

TRIFLUOROCHLOROETHYLENE

TFC

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Chlorotrifluoroethylene CTFE Genetron 1113 Kel F monomer Trifluoromonochloroethylene Trifluorovinyl chloride		Gas Colorless Odorless or faint odor
Sinks and boils in water. Flammable visible vapor cloud. is produced.		
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.		
Fire	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 shutoff with water.	
Exposure	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.	
Water Pollution	Not harmful to aquatic life.	

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge

2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: Not listed.
- 2.2 Formula: F₂C=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

3. HEALTH HAZARDS

- 3.1 Personal Protective Equipment: Self-contained breathing apparatus; goggles; rubber gloves.
- 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.
- 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.
- 3.4 TLV-TWA: Not listed.
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: Not listed.
- 3.7 Toxicity by Ingestion: Not pertinent (TFC is a gas at normal temperatures)
- 3.8 Toxicity by Inhalation: Currently not available.
- 3.9 Chronic Toxicity: Currently not available
- 3.10 Vapor (Gas) Irritant Characteristics: Currently not available
- 3.11 Liquid or Solid Characteristics: Currently not available
- 3.12 Odor Threshold: Currently not available
- 3.13 IDLH Value: Not listed.
- 3.14 OSHA PEL-TWA: Not listed.
- 3.15 OSHA PEL-STEL: Not listed.
- 3.16 OSHA PEL-Ceiling: Not listed.
- 3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

- 4.1 Flash Point: Not pertinent (gas)
- 4.2 Flammable Limits in Air: 16%-34%
- 4.3 Fire Extinguishing Agents: Let fire burn; stop gas flow; cool containers with water.
- 4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
- 4.5 Special Hazards of Combustion Products: Toxic hydrogen chloride and hydrogen fluoride gases are formed.
- 4.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. Containers may explode in a fire.
- 4.7 Auto Ignition Temperature: Currently not available
- 4.8 Electrical Hazards: Not pertinent
- 4.9 Burning Rate: Not pertinent
- 4.10 Adiabatic 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: No reaction
- 5.2 Reactivity with Common Materials: No reaction
- 5.3 Stability During Transport: Stable
- 5.4 Neutralizing Agents for Acids and Caustics: Not pertinent
- 5.5 Polymerization: Can occur
- 5.6 Inhibitor of Polymerization: Terpenes; Tributylamine (1%)

6. WATER POLLUTION

- 6.1 Aquatic Toxicity: None
- 6.2 Waterfowl Toxicity: None
- 6.3 Biological Oxygen Demand (BOD): None
- 6.4 Food Chain Concentration Potential: None
- 6.5 GESAMP Hazard Profile: Not listed

7. SHIPPING INFORMATION

- 7.1 Grades of Purity: Polymerization grade, 99.0+%
- 7.2 Storage Temperature: Ambient, but less than 150°F
- 7.3 Inert Atmosphere: Air must be excluded.
- 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 Category: 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:

Category	Classification
Health Hazard (Blue).....	-
Flammability (Red).....	4
Instability (Yellow).....	0
- 8.6 EPA Reportable Quantity: Not listed.
- 8.7 EPA Pollution Category: Not listed.
- 8.8 RCRA Waste Number: Not listed
- 8.9 EPA FWPCA List: Not listed

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 Physical State at 15° C and 1 atm: Gas
- 9.2 Molecular Weight: 116.5
- 9.3 Boiling Point at 1 atm: -18°F = -28°C = 245°K
- 9.4 Freezing Point: Not pertinent
- 9.5 Critical Temperature: (est.) 223.2°F = 106.2°C = 379.4°K
- 9.6 Critical Pressure: (est.) 592 psia = 40.2 atm = 4.08 MN/m²
- 9.7 Specific Gravity: 1.307 at 20°C (liquid)
- 9.8 Liquid Surface Tension: (est.) 12 dynes/cm = 0.012 N/m at 20°C
- 9.9 Liquid Water Interfacial Tension: Not pertinent
- 9.10 Vapor (Gas) Specific Gravity: 4.02
- 9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available
- 9.12 Latent Heat of Vaporization: 83 Btu/lb = 46 cal/g = 1.92 X 10⁵ J/kg
- 9.13 Heat of Combustion: Currently not available
- 9.14 Heat of Decomposition: Not pertinent
- 9.15 Heat of Solution: Not pertinent
- 9.16 Heat of Polymerization: Currently not available
- 9.17 Heat of Fusion: Currently not available
- 9.18 Limiting Value: Currently not available
- 9.19 Reid Vapor Pressure: Currently not available

NOTES

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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
	N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T

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
	I N S O L U B I L I T Y	-20	14.240	-20	0.35140		N O T P E R T I N E N T
		-18	14.820	-18	0.36400		
		-16	15.410	-16	0.37700		
		-14	16.030	-14	0.39020		
		-12	16.660	-12	0.40380		
		-10	17.310	-10	0.41780		
		-8	17.980	-8	0.43210		
		-6	18.670	-6	0.44670		
		-4	19.380	-4	0.46170		
		-2	20.110	-2	0.47700		
		0	20.870	0	0.49270		
		2	21.640	2	0.50870		
		4	22.440	4	0.52520		
		6	23.250	6	0.54190		
		8	24.090	8	0.55910		
		10	24.960	10	0.57670		
		12	25.840	12	0.59460		
		14	26.750	14	0.61290		