SULFUR DIOXIDE

SFD

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Liquefied compressed gas Colorless Sharp irritating odor Liquid sinks and boils in water. Poisonous visible vapor cloud is produced.

Evacuate.
Keep people away. Avoid contact with liquid and vapor.
Wear goggles and self-contained breathing apparatus.
Notify local health and pollution control agencies.
Protect water intakes.

Fire	Not flammable. Wear goggles and self-contained breathing apparatus. Cool exposed containers with water.
Exposure	CALL FOR MEDICAL AID. VAPOR POISONOUS IF INHALED. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Will cause frostbite. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. DO NOT RUB AFFECTED AREAS.
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: SO_2
2.3 IMO/UN Designation: 2.0/1079
2.4 DOT ID No.: 1079
2.5 CAS Registry No.: 7446-09-5
2.6 NAERG Guide No.: 125
2.7 Standard Industrial Trade Classification: 52238

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Air-supplied mask or approved canister; goggles or face shield; rubber gloves; rubber clothing where contact with liquid is possible.
3.2 Symptoms Following Exposure: Vapors cause irritation of eyes and lungs, with severe choking.
3.3 Treatment of Exposure: INHALATION: remove from exposure; support respiration; administer oxygen; call a doctor. SKIN: flush with water after exposure to liquid. EYES: wash promptly for at least 15 min.; call physician.
3.4 TLV-TWA: 2 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: 5 ppm
3.7 Toxicity by Ingestion: Not pertinent
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: Liquid can cause frostbite.
3.12 Odor Threshold: 3 ppm
3.13 IDLH Value: 100 ppm
3.14 OSHA PEL-TWA: 5 ppm
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: Containers may rupture and release irritating, toxic sulfur dioxide
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 Stoichometric 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 with water to form corrosive acid. The reaction is not hazardous.
5.2 Reactivity with Common Materials: Corrodes aluminum
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Mild acidity of water solution may be neutralized by dilute caustic soda
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity: 5 ppm/1 hr/trout/lethal/fresh water
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: Not listed

7. SHIPPING INFORMATION

7.1 Grades of Purity: Refrigeration grade 99.98%; commercial grade 99.90%
7.2 Storage Temperature: Less than 130°F
7.3 Inert Atmosphere: No requirement
7.4 Venting: Safety relief
7.5 IMO Pollution Category: D
7.6 Ship Type: Data not avaialable
7.7 Barge Hull Type: 1

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Poison gas
8.2 49 CFR Class: 2.3
8.3 49 CFR Package Group: Not pertinent.
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	2
Flammability (Red).....	0
Instability (Yellow).....	0

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: Gas
9.2 Molecular Weight: 64.06
9.3 Boiling Point at 1 atm: 14°F = –10.0°C = 263.2°K
9.4 Freezing Point: –103.9°F = –75.5°C = 197.7°K
9.5 Critical Temperature: 314.6°F = 157°C = 430.2°K
9.6 Critical Pressure: 1142 psia = 77.69 atm = 7.870 MN/m^2
9.7 Specific Gravity: 1.45 at –10°C (liquid)
9.8 Liquid Surface Tension: Not pertinent
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: 2.2
9.11 Ratio of Specific Heats of Vapor (Gas): 1.265
9.12 Latent Heat of Vaporization: 171 Btu/lb = 94.8 cal/g = 3.97 X 10^5 J/kg
9.13 Heat of Combustion: Not pertinent
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: –94.1 Btu/lb = –52.3 cal/g = –2.19 X 10^5 J/kg
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: 32.2 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: 84 psia

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
-55	96.509		CURRENTLY NOT AVAILABLE		NOT PERTINENT		NOT PERTINENT
-50	96.089						
-45	95.669						
-40	95.259						
-35	94.839						
-30	94.429						
-25	94.009						
-20	93.589						
-15	93.181						
-10	92.759						
-5	92.339						
0	91.929						
5	91.509						
10	91.099						

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
68	10.000	-100	0.293	-100	0.00485	0	0.143
		-90	0.464	-90	0.00749	25	0.145
		-80	0.714	-80	0.01123	50	0.147
		-70	1.071	-70	0.01640	75	0.149
		-60	1.567	-60	0.02340	100	0.151
		-50	2.243	-50	0.03268	125	0.152
		-40	3.147	-40	0.04475	150	0.154
		-30	4.333	-30	0.06019	175	0.156
		-20	5.866	-20	0.07962	200	0.158
		-10	7.817	-10	0.10370	225	0.160
		0	10.270	0	0.13330	250	0.161
		10	13.300	10	0.16900	275	0.163
		20	17.030	20	0.21180	300	0.165
		30	21.540	30	0.26250	325	0.166
		40	26.950	40	0.32190	350	0.168
		50	33.390	50	0.39090	375	0.170
		60	40.970	60	0.47050	400	0.171
						425	0.173
						450	0.174
						475	0.176
						500	0.177
						525	0.179
						550	0.180
						575	0.181
						600	0.183