

FLUOSULFONIC ACID

FSA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Fluosulfonic acid Fluosulfuric acid	Liquid Colorless to light yellow Choking odor
Reacts violently with water. Irritating mist and gas are produced on contact with water.	
<p>Evacuate. KEEP PEOPLE AWAY. Avoid inhalation. AVOID CONTACT WITH LIQUID, GAS AND MIST. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Notify local health and pollution control agencies.</p>	
Fire	Not flammable. DO NOT USE WATER OR FOAM ON ADJACENT FIRES.
Exposure	Call for medical aid. VAPOR OR MIST Irritating to eyes, nose and throat. Harmful if inhaled. Move victim to fresh air. 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: FSO ₃ H 2.3 IMO/UN Designation: 8/1777 2.4 DOT ID No.: 1777 2.5 CAS Registry No.: 7789-21-1 2.6 NAERG Guide No.: 137 2.7 Standard Industrial Trade Classification: 52236
3. HEALTH HAZARDS	
<p>3.1 Personal Protective Equipment: Rubber gloves, shoes, and clothing; goggles and face shield; acid-type canister mask or air-line mask.</p> <p>3.2 Symptoms Following Exposure: Inhalation of fumes causes severe irritation of nose and throat. Contact of liquid with eyes or skin causes very severe burns of mouth and stomach.</p> <p>3.3 Treatment of Exposure: Get medical attention quickly following all exposures to this compound. INHALATION: remove victim to fresh air; if he is unconscious, give artificial respiration. EYES: flush with water until medical help arrives. SKIN: flush with water until medical help arrives; soak burned area in strong Epsom salt solution; pay particular attention to area around fingernails. INGESTION: give large amounts of water.</p> <p>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 severe irritation of 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</p>	

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 or foam on adjacent fires.
- 4.5 **Special Hazards of Combustion**
Products: Toxic and irritating fumes of hydrogen fluoride and sulfuric acid may form in fires.
- 4.6 **Behavior in Fire:** Contact with water applied to adjacent fires produces toxic, irritating fumes of hydrogen fluoride.
- 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 violently with water to generate hydrogen fluoride and sulfuric acid mists.
- 5.2 **Reactivity with Common Materials:**
Reacts with metals, generating flammable hydrogen.
- 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: 2
Human Oral hazard: 3
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 98.5%
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Pressure-vacuum, with protection from moisture in air.
- 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:** I
- 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:** 100.07
- 9.3 **Boiling Point at 1 atm:** 324.9°F = 162.7°C = 435.9°K
- 9.4 **Freezing Point:** -125.1°F = -87.3°C = 185.9°K
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 1.73 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:** 170 Btu/lb = 94 cal/g = 3.9 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
35	110.900	52	0.500	52	1.129	0	2.980
40	110.599	54	0.500	54	1.129	5	2.845
45	110.200	56	0.500	56	1.129	10	2.718
50	109.900	58	0.500	58	1.129	15	2.599
55	109.500	60	0.500	60	1.129	20	2.488
60	109.200	62	0.500	62	1.129	25	2.384
65	108.799	64	0.500	64	1.129	30	2.286
70	108.500	66	0.500	66	1.129	35	2.194
75	108.099	68	0.500	68	1.129	40	2.108
80	107.799	70	0.500	70	1.129	45	2.026
85	107.400	72	0.500	72	1.129	50	1.949
90	107.099	74	0.500	74	1.129	55	1.877
95	106.700	76	0.500	76	1.129	60	1.808
100	106.400	78	0.500	78	1.129	65	1.744
105	106.000	80	0.500	80	1.129	70	1.682
110	105.700	82	0.500	82	1.129	75	1.624
115	105.400	84	0.500	84	1.129	80	1.569
120	105.000	86	0.500	86	1.129	85	1.517
125	104.700					90	1.467
130	104.299					95	1.420
135	104.000					100	1.376
140	103.599					105	1.333
						110	1.292
						115	1.254
						120	1.217
						125	1.182

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	-20	0.001	-20	0.00002		N
	E	-10	0.002	-10	0.00004		O
	A	0	0.003	0	0.00006		T
	C	10	0.004	10	0.00009		
	T	20	0.007	20	0.00013		P
	S	30	0.010	30	0.00019		E
		40	0.015	40	0.00027		R
		50	0.021	50	0.00039		T
		60	0.030	60	0.00054		I
		70	0.043	70	0.00076		N
		80	0.060	80	0.00104		E
		90	0.083	90	0.00140		N
		100	0.113	100	0.00188		T
		110	0.152	110	0.00249		
		120	0.203	120	0.00327		
		130	0.269	130	0.00425		
		140	0.352	140	0.00547		
		150	0.457	150	0.00698		
		160	0.588	160	0.00884		
		170	0.751	170	0.01112		
		180	0.951	180	0.01387		
		190	1.197	190	0.01718		
		200	1.496	200	0.02113		
		210	1.856	210	0.02584		