

DIFLUOROPHOSPHORIC ACID

DFA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Difluorophosphorous acid	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. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	Not flammable. POISONOUS GASES MAY BE PRODUCED WHEN HEATED.
Exposure	Call for medical aid. VAPOR Irritating to eyes, nose and throat. Move victim to fresh air. If in eyes, hold eyelids open and flush with plenty of water. If breathing is difficult, give oxygen. 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.
Water Pollution	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.

1. CORRECTIVE RESPONSE ACTIONS

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

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
2.2 **Formula:** HOPOF₂
2.3 **IMO/UN Designation:** 8/1768
2.4 **DOT ID No.:** 1768
2.5 **CAS Registry No.:** Currently not available
2.6 **NAERG Guide No.:** 154
2.7 **Standard Industrial Trade Classification:** 52236

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Air line mask or self-contained breathing apparatus; full protective clothing.
- 3.2 **Symptoms Following Exposure:** Inhalation causes severe irritation of upper respiratory tract. Contact with liquid causes severe irritation of eyes and skin. Ingestion causes severe burns of mouth and stomach.
- 3.3 **Treatment of Exposure:** Get medical attention as soon as possible following exposures to this compound. **INHALATION:** remove from exposure and support respiration. **EYES:** wash with copious volumes of water for at least 15 min. **SKIN:** wash with large amounts of water for 15 min. **INGESTION:** if victim is conscious, have him drink large amounts of water followed by milk or milk of magnesia.
- 3.4 **TLV-TWA:** Not listed.
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** Not listed.
3.7 **Toxicity by Ingestion:** Currently not available
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available
3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary.
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:**
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:** Do not use water on adjacent fires.
- 4.5 **Special Hazards of Combustion**
Products: Irritating and toxic fumes of hydrogen fluoride and phosphoric acid may be formed in fires.
- 4.6 **Behavior in Fire:** Not pertinent
- 4.7 **Auto Ignition Temperature:** Not pertinent
- 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:** Reacts vigorously to form corrosive and toxic hydrofluoric acid.
- 5.2 **Reactivity with Common Materials:** In the presence of moisture, is corrosive to glass, other siliceous materials, and most metals.
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Flush 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):** None
- 6.4 **Food Chain Concentration Potential:**
None
- 6.5 **GESAMP Hazard Profile:**
Bioaccumulation: 0
Damage to living resources: 1
Human Oral hazard: 3
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** FP Acid No. 2, 90+%; Commercial, 96+% plus 3.5% monofluorophosphoric acid
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Pressure-vacuum
- 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:** Corrosive material
- 8.2 **49 CFR Class:** 8
- 8.3 **49 CFR Package Group:** II
- 8.4 **Marine Pollutant:** No
- 8.5 **NFPA Hazard Classification:** Not listed
- 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:** 103.0
- 9.3 **Boiling Point at 1 atm:** 241°F = 116°C = 389°K
- 9.4 **Freezing Point:** -139°F = -95°C = 178°K
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 1.583 at 25°C (liquid)
- 9.8 **Liquid Surface Tension:** Currently not available
- 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:** 140 Btu/lb = 77 cal/g = 3.2 X 10⁵ J/kg
- 9.13 **Heat of Combustion:** Not pertinent
- 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

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
34	99.809	51	0.500	51	1.209		N O T P E R T I N E N T
36	99.740	52	0.500	52	1.209		
38	99.669	53	0.500	53	1.209		
40	99.599	54	0.500	54	1.209		
42	99.530	55	0.500	55	1.209		
44	99.459	56	0.500	56	1.209		
46	99.389	57	0.500	57	1.209		
48	99.320	58	0.500	58	1.209		
50	99.250	59	0.500	59	1.209		
52	99.179	60	0.500	60	1.209		
54	99.110	61	0.500	61	1.209		
56	99.040	62	0.500	62	1.209		
58	98.969	63	0.500	63	1.209		
60	98.900	64	0.500	64	1.209		
62	98.830	65	0.500	65	1.209		
64	98.770	66	0.500	66	1.209		
66	98.700	67	0.500	67	1.209		
68	98.629	68	0.500	68	1.209		
70	98.559	69	0.500	69	1.209		
72	98.490	70	0.500	70	1.209		
74	98.419	71	0.500	71	1.209		
76	98.349	72	0.500	72	1.209		
78	98.280	73	0.500	73	1.209		
80	98.209	74	0.500	74	1.209		
82	98.139	75	0.500	75	1.209		
84	98.070	76	0.500	76	1.209		

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 E A C T I O N	125	1.921	125	0.03153		N O T P E R T I N E N T
		130	2.132	130	0.03469		
		135	2.362	135	0.03811		
		140	2.613	140	0.04180		
		145	2.885	145	0.04577		
		150	3.180	150	0.05005		
		155	3.500	155	0.05463		
		160	3.846	160	0.05955		
		165	4.220	165	0.06482		
		170	4.624	170	0.07046		
		175	5.058	175	0.07648		
		180	5.526	180	0.08290		
		185	6.029	185	0.08974		
		190	6.569	190	0.09703		
		195	7.148	195	0.10480		
		200	7.768	200	0.11300		
	205	8.432	205	0.12170			
	210	9.140	210	0.13100			
	215	9.897	215	0.14080			
	220	10.700	220	0.15110			
	225	11.560	225	0.16200			
	230	12.480	230	0.17360			
	235	13.450	235	0.18570			
	240	14.480	240	0.19860			
	245	15.570	245	0.21210			