

ZIRCONIUM TETRACHLORIDE

ZCT

CAUTIONARY RESPONSE INFORMATION		
Common Synonyms Tetrachlorozirconium Zirconium chloride Zirconium tetrachloride solid (DOT)	Solid crystals White	Sinks and decomposes in water. Irritating vapor is produced.
Keep people away. AVOID CONTACT WITH SOLID AND SOLUTION. Wear chemical protective suit with self-contained breathing apparatus. Notify local health and pollution control agencies. Protect water intakes.		
Fire	Not flammable. POISONOUS GAS PRODUCED ON CONTACT WITH WATER Wear chemical protective suit with self-contained breathing apparatus. DO NOT USE WATER ON ADJACENT FIRES. Extinguish adjacent fires with carbon dioxide or dry chemical.	
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose, and throat. Harmful if inhaled. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. SOLID Irritation to 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.	
Water Pollution	Dangerous to aquatic life in high concentrations. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	

1. CORRECTIVE RESPONSE ACTIONS	2. CHEMICAL DESIGNATIONS	3. HEALTH HAZARDS	4. FIRE HAZARDS	5. CHEMICAL REACTIVITY	6. WATER POLLUTION	7. SHIPPING INFORMATION
Dilute and disperse Stop discharge Chemical and Physical Treatment: Neutralize	2.1 CG Compatibility Group: Not listed. 2.2 Formula: $ZrCl_4$ 2.3 IMO/UN Designation: Not listed 2.4 DOT ID No.: 2503 2.5 CAS Registry No.: 10026-11-6 2.6 NAERG Guide No.: 137 2.7 Standard Industrial Trade Classification: 52329	3.1 Personal Protective Equipment: Helmet, self-contained breathing apparatus, rubber boots, gloves, bands around legs, arms and waist. Facemask as well as covering rest of head. 3.2 Symptoms Following Exposure: INHALATION: Irritating to upper respiratory tract; presumably caused by liberated HCl. EYES: Irritating. SKIN: Irritating. INGESTION: Burning pain in the mouth and throat, vomiting, watery or bloody diarrhea, retching, collapse, and convulsions. 3.3 Treatment of Exposure: Call a physician. INHALATION: Remove from exposure. EYES: Flush with water. SKIN: Wash with soap and plenty of water. INGESTION: Dilute with water or milk. Give milk of magnesia. 3.4 TLV-TWA: 5 mg/m³ (as zirconium) 3.5 TLV-STEL: 10 mg/m³ (as zirconium) 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Grade 2; LD ₅₀ = 0.5 to 5.0 g/kg. 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: May cause granuloma in skin. A mild lung irritant. 3.10 Vapor (Gas) Irritant Characteristics: Vapors of HCl given off cause severe irritation of eyes and throat and can cause lung injury. They cannot be tolerated even at low concentrations. 3.11 Liquid or Solid Characteristics: Fairly severe skin irritant, may cause pain and second-degree burns after a few minutes contact. 3.12 Odor Threshold: Currently not available 3.13IDLH Value: 50 mg/m³ (as zirconium) 3.14 OSHA PEL-TWA: 5 mg/m³ (as zirconium) 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: Not listed. 3.17 EPA AEGL: Not listed	4.1 Flash Point: Not flammable 4.2 Flammable Limits in Air: Not flammable 4.3 Fire Extinguishing Agents: Not pertinent 4.4 Fire Extinguishing Agents Not to Be Used: Water 4.5 Special Hazards of Combustion Products: Not pertinent 4.6 Behavior in Fire: Will not burn - sublimes above 626°F (331°C). May give off HCl fumes. 4.7 Auto Ignition Temperature: Not flammable 4.8 Electrical Hazards: Currently not available 4.9 Burning Rate: Not flammable 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	5.1 Reactivity with Water: Reacts vigorously forming HCl. 5.2 Reactivity with Common Materials: If moist will form hydrochloric acid which is corrosive to many metals. 5.3 Stability During Transport: Stable 5.4 Neutralizing Agents for Acids and Caustics: Sodium bicarbonate and ammonia. 5.5 Polymerization: Currently not available 5.6 Inhibitor of Polymerization: Currently not available	6.1 Aquatic Toxicity: In water $ZrCl_4$ decomposes forming $ZrOCl_2$ and HCl. Using Fathead minnows the 96-hour TL ₉₀ for $ZrOCl_2$ as Zr in soft water is 18 mg/L, and in hard water 240 mg/L. The 96-hour TL ₉₀ for Mosquito fish in fresh water is 282 mg/L HCl. 6.2 Waterfowl Toxicity: Currently not available 6.3 Biological Oxygen Demand (BOD): Currently not available 6.4 Food Chain Concentration Potential: Currently not available 6.5 GESAMP Hazard Profile: Bioaccumulation: 0 Damage to living resources: 1 Human Oral hazard: 1 Human Contact hazard: 1 Reduction of amenities: XX	7.1 Grades of Purity: Currently not available 7.2 Storage Temperature: Cool 7.3 Inert Atmosphere: Currently not available 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

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
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
REACTS		374	0.019		CURRENTLY NOT AVAILABLE		CURRENTLY NOT AVAILABLE