CHLOROSULFONIC ACID

CSA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
Chlorosulfuric acid
Chlorsulfonic acid
Sulfuric chlorhydrin

Liquid | Colorless to light yellow | Sharp, choking odor

Reacts violently with water. Appears to explode. Poisonous gas is produced.

Evacuate.
Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR.
Avoid inhalation.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

May cause fire on contact with combustibles.
Flammable, explosive gases may be formed on contact with metals and moisture.
DO NOT USE WATER.
Use dry chemicals or carbon dioxide.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose, and throat.
Harmful if inhaled.
Move to fresh air.
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

Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.
Notify local health and pollution control 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: See Table 1, Compatiblity Guide; Special case
2.2 Formula: $ClSO_3H$
2.3 IMO/UN Designation: 8.0/1754
2.4 DOT ID No.: 1754
2.5 CAS Registry No.: 7790-94-5
2.6 NAERG Guide No.: 137
2.7 Standard Industrial Trade Classification: 52236

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Acid-proof goggles or a rubber hood, long rubber gloves, rubber shoes, long rubber apron, shirt and trousers of wool or acrylic fiber, and a hat with a brim. For emergency use involving considerable exposure, a complete rubber suit with hood, gloves and boots of rubber should be used. In case of fire use self-contained breathing apparatus.
3.2 Symptoms Following Exposure: INHALATION: vapor extremely irritating to lungs and mucous membranes. Vapor has such a sharp and pentrating odor that inhalation of severely toxic quantities is unlikely unless it is impossible to escape the fumes. CONTACT WITH EYES OR SKIN: liquid acid will severely burn body tissue.
3.3 Treatment of Exposure: Call a physician in all cases. INHALATION: remove victim to fresh air; if he is not breathing, apply artificial respiration; give oxygen if breathing is difficult; do NOT induce vomiting. SKIN: flush with plenty of water for at least 15 min. while removing contaminated clothing and shoes.
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: None
3.10 Vapor (Gas) Irritant Characteristics: Severe eye and throat irritant. Can cause eye or lung injury and 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; very injurious to the eyes.
3.12 Odor Threshold: 1-5 ppm
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: Water
4.5 Special Hazards of Combustion Products: Decomposes into irritating and toxic gases
4.6 Behavior in Fire: Although nonflammable, it may ignite other combustibles. Contact with water AND metal produces explosive hydrogen gas.
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 violently with water, forming hydrochloric acid (vapor) and sulfuric acid.
5.2 Reactivity with Common Materials: Hydrogen, a highly flammable and explosive gas, is generated by the action of the acid on most metals. May cause ignition by contact with combustible materials.
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Although the acid reacts violently with water, flooding (from a distance) must be carried out before neutralizing with lime water or sodium bicarbonate solution.
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity:
282 ppm/96 hr/mosquito fish/TL_m/fresh water
100-300 ppm/48 hr/shrimp/LC_{50}/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: X

7. SHIPPING INFORMATION

7.1 Grades of Purity: Technical
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
7.5 IMO Pollution Category: C
7.6 Ship Type: 1
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: I
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	0
Instability (Yellow).....	2
Special (White).....	~~W~~ OX

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: 116.53
9.3 Boiling Point at 1 atm: 311°F = 155°C = 428°K
9.4 Freezing Point: –112°F = –80°C = 193°K
9.5 Critical Temperature: Not pertinent
9.6 Critical Pressure: Not pertinent
9.7 Specific Gravity: 1.75 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: (est.) 198 Btu/lb = 110 cal/g = 4.6 X 10^5 J/kg
9.13 Heat of Combustion: Not pertinent
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: Not pertinent
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: 0.03 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
40	111.000	60	0.280		N		N
50	110.400	65	0.280		O		O
60	109.900	70	0.280		T		T
70	109.299	75	0.280				
80	108.700	80	0.280		P		P
90	108.200	85	0.280		E		E
100	107.599	90	0.280		R		R
110	107.099	95	0.280		T		T
120	106.500	100	0.280		I		I
130	106.000	105	0.280		N		N
140	105.400	110	0.280		E		E
150	104.799	115	0.280		N		N
160	104.299	120	0.280		T		T
170	103.700	125	0.280				
180	103.200	130	0.280				
190	102.599	135	0.280				
200	102.000	140	0.280				
210	101.500	145	0.280				
		150	0.280				
		155	0.280				
		160	0.280				
		165	0.280				
		170	0.280				
		175	0.280				

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	70	0.006	70	0.00013		C
	E	75	0.009	75	0.00017		U
	A	80	0.011	80	0.00023		R
	C	85	0.015	85	0.00030		R
	T	90	0.019	90	0.00038		E
	S	95	0.025	95	0.00049		N
		100	0.032	100	0.00063		T
		105	0.042	105	0.00080		L
		110	0.053	110	0.00101		Y
		115	0.068	115	0.00128		
		120	0.086	120	0.00161		N
		125	0.109	125	0.00202		O
		130	0.137	130	0.00252		T
		135	0.172	135	0.00313		
		140	0.214	140	0.00388		A
		145	0.267	145	0.00479		V
		150	0.331	150	0.00589		A
		155	0.409	155	0.00722		I
		160	0.504	160	0.00883		L
		165	0.618	165	0.01075		A
		170	0.757	170	0.01305		B
		175	0.923	175	0.01579		L
							E