

CYCLOHEXANE

CHX

CAUTIONARY RESPONSE INFORMATION

| | |
|---|---|
| Common Synonyms Hexahydrobenzene Hexamethylene Hexanaphthene | Watery liquid Colorless Gasoline-like odor |
| Floats on water. Flammable irritating vapor is produced. Freezing point is 44°F. | |
| <p>Keep people away. Shut off ignition sources and call fire department. Avoid contact with liquid and vapor. Stay upwind and use water spray to "knock down" vapor. 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. Extinguish with foam, dry chemicals 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 dizziness, nausea, vomiting or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. 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>Dangerous to aquatic life in high concentrations. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and pollution control officials. Notify operators of nearby water intakes.</p> |

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Contain
Collection Systems: Skim
Chemical and Physical Treatment: Burn
Clean shore line
Salvage waterfowl

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** 31; Paraffin
2.2 **Formula:** C₆H₁₂
2.3 **IMO/UN Designation:** 3.1/1145
2.4 **DOT ID No.:** 1145
2.5 **CAS Registry No.:** 110-82-7
2.6 **NAERG Guide No.:** 128
2.7 **Standard Industrial Trade Classification:** 51121

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Hydrocarbon vapor canister, supplied-air or hose mask, hydrocarbon-insoluble rubber or plastic gloves, chemical goggles or face splash shield, hydrocarbon-insoluble rubber or plastic apron.
- 3.2 **Symptoms Following Exposure:** Dizziness, with nausea and vomiting. Concentrated vapor may cause unconsciousness and collapse.
- 3.3 **Treatment of Exposure:** INHALATION: remove victim to fresh air; if breathing stops, apply artificial respiration and administer oxygen. SKIN OR EYE CONTACT: remove contaminated clothing and gently flush affected areas with water for 15 min.; call a physician.
- 3.4 **TLV-TWA:** 300 ppm
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** Not listed.
3.7 **Toxicity by Ingestion:** Grade 2; LD₅₀ = 0.5 to 5 g/kg
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** None
3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
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:** Currently not available
3.13 **IDLH Value:** 1,300 ppm
3.14 **OSHA PEL-TWA:** 300 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:** -4°F C.C.
4.2 **Flammable Limits in Air:** 1.33%-8.35%
4.3 **Fire Extinguishing Agents:** Foam, carbon dioxide, dry chemical.
4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective on fire.
4.5 **Special Hazards of Combustion Products:** Not pertinent
4.6 **Behavior in Fire:** Not pertinent
4.7 **Auto Ignition Temperature:** 518°F
4.8 **Electrical Hazards:** Currently not available
4.9 **Burning Rate:** 6.9 mm/min.
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 42.8 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 12.0 (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:** 15,500 ppm/24 hr/mosquito fish/TL_m/fresh water
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: 3
Human Oral hazard: 1
Human Contact hazard: II
Reduction of amenities: X

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Research grades: 99.5%, 98.0%; commercial: 85-98%
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Open (flame arrester) or pressure-vacuum
7.5 **IMO Pollution Category:** C
7.6 **Ship Type:** 3
7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Flammable liquid
8.2 **49 CFR Class:** 3
8.3 **49 CFR Package Group:** II
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|----------------------|----------------|
| Health Hazard (Blue) | 1 |
| Flammability (Red) | 3 |
| Instability (Yellow) | 0 |
- 8.6 **EPA Reportable Quantity:** 1000 pounds
8.7 **EPA Pollution Category:** C
8.8 **RCRA Waste Number:** U056
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:** 84.16
9.3 **Boiling Point at 1 atm:** 177.3°F = 80.7°C = 353.9°K
9.4 **Freezing Point:** 43.8°F = 6.6°C = 279.8°K
9.5 **Critical Temperature:** 536.5°F = 280.3°C = 553.5°K
9.6 **Critical Pressure:** 591 psia = 40.2 atm = 4.07 MN/m²
9.7 **Specific Gravity:** 0.779 at 20°C (liquid)
9.8 **Liquid Surface Tension:** 24.6 dynes/cm = 0.0246 N/m at 20°C
9.9 **Liquid Water Interfacial Tension:** 50 dynes/cm = 0.050 N/m at 25°C
9.10 **Vapor (Gas) Specific Gravity:** 2.9
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.087
9.12 **Latent Heat of Vaporization:** 150 Btu/lb = 85 cal/g = 3.6 X 10⁵ J/kg
9.13 **Heat of Combustion:** -18,684 Btu/lb = -10,380 cal/g = -434.59 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:** 7.47 cal/g
9.18 **Limiting Value:** Currently not available
9.19 **Reid Vapor Pressure:** 3.3 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 |
| 55 | 49.030 | 45 | 0.421 | 65 | 0.838 | 52 | 1.125 |
| 60 | 48.870 | 50 | 0.424 | 70 | 0.833 | 54 | 1.101 |
| 65 | 48.710 | 55 | 0.427 | 75 | 0.829 | 56 | 1.078 |
| 70 | 48.550 | 60 | 0.429 | 80 | 0.824 | 58 | 1.055 |
| 75 | 48.390 | 65 | 0.432 | 85 | 0.819 | 60 | 1.033 |
| 80 | 48.230 | 70 | 0.435 | 90 | 0.814 | 62 | 1.012 |
| 85 | 48.060 | 75 | 0.438 | 95 | 0.810 | 64 | 0.991 |
| 90 | 47.900 | 80 | 0.441 | 100 | 0.805 | 66 | 0.971 |
| 95 | 47.730 | 85 | 0.443 | 105 | 0.800 | 68 | 0.952 |
| 100 | 47.570 | 90 | 0.446 | 110 | 0.795 | 70 | 0.933 |
| 105 | 47.400 | 95 | 0.449 | 115 | 0.791 | 72 | 0.914 |
| 110 | 47.230 | 100 | 0.452 | 120 | 0.786 | 74 | 0.896 |
| 115 | 47.060 | 105 | 0.454 | 125 | 0.781 | 76 | 0.879 |
| 120 | 46.890 | 110 | 0.457 | 130 | 0.776 | 78 | 0.862 |
| 125 | 46.720 | 115 | 0.460 | 135 | 0.772 | 80 | 0.845 |
| 130 | 46.550 | 120 | 0.463 | 140 | 0.767 | 82 | 0.829 |
| 135 | 46.370 | 125 | 0.466 | 145 | 0.762 | 84 | 0.813 |
| 140 | 46.200 | 130 | 0.468 | 150 | 0.757 | 86 | 0.798 |
| 145 | 46.020 | 135 | 0.471 | 155 | 0.752 | 88 | 0.783 |
| 150 | 45.850 | 140 | 0.474 | 160 | 0.748 | 90 | 0.768 |
| 155 | 45.670 | 145 | 0.477 | 165 | 0.743 | 92 | 0.754 |
| 160 | 45.490 | 150 | 0.479 | 170 | 0.738 | 94 | 0.740 |
| 165 | 45.320 | 155 | 0.482 | | | 96 | 0.727 |
| 170 | 45.140 | 160 | 0.485 | | | 98 | 0.714 |
| 175 | 44.960 | 165 | 0.488 | | | 100 | 0.701 |
| | | 170 | 0.491 | | | 102 | 0.689 |

| 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 |
| 83 | 0.015 | 45 | 0.792 | 45 | 0.01230 | 0 | 0.247 |
| | | 50 | 0.909 | 50 | 0.01399 | 25 | 0.265 |
| | | 55 | 1.041 | 55 | 0.01587 | 50 | 0.283 |
| | | 60 | 1.190 | 60 | 0.01795 | 75 | 0.300 |
| | | 65 | 1.356 | 65 | 0.02026 | 100 | 0.317 |
| | | 70 | 1.542 | 70 | 0.02282 | 125 | 0.335 |
| | | 75 | 1.748 | 75 | 0.02564 | 150 | 0.352 |
| | | 80 | 1.978 | 80 | 0.02874 | 175 | 0.369 |
| | | 85 | 2.233 | 85 | 0.03214 | 200 | 0.385 |
| | | 90 | 2.515 | 90 | 0.03588 | 225 | 0.402 |
| | | 95 | 2.827 | 95 | 0.03996 | 250 | 0.419 |
| | | 100 | 3.171 | 100 | 0.04442 | 275 | 0.435 |
| | | 105 | 3.550 | 105 | 0.04928 | 300 | 0.451 |
| | | 110 | 3.965 | 110 | 0.05457 | 325 | 0.467 |
| | | 115 | 4.421 | 115 | 0.06032 | 350 | 0.483 |
| | | 120 | 4.921 | 120 | 0.06655 | 375 | 0.499 |
| | | 125 | 5.466 | 125 | 0.07330 | 400 | 0.515 |
| | | 130 | 6.061 | 130 | 0.08059 | 425 | 0.531 |
| | | 135 | 6.710 | 135 | 0.08846 | 450 | 0.546 |
| | | 140 | 7.415 | 140 | 0.09694 | 475 | 0.561 |
| | | 145 | 8.181 | 145 | 0.10610 | 500 | 0.576 |
| | | 150 | 9.011 | 150 | 0.11590 | 525 | 0.592 |
| | | 155 | 9.910 | 155 | 0.12640 | 550 | 0.606 |
| | | 160 | 10.880 | 160 | 0.13770 | 575 | 0.621 |
| | | 165 | 11.930 | 165 | 0.14970 | 600 | 0.636 |
| | | 170 | 13.060 | 170 | 0.16260 | | |