

Trichloroethylene

(TCE)

(try- klor'oh eth'uh- leen)

Answers to Frequently Asked Health Questions

What is TCE?

TCE is a man-made chemical that is not naturally found in the environment. TCE is a non-flammable (does not burn), colorless liquid with a somewhat sweet odor and sweet, "burning" taste. It is mainly used as a cleaner in industry to remove grease from metal parts. TCE can also be found in common household items such as glues, paint removers, typewriter correction fluids and spot removers.

The biggest source of TCE in the environment comes from evaporation (changing from a liquid into a vapor/gas) when industries use TCE to remove grease from metals or when we use common household products that contain TCE. It can also contaminate soils and groundwater (underground drinking water) as the result of spills or improper disposal.

What happens to TCE in the environment?

- Upon contact with the air, TCE quickly evaporates and breaks down in the sunlight and oxygen.
- TCE quickly evaporates from the surface waters of rivers, lakes, streams, creeks and puddles.
- If large amounts of TCE are spilled on the ground, some of it will evaporate and some of it may leak down into the soils. When it rains, TCE can be carried through the soils and into the groundwater (drinking water).
- When TCE-contaminated groundwater is in an **anaerobic** (without oxygen) environment and with time, it will break down into different chemicals such as 1,2 Dichloroethene (1,2 DCE) and Vinyl Chloride (VC).

- TCE does not build up in plants and animals.
- TCE found in foods is believed to come from TCE contaminated water used in food processing or from food processing equipment cleaned with TCE.



How does TCE get into your body?

- Breathing (Inhalation): TCE can get into your body by breathing air contaminated with TCE vapors. The vapors can be released from the industrial use of TCE, from using household products that contain TCE, or by TCE contaminated water evaporating in the shower.
- Drinking (Ingestion): TCE can get into your body by drinking TCE contaminated water.
- Skin (Dermal): Small amounts of TCE can get into your body through skin contact. This can take place when using TCE as a cleaner-degreaser or by contact with TCE contaminated soils.

Can TCE make you sick?

Yes, you can get sick from TCE. But getting sick will

depend on the following:

- 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 does TCE affect your health?

Breathing (Inhalation):

- Breathing high levels of TCE may cause headaches, lung irritation, dizziness, poor coordination (clumsy) and difficulty concentrating.
- Breathing very high levels of TCE for long periods may cause nerve, kidney and liver damage.

Drinking (Ingestion):

- Drinking high concentrations of TCE in the water for long periods may cause liver and kidney damage, harm the immune system and damage fetal heart development in pregnant women.
- It is uncertain whether drinking low levels of TCE will lead to adverse health effects.

Skin (Dermal) Contact:

- Short periods of skin contact with high levels of TCE may cause skin irritation and rash.

Does TCE cause cancer?

In September of 2011, the U.S. EPA revised their Integrated Risk Information System (IRIS) numbers for the development of cancer and non-cancer health effects associated with exposure to Trichloroethylene (TCE). The revised IRIS document classifies TCE as being "carcinogenic to humans." This classification is used when there is evidence linking human exposure to toxic chemicals and the development of cancers. Studies of exposed workers in industries using TCE indicate a link between long-term exposure to TCE in the workplace and the development of cancers of the kidney, liver, and immune-system (Non-Hodgkin Lymphoma). The International Agency for Research on Cancer (IARC) also now lists TCE as a human cancer-causing agent.

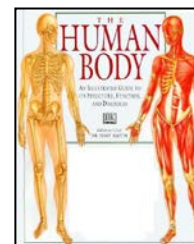
The National Toxicology Program's 13th Report on Carcinogens (2015) lists TCE as *Reasonably Anticipated to be a Human Carcinogen*.

What are the Non-Cancer Human Health Effects identified in the IRIS study?

Based on laboratory animal studies, supported by a limited number of studies of human populations exposed to TCE in the environment, IRIS identified a number of non-cancer health effects linked to drinking TCE-contaminated water or breathing TCE-contaminated indoor air. The possible health effects from exposure to TCE depend on the levels of TCE in the air or water, the length of the exposure, and whether or not sensitive individuals are exposed. Women who are in their first 8 weeks of pregnancy are most sensitive to TCE exposures. TCE exposures may increase the risk of heart malformations in the developing fetus. Exposure to TCE during development may also affect the immune system and increase susceptibility to infections.

TCE in the human body:

When chemicals enter the human body, they typically get broken down and eliminated through normal bodily functions. Some of the break down products (called metabolites) of TCE can be measured in your blood or urine. However, some of the same metabolites in your blood and urine can also be produced as a result of exposure to similar chemicals and other sources (diet, medications, environment, etc.). For this reason, blood and urine testing is not always an accurate measure of exposure to TCE.



It is important to note TCE and TCE's metabolites usually leave the body shortly after exposure, so the testing would only be useful for recent exposures. Also, testing may not be useful or reliable in determining whether people have been exposed to low-doses of TCE or whether they will experience any harmful health effects.

Has the federal government made recommendations to protect human health?

The federal government develops regulations and recommendations to protect public health and these regulations can be enforced by law.

Recommendations and regulations are periodically updated as more information becomes available. Some regulations and recommendations for TCE follow:

- On 09/28/2011 the U.S. EPA revised their Integrated Risk Information System (IRIS) numbers for Trichloroethylene (TCE) (CASRN 79-01-6) -- see below reference section for link --
- The Environmental Protection Agency (EPA) has set a maximum contaminant level (MCL) for TCE in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5.0 parts of TCE per billion parts water (5.0 ppb).
- The Occupational Safety and Health Administration (OSHA) have set an exposure limit of 100 ppm (or 100 parts of TCE per million parts of air) for a healthy adult, 8-hour workday, 40-hour workweek.
- The EPA has developed regulations for the handling and disposal of TCE.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1997. Toxicological profile for TCE (electronic at)

<http://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=173&tid=30>

Report on Carcinogens, Thirteenth Edition; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, 2015 (electronic at <http://ntp.niehs.nih.gov/pubhealth/roc/roc13/index.html#T>)

U.S. EPA Integrated Risk Information System (IRIS) for Trichloroethylene (TCE) (CASRN 79-01-6)

<http://www.epa.gov/iris/subst/0199.htm>

Where Can I Get More Information?

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246 N. High Street
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