

ZIRCONIUM POTASSIUM FLOURIDE

ZPF

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Potassium fluozirconate Potassium hexafluorozirconate Potassium zirconium fluoride		Solid crystals Colorless Sinks and mixes with water.
Avoid inhalation. Notify local health and pollution control agencies. Protect water intakes.		
Fire	Not flammable.	
Exposure	CALL FOR MEDICAL AID. DUST Harmful if inhaled. Move to fresh air. SOLID Harmful if swallowed. Irritating to skin. 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 and have victim induce vomiting.	
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW 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 Dilute and disperse Stop discharge	2. CHEMICAL DESIGNATIONS 2.1 CG Compatibility Group: Not listed. 2.2 Formula: K ₂ ZrF ₆ 2.3 IMO/UN Designation: Not listed 2.4 DOT ID No.: 9162 2.5 CAS Registry No.: 16923-95-8 2.6 NAERG Guide No.: 171 2.7 Standard Industrial Trade Classification: 52310
3. HEALTH HAZARDS	
3.1 Personal Protective Equipment: Rubber gloves, safety glasses.	
3.2 Symptoms Following Exposure: INHALATION: Irritation, nose bleed possible. SKIN: May cause granulomatous reactions. INGESTION: Burning pain in the mouth and throat, vomiting, watery or bloody diarrhea, retching anuria, liver damage and collapse.	
3.3 Treatment of Exposure: Call a physician. INHALATION: Move to fresh air. EYES: Flush with large amount of water for 15 minutes. Seek medical attention. SKIN: Wash with soap and water. INGESTION: Dilute with water or milk. Remove by gastric lavage or vomiting. Give milk or starch drink to relieve irritation. Call a physician.	
3.4 TLV-TWA: 5 mg/m ³ (as zirconium)	
3.5 TLV-STEL: 10 mg/m ³ (as zirconium)	
3.6 TLV-Ceiling: Not listed.	
3.7 Toxicity by Ingestion: Grade 3; LD ₅₀ = 50 to 500 mg/kg.	
3.8 Toxicity by Inhalation: Currently not available.	
3.9 Chronic Toxicity: Suppressed growth and caused thickening interalveolar lung septa in rats. May cause erythematous, papular and granulomatous reactions on skin.	
3.10 Vapor (Gas) Irritant Characteristics: Not pertinent	
3.11 Liquid or Solid Characteristics: Currently not available	
3.12 Odor Threshold: Currently not available	
3.13 IDLH Value: 50 mg/m ³ (as zirconium)	
3.14 OSHA PEL-TWA: 5 mg/m ³ (as zirconium)	
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 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:** Not pertinent
- 4.5 **Special Hazards of Combustion Products:** Not pertinent
- 4.6 **Behavior in Fire:** Not pertinent
- 4.7 **Auto Ignition Temperature:** Not flammable
- 4.8 **Electrical Hazards:** Not pertinent
- 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. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction
- 5.2 **Reactivity with Common Materials:** Currently not available
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Currently not available
- 5.5 **Polymerization:** Currently not available
- 5.6 **Inhibitor of Polymerization:** Currently not available

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**
Fluoride salts are toxic to fish at concentration as low as 2.3 ppm
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):** Currently not available
- 6.4 **Food Chain Concentration Potential:** Fluorine is concentrated by aquatic animals.
- 6.5 **GESAMP Hazard Profile:** Not listed

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Currently not available
- 7.2 **Storage Temperature:** Currently not available
- 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

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Not listed.
- 8.2 **49 CFR Class:** Not pertinent
- 8.3 **49 CFR Package Group:** Not listed.
- 8.4 **Marine Pollutant:** No
- 8.5 **NFPA Hazard Classification:** Not listed
- 8.6 **EPA Reportable Quantity:** 1000 pounds
- 8.7 **EPA Pollution Category:** C
- 8.8 **RCRA Waste Number:** Not listed
- 8.9 **EPA FWPCA List:** Yes

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Solid
- 9.2 **Molecular Weight:** 283.41
- 9.3 **Boiling Point at 1 atm:** Currently not available
- 9.4 **Freezing Point:** 1724°F = 840°C = 1113.2°K
- 9.5 **Critical Temperature:** Currently not available
- 9.6 **Critical Pressure:** Currently not available
- 9.7 **Specific Gravity:** 3.48 at room temperature
- 9.8 **Liquid Surface Tension:** Not pertinent
- 9.9 **Liquid Water Interfacial Tension:** Not pertinent
- 9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
- 9.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
- 9.12 **Latent Heat of Vaporization:** Not pertinent
- 9.13 **Heat of Combustion:** Not pertinent
- 9.14 **Heat of Decomposition:** Currently not available
- 9.15 **Heat of Solution:** Currently not available
- 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
40	1.856		N O T		N O T		N O T
50	3.202		P E R T I N E N T		P E R T I N E N T		P E R T I N E N T
60	4.548						
70	5.893						
80	7.239						
90	8.584						
100	9.930						
110	11.275						
120	12.621						
130	13.966						
140	15.312						
150	16.658						
160	18.003						
170	19.349						
180	20.694						
190	22.040						
200	23.385						
210	24.731						