0.003 mg/L

MCL: 0.005 mg/L

HAL(child): 1 day: 0.6 mg/L; Longer-term: 0.4 mg/L

Health Effects Summary

Acute: EPA has found 1,1,2-trichloroethane (1,1,2-TCE) to potentially cause the following health effects from acute exposures at levels above the MCL: irritation of gastrointestinal tract; red or hemorrhaged lungs; pale liver.

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: a one-day exposure of 0.6 mg/L; upto a 7-year exposure to 0.4 mg/L.

Chronic: 1,1,2-TCE has the potential to cause the following health effects from long-term exposures at levels above the MCL: damage to liver and kidneys.

Cancer: There is some evidence that 1,1,2-TCE may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

1,1,2-Trichloroethane is only important as an intermediate in the production of 1,1-dichloroethylene (vinylidene chloride) and to some extent for the synthesis of tetrachloroethanes. It is also used in adhesives, production of teflon tubing, in lacquer and coating formulations, and as a solvent for fats, oils, waxes, etc.

An estimated 124 million lbs. of 1,1,2-TCE was produced in the US during 1974, based on the manufacture of vinylidene chloride.

Release Patterns

1,1,2-Trichloroethane will enter the atmosphere from its use in the manufacture of vinylidene chloride and its use as a solvent. It will also be discharged in wastewater associated with these uses and in leachates and volatile emissions from landfills. The EPA estimates the gross annual discharge of 1,1,2-TCE waste in the US to be 4 million lbs.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, 1,1,2-TCE releases to land and water totalled over 30,000 lbs., of which about 98 percent was to water. These releases were primarily from alkalis and chlorine industries which use it as an intermediate in chemical manufacture. The largest releases occurred in Louisiana and Texas.

Environmental Fate

When released into water, 1,1,2-trichloroethane should primarily evaporate. Little of the chemical will be lost by adsorption to sediment or by biodegradation. Aquatic hydrolysis is not expected to be important.

Once in the atmosphere, 1,1,2-trichloroethane will photodegrade slowly by reaction with hydroxyl radicals (half-life 24-50 days in unpolluted atmospheres to a few days in polluted atmospheres).

When released to land 1,1,2-trichloroethane should partially volatilize and partially leach into the groundwater. Experimentally determined Koc values of 83-209 indicated that 1,1,2-trichloroethane will be moderately to highly mobile in soil. Several biodegradation screening studies have determined that 1,1,2-trichloroethane is resistant to biodegradation. Other screening studies have observed biotransformation under anaerobic conditions. Biodegradation in groundwater or subsurface regions may occur, but appears to be very slow.

1,1,2-Trichloroethane would not be expected to bioconcentrate since the experimental log BCF in fish was reported to be <1.

Primary human exposure is from occupational exposure and from ambient air in the vicinity of industrial sources and contaminated drinking water.

Chemical/Physical Properties

CAS Number: 79-00-5

Color/ Form/Odor: Clear liquid with a pleasant, chloroform-like odor

M.P.: -36.6 C B.P.: 113.8 C

Vapor Pressure: 23 mm Hg at 25 C

Octanol/Water Partition (Kow): Log Kow = 2.17

Density/Spec. Grav.: 1.4 at 20 C

Solubility: 4.4 g/L of water at 20 C; Soluble in water

Soil sorption coefficient: Koc measured at 83 to 209; moderate to high mobility in soil

Odor/Taste Thresholds: N/A

Bioconcentration Factor: BCF <1 in fish; not expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: 8.24×10^{-4} atm-cu m/mole;

Trade Names/Synonyms: Beta-trichloroethane; Beta-T; Vinyl trichloride

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source
EPA 600/4-88-039

Method Numbers
502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

TOTALS (in pounds)	Water 30,326	Land 756
Top Five States*		
LA	14,481	332
TX	9,699	294
NY	4,570	130
MD	750	0
KY	447	0
Major Industries*		
Alkalies, chlorine	21,783	361
Photograph equipment	4,570	130
Meat packing plants	981	0
Petroleum refining	959	0
Blast furnaces, steelworks	750	0

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

For Additional Information

EPA can provide further regulatory or 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