

# TRIFLUOROCHLOROETHYLENE

TFC

CAUTIONARY RESPONSE INFORMATION				4. FIRE HAZARDS	7. SHIPPING INFORMATION								
Common Synonyms Chlorotrifluoroethylene CTFE Genetron 1113 Ket F monomer Trifluoromonomchloroethylene Trifluorovinyl chloride	Gas  Sinks and boils in water. Flammable visible vapor cloud. is produced.	Colorless  Odorless or faint odor		<p><b>4.1 Flash Point:</b> Not pertinent (gas)</p> <p><b>4.2 Flammable Limits in Air:</b> 16%-34%</p> <p><b>4.3 Fire Extinguishing Agents:</b> Let fire burn; stop gas flow; cool containers with water.</p> <p><b>4.4 Fire Extinguishing Agents Not to Be Used:</b> Not pertinent</p> <p><b>4.5 Special Hazards of Combustion Products:</b> Toxic hydrogen chloride and hydrogen fluoride gases are formed.</p> <p><b>4.6 Behavior in Fire:</b> Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. Containers may explode in a fire.</p> <p><b>4.7 Auto Ignition Temperature:</b> Currently not available</p> <p><b>4.8 Electrical Hazards:</b> Not pertinent</p> <p><b>4.9 Burning Rate:</b> Not pertinent</p> <p><b>4.10 Adiabatic Flame Temperature:</b> Currently not available</p> <p><b>4.11 Stoichiometric Air to Fuel Ratio:</b> Not pertinent</p> <p><b>4.12 Flame Temperature:</b> Currently not available</p> <p><b>4.13 Combustion Molar Ratio (Reactant to Product):</b> Not pertinent.</p> <p><b>4.14 Minimum Oxygen Concentration for Combustion (MOCC):</b> Not listed</p>	<p><b>7.1 Grades of Purity:</b> Polymerization grade, 99.0+%</p> <p><b>7.2 Storage Temperature:</b> Ambient, but less than 150°F</p> <p><b>7.3 Inert Atmosphere:</b> Air must be excluded.</p> <p><b>7.4 Venting:</b> Safety relief</p> <p><b>7.5 IMO Pollution Category:</b> Currently not available</p> <p><b>7.6 Ship Type:</b> Currently not available</p> <p><b>7.7 Barge Hull Type:</b> Currently not available</p>								
	Evacuate. Keep people away. Avoid contact with liquid. Shut off ignition sources. Call fire department. Stay upwind. Use water spray to "knock down" vapor. Notify local health and pollution control agencies.				<b>8. HAZARD CLASSIFICATIONS</b>								
<b>Fire</b>	FLAMMABLE.  POISONOUS GASES ARE PRODUCED IN FIRE. Containers may explode in fire. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Let fire burn. Stop flow of gas if possible. Cool exposed containers and protect men effecting shutdown with water.			<p><b>8.1 49 CFR Category:</b> Poison gas</p> <p><b>8.2 49 CFR Class:</b> 2.3</p> <p><b>8.3 49 CFR Package Group:</b> Not pertinent.</p> <p><b>8.4 Marine Pollutant:</b> No</p> <p><b>8.5 NFPA Hazard Classification:</b></p> <table> <thead> <tr> <th>Category</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue)</td> <td>-</td> </tr> <tr> <td>Flammability (Red)</td> <td>4</td> </tr> <tr> <td>Instability (Yellow)</td> <td>0</td> </tr> </tbody> </table> <p><b>8.6 EPA Reportable Quantity:</b> Not listed.</p> <p><b>8.7 EPA Pollution Category:</b> Not listed.</p> <p><b>8.8 RCRA Waste Number:</b> Not listed</p> <p><b>8.9 EPA FWCRA List:</b> Not listed</p>	Category	Classification	Health Hazard (Blue)	-	Flammability (Red)	4	Instability (Yellow)	0	<b>9. PHYSICAL &amp; CHEMICAL PROPERTIES</b>
Category	Classification												
Health Hazard (Blue)	-												
Flammability (Red)	4												
Instability (Yellow)	0												
<b>Exposure</b>	Call for medical aid.  VAPOR If inhaled will cause dizziness, nausea, or vomiting. Move victim to fresh air. If breathing is difficult, give oxygen.  LIQUID Will cause frostbite. Flush affected areas with plenty of water. DO NOT RUB AFFECTED AREAS.			<p><b>9.1 Physical State at 15°C and 1 atm:</b> Gas</p> <p><b>9.2 Molecular Weight:</b> 116.5</p> <p><b>9.3 Boiling Point at 1 atm:</b> -18°F = -28°C = 245°K</p> <p><b>9.4 Freezing Point:</b> Not pertinent</p> <p><b>9.5 Critical Temperature:</b> (est.) 223.2°F = 106.2°C = 379.4°K</p> <p><b>9.6 Critical Pressure:</b> (est.) 592 psia = 40.2 atm = 4.08 MN/m<sup>2</sup></p> <p><b>9.7 Specific Gravity:</b> 1.307 at 20°C (liquid)</p> <p><b>9.8 Liquid Surface Tension:</b> (est.) 12 dynes/cm = 0.012 N/m at 20°C</p> <p><b>9.9 Liquid Water Interfacial Tension:</b> Not pertinent</p> <p><b>9.10 Vapor (Gas) Specific Gravity:</b> 4.02</p> <p><b>9.11 Ratio of Specific Heats of Vapor (Gas):</b> Currently not available</p> <p><b>9.12 Latent Heat of Vaporization:</b> 83 Btu/lb = 46 cal/g = 1.92 X 10<sup>5</sup> J/kg</p> <p><b>9.13 Heat of Combustion:</b> Currently not available</p> <p><b>9.14 Heat of Decomposition:</b> Not pertinent</p> <p><b>9.15 Heat of Solution:</b> Not pertinent</p> <p><b>9.16 Heat of Polymerization:</b> Currently not available</p> <p><b>9.17 Heat of Fusion:</b> Currently not available</p> <p><b>9.18 Limiting Value:</b> Currently not available</p> <p><b>9.19 Reid Vapor Pressure:</b> Currently not available</p>	<b>10. NOTES</b>								
<b>1. CORRECTIVE RESPONSE ACTIONS</b> Stop discharge	<b>2. CHEMICAL DESIGNATIONS</b> 2.1 CG Compatibility Group: Not listed. 2.2 Formula: F <sub>3</sub> C=CFCl 2.3 IMO/UN Designation: 2/1082 2.4 DOT ID No.: 1082 2.5 CAS Registry No.: 79-38-9 2.6 NAERG Guide No.: 119P 2.7 Standard Industrial Trade Classification: 51137												
<p><b>3. HEALTH HAZARDS</b></p> <p>3.1 Personal Protective Equipment: Self-contained breathing apparatus; goggles; rubber gloves.</p> <p>3.2 Symptoms Following Exposure: Inhalation causes dizziness, nausea, vomiting; liver and kidney injury may develop after several hours and cause jaundice and necrosis of the kidney. Contact with liquid causes frostbite of eyes and possibly of skin.</p> <p>3.3 Treatment of Exposure: Call a physician after all exposures to this compound; it is more toxic than most of the closely related propellant gases. INHALATION: remove victim to fresh air; enforce bed rest; administer oxygen for 30 min. of every hour for 6 hours, even if no symptoms appear. SKIN: if frostbite has occurred, apply warm water and treat burn.</p> <p>3.4 TLV-TWA: Not listed.</p> <p>3.5 TLV-STEL: Not listed.</p> <p>3.6 TLV-Ceiling: Not listed.</p> <p>3.7 Toxicity by Ingestion: Not pertinent (TFC is a gas at normal temperatures)</p> <p>3.8 Toxicity by Inhalation: Currently not available.</p> <p>3.9 Chronic Toxicity: Currently not available</p> <p>3.10 Vapor (Gas) Irritant Characteristics: Currently not available</p> <p>3.11 Liquor or Solid Characteristics: Currently not available</p> <p>3.12 Odor Threshold: Currently not available</p> <p>3.13 IDLH Value: Not listed.</p> <p>3.14 OSHA PEL-TWA: Not listed.</p> <p>3.15 OSHA PEL-STEL: Not listed.</p> <p>3.16 OSHA PEL-Ceiling: Not listed.</p> <p>3.17 EPA A EGL: Not listed</p>													

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
NOT PERTINENT			NOT PERTINENT		NOT PERTINENT		NOT PERTINENT

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
INSOLUBLE		-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14	14.240 14.820 15.410 16.030 16.660 17.310 17.980 18.670 19.380 20.110 20.870 21.640 22.440 23.250 24.090 24.960 25.840 26.750	-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14	0.35140 0.36400 0.37700 0.39020 0.40380 0.41780 0.43210 0.44670 0.46170 0.47700 0.49270 0.50870 0.52520 0.54190 0.55910 0.57670 0.59460 0.61290		NOT PERTINENT