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**SECTION 1: IDENTIFICATION**

**Effective Date:** 2/25/92

**Product Name:** Maleic Acid

**Common Name:** (2)-butenedioic acid; cis-butenedioic acid; cis-1,2-ethylenedicarboxylic acid; toxilic acid, maleinic acid; malenic acid; (Z), 1,2-ethylenedicarboxylic acid; 2-butenedioic acid )Z)-; cis-ethylenedicarboxylic acid; cis-ethylene-1,2-dicarboxylic acid; (Z)-2-butenedioic acid; cis-2-butenedioic acid

**Chemical Formula:** C4H4O4

**CAS No.:** 110-16-7

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**SECTION 2: HAZARDOUS INGREDIENTS:**

local effects: corrosive - eye May cause severe irritation with redness, pain and possible corneal erosion. A 1% solution applied to rabbit eyes for 2 minutes caused cloudiness of the cornea, hyperemia of the conjunctiva, and edema of the nictitating membrane, but no injury remained the next day. A 5% solution had a similar, more intense effect with recovery delayed 6-7 days. A 10% solution in water at pH1 applied for 30 seconds has been found to cause permanent opacity and vascularization.

acute toxicity level: moderately toxic by dermal absorption and ingestion

target effects: poisoning may affect the kidneys and liver

Additional data: a condition analogous to the human fanconi syndrome with impaired tubular reabsorption has been reported in animals.

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**SECTION 3: PHYSICAL DATA**

**Physical Data:**

Appearance and Odor:	white or colorless monoclinic crystals with a faint, acidulous odor, and a repulsive, astringent taste.
Specific Gravity (Water = 1):	1.590
Solubility in water:(by weight)	soluble in alcohol, acetone, acetic acid; very slightly soluble in benzene, ether, chloroform, and carbon tetrachloride: 79% soluble in water
Melting Point:	282-284°F (139-140°C)

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**SECTION 4: FIRE AND EXPLOSION DATA**

**Fire and Explosion Information:**

Flash point:	n/a
Flammable limit:	n/a
Extinguishing Media:	dry chemical, carbon dioxide, water spray or regular foam; for larger fires use water spray, fog or regular foam
Fire Fighting Procedures:	Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
Unusual Fire and Explosion Hazards:	slight fire hazard when exposed to heat or flame

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**SECTION 5: REACTIVITY DATA**

**Reactivity Data:**

Stable     X     Unstable                     

**Conditions to Avoid:**

May burn but does not ignite readily. Flammable, poisonous gases may accumulate in tanks and hopper cars. May ignite combustibles (wood, paper, oil, etc) oxidants - will react violently; metals - solutions may corrode

**Incompatibilities:**

**Hazardous Decomposition or byproducts:** Thermal decomposition products may include toxic oxides of carbon.  
**Hazardous Polymerization:** Has not been reported under normal temperatures and pressures.

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**SECTION 6: HEALTH HAZARD DATA**

**Threshold Limit Value (TLV):** n/a  
**Permissible Exposure Limit:** n/a  
**Irritation data:** 500 mg/24 hours skin - rabbit, mild; 100 mg eye-rabbit, severe; 1%/2 minutes eye-rabbit, severe  
**Toxicity:**  
**Oral LD50 (rat):** 708 mg/kg; 2400 mg/kg oral mouse LD50

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**SECTION 7: SPILLAGE AND DISPOSAL PROCEDURES**

**Spillage:** soil spill - Dig a holding area such as pit, pond, lagoon to contain spilled material. Use protective cover such as a plastic sheet to prevent dissolving in firefighting water or rain.  
water spill - Use activated carbon to absorb spilled substance that is dissolved. Use mechanical dredges or lifts to extract immobilized masses of pollution and precipitates.  
occupational spill: Do not touch spilled material. Stop leak if you can do it without risk.  
For small spills, take up with sand or other absorbent material and place into containers for later disposal. For small dry spills, with clean shovel place material into clean, dry container and cover. Move containers from spill area. For larger spills, dike far ahead of spill for later disposal. Keep unnecessary people away. Isolate hazard area and deny entry.  
**Disposal:** **Reportable Quantity:** 5000 pounds. The superfund amendments and reauthorization act (SARA) section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If release of substance is reportable under CERCLA section 103, the National Response Center must be notified immediately at 800-424-8802 or 202-426-2675 in metropolitan Washington, DC area (40 CFR 302.6).  
Dispose of in observation of all federal, state and local regulations when storing or disposing of this substance. For assistance contact the district director of the EPA

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**SECTION 8: FIRST AID PROCEDURES**

**Eyes:** Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Continue irrigating with normal saline until the pH has returned to normal (30-60 minutes). Cover with sterile bandages. Get medical attention immediately.  
**Skin:** Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approx. 15-20 min.) Get medical attention immediately.  
**Inhalation:** Remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention.  
**Ingestion:** Treat symptomatically and supportively. Get medical attention immediately. If vomiting occurs, keep head lower than hips to prevent aspiration.

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**SECTION 9: PRECAUTION TO BE TAKEN IN HANDLING AND STORING**

**Other Precautions:** Store away from incompatible substances. Store in tightly closed container.

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**SECTION 10: SPECIAL PROTECTION INFORMATION**

**Ventilation:** Provide local exhaust ventilation. Ventilation equipment must be explosion proof.  
**Eye Protection:** Splash proof or dust-resistant safety goggles  
**Protective Gloves:** yes  
**Respiratory Protection:** specific respirator selected must be based on contamination levels found in the work place, must be based on the specific operation, must not exceed the working limits of the respirator and must be jointly approved by NIOSH and MSHA.  
**Other Protective Gear:** Impervious clothing and equipment. Emergency wash facilities if possibility of eye or skin contact.

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**SECTION 11: TRANSPORT INFORMATION**

**DOT classification:** 8 - corrosive material, UN 2215, PG III; Ltd qty = 25 kg on passenger aircraft or railcar, 100 kg on cargo aircraft

**DOT pictograms:** Corrosive 8 sticker