

Birth Defect Research for Children, Inc.

Fact Sheet

Trichloroethylene (TCE)

What is it? Trichloroethylene (TCE) is a stable, low-boiling, colorless, photo reactive liquid with a chloroform-like odor. TCE and products containing it have a wide range of applications:

- Solvent for vapor degreasing of metals
- Extraction solvent for oils, fats, and waxes
- Dry cleaning fluid
- Refrigerant and heat exchange liquid
- Fumigation
- Typewriter correction fluid
- Paint removers
- Spot removers
- Cleaning and drying of electronic parts
- Glue solvent
- Textile processing
- Flushing liquid oxygen systems

Common trade names for industrial TCE include *Triklone* (ICI Chemicals & Polymers Ltd.), *Neu-Tri* (Dow Chemical Co.), and *Vaposol AMC* (Elm Trading & Marketing). Products containing TCE have numerous trade names, the most notable and commonly used product being *Liquid Paper*.

How does it enter the environment? Due to its hazardous nature, TCE has been banned for use as a solvent in some countries. In the United States, however, the FDA only prohibits use of TCE in food, drugs and cosmetics. TCE continues to be widely used in industrial, home and office applications. Since TCE is toxic by inhalation, and evaporates easily, once the chemical is released from its container, it enters the environment. Also, once TCE enters the soil, chemical breakdown slows substantially, allowing the agent to leach into surface and ground water supplies. Since degreasing of metals is a common use of the agent, grease waste products containing TCE slow the normal evaporation breakdown of TCE (typically requiring more than a week) and allows the chemical to stay in the soil and water as a pollutant for a

much longer period of time. Years of improper and continuous disposal of industrial waste products containing TCE resulted in TCE pollution being found in 861 of the EPA's 1428 National Priorities List hazardous waste sites (a.k.a. "Superfund" sites).

Human Exposure: Human exposure occurs when TCE is inhaled, touched, eaten or drunk. One of the early uses for TCE (in vapor form) was as a surgical anesthetic. Consequently, with just brief exposure, inhalation of TCE vapors result in dizziness and sleep. Extended exposure to TCE vapors can result in loss of consciousness or death.

In industrial use, over 400,000 American workers have direct and routine exposure to TCE. Persons living near industries using TCE in their processes or hazardous waste sites can be exposed to air and water pollution containing dangerous levels of TCE (greater than 1ppm for air and greater than .007 ppm for water). Drinking water wells located near waste sites contaminated with TCE are major sources for collateral human exposure.

Many common household and office products contain TCE. These items can include paint, dry cleaning products, correction fluid, liquid paint stripper, spot remover, rug and metal cleaner. Use of these products can pose a direct exposure risk to TCE.

When TCE enters the body, most of the chemical will be absorbed into the bloodstream and cycled to the liver for breakdown. Low, infrequent exposure to TCE usually results in the majority of the breakdown products being urinated out in a day. However, some of the TCE and its breakdown products can be stored in fat deposits for longer periods and may build up to toxic levels with constant, yet low-level exposure.

Acute Health Effects: The following are acute health effects of TCE:

- Death from inhalation or ingestion of large amounts of TCE
- Stroke
- Loss of consciousness
- Headaches
- Involuntary sleep
- Dizziness

Chronic Health Effects: Exposure to TCE may result in these chronic problems:

- Liver enlargement
- Kidney damage
- Facial nerve damage
- Arthritis
- Asthma
- Respiratory allergies
- Skin rashes and allergies
- Urinary tract disorders
- Hearing and speech impairment
- Diabetes
- Anemia and other blood disorders

Reproductive Health Effects: A number of studies have suggested a linkage between TCE exposure and birth defects. This link has been most clearly seen in case studies where expectant mothers drank water from wells and municipal water supplies contaminated with TCE. These include:

- Defects and suppressed development of the heart
- Respiratory system defects
- Eye defects
- Neural tube defects
- Oral clefts
- Hearing and speech impairment

Carcinogenic Health Effects: While the evidence is not conclusive that TCE is the sole causal factor, statistical data have been compiled during recent studies suggesting a link between TCE exposure and childhood leukemia, as well as other cancers.

Controlling Risk of Exposure: The EPA standard for the maximum safe level of TCE is 5 parts TCE per 1 ppb water. This standard, however, only applies, to community water supplies serving 25 or more persons. To protect against direct exposure and to prevent collateral TCE contamination of ground water supplies (by irrigation, for example), wells and surface water sources should

be tested to insure that the water meets EPA standards.

To prevent industrial exposure, companies should follow OSHA rules for storing and handling TCE. This includes having workers wear OSHA-approved protective clothing and gloves, and using respirators.

At home or in the office, products containing TCE should be used only in a well-ventilated room for very short periods of time, and precautions should be taken to avoid direct skin and oral exposure.

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