# cis-1,2-DICHLOROETHYLENE

## FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

### GENERAL INFORMATION

**Synonyms:**
- 1,2-DCE; cis-1,2-DCE; 1,2-Dichloroethene; Acetylene Dichloride; sym-Dichloroethylene

**Chemical Description:**
- A volatile synthetic compound with no known natural sources
- Usually found in the form of a mixture of both the cis- and trans- isomers (cis-1,2-DCE and trans-1,2-DCE)

**Properties:**
- A clear, colorless, flammable liquid
- Relatively high vapor pressure
- Moderately soluble in water

**Production and Use:**
- Used primarily as a captive intermediate in the production of other chlorinated solvents, and as an extraction solvent for meat and fish oils and fats

### ENVIRONMENTAL PROFILE

**Occurrence:**
- Major source of exposure is from contaminated water except in areas near production sites where air exposures may dominate
- Monitoring studies have found that both the cis- and trans- isomers occur as widespread low level contaminants of ground water, and occur in surface waters at even lower amounts
- The cis- isomer is reported to occur in drinking water at higher levels than the trans- isomer
- Co-occurs with trichloroethylene
- Both isomers (especially the cis- isomer) have been identified as degradation products of trichloroethylene and tetrachloroethylene

**Releases:**
- Releases to the environment are expected to be small, with the majority of releases emanating from manufacturing plants in the Gulf Region of the U.S

**Environmental Fate:**
- Little direct information, but the behavior of the compounds has been extrapolated from information on similar chlorinated compounds:
  - **Released to the atmosphere:** expected to chemically degrade in a matter of hours
  - **Released to surface waters:** slightly persistent in water; expected to volatilize rapidly to air (major route of removal); chemically stable in water, but may biodegrade to vinyl chloride in some ground waters; not likely adsorb to suspended solids or sediment
  - **Released to soil:** will not adsorb strongly to soils (moderately mobile in soils) with moderate potential to migrate to ground waters; will volatilize to the atmosphere from soil surface
- Low potential for bioaccumulation

### HEALTH EFFECTS

**Humans:**
- At high concentrations, the dichloroethylenes, like other chlorinated ethylenes, possess anesthetic properties
- The trans- isomer is approximately twice as potent as the cis- isomer in its ability to depress the central nervous system (CNS)
- cis-1,2-DCE was once used as a surgical anesthetic

**Experimental Animals:**
- Short-term, high doses have general anesthetic and narcotic effects, and detrimental effects upon liver functions
- Long-term, high doses cause decreased water consumption, alterations in hematocrit levels, and detrimental effects upon functions of the liver and circulatory system
- Non-mutagenic
- No information found in the available literature on the teratogenic, fetotoxic, or carcinogenic potential of cis-1,2-DCE

## REGULATORY PROFILE

**Existing Standards:**

- **Clean Air Act (CAA):** Not regulated
- **Clean Water Act CWA):**
  No criteria established
- **Resource Conservation and Recovery Act (RCRA):**
  Not regulated
- **Superfund (CERCLA):**
  - Hazardous substance
  - **SARA:** Hazardous substance
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):**
  Not registered
- **Toxic Substances Control Act (TSCA):**
  Not regulated

## HEALTH INFORMATION

**Maximum Contaminant Level Goals (MCLG):**

- Non-enforceable levels based solely on an evaluation of possible health risks and exposure, and taking into consideration a margin for public safety
- Set at 0.7 mg/L to protect against damage to the liver, and circulatory and nervous systems

**MCLG for cis-1,2-DCE = 0.07 mg/L**
**(effective July 1992)**

**Maximum Contaminant Levels (MCL):**

- Legally enforceable levels for contaminants in public drinking water supplies
- Based on health risks associated with the contaminants, analytical methods for their assay, and water treatment feasibility and practicality aspects
- Exceedance of the MCL in drinking water may result in adverse effects which will depend upon the contaminant concentration in water, amount of water/contaminant ingested, length of exposure, and other biological parameters

**MCL for cis-1,2-DCE = 0.07 mg/L**
**(effective July 1992)**

**EPA Health Advisories (HA):**

- **Short-term HAs:** Provide acceptable concentrations of contaminants in water for up to 10 day exposures, primarily to evaluate the public health risk resulting from an accidental spill or an emergency contamination situation
- **Longer-term HAs:** Provide guidance for persistent water contamination situations to cover a period of up to 7 years
- **Lifetime HAs:** Derived in the same way as an MCLG

Health Advisories

**Short-term HA for a child = 3.2 mg/L**
**Longer-term HA for a child = 3.2 mg/L**
**Longer-term HA for an adult = 11.2 mg/L**
**Lifetime HA = 0.07 mg/L**

## ANALYTICAL METHODS

- Purge and Trap Gas Chromatography:
  EPA Method 502.1
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- Purge and Trap Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series:
  EPA Method 502.2
- Purged Column Gas Chromatography/Mass Spectrometry:
  EPA Method 524.1
- Capillary Column Gas Chromatography/Mass Spectrometry:
  EPA Method 524.2

## WATER TREATMENT

**Permanent Treatment:**

- **Best Available Technology (BAT):**
  - Granular Activated Carbon
  - Packed Tower Aeration

## SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded, install BAT or use an alternative drinking water supply such as bottled water

## ADDITIONAL HELP

- State or county health officials can indicate a certified laboratory for testing
- Experts in the state Department of Environmental Protection or Natural Resources may also be of help
- The EPA has toll-free numbers for further information on drinking water quality, treatment technologies, for obtaining Health Advisories, and for other regulatory information
- EPA Hotlines are available Monday through Friday
  - **Safe Drinking Water:** **800-426-4791**
  - **National Pesticides:** **800-858-7378**
  - **Superfund/RCRA:** **800-424-9346**
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-1404
- For information on the Clean Air Act, call (919) 541-2777