

MALEIC ANHYDRIDE

MLA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms cis-Butenedioic anhydride 2,5-Furanedione Toxicic anhydride	Molten; or solid crystals or tablets Colorless Choking odor
Sinks and mixes slowly with water.	
<p>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.</p>	
Fire	<p>Combustible. Dust cloud may be ignited by spark or flame. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Extinguish with dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective on fire.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>LIQUID OR SOLID Will burn 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. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge
Collection Systems: Dredge

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
2.2 **Formula:** OCOCH=CHCO
2.3 **IMO/UN Designation:** 9.0/2215
2.4 **DOT ID No.:** 2215
2.5 **CAS Registry No.:** 108-31-6
2.6 **NAERG Guide No.:** 156
2.7 **Standard Industrial Trade Classification:** 51381

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Approved organic vapor-acid gas canister; chemical goggles and face shield; rubber gloves and boots; coveralls or rubber apron.
- 3.2 **Symptoms Following Exposure:** Inhalation causes coughing, sneezing, throat irritation. Skin contact causes irritation and redness. Vapors cause severe eye irritation; photophobia and double vision may occur.
- 3.3 **Treatment of Exposure:** 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.
- 3.4 **TLV-TWA:** 0.25 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 moderate irritation, such that personnel will find high concentrations unpleasant. The effect is temporary.
- 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.
- 3.12 **Odor Threshold:** 1.3 - 2.0 mg/m³
3.13 **IDLH Value:** 10 mg/m³
3.14 **OSHA PEL-TWA:** 0.25 mg/m³
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:** (Liquid) 215°F C.C.; 230°F O.C.
4.2 **Flammable Limits in Air:** 1.4%-7.1%
4.3 **Fire Extinguishing Agents:** Alcohol foam, dry chemical or carbon dioxide
4.4 **Fire Extinguishing Agents Not to Be Used:** Water or foam may cause frothing
4.5 **Special Hazards of Combustion Products:** Not pertinent
4.6 **Behavior in Fire:** When heated above 300°F in the presence of various materials may generate heat and carbon dioxide. Will explode if confined.
4.7 **Auto Ignition Temperature:** 878°F
4.8 **Electrical Hazards:** Class I, Group D
4.9 **Burning Rate:** 1.4 mm/min.
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 14.3 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 5.0 (calc.)
4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Commercial: 99.5%
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Open
7.5 **IMO Pollution Category:** D
7.6 **Ship Type:** 3
7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Corrosive material
8.2 **49 CFR Class:** 8
8.3 **49 CFR Package Group:** III
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|----------------------|----------------|
| Health Hazard (Blue) | 3 |
| Flammability (Red) | 1 |
| Instability (Yellow) | 1 |
- 8.6 **EPA Reportable Quantity:** 5000 pounds
8.7 **EPA Pollution Category:** D
8.8 **RCRA Waste Number:** U147
8.9 **EPA FWPCA List:** Yes

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Hot water may cause frothing. Reaction with cold water is slow and non-hazardous.
5.2 **Reactivity with Common Materials:** No reaction
5.3 **Stability During Transport:** Stable
5.4 **Neutralizing Agents for Acids and Caustics:** Solid spills can usually be recovered before any significant reaction with water occurs. Flush area of spill with water.
5.5 **Polymerization:** Very unlikely at ordinary temperatures, even in the molten state.
5.6 **Inhibitor of Polymerization:** None

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15°C and 1 atm:** Solid
9.2 **Molecular Weight:** 98.06
9.3 **Boiling Point at 1 atm:** 392°F = 200°C = 473°K
9.4 **Freezing Point:** 127°F = 53°C = 326°K
9.5 **Critical Temperature:** Not pertinent
9.6 **Critical Pressure:** Not pertinent
9.7 **Specific Gravity:** 1.43 at 15°C (solid)
9.8 **Liquid Surface Tension:** Not pertinent
9.9 **Liquid Water Interfacial Tension:** Not pertinent
9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
9.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
9.12 **Latent Heat of Vaporization:** Not pertinent
9.13 **Heat of Combustion:** -5936 Btu/lb = -3298 cal/g = -138.1 X 10³ J/kg
9.14 **Heat of Decomposition:** Not pertinent
9.15 **Heat of Solution:** -153 Btu/lb = -85.0 cal/g = -3.56 X 10³ J/kg
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

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** 150 ppm/24 hr/sunfish/TL₅₀/fresh water
6.2 **Waterfowl Toxicity:** Currently not available
6.3 **Biological Oxygen Demand (BOD):** 50%, 5 days
6.4 **Food Chain Concentration Potential:** None
6.5 **GESAMP Hazard Profile:**
Bioaccumulation: 0
Damage to living resources: 1
Human Oral hazard: 2
Human Contact hazard: II
Reduction of amenities: XX

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
	N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T

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 N S O L U B L E		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T