

SULFURIC ACID

SFA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Battery acid Chamber acid Fertilizer acid Oil of vitriol	Oily liquid Colorless Odorless
Sinks and mixes violently with water. Irritating mist is produced.	
<p style="color: red;">Keep people away. AVOID CONTACT WITH LIQUID. Wear goggles, self-contained breathing apparatus, and rubber overclothing. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	Not flammable. May cause fire on contact with combustibles. Flammable gas may be produced on contact with metals. POISONOUS GAS MAY BE PRODUCED IN FIRE. Wear goggles, self-contained breathing apparatus, and rubber overclothing. DO NOT USE WATER ON ADJACENT FIRES. Extinguish with dry chemical or carbon dioxide.
Exposure	CALL FOR MEDICAL AID. MIST Irritating to eyes, nose and throat. If inhaled, will cause coughing, difficult breathing, or loss of consciousness. Move to fresh air. IF IN EYES, hold eyelids open and flush with plenty of water. If breathing has stopped, give artificial respiration. 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	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
Chemical and Physical Treatment:
Neutralize

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** 2; Sulfuric acid
2.2 **Formula:** H₂SO₄
2.3 **IMO/UN Designation:** 8.0/1830
2.4 **DOT ID No.:** 1830
2.5 **CAS Registry No.:** 7664-93-9
2.6 **NAERG Guide No.:** 137
2.7 **Standard Industrial Trade Classification:** 52232

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Safety shower; eyewash fountain; safety goggles; face shield; approved respirator (self-contained or air-line); rubber safety shoes; rubber apron.
- 3.2 **Symptoms Following Exposure:** Inhalation of vapor from hot, concentrated acid may injure lungs. Swallowing may cause severe injury or death. Contact with skin or eyes causes severe burns.
- 3.3 **Treatment of Exposure:** Call a doctor. **INHALATION:** Observe victim for delayed pulmonary reaction. **INGESTION:** Have victim drink water if possible; do NOT induce vomiting. **EYES AND SKIN:** Wash with large amounts of water for at least 15 min.; do not use oils or ointments in eyes; treat skin burns.
- 3.4 **TLV-TWA:** 1 mg/m³
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** 3 mg/m³ (mist)
3.7 **Toxicity by Ingestion:** No effects except those secondary to tissue damage.
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** None
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapors from hot acid (77-98%) cause moderate irritation of eyes and respiratory system. Effect is temporary.
- 3.11 **Liquid or Solid Characteristics:** 77-98% acid causes severe second- and third-degree burns of skin on short contact and is very injurious to the eyes.
- 3.12 **Odor Threshold:** Greater than 1 mg/m³
3.13 **IDLH Value:** 15 mg/m³
3.14 **OSHA PEL-TWA:** 1 mg/m³
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:** Water used on adjacent fires should be carefully handled.
- 4.5 **Special Hazards of Combustion Products:** Not pertinent
- 4.6 **Behavior in Fire:** Not flammable
- 4.7 **Auto Ignition Temperature:** Not flammable
- 4.8 **Electrical Hazards:** None
- 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:** Reacts violently with evolution of heat. Spattering occurs when water is added to the compound.
- 5.2 **Reactivity with Common Materials:**
Extremely hazardous in contact with many materials, particularly metals and combustibles. Dilute acid reacts with most metals, releasing hydrogen which can form explosive mixtures with air in confined spaces.
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Dilute with water, then neutralize with lime, limestone, or soda ash.
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**
24.5 ppm/24 hr/bluegill/lethal/fresh water
42.5 ppm/48 hr/prawn/LC50/salt water
- 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: 2
Human Oral hazard: 3
Human Contact hazard: II
Reduction of amenities: XX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** CP; USP; Technical, at 33% to 98% (50° Be to 66° Be).
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Open
- 7.5 **IMO Pollution Category:** C
- 7.6 **Ship Type:** 3
- 7.7 **Barge Hull Type:** 3

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:**
- | Category | Classification |
|---------------------------|----------------|
| Health Hazard (Blue)..... | 3 |
| Flammability (Red)..... | 0 |
| Instability (Yellow)..... | 2 |
- 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:** Liquid
- 9.2 **Molecular Weight:** 98.08
- 9.3 **Boiling Point at 1 atm:** 644°F = 340°C = 613°K
- 9.4 **Freezing Point:** Not pertinent
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 1.84 at 20°C (liquid)
- 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:** Not pertinent
- 9.15 **Heat of Solution:** -418.0 Btu/lb = -232.2 cal/g = -9.715 X 10⁵ J/kg
- 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:** Low *Physical properties apply to concentrated (98%) acid unless otherwise stated. More dilute acid is more water-like.

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	115.400	35	0.330		N		N
40	115.200	40	0.331		O		O
45	115.000	45	0.331		T		T
50	114.900	50	0.332				
55	114.700	55	0.333		P		P
60	114.500	60	0.333		E		E
65	114.299	65	0.334		R		R
70	114.200	70	0.334		T		T
75	114.000	75	0.335		I		I
80	113.799	80	0.335		N		N
85	113.599	85	0.336		E		E
90	113.500	90	0.336		N		N
95	113.299	95	0.337		T		T
100	113.099	100	0.338				
105	112.900	105	0.338				
110	112.799	110	0.339				
115	112.599	115	0.339				
120	112.400	120	0.340				

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
	M I S C I B L E		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