

2,2-DICHLOROETHYL ETHER

DEE

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Chlorex Bis (2-Chloroethyl) ether DCEE Dichlorodiethyl ether Dichloroether Di-(2-chloroethyl) ether	Liquid Colorless Sweet pleasant odor
Sinks and mixes slowly with water.	
<p>KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID. Wear rubber overclothing (including gloves). Call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>Combustible. POISONOUS GASES MAY BE PRODUCED IN FIRE. Wear goggles and self-contained breathing apparatus. Extinguish with water, dry chemicals, foam, or carbon dioxide. Cool exposed containers with water.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>LIQUID POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED. Irritating to 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 and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.</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>

<p>1. CORRECTIVE RESPONSE ACTIONS Stop discharge Collection Systems: Pump Do not burn</p>	<p>2. CHEMICAL DESIGNATIONS 2.1 CG Compatibility Group: 41; Ether 2.2 Formula: (C₂H₄Cl)₂O 2.3 IMO/UN Designation: 3.3/1916 2.4 DOT ID No.: 1916 2.5 CAS Registry No.: 111-44-4 2.6 NAERG Guide No.: 152 2.7 Standard Industrial Trade Classification: 51616</p>
<p>3. HEALTH HAZARDS</p> <p>3.1 Personal Protective Equipment: Goggles or face shield; rubber gloves; protective clothing. 3.2 Symptoms Following Exposure: Inhalation of vapor causes irritation of nose, coughing, nausea. Liquid irritates eyes and causes mild irritation of skin. (Can be absorbed in toxic amounts through the skin.) Ingestion causes irritation of mouth and stomach, symptoms of systemic poisoning. 3.3 Treatment of Exposure: INHALATION: remove from exposure; support respiration; call physician if needed. EYES: irrigate with copious quantities of water for 15 min.; call physician. SKIN: wipe off, wash well with soap and water. INGESTION: induce vomiting; get medical attention. 3.4 TLV-TWA: 5 ppm 3.5 TLV-STEL: 10 ppm 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Grade 3; oral LD₅₀ = 75 mg/kg (rat) 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: Said to be carcinogenic 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: Causes smarting of the skin and first-degree burns on short exposure; may cause second-degree burns on long exposure. 3.12 Odor Threshold: Currently not available 3.13 IDLH Value: 100 ppm 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</p>	

4. FIRE HAZARDS

- 4.1 **Flash Point:** 180°F O.C. 131°F C.C.
4.2 **Flammable Limits in Air:** Currently not available
4.3 **Fire Extinguishing Agents:** Water, foam, dry chemical, carbon dioxide
4.4 **Fire Extinguishing Agents Not to Be Used:** Not pertinent
4.5 **Special Hazards of Combustion Products:** May form phosgene or hydrogen chloride in fires.
4.6 **Behavior in Fire:** Not pertinent
4.7 **Auto Ignition Temperature:** 696°F
4.8 **Electrical Hazards:** Currently not available
4.9 **Burning Rate:** 2.4 mm/min.
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 23.8 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 9.0 (calc.)
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:** 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:** Commercial
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Open (flame arrester)
7.5 **IMO Pollution Category:** B
7.6 **Ship Type:** 2
7.7 **Barge Hull Type:** 2

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Not listed
8.2 **49 CFR Class:** Not pertinent
8.3 **49 CFR Package Group:** Not listed.
8.4 **Marine Pollutant:** Yes
8.5 **NFPA Hazard Classification:** Not listed
8.6 **EPA Reportable Quantity:** 10 pounds
8.7 **EPA Pollution Category:** A
8.8 **RCRA Waste Number:** U025
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:** 143.0
9.3 **Boiling Point at 1 atm:** 353°F = 178°C = 451°K
9.4 **Freezing Point:** -62°F = -52°C = 221°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:** 37.9 dynes/cm = 0.0379 N/m at 19°C
9.9 **Liquid Water Interfacial Tension:** (est.) 40 dynes/cm = 0.040 N/m at 20°C
9.10 **Vapor (Gas) Specific Gravity:** 4.93
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.0743
9.12 **Latent Heat of Vaporization:** 143 Btu/lb = 79.5 cal/g = 3.33 X 10⁵ J/kg
9.13 **Heat of Combustion:** (est.) -7,530 Btu/lb = -4,180 cal/g = -175 X 10⁵ 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
35	77.469	42	0.366	42	0.726	42	3.753
40	77.270	44	0.367	44	0.726	44	3.686
45	77.080	46	0.368	46	0.726	46	3.619
50	76.879	48	0.369	48	0.726	48	3.555
55	76.679	50	0.370	50	0.726	50	3.492
60	76.480	52	0.371	52	0.726	52	3.431
65	76.290	54	0.372	54	0.726	54	3.372
70	76.089	56	0.373	56	0.726	56	3.313
75	75.889	58	0.374	58	0.726	58	3.257
80	75.690	60	0.376	60	0.726	60	3.201
85	75.500	62	0.377	62	0.726	62	3.147
90	75.299	64	0.378	64	0.726	64	3.095
95	75.099	66	0.379	66	0.726	66	3.043
100	74.900	68	0.380	68	0.726	68	2.993
105	74.700	70	0.381	70	0.726	70	2.944
110	74.509	72	0.382	72	0.726	72	2.897
115	74.309	74	0.383	74	0.726	74	2.850
120	74.110	76	0.384	76	0.726	76	2.804
125	73.910						
130	73.719						
135	73.520						
140	73.320						
145	73.120						
150	72.929						
155	72.730						
160	72.530						

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	1.070	60	0.005	60	0.00012	0	0.185
		70	0.007	70	0.00018	20	0.190
		80	0.011	80	0.00026	40	0.194
		90	0.016	90	0.00038	60	0.199
		100	0.023	100	0.00055	80	0.203
		110	0.033	110	0.00078	100	0.208
		120	0.047	120	0.00109	120	0.212
		130	0.067	130	0.00150	140	0.216
		140	0.092	140	0.00205	160	0.221
		150	0.127	150	0.00277	180	0.225
		160	0.173	160	0.00371	200	0.229
		170	0.233	170	0.00492	220	0.233
		180	0.311	180	0.00647	240	0.237
		190	0.411	190	0.00842	260	0.240
		200	0.539	200	0.01088	280	0.244
		210	0.701	210	0.01394	300	0.248
		220	0.905	220	0.01774	320	0.251
		230	1.160	230	0.02240	340	0.255
		240	1.475	240	0.02809	360	0.258
		250	1.864	250	0.03500	380	0.262
		260	2.341	260	0.04333	400	0.265
		270	2.921	270	0.05333	420	0.268
		280	3.623	280	0.06524	440	0.271
		290	4.467	290	0.07938		
		300	5.479	300	0.09607		
		310	6.683	310	0.11570		