SILVER FERN CHEMICAL

Safety Data Sheet

Trichloroethylene

SECTION 1: IDENTIFICATION

Product Name: Trichloroethylene
CAS Number: 79-01-6
Chemical Name: Trichloroethylene
Synonyms: TCE; 1,1,2-Trichloroethene; 1,1-Dichloro-2-Chloroethylene; 1-Chloro-2,2-Dichloroethylene; Acetylene Trichloride; Trethylene; Triclene; Trimar; Trilene; HCC-1120
Uses: Laboratory chemicals, Manufacture of substances

Company
Silver Fern Chemical, Inc.
2226 Queen Anne Avenue North
Suite #C
Seattle WA 98109, USA

24 Hour Emergency Contact
Infotrac 800-535-5053
Outside USA & Canada 352-323-3500

SECTION 2: HAZARD IDENTIFICATION

Danger

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):
Skin irritation (Category 2), \text{H315}
Eye irritation (Category 2A), \text{H319}
Germ cell mutagenicity (Category 2), \text{H341}
Carcinogenicity (Category 1B), \text{H350}
Specific target organ toxicity - single exposure (Category 3), Central nervous system, \text{H336}
Acute aquatic toxicity (Category 3), \text{H402}
Chronic aquatic toxicity (Category 3), \text{H412}
Hazard statement(s):
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s):
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.
P280 Wear protective gloves.
P281 Use personal protective equipment as required.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Content (W/W)</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-01-6</td>
<td>&lt;=100%</td>
<td>Trichloroethylene</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact: Wash off with soap and plenty of water. Consult a physician.

In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
SECTION 5: FIRE FIGHTING MEASURES

Flash Point: no data available

Lower/Upper explosion limit: Upper explosion limit: 10.5 %(V)/ Lower explosion limit: 8 %(V)

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

Special hazards arising from the substance or mixture: Carbon oxides, Hydrogen chloride gas

Advice for firefighters: Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Containment and Clean Up: Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas

Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided

SECTION 7: HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapor or mist

Storage: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Light sensitive. Handle and store under inert gas.

Storage class: (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Personal Protective Equipment (PPE)

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands

Eye protection: Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Body protection: Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace
General safety and hygiene measures: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Appropriate engineering controls: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Components with workplace control parameters:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethylene</td>
<td>79-01-6</td>
<td>TWA</td>
<td>10.000000 ppm</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td>Central Nervous System impairment cognitive decrement Renal toxicity. Substances for which there is a Biological Exposure Index or Indices Suspected human carcinogen</td>
<td></td>
</tr>
<tr>
<td>STEL</td>
<td></td>
<td>25.000000 ppm</td>
<td>USA, ACGIH threshold Limit Values (TLV)</td>
<td></td>
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<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td>Central Nervous System impairment cognitive decrement Renal toxicity. Substances for which there is a Biological Exposure Index or Indices Suspected human carcinogen</td>
<td></td>
</tr>
<tr>
<td>Potential occupational carcinogen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>100.000000 ppm</td>
<td>USA, Occupational Exposure Limits (OSHA)</td>
<td></td>
</tr>
<tr>
<td>CEIL</td>
<td></td>
<td>200.000000 Ppm</td>
<td>USA, Occupational Exposure Limits (OSHA)</td>
<td></td>
</tr>
<tr>
<td>PEAK</td>
<td></td>
<td>300.000000 ppm</td>
<td>USA, Occupational Exposure Limits (OSHA)</td>
<td></td>
</tr>
</tbody>
</table>

Biological occupational exposure limits:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-NO</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethylene</td>
<td>79-01-6</td>
<td>Trichloroacetic acid</td>
<td>15.0000 mg/l</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td>End of shift at end of workweek</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethanol</td>
<td></td>
<td></td>
<td>0.5000 mg/l</td>
<td>In blood</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td>End of shift at end of workweek</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td></td>
<td></td>
<td>In blood</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td>End of shift at end of workweek</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form: liquid, clear/
Color: colorless

Odor
no data available

Odor Threshold
no data available

pH
no data available

Melting point/freezing Point
Melting point/range: -84.8 °C (-120.6 °F) - lit.

Initial boiling point and boiling range
86.7 °C (188.1 °F) - lit.

Flash point
no data available

Evaporation rate
no data available

Flammability (solid, gas)
no data available

Upper/lower flammability or explosive limits
Upper explosion limit: 10.5 % (V)/ Lower explosion limit: 8 % (V)

Vapor pressure
81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)

Vapor density
no data available

Relative density
1.463 g/mL at 25 °C (77 °F)

Water solubility
no data available

Partition Coefficient:
log Pow: 2.29 log Pow: 5

n-octanol/water

Auto-ignition temperature
410.0 °C (770.0 °F)

Decomposition temperature:
no data available

Viscosity:
no data available

 Explosive properties:
no data available

SECTION 10: STABILITY AND REACTIVITY

Conditions to avoid: no data available

Substances to avoid: Oxidizing agents, Strong bases, Magnesium

Hazardous reactions: no data available

Decomposition products: no data available
SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity:
LD50 Oral - Rat - 4,920 mg/kg
LC50 Inhalation - Mouse - 4 h - 8450 ppm
LD50 Dermal - Rabbit - > 20,000 mg/kg

Skin corrosion/irritation:
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation:
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitization: no data available

Germ cell mutagenicity:
Laboratory experiments have shown mutagenic effects. In vitro tests showed mutagenic effects.

Carcinogenicity:
This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Possible human carcinogen.
IARC: 1 - Group 1: Carcinogenic to humans (Trichloroethylene)
NTP: Reasonably anticipated to be a human carcinogen (Trichloroethylene)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: no data available

Additional information:
RTECS: Not available. burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:
Toxicity to fish
LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h
LOEC - other fish - 11 mg/l - 10.0 d
NOEC - Oryzias latipes - 40 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h
Toxicity to algae
IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

Biodegradability: no data available

Bioaccumulative Potential: Does not bioaccumulate

Other: PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects. An environmental hazard cannot
be excluded in the event of unprofessional handling or disposal. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

SECTION 13: DISPOSAL CONSIDERATIONS

**Waste disposal of substance:** Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

**Container disposal:** Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

**DOT (US):**
UN number: 1710   Class: 6.1   Packing group: III
Proper shipping name: Trichloroethylene
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

**IMDG:**
UN number: 1710   Class: 6.1   Packing group: III
Proper shipping name: TRICHLOROETHYLENE
EMS-No: F-A, S-A

**IATA:**
UN number: 1710   Class: 6.1   Packing group: III
Proper shipping name: Trichloroethylene

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

**SARA 302 Components:**
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

**SARA 313 Components:**
The following components are subject to reporting levels established by SARA Title III, Section 313
Trichloroethylene    CAS-No. 79-01-6    Revision Date 2007-07-01

**SARA 311/312 Hazards:**
Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**
Trichloroethylene    CAS-No. 79-01-6    Revision Date 2007-07-01

**Pennsylvania Right To Know Components**
Trichloroethylene    CAS-No. 79-01-6    Revision Date 2007-07-01

**New Jersey Right To Know Components**
Trichloroethylene    CAS-No. 79-01-6    Revision Date 2007-07-01

**California Prop. 65 Components**
WARNING! This product contains a chemical known to the State of California to cause cancer.

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Effective Date: 07/14/2015
SECTION 16: OTHER INFORMATION

Aquatic Acute  Acute aquatic toxicity
Aquatic Chronic  Chronic aquatic toxicity
Carc.   Carcinogenicity
Eye Irrit.  Eye irritation
H315  Causes skin irritation.
H319  Causes serious eye irritation.
H336  May cause drowsiness or dizziness.
H341  Suspected of causing genetic defects.
H350  May cause cancer.
H402  Harmful to aquatic life.

HMIS Rating
Health hazard:  2
Chronic Health Hazard:  *
Flammability:  0
Physical Hazard  0

NFPA Rating
Health hazard:  2
Fire Hazard:  0
Reactivity Hazard:  0

DISCLAIMER OF RESPONSIBILITY

The information on this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this SDS information may not be applicable.

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Revision Date 03/03/2015