1. **PRODUCT IDENTIFICATION**

**Name**: Trichloroethylene  
**Synonyms**: 1,1,2-trichloroethylene, acetylene trichloride, TCE & trade names  
**CAS#**: 79-01-6  
**Europe EC#**: 201-167-4  
**Product Uses**: Cleaning solvent for vapour degreasing

<table>
<thead>
<tr>
<th>EMERGENCY INFORMATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canada</strong> Call CANUTEC (collect)</td>
<td>(613) 996-6666</td>
</tr>
<tr>
<td><strong>U.S.A.</strong> Call CHEMTREC</td>
<td>(800) 424-9300</td>
</tr>
</tbody>
</table>

2. **HAZARDS**

<table>
<thead>
<tr>
<th>GHS Class (Category)</th>
<th>skin irritant (2)</th>
<th>eye irritant (2)</th>
<th>STOT (3)</th>
<th>carcinogen (1B)</th>
<th>aquatic chronic (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal Words</strong></td>
<td>WARNING</td>
<td>WARNING</td>
<td>WARNING</td>
<td>DANGER</td>
<td>no Signal Word</td>
</tr>
<tr>
<td><strong>Hazard Statements</strong></td>
<td>causes skin irritation (H315)</td>
<td>causes serious eye irritation (H319)</td>
<td>may cause drowsiness or dizziness (H336)</td>
<td>may cause cancer (H330)</td>
<td>toxic to aquatic life with long-lasting effects (H411)</td>
</tr>
</tbody>
</table>

**GHS Precautionary Statements for Labelling**

- P261 P271 Avoid breathing vapour. Use only in a well ventilated area
- P262 P264 Do not get in eyes, on skin or on clothing. Wash thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P280 Wear eye protection, protective gloves and clothing of butyl or “Viton”.
- P273 P391 Avoid release to the environment. Collect spillage.

**Canada – WHMIS**  
**Key**:

- B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C
- D 1 – Immediately Toxic, D 2 – Chronic Toxicity
- C – Oxidising Substance, E – Corrosive, F – Reactive Substance

3. **COMPOSITION**

<table>
<thead>
<tr>
<th>%</th>
<th>TWAEV / TLV ppm / mg/m³</th>
<th>LD₅₀ (mg/kg) ORAL</th>
<th>LD₅₀ (mg/kg) SKIN</th>
<th>LC₁₀₀ ppm INHALATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,2-trichloroethylene</td>
<td>100%</td>
<td>10 / 55</td>
<td>2400</td>
<td>29,280</td>
</tr>
</tbody>
</table>

4. **FIRST AID**

**SKIN**: Wash with soap & plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.

**EYES**: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if irritation persists.

**INHALATION**: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.

**INGESTION**: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim’s head below hips to prevent inhalation of vomited material. Seek medical help promptly.

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

Please ensure that this SDS is given to, and explained to people using this product.
5. FIRE FIGHTING & FLAMMABILITY

Flash Point will not flash\(^1\)
Autoignition Temperature 410°C / 770°F\(^1\)
Flammable Limits 8% \(\text{v/v}\) – 50% \(\text{v/v}\) only burns in continuous contact with ignition source
Combustion Products hydrogen chloride & chlorine (both corrosive), plus phosgene (highly toxic)
Firefighting Precautions as for substances sustaining fire; firefighters must wear SCBA
Static Discharge will accumulate a static charge, but cannot be ignited by a spark

**NOTE:** Trichloroethylene may ignite in the presence of a welding torch – and then produce highly hazardous vapours.

6. ACCIDENTAL RELEASE MEASURES

Leak Precaution dye to control spillage; dye must be able to contain the entire volume of a bulk storage tank
Handling Spill ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep shovel & store in closed containers for recycling or disposal

7. HANDLING & STORAGE

Store in a cool environment, away from substances named in Part 10 (below).
Avoid breathing product vapour. Product should be used in equipment designed for the purpose (eg: vapour degreaser)
Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear a suitable respirator (see Part 8). **Do not routinely wear a respirator for handling this product! Effective ventilation or engineering control of vapour is the ONLY acceptable way to protect people working with this product.**
When transferring product, if there is any danger of contact, wear appropriate protective clothing.

Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

**NOTE:** Although trichloroethylene is hard to ignite, fire can convert vapours into highly toxic, corrosive gases – Part 5, above.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Standards</th>
<th>Limits</th>
<th>Standards</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontario TWAEV</strong></td>
<td>10 ppm / 55 mg/m(^3)</td>
<td><strong>Ontario STEV</strong></td>
<td>25 ppm / 135 mg/m(^3)</td>
</tr>
<tr>
<td>ACGIH TLV</td>
<td>10 ppm / 55 mg/m(^3)</td>
<td>ACGIH STEL</td>
<td>25 ppm / 135 mg/m(^3)</td>
</tr>
<tr>
<td>OSHA PEL</td>
<td>50 ppm / 270 mg/m(^3)</td>
<td>OSHA STEL</td>
<td>200 ppm / 1080 mg/m(^3)</td>
</tr>
</tbody>
</table>
| Ventilation      | product should only be used in specially designed equipment (eg: vapour degreaser); mechanical ventilation should not be required so long as the equipment is working properly; **using this product in open air and relying on mechanical ventilation is NOT ACCEPTABLE**; a respirator with organic vapour cartridge should be available for escape purposes, should vapour containment fail (**always store respirators in airtight containers** [eg: “Tupperware”] to maintain cartridge “freshness”)
| Hands            | \(\text{Viton®}\) gloves \(\text{other types also protect, always confirm suitability with supplier}\)
| Eyes             | safety glasses with side shields or chemical goggles – **always protect eyes!** |
| Clothing         | impermeable (hands, above) apron, boots, long sleeves, if splashing is anticipated |

**Please ensure that this SDS is given to, and explained to people using this product.**
9. PHYSICAL PROPERTIES

Odour & Appearance clear, colourless, liquid with mild, sweet, pleasant ether odour
Odour Threshold 80ppm to 100ppm well above the TLV; hazardous below odour threshold!
Vapour Pressure 60mmHg / 8kPa (20°C/ 68°F); also 74.5mmHg / 9.9kPa (25°C / 77°F)
Evaporation Rate (Butyl Acetate = 1) 4.5-4.9
Vapour Density (air = 1) 4.5
Boiling Point 87°C / 189°F
Freezing Point -73°C / -99°F; also -85°C / -121°F
Specific Gravity 1.46 (20/20°C)
Water Solubility 1.1 grams/litre (20°C / 68°F)
- in other solvents most organic solvents
Log P<sub>ow</sub> (Octanol/H<sub>2</sub>O partition) 2.53
Viscosity 0.58 centipoise (20°C / 68°F)
pH none - does not yield hydrogen ions in solution
Conversion Factor 1ppm = 5.36mg/m³
Molecular Weight 131

10. REACTIVITY

Dangerously Reactive With strong oxidising agents or reducing agents; reactive metals (eg: Na, K, Ca, Ba)
Also Reactive With strong alkalies forming explosive dichloroacetylene gas; copper reacts with any dichloroethylene present to form explosive acetyclides; reactive with epoxides; unstabilised trichloroethylene may corrode aluminium, copper, zinc in presence of moisture
Chemical Stability stable; will not polymerize except under x-ray or other radiation source, or in the presence of aluminium chloride
Decomposes in Presence of iron, copper, zinc or aluminium at 250-600°C cause decomposition to phosgene; reactive metals cause decomposition to dichloroacetylene
Decomposition Products apart from Hazardous Combustion Products dichloroacetylene
Mechanical Impact not sensitive

11. TOXICITY

Effects, Acute Exposure severely irritating if not removed promptly; chemical burns if contact is prolonged (>5 minutes)
Skin Contact slight no systemic toxic effects by this route
Skin Absorption liquid severely irritating, may damage eyes; vapour irritates some above 160ppm, others at 350ppm blurred vision & other disturbances have been reported following contact with eyes
Eye Contact headache, dizziness, drowsiness, intoxication may occur at above 350ppm; irritating above 1000ppm; high concentrations can lead to unconsciousness & death, numbness & muscle weakness also reported
Inhalation burning sensation in mouth & throat; headache, dizziness, drowsiness, intoxication & vomiting, followed by muscle weakness, plus possible delayed heart, kidney & liver damage
Ingestion LD<sub>50</sub> (oral) 4920 & 5620mg/kg (rat), 2400mg/kg (mouse), >7330mg/kg (rabbit), >5865mg/kg (cat), 5680mg/kg (dog)
LD<sub>50</sub> (skin) 29,280mg/kg (rabbit)
LC<sub>50</sub> (inhaled) 7175, 7440, 8450, 40,920 & 48,730ppm (mouse), 7250 & 26,170ppm (rat)

Effects, Chronic Exposure general prolonged or repeated exposure may cause dermatitis; neurological damage (headache, sleeplessness, mood change), plus blurred or tunnel vision may be seen; loss of sensation in hands & feet may occur
Sensitising not a sensitizer
Carcinogen/Tumorigen probable carcinogen IARC I Group 1, ACGIH I A2; the NTP rates trichloroethylene a carcinogen
Reproductive Effect no known effect on humans or animals
Mutagen not known to be a mutagen or teratogen in humans
Synergistic With alcohol prior exposure to trichloroethylene followed by alcohol consumption causes upper body flush called degreasers flush

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Member: Canadian Association of Chemical Distributors
12. ECOLOGICAL INFORMATION

Bioaccumulation: Trichloroethylene metabolised & excreted (½-life ~40hr) and will not bioaccumulate.

Biodegradation: Biodegrades in aerobic sewage treatment facilities, but only in the presence of other carbon sources; biodegradation is much slower under anaerobic conditions.

Abiotic Degradation: Reacts with atmospheric hydroxyl (OH) radicals; estimated ½-life in air 5-7 days.

Mobility in soil, water: Shown to have moderate mobility in soil and the water column.

MARINE TOXICITY:

LC₅₀ (96 hr) Fish: 28 & 63mg/litre/96hr (Jordanella floridae), 41mg/litre/96hr (Pimephales promelas), 16mg/litre Limada limada), 52 & 99mg/litre (Cyprinodon variegatus), 45mg/litre (Lepomis macrochirus).

LC₃₀ (48hr) Shrimp: 58mg/litre/ (Daphnia cucullata), 2.2, 8, 21 & 42-97mlg/litre (Daphnia magna) & others.

EC₅₀ (Algae): 450mg/litre (Scenedesmus subspicatus), 175mg/litre (Selenastrum capricornutum), 96 & 150mg/litre (Skeletonema costatum).

EC₅₀ (Bacteria): 235mg/litre (Bacillus subtilis), >400mg/litre (Chilomonas paramecium), 975mg/litre (Photobacterium phosphoreum) & others.

13. DISPOSAL

Waste Disposal: Do not flush to sewer. Recycle solvent if possible. May be incinerated in approved facility with flue gas monitoring and scrubbing after mixing with a suitable flammable waste solvent.

Containers: Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use. Pails must be vented and thoroughly dried prior to crushing and recycling. IBCs (intermediate bulk containers); polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years. Never cut, drill, weld or grind on or near this container, even if empty.

14. TRANSPORT CLASSIFICATION

Canada TDG: Pin UN-1710

U.S.A. 49 CFR: Shipping Name trichloroethylene

Marine Pollutant: Not a marine pollutant

ERAP Required: No

15. REGULATIONS

Canada DSL: On inventory

U.S.A. TSCA: On inventory

Europe EINECS: On inventory

U.S.A. Regulations:

Immediately Dangerous to Life or Health: 1000 ppm; NIOSH considers trichloroethylene to be a potential occupational carcinogen.

Allowable Tolerances: Tolerances are established for residues of trichloroethylene resulting from its use as a solvent in the manufacture of foods as follows:

<table>
<thead>
<tr>
<th>Food</th>
<th>Parts per million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decaffeinated ground coffee</td>
<td>25</td>
</tr>
<tr>
<td>Decaffeinated soluble (instant) coffee extract</td>
<td>10</td>
</tr>
<tr>
<td>Spice oleoresins</td>
<td>30 parts per million (provided that if residues of other chlorinated solvents are also present, the total of all residues of such solvents in spice oleoresins shall not exceed 30 parts per million).</td>
</tr>
</tbody>
</table>

OSHA Standards: Permissible Exposure Limit: Table Z-2 8-hr Time Weighted Avg: 100 ppm. Permissible Exposure Limit: Table Z-2 Acceptable Ceiling Concentration: 200 ppm. Permissible Exposure Limit: Table Z-2 Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift. Concentration: 300 ppm. Maximum Duration: 5 minutes in any 2 hours. Vacated 1989. OSHA PEL TWA 50 ppm (270 mg/cu m); STEL 200 ppm (1080 mg/cu m) is still enforced in some states.

NIOSH Recommendations: NIOSH considers trichloroethylene to be a potential occupational carcinogen. NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concentration. Recommended Exposure Limit: 60 Minute Ceiling Value: 2 ppm. /During the usage of trichloroethylene as an anesthetic agent/

Recommended Exposure Limit: 10 Hour Time-Weighted Average: 25 ppm. /During exposures to trichloroethylene other than as an anesthetic agent/

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Member: Canadian Association of Chemical Distributors
15. REGULATIONS, cont’d

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 10 ppm; 15min Short Term Exposure Limit (STEL) 25 ppm, A2: Suspected human carcinogen.

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Trichloroethylene is produced, as an intermediate or a final product, by process units covered under this subpart. Listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Trichloroethylene is included on this list.

Federal Drinking Water Standards: Maximum contaminant level goals for organic contaminants: Trichloroethylene, MCLG: zero. Maximum contaminant levels (MCL) for organic contaminants apply to community and non-transient, non-community water systems: Trichloroethylene, MCL 0.005 mg/L. EPA 5 ug/l

State Drinking Water Standards: Florida 3 ug/l, New Jersey 1 ug/l

State Drinking Water Guidelines: Arizona 3.2 ug/l, Connecticut 5 ug/l, Maine 32 ug/l. Minnesota 5 ug/L

Clean Water Act Requirements: Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations. Trichloroethylene is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

RCRA Requirements: As stipulated in 40 CFR 261.33, when trichloroethylene, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). A solid waste containing trichloroethylene may or may not become characterized as a hazardous waste when subjected to the Toxicity Characteristic Leaching Procedure listed in 40 CFR 261.24, and if so characterized, must be managed as a hazardous waste. When trichloroethylene is a spent solvent, it is classified as a hazardous waste from a nonspecific source, as stated in 40 CFR 261.31, and must be managed according to state and/or federal hazardous waste regulations.

FDA Requirements: Trichloroethylene is an indirect food additive for use as a component of adhesives. Tolerances are established for residues of trichloroethylene resulting from its use as a solvent in the manufacture of foods as follows:

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16. OTHER INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577
Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS - European Chem. Substance Info. System), & others.
Preparation Date: May 2005 Revision Date: June 2008, June 2011, June 2014

European Chemicals Agency (EChA) dossier for Trichloroethylene:
http://apps.echa.europa.eu/registered/data/dossiers/DISS-9c83a2d3-4a9f-1ff5-e044-00144f67d249/DISS-9c83a2d3-4a9f-1ff5-e044-00144f67d249.html

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