

# MALEIC ANHYDRIDE

MLA

| CAUTIONARY RESPONSE INFORMATION  |   |           |              |
|--|---|-----------|--------------|
| Common Synonyms<br>cis-Butenedioic anhydride<br>2,5-Furandione<br>Toxic anhydride  | Molten; or solid crystals or tablets<br><br>Sinks and mixes slowly with water.  | Colorless | Choking odor |
| Keep people away. Avoid contact with solid and liquid. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Call fire department. Notify local health and pollution control agencies. |   |           |              |
| Fire   | Combustible.<br>Dust cloud may be ignited by spark or flame.<br>Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).<br>Extinguish with dry chemical, alcohol foam, or carbon dioxide.<br>Water may be ineffective on fire.  |           |              |
| Exposure   | CALL FOR MEDICAL AID.<br><br>LIQUID OR SOLID<br>Will burn skin and eyes.<br>Harmful if swallowed.<br>Remove contaminated clothing and shoes.<br>Flush affected areas with plenty of water.<br>IF IN EYES, hold eyelids open and flush with plenty of water.<br>IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. |           |              |
| Water Pollution  | Dangerous to aquatic life in high concentrations.<br>May be dangerous if it enters water intakes.<br>Notify local health and wildlife officials.<br>Notify operators of nearby water intakes.   |           |              |

| 1. CORRECTIVE RESPONSE ACTIONS                                      | 2. CHEMICAL DESIGNATIONS  | 3. HEALTH HAZARDS  | 4. FIRE HAZARDS   | 5. CHEMICAL REACTIVITY  | 6. WATER POLLUTION  | 7. SHIPPING INFORMATION  | 8. HAZARD CLASSIFICATIONS  | 9. PHYSICAL & CHEMICAL PROPERTIES |                |                      |   |                    |   |                      |   |  |
|---|---|--|---|---|---|--|--|-----------------------------------|----------------|----------------------|---|--------------------|---|----------------------|---|--|
| Dilute and disperse<br>Stop discharge<br>Collection Systems: Dredge | 2.1 CG Compatibility Group: Not listed.<br>2.2 Formula: OCOCH=CHCO<br>2.3 IMO/UN Designation: 9.0/2215<br>2.4 DOT ID No.: 2215<br>2.5 CAS Registry No.: 108-31-6<br>2.6 NAERG Guide No.: 156<br>2.7 Standard Industrial Trade Classification: 51381 | <b>3.1 Personal Protective Equipment:</b> Approved organic vapor-acid gas canister; chemical goggles and face shield; rubber gloves and boots; coveralls or rubber apron.<br><b>3.2 Symptoms Following Exposure:</b> Inhalation causes coughing, sneezing, throat irritation. Skin contact causes irritation and redness. Vapors cause severe eye irritation; photophobia and double vision may occur.<br><b>3.3 Treatment of Exposure:</b> INHALATION: give oxygen. EYE OR SKIN CONTACT: flush with lots of water for at least 15 min.; for eyes, call a physician. For molten maleic burns, remove crust and treat as chemical and thermal burn.<br>3.4 TLV-TWA: 0.25 ppm<br>3.5 TLV-STEL: Not listed.<br>3.6 TLV-Ceiling: Not listed.<br>3.7 Toxicity by Ingestion: Grade 2; LD <sub>50</sub> = 0.5 to 5 g/kg<br>3.8 Toxicity by Inhalation: Currently not available.<br>3.9 Chronic Toxicity: None<br>3.10 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation, such that personnel will find high concentrations unpleasant. The effect is temporary.<br>3.11 Liquid or Solid Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.<br>3.12 Odor Threshold: 1.3 - 2.0 mg/m <sup>3</sup><br>3.13 IDLH Value: 10 mg/m <sup>3</sup><br>3.14 OSHA PEL-TWA: 0.25 mg/m <sup>3</sup><br>3.15 OSHA PEL-STEL: Not listed.<br>3.16 OSHA PEL-Ceiling: Not listed.<br>3.17 EPA AEGL: Not listed | <b>4.1 Flash Point:</b> (Liquid) 215°F C.C.; 230°F O.C.<br><b>4.2 Flammable Limits in Air:</b> 1.4%-7.1%<br><b>4.3 Fire Extinguishing Agents:</b> Alcohol foam, dry chemical or carbon dioxide<br><b>4.4 Fire Extinguishing Agents Not to Be Used:</b> Water or foam may cause frothing<br><b>4.5 Special Hazards of Combustion Products:</b> Not pertinent<br><b>4.6 Behavior in Fire:</b> When heated above 300°F in the presence of various materials may generate heat and carbon dioxide. Will explode if confined.<br><b>4.7 Auto Ignition Temperature:</b> 878°F<br><b>4.8 Electrical Hazards:</b> Class I, Group D<br><b>4.9 Burning Rate:</b> 1.4 mm/min.<br><b>4.10 Adiabatic Flame Temperature:</b> Currently not available<br><b>4.11 Stoichiometric Air to Fuel Ratio:</b> 14.3 (calc.)<br><b>4.12 Flame Temperature:</b> Currently not available<br><b>4.13 Combustion Molar Ratio (Reactant to Product):</b> 5.0 (calc.)<br><b>4.14 Minimum Oxygen Concentration for Combustion (MOCC):</b> Not listed | <b>5.1 Reactivity with Water:</b> Hot water may cause frothing. Reaction with cold water is slow and non-hazardous.<br><b>5.2 Reactivity with Common Materials:</b> No reaction<br><b>5.3 Stability During Transport:</b> Stable<br><b>5.4 Neutralizing Agents for Acids and Caustics:</b> Solid spills can usually be recovered before any significant reaction with water occurs. Flush area of spill with water.<br><b>5.5 Polymerization:</b> Very unlikely at ordinary temperatures, even in the molten state.<br><b>5.6 Inhibitor of Polymerization:</b> None | <b>6.1 Aquatic Toxicity:</b> 150 ppm/24 hr/sunfish/TL <sub>50</sub> /fresh water<br><b>6.2 Waterfowl Toxicity:</b> Currently not available<br><b>6.3 Biological Oxygen Demand (BOD):</b> 50%, 5 days<br><b>6.4 Food Chain Concentration Potential:</b> None<br><b>6.5 GESAMP Hazard Profile:</b><br>Bioaccumulation: 0<br>Damage to living resources: 1<br>Human Oral hazard: 2<br>Human Contact hazard: II<br>Reduction of amenities: XX | <b>7.1 Grades of Purity:</b> Commercial: 99.5%<br><b>7.2 Storage Temperature:</b> Ambient<br><b>7.3 Inert Atmosphere:</b> No requirement<br><b>7.4 Venting:</b> Open<br><b>7.5 IMO Pollution Category:</b> D<br><b>7.6 Ship Type:</b> 3<br><b>7.7 Barge Hull Type:</b> Currently not available | <b>8.1 49 CFR Category:</b> Corrosive material<br><b>8.2 49 CFR Class:</b> 8<br><b>8.3 49 CFR Package Group:</b> III<br><b>8.4 Marine Pollutant:</b> No<br><b>8.5 NFPA Hazard Classification:</b> <table border="1"><tr><th>Category</th><th>Classification</th></tr><tr><td>Health Hazard (Blue)</td><td>3</td></tr><tr><td>Flammability (Red)</td><td>1</td></tr><tr><td>Instability (Yellow)</td><td>1</td></tr></table><br><b>8.6 EPA Reportable Quantity:</b> 5000 pounds<br><b>8.7 EPA Pollution Category:</b> D<br><b>8.8 RCRA Waste Number:</b> U147<br><b>8.9 EPA FWCRA List:</b> Yes | Category                          | Classification | Health Hazard (Blue) | 3 | Flammability (Red) | 1 | Instability (Yellow) | 1 | <b>9.1 Physical State at 15°C and 1 atm:</b> Solid<br><b>9.2 Molecular Weight:</b> 98.06<br><b>9.3 Boiling Point at 1 atm:</b> 392°F = 200°C = 473°K<br><b>9.4 Freezing Point:</b> 127°F = 53°C = 326°K<br><b>9.5 Critical Temperature:</b> Not pertinent<br><b>9.6 Critical Pressure:</b> Not pertinent<br><b>9.7 Specific Gravity:</b> 1.43 at 15°C (solid)<br><b>9.8 Liquid Surface Tension:</b> Not pertinent<br><b>9.9 Liquid Water Interfacial Tension:</b> Not pertinent<br><b>9.10 Vapor (Gas) Specific Gravity:</b> Not pertinent<br><b>9.11 Ratio of Specific Heats of Vapor (Gas):</b> Not pertinent<br><b>9.12 Latent Heat of Vaporization:</b> Not pertinent<br><b>9.13 Heat of Combustion:</b> -5936 Btu/lb = -3298 cal/g = -138.1 X 10 <sup>3</sup> J/kg<br><b>9.14 Heat of Decomposition:</b> Not pertinent<br><b>9.15 Heat of Solution:</b> -153 Btu/lb = -85.0 cal/g = -3.56 X 10 <sup>3</sup> J/kg<br><b>9.16 Heat of Polymerization:</b> Not pertinent<br><b>9.17 Heat of Fusion:</b> Currently not available<br><b>9.18 Limiting Value:</b> Currently not available<br><b>9.19 Reid Vapor Pressure:</b> Currently not available |
| Category  | Classification  |  |   |   |   |  |  |                                   |                |                      |   |                    |   |                      |   |  |
| Health Hazard (Blue)  | 3   |  |   |   |   |  |  |                                   |                |                      |   |                    |   |                      |   |  |
| Flammability (Red)  | 1   |  |   |   |   |  |  |                                   |                |                      |   |                    |   |                      |   |  |
| Instability (Yellow)  | 1   |  |   |   |   |  |  |                                   |                |                      |   |                    |   |                      |   |  |

NOTES

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| 9.20<br>SATURATED LIQUID DENSITY |                       | 9.21<br>LIQUID HEAT CAPACITY |                                     | 9.22<br>LIQUID THERMAL CONDUCTIVITY |   | 9.23<br>LIQUID VISCOSITY   |                  |
|----------------------------------|-----------------------|------------------------------|-------------------------------------|-------------------------------------|---|----------------------------|------------------|
| Temperature<br>(degrees F)       | Pounds per cubic foot | Temperature<br>(degrees F)   | British thermal unit per<br>pound-F | Temperature<br>(degrees F)          | British thermal unit inch<br>per hour-square foot-F | Temperature<br>(degrees F) | Centipoise       |
| NOT<br>PERTINENT                 |                       |                              | NOT<br>PERTINENT                    |                                     | NOT<br>PERTINENT                                    |                            | NOT<br>PERTINENT |

| 9.24<br>SOLUBILITY IN WATER |                                   | 9.25<br>SATURATED VAPOR PRESSURE |                        | 9.26<br>SATURATED VAPOR DENSITY |                       | 9.27<br>IDEAL GAS HEAT CAPACITY |                                     |
|-----------------------------|-----------------------------------|----------------------------------|------------------------|---------------------------------|-----------------------|---------------------------------|-------------------------------------|
| Temperature<br>(degrees F)  | Pounds per 100 pounds<br>of water | Temperature<br>(degrees F)       | Pounds per square inch | Temperature<br>(degrees F)      | Pounds per cubic foot | Temperature<br>(degrees F)      | British thermal unit per<br>pound-F |
| INSOLUBLE                   |                                   |                                  | NOT<br>PERTINENT       |                                 | NOT<br>PERTINENT      |                                 | NOT<br>PERTINENT                    |