CHLORINE TRIFLUORIDE

CAUTIONARY RESPONSE INFORMATION

**Common Synonyms**
CTF

**Liquified compressed**
**Greenish yellow liquid**
**Strong sweetish gas**
**or colorless gas**

**KEEP PEOPLE AWAY**
**AVOID CONTACT WITH LIQUID AND VAPOR**
**Avoid inhalation:**
**Wear chemical protective suit with self-contained breathing apparatus.**
**Evacuate area in case of large discharge.**
**Call fire department.**
**Notify local health and pollution control agencies.**
**Protect water intakes.**

**Exposure**
**CALL FOR MEDICAL AID**

**VAPOR**
**POISONOUS IF INHALED**

**Irritating to skin, eyes, nose and throat.**
**Move victim to fresh air.**
**If breathing has stopped, give artificial respiration.**
**If breathing is difficult, give oxygen.**
**LIQUID**
**POISONOUS IF INHALED**

**Will burn skin and eyes.**
**Remove contaminated clothing and shoes.**
**Flash affected areas with plenty of water.**
**DO NOT RUB AFFECTED AREA.**
**IF IN EYES, hold eyelids open and flush with plenty of water.**
**IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.**
**DO NOT INDUCE VOMITING.**

**Water Pollution**
**Effect of low concentrations on aquatic life is unknown.**
**May be dangerous if it enters water intakes.**
**Notify local health and wildlife officials.**
**Notify operators of nearby water intakes.**

**1. CORRECTIVE RESPONSE ACTIONS**
**Stop discharge**
**Chemical and Physical Treatment:**
**Neutralize**
**Do not add water to undissolved material**

**2. CHEMICAL DESIGNATIONS**

2.1 **CG Compatibility Group:** Not listed.
2.2 **Formula:** CF₂Cl₂
2.3 **IMON Designation:** Not pertinent
2.4 **DOT ID No.:** 1J749
2.5 **CAS Registry No.:** 7790-91-2
2.6 **NEGO Guide No.:** 124
2.7 **Standard Industrial Trade Classification:** 52241

**3. HEALTH HAZARDS**

3.1 **Personal Protective Equipment:**
Nasal cubes and protective clothing made of glass fiber and Teflon, including full hood; self-contained breathing apparatus with full face mask.

3.2 **Symptoms Following Exposure:** Inhalation causes extreme irritation of respiratory tract; pulmonary edema may result. Vapors are very irritating to eyes and skin; liquid causes severe burns.

3.3 **Treatment of Exposure:** Call physician at once after any exposure to this compound. INHALATION: remove victim to fresh air and keep him quiet, give artificial respiration if breathing has stopped, give oxygen; enfore rest for 24 hours. EYES: flush with water for at least 15 min., get medical attention, but do not interrupt flushing for at least 10 min. SKIN: flush with water, then with 2.3% aqueous ammonia, again then with water; apply ice-cold pack of saturated Epsom salt or 70% alcohol.

3.4 **TLV-TWA:** Not listed.
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** 0.1 ppm
3.7 **Toxicity by Ingestion:** Grade 4; LD₅₀ < 50 mg/kg
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available.
3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause severe irritation of eyes and throat and can cause eye and lung damage. They cannot be tolerated even at low concentrations.
3.11 **Liquid or Solid Characteristics:** Severe skin irritant, causes second- and third-degree burns on short contact and is very injurious to the eyes.
3.12 **Odor Threshold:** Currently not available
3.13 **LD₅₀ Values:** 20 ppm
3.14 **OSHA PEL-TWA:** Not listed.
3.15 **OSHA PEL-STEL:** Not listed.
3.16 **OSHA PEL-Ceiling:** 0.1 ppm
3.17 **EPA AEGL:** Not listed

4. **FIRE HAZARDS**

4.1 **Flash Point:** Not flammable, but may cause fire on contact with some material.
4.2 **Flammable Limits in Air:** Not pertinent
4.3 **Fire Extinguishing Agents:** Dry chemical
4.4 **Fire Extinguishing Agents Not to Be Used:** Do not use water on adjacent fires unless well protected against hydrogen fluoride gas.
4.5 **Special Hazards of Combustion Products:** If released from container, fumes are toxic and irritating.
4.6 **Behavior in Fire:** If released from container, fumes are toxic and irritating.
4.7 **Auto Ignition Temperature:** Not pertinent
4.8 **Electrical Hazards:** Not pertinent
4.9 **Burning Rate:** Not pertinent
4.10 **10th Edition Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** Not pertinent
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** Not pertinent
4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. **CHEMICAL REACTIVITY**

5.1 **Reactivity with Water:** Reacts explosively with water, evolving hydrogen fluoride (hydrofluoric acid) and chlorine.
5.2 **Reactivity with Common Materials:** Causes ignition of all combustible materials and even sand or concrete. Very similar to fluorine gas.
5.3 **Stability During Transport:** Stable
5.4 **Neutralizing Agents for Acids and Caustics:** Currently not available
5.5 **Polymerization:** Not pertinent
5.6 **Inhibitor of Polymerization:** Not pertinent

6. **WATER POLLUTION**

6.1 **Aqueous Toxicity:** Currently not available
6.2 **Waterfowl Toxicity:** Currently not available
6.3 **Biological Oxygen Demand (BOD):** None
6.4 **Food Chain Concentration Potential:** None
6.5 **GESAMP Hazard Profile:** Bioaccumulation: 0
**Damage to living resources: 2**
**Human Oral hazard: 3**
**Human Contact hazard: 0**
**Reduction of amenities: XX**

7. **SHIPPING INFORMATION**

7.1 **Grades of Purity:** 99.5%
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Safety relief
7.5 **IMO Pollution Category:** Currently not available
7.6 **Ship Type:** Currently not available
7.7 **Barge Hull Type:** Currently not available

8. **HAZARD CLASSIFICATIONS**

8.1 **49 CFR Class:** Poison Gas
8.2 **49 CFR Class:** 2.3
8.3 **49 CFR Package Group:** Not pertinent.
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:** Not listed
8.6 **EPA Reportable Quantity:** Not listed.
8.7 **EPA Pollutant Category:** Not listed
8.8 **RCRA Waste Number:** Not listed
8.9 **EPA FIFRA List:** Not listed

9. **PHYSICAL & CHEMICAL PROPERTIES**

9.1 **Physical State at 15°C and 1 atm:** Gas
9.2 **Molecular Weight:** 124.5
9.3 **Boiling Point at 1 atm:** 59°F = 16°C = 292 K
9.4 **Freezing Point:** –105°F = –76.1°C = 197.1 K
9.5 **Critical Temperature:** 307.4°F = 153°C = 456.8 K
9.6 **Critical Pressure:** 837 psia = 56.9 atm = 5.77 MN/m²
9.7 **Specific Gravity:** 1.95 at 11°C (liquid)
9.8 **Liquid Surface Tension:** 26.6 dyn/cm × 0.0266 N/m at 0°C
9.9 **Liquid Water Interfacial Tension:** Not pertinent
9.10 **Vapor (Gas) Specific Gravity:** 3.2
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.2832
9.12 **Latent Heat of Vaporization:** 128 Btu/lb = 71.2 cal/g = 2.988 × 10⁴ J/kg
9.13 **Heat of Combustion:** Not pertinent
9.14 **Heat of Decomposition:** Not pertinent
9.15 **Heat of Solution:** Currently not available
9.16 **Heat of Polymerization:** Not pertinent
9.17 **Heat of Fusion:** Currently not available
9.18 **Limiting Value:** Currently not available
9.19 **Total Vapor Pressure:** Currently not available

NOTES

JUNE 1999
### 9.20 Saturated Liquid Density

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
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</thead>
<tbody>
<tr>
<td>35</td>
<td>117.400</td>
</tr>
<tr>
<td>40</td>
<td>116.800</td>
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<tr>
<td>45</td>
<td>116.299</td>
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<td>50</td>
<td>115.799</td>
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### 9.21 Liquid Heat Capacity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>British thermal unit per pound-F</th>
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<tbody>
<tr>
<td>33</td>
<td>1.048</td>
</tr>
<tr>
<td>34</td>
<td>1.048</td>
</tr>
<tr>
<td>35</td>
<td>1.048</td>
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</table>

### 9.22 Liquid Thermal Conductivity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>British thermal unit inch per hour-square foot-F</th>
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<tr>
<td>33</td>
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<tr>
<td>34</td>
<td>1.048</td>
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<tr>
<td>35</td>
<td>1.048</td>
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### 9.23 Liquid Viscosity

<table>
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<th>Temperature (degrees F)</th>
<th>Centipoise</th>
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<tr>
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### 9.24 Solubility in Water

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<th>Temperature (degrees F)</th>
<th>Pounds per 100 pounds of water</th>
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<td>R</td>
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### 9.25 Saturated Vapor Pressure

<table>
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<th>Temperature (degrees F)</th>
<th>Pounds per square inch</th>
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<tbody>
<tr>
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<td>2.213</td>
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### 9.26 Saturated Vapor Density

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
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</thead>
<tbody>
<tr>
<td>5</td>
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### 9.27 Ideal Gas Heat Capacity

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<th>Temperature (degrees F)</th>
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</thead>
<tbody>
<tr>
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