Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

<table>
<thead>
<tr>
<th>NFPA</th>
<th>HMIS</th>
<th>Personal Protective Equipment</th>
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<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>See Section 15.</td>
</tr>
</tbody>
</table>

Common Name/Trade Name: Maleic acid

Manufacturer: SPECTRUM LABORATORY PRODUCTS INC.
14422 S. SAN PEDRO STREET
GARDENA, CA 90248

Commercial Name(s): Not available.

Synonym: (2)-Butenedioic acid (2Z); (Z)-Butenedioic Acid

Chemical Name: Maleic Acid

Chemical Family: Not available.

Chemical Formula: C4H4O4

Supplier: SPECTRUM LABORATORY PRODUCTS INC.
14422 S. SAN PEDRO STREET
GARDENA, CA 90248

Section 2. Composition and Information on Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>TWA (mg/m³)</th>
<th>STEL (mg/m³)</th>
<th>CEIL (mg/m³)</th>
<th>% by Weight</th>
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<tbody>
<tr>
<td>1) Maleic acid</td>
<td>110-16-7</td>
<td></td>
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Toxicological Data on Ingredients:

**ORAL (LD50):**
- Acute: 708 mg/kg [Rat].
- 2400 mg/kg [Mouse].

**DERMAL (LD50):**
- Acute: 1560 mg/kg [Rabbit].

**DUST (LC50):**
- Acute: >720 mg/m³ 1 hours [Rat].

Section 3. Hazards Identification

Potential Acute Health Effects:
- Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant).
- Slightly hazardous in case of skin contact (permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:
- CARCINOGENIC EFFECTS: Not available.
- MUTAGENIC EFFECTS: Not available.
- TERATOGENIC EFFECTS: Not available.
- DEVELOPMENTAL TOXICITY: Not available.
- The substance may be toxic to kidneys, lungs.
- Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Continued on Next Page
### Section 4. First Aid Measures

| Eye Contact | Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately. |
| Skin Contact | In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention. |
| Serious Skin Contact | Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention. |
| Inhalation | If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. |
| Serious Inhalation | Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention. |
| Ingestion | Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Serious Ingestion | Not available. |

### Section 5. Fire and Explosion Data

| Flammability of the Product | May be combustible at high temperature. |
| Auto-Ignition Temperature | Not available. |
| Flash Points | Not available. |
| Flammable Limits | Not available. |
| Products of Combustion | These products are carbon oxides (CO, CO₂). |
| Fire Hazards in Presence of Various Substances | Slightly flammable to flammable in presence of heat, of metals. Non-flammable in presence of shocks. |
| Fire Fighting Media and Instructions | SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet. |
| Special Remarks on Fire Hazards | Contact with metals may evolve flammable hydrogen gas. |
| Special Remarks on Explosion Hazards | When heated, vapors may form explosive mixtures with air. Containers may explode when heated. |

### Section 6. Accidental Release Measures

| Small Spill | Use appropriate tools to put the spilled solid in a convenient waste disposal container. |
| Large Spill | Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. |

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**Continued on Next Page**
**Maleic acid**

### Section 7. Handling and Storage

**Precautions**
- Keep locked up.
- Keep container dry.
- Keep away from heat.
- Keep away from sources of ignition.
- Empty containers pose a fire risk, evaporate the residue under a fume hood.
- Ground all equipment containing material. Do not ingest.
- Do not breathe dust.
- Never add water to this product.
- In case of insufficient ventilation, wear suitable respiratory equipment.
- If ingested, seek medical advice immediately and show the container or the label.
- Avoid contact with skin and eyes.
- Keep away from incompatibles such as oxidizing agents, reducing agents, metals, alkalis.

**Storage**
- Keep container tightly closed.
- Keep container in a cool, well-ventilated area.
- Do not store above 25°C (77°F).

### Section 8. Exposure Controls/Personal Protection

**Engineering Controls**
- Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.
- If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection**
- Splash goggles.
- Synthetic apron.
- Vapor and dust respirator.
- Be sure to use an approved/certified respirator or equivalent.
- Gloves.

**Personal Protection in Case of a Large Spill**
- Splash goggles.
- Full suit.
- Vapor and dust respirator.
- Boots.
- Gloves.
- A self contained breathing apparatus should be used to avoid inhalation of the product.
- Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits**
- Not available.

### Section 9. Physical and Chemical Properties

**Physical state and appearance**
- Solid. (Powdered solid.)

**Molecular Weight**
- 116.08 g/mole

**pH (1% soln/water)**
- Not available.

**Boiling Point**
- Decomposition temperature: 135°C (275°F)

**Melting Point**
- 138.5°C (281.3°F)

**Critical Temperature**
- Not available.

**Specific Gravity**
- 1.59 (Water = 1)

**Vapor Pressure**
- Not applicable.

**Vapor Density**
- 4 (Air = 1)

**Volatile**
- Not available.

**Odor Threshold**
- Not available.

**Water/Oil Dist. Coeff.**
- The product is more soluble in water; \( \log(\text{oil/water}) = -0.5 \)

**Ionicity (in Water)**
- Not available.

**Dispersion Properties**
- See solubility in water, acetone.

**Solubility**
- Easily soluble in cold water, hot water.
- Soluble in acetone.
- Very slightly soluble in diethyl ether.
- Freely soluble in alcohol.
- Soluble in Glacial Acetic Acid.
- Practically insoluble in Benzene.
- Insoluble in chloroform.
- Soluble in concentrated Sulfuric Acid.

*Continued on Next Page*
## Section 10. Stability and Reactivity Data

| **Stability** | The product is stable. |
| **Instability Temperature** | Not available. |
| **Conditions of Instability** | Excess heat (above 200°C), dust generation, incompatible materials, moisture |
| **Incompatibility with various substances** | Reactive with oxidizing agents, reducing agents, metals, alkalis. Slightly reactive to reactive with moisture. |
| **Corrosivity** | Non-corrosive in presence of glass. |
| **Special Remarks on Reactivity** | Contact with metals may evolve flammable hydrogen gas. Maleic Acid releases acrid smoke and fumes when heated to decomposition. |
| **Special Remarks on Corrosivity** | Not available. |
| **Polymerization** | Will not occur. |

## Section 11. Toxicological Information

### Routes of Entry
- Absorbed through skin. Inhalation. Ingestion.

### Toxicity to Animals
- Acute oral toxicity (LD50): 708 mg/kg [Rat].
- Acute dermal toxicity (LD50): 1560 mg/kg [Rabbit].
- Acute toxicity of the dust (LC50): >720 mg/m³ 1 hours [Rat].

### Chronic Effects on Humans
- May cause damage to the following organs: kidneys, lungs.

### Other Toxic Effects on Humans
- Hazardous in case of skin contact (irritant), of ingestion, of inhalation (lung irritant).
- Slightly hazardous in case of skin contact (permeator).

### Special Remarks on Toxicity to Animals
- Not available.

### Special Remarks on Chronic Effects on Humans
- May affect genetic material (mutagenic)

### Special Remarks on other Toxic Effects on Humans
- Acute Potential Health Effects:
  - Skin: Contact with skin causes irritation with possible burns, especially if the skin is wet or moist. It may cause dermatitis. It may be absorbed through the skin and may be harmful if absorbed through skin. If may affect behavior if absorbed through the skin.
  - Eyes: May cause severe irritation, and possible eye burns. May result is corneal injury.
  - Inhalation: May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath, and delayed lung edema. May cause chemical to the respiratory tract. Inhalation may also affect behavior and cause generalized inactivity, sedation, and other symptoms similar to ingestion.
  - Ingestion: May be harmful if swallowed. May cause severe gastrointestinal tract irritation and burns. May cause severe and permanent damage to the digestive tract. Ingestion may also affect behavior and may cause dizziness, lightheadedness, muscle weakness, tremors, seizures, and coma. May cause kidney damage.
  - Chronic Potential Health Effects:
    - Repeated or prolonged overexposure may cause delayed kidney injury.

## Section 12. Ecological Information

### Ecotoxicity
- Not available.

### BOD5 and COD
- Not available.

### Products of Biodegradation
- Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

### Toxicity of the Products of Biodegradation
- The products of degradation are less toxic than the product itself.

### Special Remarks on the Products of Biodegradation
- Not available.
Section 13. Disposal Considerations

Waste Disposal
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14. Transport Information

DOT Classification
Class 8: Corrosive material

Identification
Maleic acid UNNA: NA2215 PG: III

Special Provisions for Transport
Not available.

DOT (Pictograms)

Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations
Connecticut hazardous material survey: Maleic acid
Illinois toxic substances disclosure to employee act: Maleic acid
Illinois chemical safety act: Maleic acid
New York release reporting list: Maleic acid
Pennsylvania RTK: Maleic acid
Massachusetts RTK: Maleic acid
New Jersey: Maleic acid
New Jersey spill list: Maleic acid
Louisiana spill reporting: Maleic acid
TSCA 8(b) inventory: Maleic acid
CERCLA: Hazardous substances: Maleic acid: 5000 lbs. (2268 kg)

California Proposition 65 Warnings
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found.
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found.

Other Regulations
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances (EINECS No. 203-742-5).
Canada: Listed on Canadian Domestic Substance List (DSL).
China: Listed on National Inventory.
Japan: Listed on National Inventory (ENCS).
Korea: Listed on National Inventory (KECI).
Philippines: Listed on National Inventory (PICCS).
Australia: Listed on AICS.

Other Classifications
WHMIS (Canada) CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC)
R22- Harmful if swallowed.
R36/37/38- Irritating to eyes, respiratory system and skin.

S22- Do not breathe dust.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28- After contact with skin, wash immediately with plenty of water.
S37- Wear suitable gloves.
S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.)

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Fire Hazard</th>
<th>Reactivity</th>
<th>Personal Protection</th>
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<tr>
<td>2</td>
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</table>

National Fire Protection Association (U.S.A.)

Flammability
0 2 0
Reactivity
Specific hazard
WHMIS (Canada) (Pictograms)

DSCL (Europe) (Pictograms)

TDG (Canada) (Pictograms)

ADR (Europe) (Pictograms)

Protective Equipment

- Gloves.
- Synthetic apron.
- Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent.
- Splash goggles.

Section 16. Other Information

<table>
<thead>
<tr>
<th>MSDS Code</th>
<th>M3250</th>
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<tbody>
<tr>
<td>References</td>
<td>Not available.</td>
</tr>
<tr>
<td>Other Special Considerations</td>
<td>Not available.</td>
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</tbody>
</table>


CALL (310) 516-8000

Notice to Reader

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user’s responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Quality Products, Inc. assumes no responsibility for the completeness or accuracy of the information contained herein.