CHLOROBENZENE

CRB

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
Benzene chloride MCB Monochlorobenzene Phenyl chloride	Watery liquid	Colorless	Sweet, almond odor
	Sinks in water. Flammable vapor is produced.		

Keep people away. Avoid contact with liquid and vapor.
Avoid inhalation.
Shut off ignition sources and call fire department.
Stay upwind and use water spray to ``knock down'' vapor.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

FLAMMABLE
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Wear goggles and self-contained breathing apparatus.
Extinguish with dry chemical, foam, or carbon dioxide.

Exposure

CALL FOR MEDICAL AID.

VAPOR
If inhaled, will cause coughing or dizziness.
Not irritating to eyes, nose and throat.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

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.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Contain
Collection Systems: Pump; Dredge
Do not burn
Clean shore line

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 36; Halogenated hydrocarbon
2.2 Formula: C_6H_5Cl
2.3 IMO/UN Designation: 3.3/1134
2.4 DOT ID No.: 1134
2.5 CAS Registry No.: 108-90-7
2.6 NAERG Guide No.: 130
2.7 Standard Industrial Trade Classification: 51139

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Organic vapor-acid gas respirator where appropriate; neoprene or vinyl gloves; chemical safety spectacles, plus face shield where appropriate; rubber footwear; apron or impervious clothing for splash protection; hard hat.
3.2 Symptoms Following Exposure: Irritating to skin, eyes and mucous membranes. Repeated exposure of skin may cause dermatitis due to defatting action. Chronic inhalation of vapors or mist may result in damage to lungs, liver, and kidneys. Acute vapor exposures can cause symptoms ranging from coughing to transient anesthesia and central nervous system depression.
3.3 Treatment of Exposure: Get medical attention for all eye exposures and any serious over-exposures. Treat the symptoms. INHALATION: remove to clean air; administer oxygen as needed. INGESTION: dilute by drinking water; if vomiting occurs, administer more water. Administer saline laxative. EYES: flush thoroughly with water. SKIN: remove contaminated clothing, wash exposed area with soap and water.
3.4 TLV-TWA: 10 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 2; LD_{50} = 0.5 to 5 g/kg (rat, rabbit)
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Vapors are nonirritating to the eyes and throat.
3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
3.12 Odor Threshold: 0.21 ppm
3.13 IDLH Value: 1,000 ppm
3.14 OSHA PEL-TWA: 75 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: 97°F O.C. 84°F C.C.
4.2 Flammable Limits in Air: 1.3%-9.6%
4.3 Fire Extinguishing Agents: Carbon dioxide, dry chemical, foam or water spray
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Burning in open flame can form toxic phosgene and hydrogen chloride gases.
4.6 Behavior in Fire: Heavy vapor can travel a considerable distance to a source of ignition and flash back.
4.7 Auto Ignition Temperature: 1099°F
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: (est.) 4.6 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 33.3 (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: 20 ppm/96 hr/bluegill/TL_m/fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 0.3 lb/lb, 5 days
6.4 Food Chain Concentration Potential: Currently not available
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
Damage to living resources: 3
Human Oral hazard: 1
Human Contact hazard: 0
Reduction of amenities: X

7. SHIPPING INFORMATION

7.1 Grades of Purity: 99.5%; technical
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
7.5 IMO Pollution Category: B
7.6 Ship Type: 3
7.7 Barge Hull Type: 3

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Flammable liquid
8.2 49 CFR Class: 3
8.3 49 CFR Package Group: III
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	2
Flammability (Red).....	3
Instability (Yellow).....	0

8.6 EPA Reportable Quantity: 100 pounds
8.7 EPA Pollution Category: B
8.8 RCRA Waste Number: U037/D021
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: 112.56
9.3 Boiling Point at 1 atm: 270°F = 132°C = 405°K
9.4 Freezing Point: –50.1°F = –45.6°C = 227.6°K
9.5 Critical Temperature: 678.2°F = 359°C = 632.2°K
9.6 Critical Pressure: 656 psia = 44.6 atm = 4.52 MN/m^2
9.7 Specific Gravity: 1.11 at 20°C (liquid)
9.8 Liquid Surface Tension: 33 dynes/cm = 0.033 N/m at 25°C
9.9 Liquid Water Interfacial Tension: 37.41 dynes/cm = 0.03741 N/m at 20°C
9.10 Vapor (Gas) Specific Gravity: Not pertinent
9.11 Ratio of Specific Heats of Vapor (Gas): 1.094
9.12 Latent Heat of Vaporization: 135 Btu/lb = 75 cal/g = 3.140 X 10^5 J/kg
9.13 Heat of Combustion: (est.) 12,000 Btu/lb = 6700 cal/g = 280 X 10^5 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: 20.40 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: 0.5 psia

NOTES

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9.20 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot
35	70.419
40	70.230
45	70.040
50	69.849
55	69.660
60	69.469
65	69.270
70	69.080
75	68.889
80	68.700
85	68.500
90	68.309
95	68.120
100	67.919
105	67.730
110	67.530
115	67.339
120	67.139
125	66.950
130	66.750
135	66.559
140	66.360
145	66.169
150	65.969
155	65.770
160	65.580

9.21 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
40	0.316
50	0.317
60	0.319
70	0.321
80	0.323
90	0.325
100	0.327
110	0.329
120	0.331
130	0.333
140	0.335
150	0.337
160	0.339
170	0.341
180	0.343
190	0.345
200	0.347
210	0.349

9.22 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit inch per hour-square foot-F
-20	0.956
-10	0.946
0	0.937
10	0.927
20	0.917
30	0.908
40	0.898
50	0.888
60	0.879
70	0.869
80	0.859
90	0.850
100	0.840
110	0.830
120	0.821
130	0.811
140	0.801
150	0.792
160	0.782
170	0.772

9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
35	1.027
40	0.987
45	0.949
50	0.914
55	0.880
60	0.848
65	0.818
70	0.790
75	0.763
80	0.738
85	0.713
90	0.690
95	0.668
100	0.648
105	0.628
110	0.609
115	0.591
120	0.574
125	0.558
130	0.542
135	0.527
140	0.513
145	0.499
150	0.486
155	0.473

9.24 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
77	0.049

9.25 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch
20	0.032
30	0.048
40	0.069
50	0.099
60	0.140
70	0.195
80	0.269
90	0.366
100	0.492
110	0.656
120	0.865
130	1.130
140	1.464
150	1.880
160	2.394
170	3.026
180	3.797
190	4.731
200	5.856
210	7.203

9.26 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
20	0.00071
30	0.00102
40	0.00145
50	0.00204
60	0.00283
70	0.00386
80	0.00522
90	0.00698
100	0.00923
110	0.01207
120	0.01565
130	0.02010
140	0.02560
150	0.03233
160	0.04051
170	0.05039
180	0.06224
190	0.07636
200	0.09309
210	0.11280

9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
0	0.178
25	0.188
50	0.198
75	0.207
100	0.217
125	0.226
150	0.235
175	0.244
200	0.252
225	0.261
250	0.269
275	0.277
300	0.285
325	0.292
350	0.300
375	0.307
400	0.314
425	0.320
450	0.327
475	0.333
500	0.340
525	0.345
550	0.351
575	0.357
600	0.362