

# 1,1,1-TRICHLOROETHANE

## Overview

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1,1,1-Trichloroethane is an industrial solvent widely used to degrease machines, as a dye in the textile industry, and as an additive in aerosols (#EPA). It was set to be phased out with production ceasing in 2002 because it thins the ozone layer, but it is still used under certain essential applications (#Scorecard).

## Just the facts

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### Physical Information

Name:

Synonyms/Trade Names: methylchloroform, methyltrichloromethane, trichloromethylmethane, ??trichloromethane, Chloroethene, Methylchloroform, Aerothene TT, Algylen, Alpha-T, Chlorten, Gemalgene, Genklene, Dowclene, Solvent 111, Trichloran, Inhibisol

Chemical Formula:  $\text{CH}_3\text{CCl}_3$

Use: solvent

Source: synthetic chemistry

Recommended daily intake: none

Absorption: dermal, inhalation

Toxicity/symptoms: inhalation causes symptoms similiar to being "drunk" and dermal exposure causes skin irritation

### Chemical Structure

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## Chemical Description

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1,1,1-Trichloroethane is a synthetic colorless liquid chemical at room temperature that is soluble in most organic solvents - Chemical Profiles and External Links

## Production

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Production of 1,1,1-trichloroethane has been drastically reduced in the last quarter century. Following the 1990 amendments to the Clean Air Act and the Montreal Protocol, production of 1,1,1-trichloroethane was to be phased out incrementally with the goal of ceasing production in 2002, however somewhere between 100-500 million pounds of 1,1,1-trichloroethane continued to be produced in 2002 (#ATSDR Toxicological Profile). Production has continued to be phased out with 125 million pounds produced in 2005 (NOTE: some places produce and store on-site and those numbers are not known exactly) (#ATSDR Toxicological Profile). It is only used currently for essential applications (#ATSDR Toxicological Profile)

The most common production method used to produce 1,1,1-trichloroethane is a reaction between hydrochloric acid and vinyl chloride which yields 1,1-dichloroethane which is then followed by either thermal or photochemical chlorination (#ATSDR Toxicological Profile).

## Use

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1,1,1-trichloroethane is a versatile high-volume industrial and household solvent used in many industries and found in many products (#ATSDR ToxFAQs). It is used industrially in numerous industries to degrease metal parts and dissolve other solvents - Chemical Profiles and External Links as well as being used extensively in household products. A random survey of goods in 1992 found 1,1,1-trichloroethane in 216 of 1,159 products but that number should be expected to be smaller today as the usage has dropped.

Specifically, it has been used in the following products

- \* a [solvent|solvents] for adhesive products (including food adhesives)
- \* metal degreasing
- \* [pesticide|pesticides] production

- \* textile processing
- \* cutting fluids
- \* cutting oil formulations
- \* lubricants
- \* aerosols
- \* shoe polish
- \* spot cleaners
- \* printing inks

1,1,1-trichloroethane is also used industrially for cleaning and degreasing purposes on the following products

- \* electric components
- \* missile hardware
- \* paint masks
- \* photographic film
- \* printed circuit boards
- \* generators
- \* Switchgears
- \* Semiconductors
- \* food packing equipment
- \* printing messes

It is classified as a "hazardous material" by the EPA and guidelines and procedures for its disposal must be followed.

## **Health Effects**

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Exposure to 1,1,1-trichloroethane is most likely to be from dermal or inhalation, and there is not enough information on the intestinal absorption of 1,1,1-trichloroethane. It causes dizziness, light-headedness, nervous system depression, and skin irritation.

## **Inhalation**

1,1,1-Trichloroethane is one of the many Solvents - Chemical Profiles and External Links that people intentionally inhale and is associated with "sudden sniffing death syndrome" with numerous deaths attributed to sniffing this solvent in the 1960s (#ATSDR Toxicological Profile). Deaths resulting from occupation inhalation exposure

have also been recorded in the past. Breathing air contaminated with 1,1,1-trichloroethane will make one dizzy and lightheaded and possibly lose consciousness but the symptoms will abate quickly once one begins to breath fresh, uncontaminated air again (#ATSDR ToxFAQs). Breathing high levels of 1,1,1-trichloroethane will cause one to lose consciousness, have decreased blood pressure, and potentially cease breathing. It is also thought to have adverse effects on liver function.

### **Dermal**

It is a skin irritant

It is not thought to be a carcinogen

### **Environmental Effects**

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The majority of 1,1,1-trichloroethane that enters the environment does so into the air from human industrial activity where it stays for around six years. It is an o-zone depleting substance that was supposed to be phased out of production in 2002-2005 and is only currently used for essential applications

1,1,1-trichloroethane has been found at 823 of the 1,662 hazardous waste sites on the EPA's National Priorities List

It evaporates quickly from water and does not bioaccumulate

Source : <http://www.toxipedia.org/display/toxipedia/1%2C1%2C1-Trichloroethane>