

# DICHLOROMONOFUOROMETHANE

DFM

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> Dichlorofluoromethane F-21 Fluorodichloromethane Freon 21 Halocarbon 21 Halon 112 R-21 Refrigerant 21		Liquid or compressed gas Colorless Slight ether-like odor
Keep people away. Avoid contact with liquid or vapor. Stay upwind; keep out of low areas. Wear self-contained positive pressure breathing apparatus and full protective clothing. Notify local health and pollution control agencies.		
<b>Fire</b>	Nonflammable. Container may explode in heat of fire. Move container from fire area if you can do it without risk. Stay away from ends of tanks. Cool containers that are exposed to flames with water from the side until well after fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.	
<b>Exposure</b>	CALL FOR MEDICAL AID.  <b>VAPORS</b> Vapors may cause dizziness or suffocation. Move victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.  <b>LIQUID</b> Contact with liquid may cause frostbite. Remove contaminated clothing and shoes. Flush affected areas with plenty of lukewarm water. DO NOT USE HOT WATER.	
<b>Water Pollution</b>	Not pertinent	

### 1. CORRECTIVE RESPONSE ACTIONS

Stop discharge

### 2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: Not listed.
- 2.2 Formula:  $\text{CHCl}_2\text{F}$
- 2.3 IMO/UN Designation: 2.2/1029
- 2.4 DOT ID No.: 1029
- 2.5 CAS Registry No.: 75-43-4
- 2.6 NAERG Guide No.: 126
- 2.7 Standard Industrial Trade Classification: 51138

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Self-contained positive pressure breathing apparatus, rubber gloves, safety goggles, safety shoes.
- 3.2 **Symptoms Following Exposure:** INHALATION: May cause giddiness, light-headedness, disorientation, nausea, vomiting, narcosis, cardiac dysrhythmias, hypotension, and death. SKIN: May cause frostbite or irritation. EYES: May cause irritation or cold injury.
- 3.3 **Treatment of Exposure:** INHALATION: Remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. SKIN: Remove contaminated clothing. Flush affected areas with lukewarm water. DO NOT USE HOT WATER. Contact a physician. EYES: Flush with plenty of running water for at least 15 minutes, holding eyelids open if necessary.
- 3.4 TLV-TWA: 10 ppm
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: Not listed.
- 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 are non-irritating to eyes and throat.
- 3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing or skin, may cause frostbite.
- 3.12 Odor Threshold: Currently not available
- 3.13 IDLH Value: 5,000 ppm
- 3.14 OSHA PEL-TWA: 1000 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: None
- 4.2 Flammable Limits in Air: Not pertinent
- 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: Toxic fumes of chlorine and fluorine may be produced in fire.
- 4.6 Behavior in Fire: Not pertinent
- 4.7 Auto Ignition Temperature: 1022°F
- 4.8 Electrical Hazards: None
- 4.9 Burning Rate: Not pertinent
- 4.10 Adiabatic Flame Temperature: Not pertinent
- 4.11 Stoichiometric Air to Fuel Ratio: Not pertinent
- 4.12 Flame Temperature: Not pertinent
- 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: No reaction
- 5.2 Reactivity with Common Materials: No reaction
- 5.3 Stability During Transport: Stable
- 5.4 Neutralizing Agents for Acids and Caustics: Not pertinent
- 5.5 Polymerization: Not pertinent
- 5.6 Inhibitor of Polymerization: Not pertinent

### 6. WATER POLLUTION

- 6.1 Aquatic Toxicity: Not pertinent
- 6.2 Waterfowl Toxicity: Not pertinent
- 6.3 Biological Oxygen Demand (BOD): Not pertinent
- 6.4 Food Chain Concentration Potential: Not pertinent
- 6.5 GESAMP Hazard Profile: Not listed

### 7. SHIPPING INFORMATION

- 7.1 Grades of Purity: 98%
- 7.2 Storage Temperature: Currently not available
- 7.3 Inert Atmosphere: Currently not available
- 7.4 Venting: Currently not available
- 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: Nonflammable Gas
- 8.2 49 CFR Class: 2.2
- 8.3 49 CFR Package Group: Not listed.
- 8.4 Marine Pollutant: No
- 8.5 NFPA Hazard Classification: Not listed
- 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: 102.92
- 9.3 Boiling Point at 1 atm: 48°F = 8.9°C = 282°K
- 9.4 Freezing Point: -211°F = -135°F = 138°K
- 9.5 Critical Temperature: 353.3°F = 178.5°C = 451.7°K
- 9.6 Critical Pressure: 749.5 psia = 51 atm = 5.2 MN/m<sup>2</sup>
- 9.7 Specific Gravity: 1.48 at 20°C
- 9.8 Liquid Surface Tension: 18 dyne/cm = .018 N/m @ 25°C
- 9.9 Liquid Water Interfacial Tension: Currently not available
- 9.10 Vapor (Gas) Specific Gravity: 3.55
- 9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available
- 9.12 Latent Heat of Vaporization: 104.2 Btu/lb = 57.9 cal/g = 2.42 x 10<sup>5</sup> J/kg
- 9.13 Heat of Combustion: Currently not available
- 9.14 Heat of Decomposition: Currently not available
- 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: 42.9 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
48	87.710		C	40	0.920	80	0.338
			U	50	0.920	85	0.333
			R	60	0.920	90	0.327
			R	70	0.920	95	0.322
			E	80	0.920	100	0.317
			N	90	0.920	105	0.311
			T	100	0.920	110	0.306
			L	110	0.920	115	0.300
			Y	120	0.920	120	0.295
				130	0.920	125	0.289
			N	140	0.920	130	0.284
			O	150	0.920	135	0.279
			T	160	0.920	140	0.273
			A			145	0.268
			V			150	0.262
			A			155	0.257
			I			160	0.251
			L			165	0.246
			A			170	0.240
			B			175	0.235
			L			180	0.230
	E						

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
77	0.950	-130	0.036	48	0.29000	0	0.128
		-120	0.052			25	0.131
		-110	0.075			50	0.133
		-100	0.107			75	0.136
		-90	0.153			100	0.139
		-80	0.219			125	0.141
		-70	0.313			150	0.144
		-60	0.448			175	0.147
		-50	0.641			200	0.150
		-40	0.917			225	0.152
		-30	1.311			250	0.155
		-20	1.876			275	0.158
		-10	2.684			300	0.160
		0	3.839			325	0.163
		10	5.492			350	0.166
		20	7.857			375	0.168
		30	11.239			400	0.171
						425	0.174
						450	0.176
						475	0.179
						500	0.182
		525	0.184				
		550	0.187				
		575	0.190				
		600	0.192				