

FACT SHEET: Trichloroethylene (TCE)

Note: $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter 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.

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 enter air and groundwater if it is improperly disposed of or leaks into the ground. It evaporates easily but can stay in the soil and in groundwater for an extended period 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. This is due to the presence of TCE in the groundwater underneath the homes. TCE can evaporate from the contaminated groundwater, 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."

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 are those that 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 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) or greater). Symptoms of acute exposure can include drowsiness, decreased memory and perception, visual effects and anesthesia.

Chronic effects are those that occur after long-term exposure (e.g. years). Sub-chronic effects are those that 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. workers exposed to extremely high levels of 20,000 µg/m³). Cancers that have been associated with exposure to TCE include kidney, liver and lymphoid tissue cancers.

Chronic and sub-chronic effects, other than cancer, are less understood and research is ongoing. Potential effects 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?

Recent indoor air surveys of different chemicals, including TCE, in Quebec City, Windsor, Ottawa and Regina have reported typical (i.e. median) concentrations of TCE ranging from 0.06 to 0.44 µg/m³ (Health Canada, 2010). These studies were conducted in homes without any industrial source of TCE exposure.

How is testing handled for TCE?

Please contact the Ministry of the Environment to inquire about TCE testing. Inquiries can be directed to Kelly Andreoli, District Engineer, Ministry of the Environment at (705) 755-4326.

For further information, please contact:

Peterborough County-City Health Unit, Health Hazards Prevention and Management Program
705-743-1000