

The ToxGuide™ is developed to be used as a pocket guide. Tear off at perforation and fold along lines.

Sources of Exposure

General Populations

- Exposure occurs principally by inhalation of low levels in air or ingestion of very low levels in water. These levels may be higher for people living near hazardous waste sites.
- Very small amounts of 1,1,1-trichloroethane have been found in some food items.
- People who still have at home consumer products such as glues, cleaners, and aerosol sprays that have 1,1,1-trichloroethane may be exposed to it by breathing vapors or by skin contact with the liquid.
- Intentional exposure can occur via sniffing household chemicals in an attempt to get “high”.

Occupational Populations

- Exposure can occur during the manufacture of 1,1,1-trichloroethane for export or as a chemical intermediate in the manufacture of hydrofluorocarbons.

Toxicokinetics and Normal Human Levels

Toxicokinetics

- 1,1,1-Trichloroethane is rapidly and efficiently absorbed by the inhalation route.
- Pulmonary absorption of 1,1,1-trichloroethane is saturable.
- Animal data indicate a rapid and complete absorption through the gastrointestinal tract.
- Liquid 1,1,1-trichloroethane is absorbed to a lesser extent through the skin.
- Data in animals suggest that 1,1,1-trichloroethane would probably distribute preferentially to fatty tissues.
- 1,1,1-Trichloroethane is poorly metabolized.
- <10% of the absorbed dose is metabolized by P-450 enzymes to trichloroethanol and trichloroacetic acid, which are excreted in the urine.
- Most of the absorbed 1,1,1-trichloroethane is rapidly excreted as parent compound in expired air.
- 1,1,1-Trichloroethane does not accumulate in the body.

Normal Human Levels

- Mean of 0.34 ppb ($\mu\text{g/L}$) in blood of non-occupationally exposed subjects in a national survey in 1994.

Biomarkers/Environmental Levels

Biomarkers

- 1,1,1-Trichloroethane in blood, breath, and urine is a biomarker of exposure to this chemical.
- Trichloroethanol and trichloroacetic acid in urine are non-specific biomarkers of exposure to 1,1,1-trichloroethane, unless exposure to other chemicals can be ruled out.
- Assay for the parent compound must be done soon after exposure; assays of the metabolites are more useful for a longer period after exposure.

Environmental Levels

Air

- Typically 0.1–1.0 ppb in city air in the U.S.; <0.1 ppb in rural air.

Sediment and Soil

- No representative values available due probably to rapid volatilization.

Water

- Usually <1 ppb in surface waters; 0.01–3.5 ppb in drinking water from surface or groundwater sources.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for 1,1,1-Trichloroethane (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™

for

1,1,1-Trichloroethane



CAS# 71-55-6

July 2006

U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry
www.atsdr.cdc.gov

Contact Information:
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Chemical and Physical Information

1,1,1-Trichloroethane is a liquid

- 1,1,1-Trichloroethane is a manufactured organic solvent.
- 1,1,1-Trichloroethane is a colorless liquid that burns easily when it contacts a spark or flame.
- 1,1,1-Trichloroethane is volatile and has a sweet, sharp odor.
- It dissolves slightly in water and is miscible with most common organic solvents.
- In the past, it was used in industry as a solvent and as a cleaner for metal parts.
- At home, it was an ingredient of cleaners, glues, and aerosol sprays.
- Currently, limited amounts of 1,1,1-trichloroethane are produced for export.

Routes of Exposure

- Inhalation** – Primary route of exposure for the general population, people near waste sites, and workers involved in the manufacture or use of 1,1,1-trichloroethane.
- Oral** – Route of exposure at or near waste sites via ingestion of contaminated media. Certain foods also contain small amounts of 1,1,1-trichloroethane.
- Dermal** – Route of exposure for workers involved in the manufacture and use of 1,1,1-trichloroethane and for people near waste sites via skin contact with contaminated media.

1,1,1-Trichloroethane in the Environment

- Most 1,1,1-trichloroethane released into the environment moves to the air, where it can last for about 6 years.
- 1,1,1-Trichloroethane in air can travel to the ozone layer where it undergoes photolysis.
- Much of 1,1,1-trichloroethane released to surface water or soil evaporates rapidly to the air; the remaining portions can be broken down by microorganisms.
- 1,1,1-Trichloroethane is expected to be mobile in soil and readily leach into groundwater.
- 1,1,1-Trichloroethane does not accumulate in animals or in plants.

Relevance to Public Health (Health Effects)

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- An MRL of 2 ppm has been derived for acute-duration inhalation exposure (≤ 14 days).
- An MRL of 0.7 ppm has been derived for intermediate-duration inhalation exposure (15–364 days).
- No chronic-duration inhalation MRL was derived for 1,1,1-trichloroethane.

Oral

- An MRL of 20 mg/kg/day has been derived for intermediate-duration oral exposure (15–364 days).
- No acute- or chronic-duration oral MRLs were derived for 1,1,1-trichloroethane.

Health Effects

- High levels of 1,1,1-trichloroethane in the air can cause dizziness, lightheadedness, and loss of coordination.
- Very high concentrations of 1,1,1-trichloroethane can lower blood pressure and damage the myocardium.

- Skin contact with the liquid can produce effects ranging from mild irritation to chemical burns, as exposure duration increases.
- High levels of 1,1,1-trichloroethane in the air can cause eye irritation.
- Based on no data in humans and inadequate data in animals, the EPA has determined that 1,1,1-trichloroethane is not classifiable as to human carcinogenicity.
- NTP has not classified 1,1,1-trichloroethane for human carcinogenicity.

Children's Health

- Children exposed to 1,1,1-trichloroethane probably would experience the same effects as adults.
- It is not known whether children are more susceptible to 1,1,1-trichloroethane poisoning than adults.