

Technical Factsheet on: TRICHLOROETHYLENE

[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: zero
MCL: 0.005 mg/L
HAL(child): none

Health Effects Summary

Acute: EPA has found trichloroethylene to potentially cause vomiting and abdominal pain from acute exposures at levels above the MCL.

No Health Advisories have been established for short-term exposures.

Chronic: Trichloroethylene has the potential to cause liver damage from a lifetime exposure at levels above the MCL.

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

Usage Patterns

Production of trichloroethylene has increased from just over 260,000 lbs in 1981 to 320 million lbs. in 1991. Vapor degreasing of fabricated metal parts and some textiles accounts for 80% of its use.

Five percent is used as an intermediate in the production of organic chemicals and pharmaceuticals. Miscellaneous uses (5%) include solvents for dry cleaning, extraction and as a refrigerant/heat exchange liquid. An estimated 10% is exported.

Release Patterns

Major environmental releases of trichloroethylene are due to air emissions from metal degreasing plants. Wastewater from metal finishing, paint and ink formulation, electrical/electronic components, and rubber processing industries also may contain trichloroethylene.

From 1987 to 1993, according to the Toxics Release Inventory, trichloroethylene releases to water totalled over 100,000 lbs. Releases to land totalled over 191,000 lbs. These releases were primarily from steel pipe and tube manufacturing industries. The largest releases occurred in Pennsylvania and Illinois. The largest direct releases to water occurred in West Virginia.

Environmental Fate

Relatively high vapor pressure and low adsorption coefficient to a number of soil types indicates ready transport through soil and low potential for adsorption to sediments. The mobility in soil is confirmed in soil column studies and river bank infiltration studies. Four to six percent of environmental concentrations

of trichloroethylene adsorbed to two silty clay loams ($K_{oc} = 87$ and 150). No adsorption to Ca-saturated montmorillonite and 17% adsorption to Al-saturated montmorillonite was observed.

The high Henry's Law Constant indicates rapid evaporation from water. Half-lives of evaporation have been reported to be on the order of several minutes to hours, depending upon the turbulence. Field studies also support rapid evaporation from water. Trichloroethylene is not hydrolyzed by water under normal conditions. It does not adsorb light of less than 290 nm and therefore should not directly photodegrade. However, slow (half-life -10.7 months) photooxidation in water has been noted.

Trichloroethylene is relatively reactive under smog conditions with 60% degradation in 140 min and 50% degradation in 1 to 3.5 hours reported. Atmospheric residence times based upon reaction with hydroxyl radical is 5 days (6-8) with production of phosgene, dichloroacetyl chloride, and formyl chloride.

Marine monitoring data only suggest moderate bioconcentration (2-25 times). Bioconcentration factors of 17 to 39 have been reported in bluegill sunfish and rainbow trout.

Chemical/Physical Properties

CAS Number: 79-01-6

Color/ Form/Odor: Clear, colorless or blue mobile liquid with sweet chloroform-like odor

M.P.: -73 C B.P.: 87 C

Vapor Pressure: 57.8 mm Hg at 20 C

Density/Spec. Grav.: 1.465 at 20 C

Octanol/Water Partition (K_{ow}): Log $K_{ow} = 2.29$

Solubilities: 1.0 g/L of water at 25 C

Soil sorption coefficient: Log $K_{oc} = 2$ for many soil types; high to very high mobility in soil

Bioconcentration Factor: 17 to 39 in fish; moderate.

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: 0.01 atm-cu m/mole

Trade Names/Synonyms: 1,1,2-Trichloroethylene; Acetylene trichloroethylene; Agylen; Anameth; Benzinol; Chlorilen; CirCosolv; Germalgene; Lethurin; Perm-a-chlor; Petzinol; Philex; TRI-Plus M; Vitran

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 consecutive quarterly samples during initial compliance period (1993-1995)

Repeat Frequency- If no detects in initial samples GW systems must take annual samples during 1996-1998 compliance period and triennial samples thereafter; SW systems must take annual samples.

-- Triggers - Return to quarterly monitoring if detect at > 0.0005 mg/L, until primacy State determines otherwise

Analysis

Reference Source
EPA 600/4-88-039

Method Numbers
502.2; 524.2; 551

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

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

	Water	Land
TOTALS (in pounds)	100,293	191,088
Top Six States*		
PA	0	33,450
IL	0	30,711
GA	3,742	17,532
TX	0	21,000
MA	0	19,920
WV	12,822	0
Major Industries		
Steel pipe, tubes	31	39,288
Misc. Indust. Organics	27,708	0
Car parts, access.	4,405	19,920
Plating, polishing	3,342	20,100
Wool fabric mills	3,942	18,081

* State totals only include facilities with releases greater than 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