

ALLYL CHLOROFORMATE

ACF

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Allyl chloroformate	Watery liquid Colorless Extremely irritating odor
Sinks in water. Flammable, irritating vapor is produced.	
<p>Stop discharge if possible. Keep people away. Shut off ignition sources. Call fire department. Avoid inhalation. Isolate and remove discharged material. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles, self-contained breathing apparatus and rubber overclothing (including gloves). Extinguish with dry chemicals, foam or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>
Exposure	<p>Call for medical aid.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled will cause difficult breathing. Move victim to fresh air. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to 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.</p>
Water Pollution	<p>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.</p>

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse small amounts
Stop discharge
Collection Systems: Pump; Dredge
Chemical and Physical Treatment:
Neutralize

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed
2.2 **Formula:** CH=CHCH₂OCCl
2.3 **IMO/UN Designation:** 8/1722
2.4 **DOT ID No.:** 1722
2.5 **CAS Registry No.:** 2937-50-0
2.6 **NAERG Guide No.:** 155
2.7 **Standard Industrial Trade Classification:** 51374

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Vapor-proof protective goggles and face shield; plastic or rubber gloves, shoes and clothing; gas mask or self-contained breathing apparatus.
- 3.2 **Symptoms Following Exposure:** Vapor irritates eyes and respiratory tract. Contact with liquid causes eye and skin irritation, and ingestion irritates mouth and stomach.
- 3.3 **Treatment of Exposure:** INHALATION: remove from exposure; support respiration if necessary; call physician. EYES: if irritated by either vapor or liquid, flush with water for at least 15 min. SKIN: wash with large amounts of water for at least 15 min. INGESTION: do NOT induce vomiting; give water; call physician.
- 3.4 **TLV-TWA:** Not listed.
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** Not listed.
- 3.7 **Toxicity by Ingestion:** Grade 3; LD₅₀ = 50 to 500 mg/kg
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapors are moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
3.11 **Liquid or Solid Characteristics:** Fairly severe skin irritant. May cause pain and second-degree burns after a few minutes' contact.
3.12 **Odor Threshold:** 1.4 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:** 92°F O.C. 88°F C.C.
4.2 **Flammable Limits in Air:** Currently not available
4.3 **Fire Extinguishing Agents:** Dry chemical, foam, carbon dioxide
4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective
4.5 **Special Hazards of Combustion Products:** When heated to decomposition, emits highly toxic phosgene gas.
4.6 **Behavior in Fire:** Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back.
4.7 **Auto Ignition Temperature:** Currently not available
4.8 **Electrical Hazards:** I, D
4.9 **Burning Rate:** 4.9 mm/min.
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** Currently not available
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** Currently not available
4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Reacts slowly, generating hydrogen chloride.
5.2 **Reactivity with Common Materials:** Corrodes metals
5.3 **Stability During Transport:** Stable
5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water, rinse with lime or sodium bicarbonate solution.
5.5 **Polymerization:** Currently not available.
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: -
Human Oral hazard: 2
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Commercial, 97+%
7.2 **Storage Temperature:** Keep cool
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:** Poison
8.2 **49 CFR Class:** 6.1
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) | 3 |
| Instability (Yellow) | 1 |
- 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:** 120.5
9.3 **Boiling Point at 1 atm:** 235°F = 113°C = 386°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:** 1.139 at 20°C (liquid)
9.8 **Liquid Surface Tension:** (est.) 25 dynes/cm = 0.025 N/m at 20°C
9.9 **Liquid Water Interfacial Tension:** Not pertinent
9.10 **Vapor (Gas) Specific Gravity:** 4.15
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.0804
9.12 **Latent Heat of Vaporization:** (est.) 100 Btu/lb = 56 cal/g = 2.3 X 10⁵ J/kg
9.13 **Heat of Combustion:** (est.) -7,800 Btu/lb = -4,300 cal/g = -180 X 10⁶ J/kg
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:** 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	72.339	34	0.450	34	1.048	34	0.958
36	72.270	36	0.450	36	1.048	36	0.940
38	72.200	38	0.450	38	1.048	38	0.923
40	72.129	40	0.450	40	1.048	40	0.906
42	72.059	42	0.450	42	1.048	42	0.889
44	71.990	44	0.450	44	1.048	44	0.873
46	71.919	46	0.450	46	1.048	46	0.858
48	71.849	48	0.450	48	1.048	48	0.842
50	71.790	50	0.450	50	1.048	50	0.827
52	71.719	52	0.450	52	1.048	52	0.813
54	71.650	54	0.450	54	1.048	54	0.799
56	71.580	56	0.450	56	1.048	56	0.785
58	71.509	58	0.450	58	1.048	58	0.772
60	71.440	60	0.450	60	1.048	60	0.758
62	71.370	62	0.450	62	1.048	62	0.746
64	71.299	64	0.450	64	1.048	64	0.733
66	71.230	66	0.450	66	1.048	66	0.721
68	71.160	68	0.450	68	1.048	68	0.709
70	71.089	70	0.450	70	1.048	70	0.698
72	71.020	72	0.450	72	1.048	72	0.686
74	70.950	74	0.450	74	1.048	74	0.675
76	70.879	76	0.450	76	1.048	76	0.664
78	70.809	78	0.450	78	1.048	78	0.654
80	70.750	80	0.450	80	1.048	80	0.644
82	70.679	82	0.450	82	1.048	82	0.633
84	70.610	84	0.450	84	1.048	84	0.624

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
	I	60	4.950	60	0.10690	100	0.230
	N	65	5.538	65	0.11850	120	0.236
	S	70	6.182	70	0.13100	140	0.241
	O	75	6.888	75	0.14460	160	0.247
	L	80	7.658	80	0.15930	180	0.252
	U	85	8.498	85	0.17510	200	0.257
	B	90	9.413	90	0.19220	220	0.263
	L	95	10.410	95	0.21060	240	0.268
	E	100	11.480	100	0.23030	260	0.273
		105	12.650	105	0.25150	280	0.278
		110	13.910	110	0.27420	300	0.284
		115	15.280	115	0.29840	320	0.289
		120	16.750	120	0.32430	340	0.294
						360	0.299
						380	0.304
						400	0.309
						420	0.314
						440	0.319