Trichloroethylene

*Formula:* \( \text{C}_2\text{HCl}_3 \)

**Physical Data**

- **Boiling point:** 86.7°C
- **Melting point:** -84.8°C
- **Vapour Pressure:** 61 mm (at 20°C)
- **Specific Gravity:** 1.463
- **Vapour Density:** 4.5
- **Appearance:** colorless liquid

**Hazardous Decomposition**

- Carbon Dioxide
- Carbon Monoxide
- Hydrogen Chloride Gas
- Phosgene Gas

**Incompatibles**

- Oxidizing Agents
- Reducing Agents
- Strong Bases
- Aluminum
- Magnesium
- Sensitive to Light

**Protective Equipment**

**Eyes**

- Wear chemical resistant safety goggles.

**Skin**

- Wear chemical resistant gloves and other protective clothing.
Respiratory

- Wear appropriate NIOSH/MSHA approved respirator.

Special Precautions

- Storage:
  1. Keep tightly closed.
  2. Store in a cool, dry place.

- Handling:
  1. Avoid contact.

- Ventilation:
  1. Use only in a chemical fume hood.

- Severe irritant.
- Harmful vapour.
- Carcinogen
- Mutagen

Toxicity

Irritation Data

- SKN-RBT  2 mg/24 hour Severe
- EYE-RBT  20 mg/ 24 hour Moderate

Toxicity Data

NIOSH considers trichloroethylene (TCE) to be a potential occupational carcinogen and recommends a REL(recommended exposure limit) of 2 ppm (as a 60-minute ceiling) during the usage of TCE as an anesthetic agent and 25 ppm (as a 10-hour TWA) during all other exposures.

- ORL-HMN LDLo  7 gm/kg
- IHL-MAN LCLo  2900 ppm
- ORL-RAT LD50  5650 mg/kg
- IPR-RAT LD50  1282 mg/kg
- ORL-MUS LD50  2402 mg/kg
- IHL-MUS LC50  8450 ppm/4hour
- SCU-MUS LD50  16 mg/kg
- IVN-MUS LD50  33900 µg/kg
- IPR-DOG LD50  1900 mg/kg
- SKN-RBT LD50  >20 gm/kg
Toxicity Data

- **Sense Organs and Special Senses** (Other eye effects)
- **Behavioral** (Somnolence, Hallucinations, Distorted perceptions)
- **Vascular** (Tumors)
- **Lungs, Thorax, or Respiration** (Tumors)
- **Gastrointestinal** (Other changes)
- **Liver** (Jaundice, Other or unclassified; Liver function tests impaired; Tumors)
- **Blood** (Lymphoma, including Hodgkin's Disease)
- **Skin and Appendages** (Tumors)
- **Paternal Effects** (Spermatogenesis)
- **Effects on Fertility** (Post implantation mortality)
- **Effects on Embryo or Fetus** (Fetotoxicity)
- **Specific Developmental Abnormalities** (Central nervous system, Musculoskeletal system, Urogenital system, Other developmental abnormalities)
- **Tumorigenic** (Carcinogenic by RTECS criteria)

Health Effects:

- **Inhalation**: Harmful if inhaled. High concentrations are extremely destructive to tissues of the mucous membranes and the upper respiratory tract.

- **Skin/ Eye**: Harmful if absorbed through skin. High concentrations are extremely destructive to tissues of the skin and eyes. May cause dermatitis.

- **Symptoms of Exposure**: Burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure to and/or Consumption of Alcohol may increase toxic effects.

- **Ingestion**: Harmful if swallowed. Ingestion can cause Gastrointestinal disturbances, damage to the kidneys, Nausea, dizziness and headache, narcotic effects.

- **Chronic Effects**: Carcinogen, may alter genetic material.

- **Target Organs**: Central Nervous System, Liver, Kidneys, Heart, and Lungs

First Aid:

- **Inhalation**: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.

- **Skin**: Immediately flush skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes.

- **Eye**: Immediately flush eyes with copious amounts of water for at least 15 minutes. Separate eyelids with fingers to assure adequate flushing.
- **Ingestion:** Wash out mouth with water provided person is conscious. Call a physician immediately.

**PEL/TWA**

**PEL**

- **OSHA PEL/TWA 8hour** 100 ppm

**TWA**

- **TLV** 50 ppm
- **STEL** 200 ppm
- **MSHA Standard TWA** 100 ppm

**Fire Hazard Data**

- **Flash point:** 295°F (156°C)
- **Explosion Limits:** upper-10.5% (25°C) lower-8.0% (25°C)
- **Autoignition Temperature:** 770°F (409°C)
- **Extinguishing Media:** Non combustible. Use extinguishing media appropriate for surrounding fire.
- **Special Fire-Fighting Procedures:** Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
- **Unusual Fire Hazards:** Emits toxic fumes under fire conditions.
- **NFPA:** Information not given by the manufacturer.

**Disposal**

**Spill Procedures:**

- Evacuate area.
- Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.
- Absorb on sand or vermiculite.
- Place in a closed container for disposal.
- Ventilate area.
- Wash spill site after material pickup is complete.

**Disposal:**

- Dispose as Toxic and carcinogenic chlorinated waste.