

# METHYL CHLOROFORMATE

MHC

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> Chlorocarbonic acid, methyl ester Chloroformic acid, methyl ester Methyl chlorocarbonate	Liquid Colorless to light yellow Unpleasant odor  Sinks and reacts in water. Flammable, irritating vapor is produced.
<p><b>Evacuate.</b>  <b>Keep people away. Avoid contact with liquid and vapor.</b>  <b>Shut off ignition sources. Call fire department.</b>  <b>Stay upwind. Use water spray to "knock down" vapor.</b>  <b>Notify local health and pollution control agencies.</b></p>	
<b>Fire</b>	<p><b>FLAMMABLE.</b>  <b>POISONOUS GASES MAY BE PRODUCED IN FIRE.</b>            Containers may explode in fire.            Flashback along vapor trail may occur.            Vapor may explode if ignited in an enclosed area.            Extinguish with water, dry chemicals, foam, carbon dioxide.            Cool exposed containers with water.</p>
<b>Exposure</b>	<p>CALL FOR MEDICAL AID.</p> <p><b>VAPOR</b>            Irritating to eyes, nose and throat.            If inhaled will cause difficult breathing.            Move victim to fresh air.            If breathing has stopped, give artificial respiration.            If breathing is difficult, give oxygen.</p> <p><b>LIQUID</b>  <b>POISONOUS IF SWALLOWED.</b>            Will burn skin and eyes.            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.  <b>DO NOT INDUCE VOMITING.</b></p>
<b>Water Pollution</b>	<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  
 Stop discharge  
 Collection Systems: Pump  
 Chemical and Physical Treatment:  
 Neutralize

### 2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.  
 2.2 **Formula:** CICOCH<sub>3</sub>  
 2.3 **IMO/UN Designation:** 3.2/1238  
 2.4 **DOT ID No.:** 1238  
 2.5 **CAS Registry No.:** Currently not available  
 2.6 **NAERG Guide No.:** 155  
 2.7 **Standard Industrial Trade Classification:** 51374

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Acid- or organic-canister mask or self-contained breathing apparatus; goggles or face shield; plastic gloves
- 3.2 **Symptoms Following Exposure:** Inhalation of vapor irritates nose and throat and can cause delayed pulmonary edema. Liquid irritates eyes and causes severe skin burns if allowed to remain. Ingestion causes burns of mouth and stomach.
- 3.3 **Treatment of Exposure:** INHALATION: remove victim from exposure; if breathing stops, administer artificial respiration; call physician. EYES: irrigate with copious amounts of water for at least 15 min.; call physician if needed. SKIN: flush with water for 15 min.; get medical attention for burns. INGESTION: give large amounts of water; do NOT induce vomiting; get medical attention.
- 3.4 **TLV-TWA:** Not listed.  
 3.5 **TLV-STEL:** Not listed.  
 3.6 **TLV-Ceiling:** Not listed.  
 3.7 **Toxicity by Ingestion:** Grade 4; oral LD<sub>50</sub> <50 mg/kg (rat)  
 3.8 **Toxicity by Inhalation:** Currently not available.  
 3.9 **Chronic Toxicity:** Currently not available  
 3.10 **Vapor (Gas) Irritant Characteristics:** Currently not available  
 3.11 **Liquid or Solid Characteristics:** Currently not available  
 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 AEG:** Not listed

### 4. FIRE HAZARDS

- 4.1 **Flash Point:** 76°F O.C. 73°F C.C.  
 4.2 **Flammable Limits in Air:** LFL = 6.7%  
 4.3 **Fire Extinguishing Agents:** Water, dry chemical, foam, carbon dioxide  
 4.4 **Fire Extinguishing Agents Not to Be Used:** Not pertinent  
 4.5 **Special Hazards of Combustion**  
**Products:** Irritating and toxic hydrogen chloride and phosgene may be formed.  
 4.6 **Behavior in Fire:** Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back.  
 4.7 **Auto Ignition Temperature:** Currently not available  
 4.8 **Electrical Hazards:** Currently not available  
 4.9 **Burning Rate:** 2.0 mm/min.  
 4.10 **Adiabatic Flame Temperature:** Currently not available  
 4.11 **Stoichiometric Air to Fuel Ratio:** 7.1 (calc.)  
 4.12 **Flame Temperature:** Currently not available  
 4.13 **Combustion Molar Ratio (Reactant to Product):** 4.0 (calc.)  
 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

### 5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Reacts slowly, evolving hydrogen chloride (hydrochloric acid). Reaction can be hazardous if water is hot.  
 5.2 **Reactivity with Common Materials:** Corrodes rubber  
 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:** Not listed

### 7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 97+%  
 7.2 **Storage Temperature:** Ambient  
 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:** Not listed  
 8.6 **EPA Reportable Quantity:** 1000 pounds  
 8.7 **EPA Pollution Category:** C  
 8.8 **RCRA Waste Number:** U156  
 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:** 94.5  
 9.3 **Boiling Point at 1 atm:** 160°F = 71°C = 344°K  
 9.4 **Freezing Point:** <-114°F = <-81°C = <192°K  
 9.5 **Critical Temperature:** Not pertinent  
 9.6 **Critical Pressure:** Not pertinent  
 9.7 **Specific Gravity:** 1.22 at 20°C (liquid)  
 9.8 **Liquid Surface Tension:** (est.) 26 dynes/cm = 0.026 N/m at 20°C  
 9.9 **Liquid Water Interfacial Tension:** Not pertinent  
 9.10 **Vapor (Gas) Specific Gravity:** 3.25  
 9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.1544  
 9.12 **Latent Heat of Vaporization:** (est.) 153 Btu/lb = 85 cal/g = 3.6 X 10<sup>5</sup> J/kg  
 9.13 **Heat of Combustion:** -4,690 Btu/lb = -2,600 cal/g = -109 X 10<sup>6</sup> J/kg  
 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
34	77.330	65	0.316	52	1.048	60	7.064
36	77.259	70	0.320	54	1.048	61	6.879
38	77.200	75	0.324	56	1.048	62	6.699
40	77.129	80	0.327	58	1.048	63	6.524
42	77.059	85	0.331	60	1.048	64	6.355
44	76.990	90	0.335	62	1.048	65	6.190
46	76.919	95	0.339	64	1.048	66	6.031
48	76.849	100	0.343	66	1.048	67	5.876
50	76.780	105	0.347	68	1.048	68	5.726
52	76.709	110	0.351	70	1.048	69	5.580
54	76.639	115	0.355	72	1.048	70	5.438
56	76.570	120	0.359	74	1.048	71	5.301
58	76.500	125	0.362	76	1.048	72	5.167
60	76.429	130	0.366	78	1.048	73	5.037
62	76.360			80	1.048	74	4.911
64	76.290			82	1.048	75	4.789
66	76.219			84	1.048	76	4.670
68	76.150			86	1.048	77	4.555
70	76.089						
72	76.020						
74	75.950						
76	75.879						
78	75.809						
80	75.740						
82	75.669						
84	75.599						

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
	C	141	10.230	141	0.14990	0	0.148
	U	142	10.440	142	0.15270	25	0.151
	R	143	10.650	143	0.15550	50	0.155
	R	144	10.860	144	0.15840	75	0.158
	E	145	11.080	145	0.16140	100	0.161
	N	146	11.310	146	0.16430	125	0.164
	T	147	11.520	147	0.16740	150	0.168
	L	148	11.760	148	0.17040	175	0.170
	Y	149	12.000	149	0.17350	200	0.173
		150	12.240	150	0.17670	225	0.176
	N	151	12.480	151	0.17990	250	0.179
	O	152	12.730	152	0.18320	275	0.181
	T	153	12.980	153	0.18650	300	0.184
		154	13.230	154	0.18980	325	0.186
	A	155	13.490	155	0.19320	350	0.188
	V	156	13.750	156	0.19660	375	0.190
	A	157	14.020	157	0.20010	400	0.192
	I	158	14.290	158	0.20370	425	0.194
	L	159	14.570	159	0.20730	450	0.196
	A	160	14.850	160	0.21090	475	0.198
	B	161	15.130	161	0.21460	500	0.199
	L	162	15.420	162	0.21840	525	0.201
	E	163	15.710	163	0.22220	550	0.202
		164	16.010	164	0.22600	575	0.203
		165	16.310	165	0.22990	600	0.204
		166	16.620	166	0.23390		