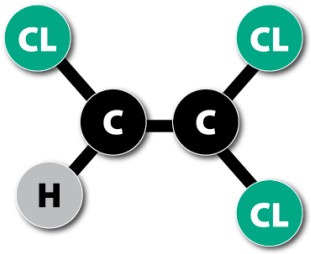
FACT SHEET: Trichloroethylene (TCE)



Note: µg/m^3 = micrograms per cubic metre of air. A microgram is one millionth of a gram.

What is Trichloroethylene (TCE)?

TCE is a clear, colourless liquid used mainly for degreasing of metal parts in the automotive and metal industries. It can also be found in some household products, such as glues, adhesives, paint removers, spot removers, rug cleaning fluids, paints, metal cleaners and typewriter correction fluid.

TCE naturally breaks down in the environment; one of the breakdown products is known as vinyl chloride which is also a colourless gas. At certain concentrations, TCE and vinyl chloride have the potential to cause adverse health effects including cancer. The Ministry of Environment, Conservation and Parks (MECP) consider TCE and vinyl chloride to be contaminants.

How does TCE get into the environment?

The largest source of TCE in the environment is through air emissions from factories that use it to remove grease from metals. TCE can also be found in groundwater and soil if it is improperly disposed of or leaks into the ground. TCE evaporates easily but can concentrate in indoor air and stay in soil and groundwater for long periods of time.

How can I be exposed to TCE?

Aside from workers with occupational exposure, the most common sources of exposure to TCE for the general population are through air and drinking water.

The potential route of exposure of residents to TCE in the affected areas is not through the outdoor air which does not have elevated levels of TCE, but rather through indoor air. If TCE is present in the groundwater or soil underneath buildings, it has the potential to evaporate, enter the soil vapour (air spaces between soil particles), and migrate through building foundations into the building's indoor air. This process is called "soil vapour intrusion." Through this process, TCE can concentrate in indoor air, mainly in basements and areas with little ventilation.

What are the health risks associated with TCE exposure?

As with exposure to any chemical, a person's health risk depends on a number of factors, including:

- How much TCE an individual was exposed to (the dose);
- How long the exposure lasted (the duration);
- How the person was exposed (breathing, drinking, eating or skin contact);
- Other factors associated with the individual (such as age, health, lifestyle choices, family traits, and other chemicals the person is exposed to).

Health risks can be categorized into acute effects and chronic/sub-chronic effects. Acute effects may occur after short-term exposure (e.g. minutes, a few days) to very high concentrations of TCE (e.g. concentrations in the hundreds of thousands of µg/m^3 or greater). Some symptoms of acute exposure can include drowsiness, decreased memory and perception, visual effects and anesthesia.

Chronic effects may occur after long-term exposure (e.g. years) and sub-chronic effects may occur after intermediate-term exposure (e.g. months). These effects include cancer (from chronic exposure) and non-cancer effects (from sub-chronic or chronic exposure). The main concern with TCE exposure is the risk of cancer. Overall, studies in humans and animals are highly suggestive of an increased risk for cancer in people who are exposed to elevated levels of TCE over long periods of time (e.g. occupational exposure in workers exposed to extremely high levels of TCE such as 20,000 µg/m^3 or greater). Cancers that have been associated with exposure to TCE include kidney, liver and lymphoid tissue cancers.

The risks of cancer associated with chronic exposures to low levels of TCE are as follows:

- An air concentration level of TCE at 0.5 µg/m^3 corresponds to a 1 in one million risk of cancer over a lifetime (70-year exposure).
- An air concentration level of TCE at 5 µg/m^3 corresponds to a 1 in one hundred thousand risk of cancer over a lifetime (70-year exposure).
- An air concentration level of TCE at 50 µg/m^3 corresponds to a 1 in ten thousand risk of cancer over a lifetime (70-year exposure).

Chronic and sub-chronic effects, other than cancer, are less understood and research is ongoing. Non-cancer effects may include those to the central nervous system, kidney, liver, respiratory, developmental and reproductive systems. However, it is generally recognized that cancer is the most common health outcome.

What are typical concentrations of TCE in indoor air?

Between 2009-2011, a survey of indoor air quality in Canadian residential dwellings with no known exposures of TCE was conducted in various locations throughout Canada. This study reported that an average of 0.21 µg/m^3 TCE was detected in residential indoor air. The presence of TCE in indoor air may be due to the release of TCE from the use and presence of products in the building.

In 2010, The World Health Organization reported that indoor air concentrations of TCE in residential dwellings without known sources of TCE in the environment have been found to be approximately 1 µg/m^3 or below.

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