



Bureau of Environmental Health and Radiation Protection

"Protect and improve the health of all Ohioans by preventing disease, promoting good health and assuring access to quality care."

Carbon Tetrachloride

(Also called CCL₄, carbon chloride, methane tetrachloride, perchloromethane, tetrachloroethane or benziform)

What is carbon tetrachloride?

Carbon tetrachloride, CAS # 56-23-5, is a clear liquid with a sweet smell. It is most often found in the air as a colorless gas. It is not flammable (does not burn) and does not dissolve easily in water.

Where do you find carbon tetrachloride? How was it used?

Carbon tetrachloride is a man-made chemical whose commercial use was banned in the mid-1960s. In the past it was used as a dry cleaning fluid, as a degreasing agent and a spot remover, as propellants for aerosol cans and in fire extinguishers, in the production of refrigeration fluid, and as a pesticide.

Carbon tetrachloride is very persistent (does not break down) in the air and can last several years before it is broken down. When it does break down, it forms chemicals harmful to earth's ozone. Because of this, its manufacture and use has declined a great deal.

What happens to carbon tetrachloride in the environment?

When carbon tetrachloride is exposed to the air it quickly evaporates (changes from a liquid to a gas). It also quickly evaporates (a few days or weeks) from contaminated surface waters.

If spilled onto the ground, much of it will evaporate to the air and move into the groundwater (underground drinking water). In the groundwater it is broken down to other chemicals within months.

How do you come in contact with carbon tetrachloride?

Because of past and present releases, very low "background levels" of carbon tetrachloride are found in air, water, and soil. Concentrations in air of 0.1 part carbon tetrachloride per billion parts of air (0.1 ppb) are common around the world, with somewhat higher levels often found (0.2-0.6 ppb) in cities. Carbon tetrachloride is also found in some drinking water supplies, usually at concentrations less than 0.5 ppb.

Exposure to higher levels of carbon tetrachloride is likely to occur only at specific industrial locations where it is still used or near chemical waste sites where releases into the air, water, or soil are not properly controlled.



Can exposure to carbon tetrachloride make you sick?

Yes, you can get sick from carbon tetrachloride. But getting sick will depend on:

- How much you were exposed to (dose).
- How long you were exposed (duration).
- How often you were exposed (frequency).
- General Health, Age, Lifestyle
Young children, the elderly and people with chronic (on-going) health problems are more at risk to chemical exposures.

How can carbon tetrachloride affect my health?

Exposure to high levels of carbon tetrachloride can damage the liver, kidneys, and nervous system. In severe cases, coma and even death may occur.

If exposure is very high, the nervous system, including the brain, is affected. People may feel intoxicated and experience headaches, dizziness, sleepiness, and nausea and vomiting. But all of these health effects stop once the exposure is stopped.

The liver is especially sensitive to carbon tetrachloride because it enlarges and the cells can be damaged or destroyed. Kidneys can also be damaged, causing a buildup of wastes in the blood. If exposure levels are low and brief, the liver and kidneys can repair the damaged cells and function normally again.

Make note that the health effects of carbon tetrachloride are more severe in persons who drink large amounts of alcohol.

There have been no human reproductive studies of the effects of carbon tetrachloride, but studies in laboratory rats showed that long-term inhalation (breathing) may decrease their ability to reproduce.

Does carbon tetrachloride cause cancer?

The Department of Health and Human Services (DHHS) has determined that carbon tetrachloride is *Reasonably Anticipated to be a Human Carcinogen* (cancer-causing agent). This is based on evidence of carcinogenicity in laboratory animal studies (rats and mice).

The International Agency for Research on Cancer (IARC) has determined that carbon tetrachloride to be Group B2, or possibly carcinogenic to humans, whereas the U.S. EPA has classified carbon tetrachloride as a probable human carcinogen.

Cancer Studies in Humans:

Studies in humans have not been able to determine whether or not carbon

tetrachloride can cause cancer because usually there has been exposure to other chemicals at the same time.

Cancer Studies in Experimental Animals:

Liver tumors have developed in lab rats and mice exposed to carbon tetrachloride by gavage (experimentally placing the chemical in their stomachs). Mice that breathed carbon tetrachloride also developed tumors of the adrenal gland.

What has been done to protect human health?

The EPA has set a limit for carbon tetrachloride in drinking water of 5 parts of carbon tetrachloride per billion parts of water (5.0 ppb). The EPA has also set limits on how much carbon tetrachloride can be released from an industrial plant into waste water and is preparing to set limits on how much carbon tetrachloride can escape from an industrial plant into outside air.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 parts per million (10 ppm) for carbon tetrachloride in workplace air for an 8-hour workday, 40-hour workweek.



References:

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for [Carbon Tetrachloride](#) (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Report on Carcinogens, 13th Edition; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, 2014

Agency for Toxic Substances and Disease Registry (ATSDR). [Public Health Statement for Carbon Tetrachloride](#). August 2005

U.S. Environmental Protection Agency (EPA),
Technology Transfer Network, Carbon
tetrachloride, 56-23-5 (web accessed 2013)

Where Can I Get More Information?

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