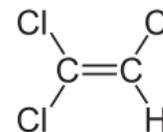

FREQUENTLY ASKED QUESTIONS ABOUT TRICHLOROETHYLENE



What is trichloroethylene?

Trichloroethylene (TCE) is a colorless, nonflammable liquid with a characteristic chloroform-like odor. It is practically insoluble in water and evaporates quickly. The most important use of trichloroethylene is the degreasing of metal parts in the automotive and metal industries. TCE is used in many consumer products, including typewriter correction fluids, paint removers, paint strippers, adhesives, spot removers, cleaning fluids for rugs, and metal cleaners.

How might I be exposed to trichloroethylene?

Most exposures to trichloroethylene occur in the workplace through breathing vapors or direct contact with the liquid. Exposure of the general public occurs mainly through breathing industrial emissions, drinking, swimming, or showering in water that has been contaminated, or using consumer products containing trichloroethylene. Low levels of TCE ranging from 0.25 to 0.31 parts per billion (ppb) have been detected in many drinking water samples throughout the United States. TCE has been detected in small concentrations in many processed foods as a result of its use in cleaning equipment. A monitoring study conducted by the U.S. Food and Drug Administration found the following trichloroethylene concentrations in various food items: chocolate chip cookies, 2.9 ppb; plain granola, 8 ppb; cheddar cheese, 3.1 ppb; peanut butter, 1.7 ppb; butter, 12 ppb; evaporated milk, 1.7 ppb; and cooked pork sausage, 5.1 ppb.

What happens to trichloroethylene when it enters the environment?

Most of the trichloroethylene released into the environment comes from its use to remove grease from metals. It can also enter the air and water when it is disposed of at waste sites. It evaporates easily, but can stay in the soil and in groundwater for a long time. It breaks down in the air in the presence of sunlight. TCE present in surface waters or on soil surfaces evaporates into the air. It is highly mobile in soil and susceptible to leaching into the groundwater.

How does trichloroethylene get into and leave the body?

Trichloroethylene enters the body by breathing air or drinking water containing it. About half the amount breathed in gets into the bloodstream, the rest is breathed out. Most of ingested trichloroethylene is absorbed into the blood. If liquid TCE comes in contact with the skin, some of it can enter the body, although not as easily as by breathing or swallowing it. Once in the blood, the liver changes much of the TCE into other chemicals. The majority of these breakdown products leave the body in urine within a day.

How can trichloroethylene affect my health?

Inhaling TCE vapors at very high concentrations may cause irregular heartbeat, heart functions failure, unconsciousness, and death. Inhaling moderate amounts in the air may cause headaches, dizziness, poor coordination, difficulty concentrating, facial numbness, and lung irritation. Consumption of alcohol and exposure to trichloroethylene at the same time can result in “degreaser’s flush”, a temporary redness and itching of the back, neck, and face. Long term exposures at high concentrations may cause liver and kidney damage and changes in heartbeat. Skin contact with trichloroethylene can cause skin rashes.

How likely is trichloroethylene to cause cancer?

Trichloroethylene is classified as a Group 1 carcinogen by the EPA and IARC (IARC), which means that it is carcinogenic to humans.

Are there any reproductive and developmental effects from exposure to trichloroethylene?

There are no reports of adverse reproductive effects in humans exposed to trichloroethylene in their workplace. No increased incidence of congenital malformations has been detected in babies born to mothers occupationally exposed to TCE. Data from experimental animal studies reveal no adverse effects on the reproductive system or fertility. Although TCE has the ability to cross the placenta and possibly expose the fetus, fetal toxicity has not been observed in experimental animals. There are some reports of an increased number of children born with heart defects whose mothers consumed water contaminated with TCE for several years. However, these studies are not conclusive because other chemicals were also present in the water and may have contributed to these effects. Also, the levels of trichloroethylene in water were very high.

Is there a medical test to show whether I have been exposed to trichloroethylene?

There are some tests that can show if a person has been exposed to high levels of TCE within the past 24 hours. Blood and urine tests can also show the breakdown products of TCE. However, these breakdown products cannot be measured in the blood or urine when people have been exposed to low levels of trichloroethylene over a long period of time.

Exposure to other similar chemicals can also produce the same breakdown products. Therefore, their detection is not absolute proof of exposure to trichloroethylene.



What is the air quality standard for trichloroethylene?

The World Health Organization (WHO) has established an air quality guideline of 2.3 $\mu\text{g}/\text{m}^3$ for trichloroethylene associated with an excess lifetime cancer risk of 1 in 1,000,000. The Occupational Safety and Health Administration (OSHA) has established the permissible exposure limit (PEL) of 100 parts per million (ppm) trichloroethylene in workplace air. This limit is based on an eight-hour time-weighted average for a 40-hour workweek. A short-term exposure limit (STEL) has been established at 200 ppm for a 15-minute exposure.

What is the drinking water standard for trichloroethylene?



EPA sets the standards for public drinking water. These standards or limits are known as Maximum Contaminant Levels or MCLs. EPA has promulgated an MCL of 5 ppb in the public drinking water supply for trichloroethylene. This standard was derived based on its classification as a probable human carcinogen and based on the assumption that a person drinks 2 liters of water per day for 70 years. Consuming water with levels of trichloroethylene consistently above the MCL over a long period of time (many years) may increase the risk of adverse health effects, especially cancer. Based on extrapolation of data from animal studies and theoretical models, it is

estimated that a lifetime exposure to drinking water containing trichloroethylene at 5 ppb may increase the risk of 2 additional cases of cancer in a population of one million people.

What does VDH recommend if high levels of trichloroethylene are found in drinking water?

VDH recommends installing a whole-house charcoal filtration device to remove trichloroethylene contamination from drinking water.

Where can my physician or I get more information?

If you need further information regarding the health effects of trichloroethylene, please contact the Virginia Department of Health, Division of Environmental Epidemiology, 101 N. 14th Street, Richmond, VA 23219, or call (804) 864-8182. If you are interested in finding information on corrective measures to reduce trichloroethylene in drinking water, call the Virginia Department of Health, Office of Drinking Water at (804) 864-7500.

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