

ETHYLTRICHLOROSILANE

ETS

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Ethyl silicon trichloride Trichloroethyl silane Trichloroethyl silicone	Liquid Colorless Sharp irritating odor	Reacts violently with water. Irritating gas is produced on contact with water.
<p>Evacuate. KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID AND VAPOR. Avoid inhalation. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Shut off ignition sources. Call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>		
Fire	<p>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. Extinguish with dry chemicals, alcohol foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>	
Exposure	<p>Call for medical aid.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled will cause difficult breathing. Move victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Will burn skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. 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.</p>	
Water Pollution	<p>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.</p>	

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
 Stop discharge
 Chemical and Physical Treatment:
 Neutralize
 Do not burn
 Do not add water to undissolved material

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
 2.2 **Formula:** C₂H₅SiCl₃
 2.3 **IMO/UN Designation:** 3.2/1196
 2.4 **DOT ID No.:** 1196
 2.5 **CAS Registry No.:** 115-21-9
 2.6 **NAERG Guide No.:** 155
 2.7 **Standard Industrial Trade Classification:** 51550

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Full protective clothing; acid-vapor-type respiratory protection; rubber gloves; chemical worker's goggles; other equipment as necessary to protect skin and eyes.
- 3.2 **Symptoms Following Exposure:** Inhalation causes irritation of nose and throat. Contact with liquid causes severe burns of eyes and skin. Ingestion causes burns of mouth and stomach.
- 3.3 **Treatment of Exposure:** INHALATION: remove victim from exposure; administer artificial respiration if breathing has stopped; call physician. EYES: flush with water for 15 min.; obtain medical attention immediately. SKIN: flush with water; obtain medical attention immediately if irritation persists. INGESTION: give large amounts of water; get medical attention.
- 3.4 **TLV-TWA:** Not listed.
 3.5 **TLV-STEL:** Not listed.
 3.6 **TLV-Ceiling:** Not listed.
 3.7 **Toxicity by Ingestion:** Grade 2; oral LD₅₀ = 1,330 mg/kg (rat)
 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 the eyes and throat and can cause eye and lung injury. 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 **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:** 57°F C.C.
 4.2 **Flammable Limits in Air:** Currently not available
 4.3 **Fire Extinguishing Agents:** Dry chemical, alcohol foam, carbon dioxide
 4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective.
 4.5 **Special Hazards of Combustion Products:** Toxic hydrogen chloride and phosgene gases may form.
 4.6 **Behavior in Fire:** Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Difficult to extinguish; re-ignition may occur. Contact with water applied to adjacent fires will produce irritating hydrogen chloride fumes.
 4.7 **Auto Ignition Temperature:** Currently not available
 4.8 **Electrical Hazards:** Currently not available
 4.9 **Burning Rate:** 2.0 mm/min.
 4.10 **Adiabatic Flame Temperature:** Currently not available
 4.11 **Stoichiometric Air to Fuel Ratio:** 16.7 (calc.)
 4.12 **Flame Temperature:** Currently not available
 4.13 **Combustion Molar Ratio (Reactant to Product):** 7.0 (calc.)
 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Reacts vigorously, evolving hydrogen chloride (hydrochloric acid).
 5.2 **Reactivity with Common Materials:** Reacts with surface moisture to form hydrogen chloride, which is corrosive to common metals.
 5.3 **Stability During Transport:** Stable
 5.4 **Neutralizing Agents for Acids and Caustics:** Flood with water, rinse with sodium bicarbonate or lime solution.
 5.5 **Polymerization:** Not pertinent
 5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** Currently not available
 6.2 **Waterfowl Toxicity:** Currently not available
 6.3 **Biological Oxygen Demand (BOD):** Currently not available
 6.4 **Food Chain Concentration Potential:** None
 6.5 **GESAMP Hazard Profile:**
 Bioaccumulation: 0
 Damage to living resources: 1
 Human Oral hazard: 1
 Human Contact hazard: II
 Reduction of amenities: XX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 98+%
 7.2 **Storage Temperature:** Ambient
 7.3 **Inert Atmosphere:** No requirement
 7.4 **Venting:** Currently not available
 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:** Flammable liquid
 8.2 **49 CFR Class:** 3
 8.3 **49 CFR Package Group:** II
 8.4 **Marine Pollutant:** No
 8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|---------------------------|----------------|
| Health Hazard (Blue)..... | 3 |
| Flammability (Red)..... | 3 |
| Instability (Yellow)..... | 0 |
| Special (White)..... | W |
- 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:** Liquid
 9.2 **Molecular Weight:** 163.5
 9.3 **Boiling Point at 1 atm:** 210°F = 99°C = 372°K
 9.4 **Freezing Point:** Not pertinent
 9.5 **Critical Temperature:** Not pertinent
 9.6 **Critical Pressure:** Not pertinent
 9.7 **Specific Gravity:** 1.24 at 25°C (liquid)
 9.8 **Liquid Surface Tension:** (est.) 25 dynes/cm = 0.025 N/m at 20°C
 9.9 **Liquid Water Interfacial Tension:** Not pertinent
 9.10 **Vapor (Gas) Specific Gravity:** 5.6
 9.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
 9.12 **Latent Heat of Vaporization:** 104 Btu/lb = 58 cal/g = 2.4 X 10⁵ J/kg
 9.13 **Heat of Combustion:** (est.) -4,300 Btu/lb = -2,400 cal/g = -100 X 10⁵ J/kg
 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 **Reid Vapor Pressure:** Currently not available

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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
35	78.549	42	0.400	42	0.873	51	4.064
40	78.370	44	0.400	44	0.873	52	4.005
45	78.200	46	0.400	46	0.873	53	3.948
50	78.030	48	0.400	48	0.873	54	3.892
55	77.849	50	0.400	50	0.873	55	3.836
60	77.679	52	0.400	52	0.873	56	3.782
65	77.509	54	0.400	54	0.873	57	3.729
70	77.330	56	0.400	56	0.873	58	3.677
75	77.160	58	0.400	58	0.873	59	3.625
80	76.990	60	0.400	60	0.873	60	3.575
85	76.809	62	0.400	62	0.873	61	3.525
90	76.639	64	0.400	64	0.873	62	3.476
95	76.469	66	0.400	66	0.873	63	3.428
100	76.290	68	0.400	68	0.873	64	3.381
		70	0.400	70	0.873	65	3.335
		72	0.400	72	0.873	66	3.290
		74	0.400	74	0.873	67	3.245
		76	0.400	76	0.873	68	3.201
				78	0.873	69	3.158
				80	0.873	70	3.116
				82	0.873	71	3.074
				84	0.873	72	3.033
				86	0.873	73	2.993
				88	0.873	74	2.954
						75	2.915
						76	2.877

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
	R	70	0.496	70	0.01427		N
	E	80	0.670	80	0.01890		O
	A	90	0.894	90	0.02477		T
	C	100	1.181	100	0.03215		
	T	110	1.546	110	0.04133		P
	S	120	2.004	120	0.05265		E
		130	2.575	130	0.06651		R
		140	3.281	140	0.08334		T
		150	4.148	150	0.10360		I
		160	5.204	160	0.12790		N
		170	6.483	170	0.15680		E
		180	8.020	180	0.19100		N
		190	9.856	190	0.23110		N
		200	12.040	200	0.27800		T
		210	14.620	210	0.33240		
		220	17.640	220	0.39540		