

CYCLOPROPANE

CPR

| CAUTIONARY RESPONSE INFORMATION | | | | 4. FIRE HAZARDS | 7. SHIPPING INFORMATION | | | | | | | | |
|---|---|-----------------|---|--|--|----------|----------------|----------------------|---|--------------------|---|----------------------|---|
| Common Synonyms Trimethylene | Liquefied gas Colorless Floats and boils on water. Flammable visible vapor cloud is produced. | Mild sweet odor | | <p>4.1 Flash Point: Flammable gas</p> <p>4.2 Flammable Limits in Air: 2.4%-10.3%</p> <p>4.3 Fire Extinguishing Agents: Shut off flow of gas.</p> <p>4.4 Fire Extinguishing Agents Not to Be Used: Water, foam.</p> <p>4.5 Special Hazards of Combustion Products: Not pertinent</p> <p>4.6 Behavior in Fire: Containers may explode.</p> <p>4.7 Auto Ignition Temperature: 932°F</p> <p>4.8 Electrical Hazards: Class I, Group C</p> <p>4.9 Burning Rate: Not pertinent</p> <p>4.10 Adiabatic Flame Temperature: Currently not available</p> <p>4.11 Stoichiometric Air to Fuel Ratio: 21.4 (calc.)</p> <p>4.12 Flame Temperature: Currently not available</p> <p>4.13 Combustion Molar Ratio (Reactant to Product): 6.0 (calc.)</p> <p>4.14 Minimum Oxygen Concentration for Combustion (MOCC): N₂ diluent: 11.5% - 11.7%; CO₂ diluent: 14.0%</p> | <p>7.1 Grades of Purity: 99.5+%; USP</p> <p>7.2 Storage Temperature: Ambient</p> <p>7.3 Inert Atmosphere: No requirement</p> <p>7.4 Venting: Safety relief</p> <p>7.5 IMO Pollution Category: Currently not available</p> <p>7.6 Ship Type: Currently not available</p> <p>7.7 Barge Hull Type: Currently not available</p> | | | | | | | | |
| <p>Keep people away. Avoid inhalation. Shut off ignition sources and call fire department. Evacuate area in case of large discharge. Stay upwind. Use water spray to "knock down" vapor. Avoid contact with liquid. Notify local health and pollution control agencies.</p> | | | | <p>8. HAZARD CLASSIFICATIONS</p> <p>8.1 49 CFR Category: Flammable gas</p> <p>8.2 49 CFR Class: 2.1</p> <p>8.3 49 CFR Package Group: Not pertinent</p> <p>8.4 Marine Pollutant: No</p> <p>8.5 NFPA Hazard Classification:</p> <table> <thead> <tr> <th>Category</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue)</td> <td>1</td> </tr> <tr> <td>Flammability (Red)</td> <td>4</td> </tr> <tr> <td>Instability (Yellow)</td> <td>0</td> </tr> </tbody> </table> <p>8.6 EPA Reportable Quantity: Not listed.</p> <p>8.7 EPA Pollution Category: Not listed.</p> <p>8.8 RCRA Waste Number: Not listed</p> <p>8.9 EPA FWCNA List: Not listed</p> | | Category | Classification | Health Hazard (Blue) | 1 | Flammability (Red) | 4 | Instability (Yellow) | 0 |
| Category | Classification | | | | | | | | | | | | |
| Health Hazard (Blue) | 1 | | | | | | | | | | | | |
| Flammability (Red) | 4 | | | | | | | | | | | | |
| Instability (Yellow) | 0 | | | | | | | | | | | | |
| <p>Fire FLAMMABLE. Containers may explode in fire. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Let fire burn. Stop flow of gas if possible. Cool exposed containers and protect men effecting shutoff with water.</p> | | | | <p>9. PHYSICAL & CHEMICAL PROPERTIES</p> <p>9.1 Physical State at 15°C and 1 atm: Gas</p> <p>9.2 Molecular Weight: 42.1</p> <p>9.3 Boiling Point at 1 atm: -27.2°F = -32.9°C = 240.3°K</p> <p>9.4 Freezing Point: -197.3°F = -127.4°C = 145.8°K</p> <p>9.5 Critical Temperature: 256.5°F = 124.7°C = 397.9°K</p> <p>9.6 Critical Pressure: 798 psia = 54.2 atm = 5.50 MN/m²</p> <p>9.7 Specific Gravity: 0.676 at -33°C (liquid)</p> <p>9.8 Liquid Surface Tension: 22 dynes/cm = 0.022 N/m at -40°C</p> <p>9.9 Liquid Water Interfacial Tension: Not pertinent</p> <p>9.10 Vapor (Gas) Specific Gravity: 1.48</p> <p>9.11 Ratio of Specific Heats of Vapor (Gas): 1.1790</p> <p>9.12 Latent Heat of Vaporization: 203 Btu/lb = 113 cal/g = 4.73 X 10³ J/kg</p> <p>9.13 Heat of Combustion: 21,247 Btu/lb = -11,804 cal/g = 493.88 X 10³ J/kg</p> <p>9.14 Heat of Decomposition: Not pertinent</p> <p>9.15 Heat of Solution: Not pertinent</p> <p>9.16 Heat of Polymerization: Not pertinent</p> <p>9.17 Heat of Fusion: 30.92 cal/g</p> <p>9.18 Limiting Value: Currently not available</p> <p>9.19 Reid Vapor Pressure: Currently not available</p> | | | | | | | | | |
| <p>Exposure Call for medical aid. VAPOR 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>LIQUID Will cause frostbite. Flush affected areas with plenty of water. DO NOT RUB AFFECTED AREAS.</p> | | | | <p>5. CHEMICAL REACTIVITY</p> <p>5.1 Reactivity with Water: No reaction</p> <p>5.2 Reactivity with Common Materials: No reaction</p> <p>5.3 Stability During Transport: Stable</p> <p>5.4 Neutralizing Agents for Acids and Caustics: Not pertinent</p> <p>5.5 Polymerization: Not pertinent</p> <p>5.6 Inhibitor of Polymerization: Not pertinent</p> <p>6. WATER POLLUTION</p> <p>6.1 Aquatic Toxicity: None</p> <p>6.2 Waterfowl Toxicity: None</p> <p>6.3 Biological Oxygen Demand (BOD): None</p> <p>6.4 Food Chain Concentration Potential: None</p> <p>6.5 GESAMP Hazard Profile: Not listed</p> | | | | | | | | | |
| <p>Water Pollution Not harmful to aquatic life.</p> | | | | <p>NOTES</p> | | | | | | | | | |
| <p>1. CORRECTIVE RESPONSE ACTIONS Stop discharge Chemical and Physical Treatment: Burn</p> | | | <p>2. CHEMICAL DESIGNATIONS</p> <p>2.1 CG Compatibility Group: Not listed.</p> <p>2.2 Formula: C₃H₆</p> <p>2.3 IMO/UN Designation: 2/1027</p> <p>2.4 DOT ID No.: 1027</p> <p>2.5 CAS Registry No.: 75-19-4</p> <p>2.6 NAERG Guide No.: 115</p> <p>2.7 Standard Industrial Trade Classification: 51129</p> <p>3. HEALTH HAZARDS</p> <p>3.1 Personal Protective Equipment: Self-contained breathing apparatus for high concentrations of vapor; safety goggles or face shield.</p> <p>3.2 Symptoms Following Exposure: Inhalation causes some analgesia, anesthesia, pupil dilation, shallow depth of respirations, decreasing muscle tone. Contact with liquid may cause frostbite.</p> <p>3.3 Treatment of Exposure: INHALATION: remove promptly to fresh air; if symptoms of asphyxiation persist, administer artificial respiration and oxygen; treat symptomatically thereafter. SKIN: if frostbite has occurred, apply warm water; treat burn.</p> <p>3.4 TLV-TWA: Not listed.</p> <p>3.5 TLV-STEL: Not listed.</p> <p>3.6 TLV-Ceiling: Not listed.</p> <p>3.7 Toxicity by Ingestion: Currently not available.</p> <p>3.8 Toxicity by Inhalation: Currently not available.</p> <p>3.9 Chronic Toxicity: None</p> <p>3.10 Vapor (Gas) Irritant Characteristics: Currently not available</p> <p>3.11 Liquid or Solid Characteristics: Currently not available</p> <p>3.12 Odor Threshold: Currently not available</p> <p>3.13 IDLH Value: Not listed.</p> <p>3.14 OSHA PEL-TWA: Not listed.</p> <p>3.15 OSHA PEL-STEL: Not listed.</p> <p>3.16 OSHA PEL-Ceiling: Not listed.</p> <p>3.17 EPA AEGL: Not listed</p> | | | | | | | | | | |

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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 |
| -110 | 45.790 | -110 | 0.429 | -35 | 0.947 | -110 | 0.208 |
| -105 | 45.580 | -105 | 0.431 | -30 | 0.937 | -105 | 0.204 |
| -100 | 45.360 | -100 | 0.434 | | | -100 | 0.200 |
| -95 | 45.140 | -95 | 0.436 | | | -95 | 0.197 |
| -90 | 44.930 | -90 | 0.438 | | | -90 | 0.193 |
| -85 | 44.710 | -85 | 0.440 | | | -85 | 0.190 |
| -80 | 44.490 | -80 | 0.443 | | | -80 | 0.187 |
| -75 | 44.280 | -75 | 0.445 | | | -75 | 0.184 |
| -70 | 44.060 | -70 | 0.447 | | | -70 | 0.181 |
| -65 | 43.840 | -65 | 0.449 | | | -65 | 0.178 |
| -60 | 43.630 | -60 | 0.452 | | | -60 | 0.175 |
| -55 | 43.410 | -55 | 0.454 | | | -55 | 0.173 |
| -50 | 43.190 | -50 | 0.456 | | | -50 | 0.170 |
| -45 | 42.980 | -45 | 0.458 | | | -45 | 0.168 |
| -40 | 42.760 | -40 | 0.461 | | | -40 | 0.165 |
| -35 | 42.540 | -35 | 0.463 | | | -35 | 0.163 |
| -30 | 42.330 | -30 | 0.465 | | | -30 | 0.161 |

| 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 |
| I | | -125 | 0.523 | -125 | 0.00612 | 0 | 0.272 |
| N | | -120 | 0.649 | -120 | 0.00749 | 20 | 0.283 |
| S | | -115 | 0.801 | -115 | 0.00911 | 40 | 0.295 |
| O | | -110 | 0.982 | -110 | 0.01102 | 60 | 0.306 |
| L | | -105 | 1.198 | -105 | 0.01325 | 80 | 0.318 |
| U | | -100 | 1.453 | -100 | 0.01585 | 100 | 0.329 |
| B | | -95 | 1.753 | -95 | 0.01886 | 120 | 0.341 |
| L | | -90 | 2.104 | -90 | 0.02233 | 140 | 0.352 |
| E | | -85 | 2.514 | -85 | 0.02631 | 160 | 0.364 |
| | | -80 | 2.989 | -80 | 0.03087 | 180 | 0.375 |
| | | -75 | 3.537 | -75 | 0.03606 | 200 | 0.387 |
| | | -70 | 4.168 | -70 | 0.04195 | 220 | 0.398 |
| | | -65 | 4.892 | -65 | 0.04861 | 240 | 0.410 |
| | | -60 | 5.718 | -60 | 0.05611 | 260 | 0.421 |
| | | -55 | 6.658 | -55 | 0.06452 | 280 | 0.432 |
| | | -50 | 7.723 | -50 | 0.07394 | 300 | 0.444 |
| | | -45 | 8.927 | -45 | 0.08443 | 320 | 0.455 |
| | | -40 | 10.280 | -40 | 0.09610 | 340 | 0.467 |
| | | -35 | 11.810 | -35 | 0.10900 | 360 | 0.478 |
| | | -30 | 13.510 | -30 | 0.12330 | 380 | 0.490 |
| | | -25 | 15.410 | -25 | 0.13910 | 400 | 0.501 |
| | | -20 | 17.530 | -20 | 0.15640 | 420 | 0.513 |
| | | -15 | 19.880 | -15 | 0.17540 | 440 | 0.524 |
| | | -10 | 22.490 | -10 | 0.19610 | 460 | 0.536 |
| | | -5 | 25.360 | -5 | 0.21880 | 480 | 0.547 |
| | | 0 | 28.530 | 0 | 0.24340 | 500 | 0.559 |