1. Product and Company Identification

Material name: CITRIC ACID MONOHYDRATE
Version #: 02
Revision date: 06-17-2011
CAS #: 5949-29-1
Product Codes: J.T.Baker: 0110, 0115, 0116, 0118, 0119, 0120
Macron: 0616, 0627, 11213, 7788
Synonym(s): 1,2,3-PROPANETRICARBOXYLIC ACID, 2-HYDROXY-, HYDRATE (1:1)
Manufacturer: Avantor Performance Materials, Inc.
Address: 222 Red School Lane
Phillipsburg, NJ 08865
US
Customer Service: 800-582-2537
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazards Identification

Emergency overview: DANGER
Contact will irritate or burn eyes. Irritating to respiratory system and skin.

OSHA regulatory status: This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:
Routes of exposure: Inhalation. Skin contact. Eye contact. Ingestion.
Eyes: Severely irritating, and may seriously damage eye tissue.
Skin: Causes skin irritation.
Inhalation: Inhalation of dusts may cause respiratory irritation.
Ingestion: Expected to be a low ingestion hazard. May cause irritation of the gastrointestinal tract.
Target organs: Eyes. Skin. Upper respiratory tract.
Chronic effects: None known.
Potential environmental effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITRIC ACID MONOHYDRATE</td>
<td>5949-29-1</td>
<td>99 - 100</td>
</tr>
</tbody>
</table>

Composition comments: CAS # 5949-29-1 can be described by the CAS # 77-92-9.

4. First Aid Measures

First aid procedures:
- **Eye contact**: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention immediately.
- **Skin contact**: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops or persists.
- **Inhalation**: Move to fresh air. Treat symptomatically. Call a physician if symptoms develop or persist.
- **Ingestion**: Drink plenty of water. Seek medical advice. If ingestion of a large amount does occur, call a poison control center immediately.
Treat symptomatically.

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

**Flammable properties**
Dust may form explosive mixture with air.

**Extinguishing media**

- **Suitable extinguishing media**
  Water. Carbon dioxide (CO2). Dry chemical.

- **Unsuitable extinguishing media**
  None known.

**Protection of firefighters**

- **Protective equipment and precautions for firefighters**
  Firefighters should wear full protective gear. Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

**Special protective equipment for fire-fighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**Specific methods**
In the event of fire, cool tanks with water spray. In the event of fire and/or explosion do not breathe fumes.

**Hazardous combustion products**
Carbon monoxide and carbon dioxide.

6. Accidental Release Measures

**Personal precautions**
Keep unnecessary personnel away. Keep upwind. Ventilate the area. Avoid inhalation of dust from the spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so.

**Methods for containment**
ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). If sweeping of a contaminated area is necessary use a dust suppressant agent which does not react with the product. Prevent entry into waterways, sewer, basements or confined areas.

**Methods for cleaning up**

- **Small Spills:** Sweep up or vacuum up spillage and collect in suitable container for disposal.
- **Large Spills:** Collect dust or particulates using a vacuum cleaner with a HEPA filter. Reduce airborne dust and prevent scattering by moistening with water.

Never return spills in original containers for re-use. Clean contaminated surface thoroughly. Clean up in accordance with all applicable regulations.

7. Handling and Storage

**Handling**
Keep formation of airborne dusts to a minimum. Dust may form explosive mixture with air. Avoid heat, sparks, open flames and other ignition sources. Avoid breathing dust. Do not get in eyes and avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed. Wear appropriate personal protective equipment. See Section 8 of the MSDS for Personal Protective Equipment.

**Storage**
Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure Controls / Personal Protection

**Exposure guidelines**
Not established.

**Engineering controls**
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Personal protective equipment**

- **Eye / face protection**
  Wear safety glasses with side shields (or goggles) and a face shield.
Skin protection
Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves.

Respiratory protection
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: High-efficiency particulate respirator with full facepiece.

General hygiene considerations
Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical & Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Granular</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Form</td>
<td>Powder</td>
</tr>
<tr>
<td>pH</td>
<td>2.2 (0.1 N Solution)</td>
</tr>
<tr>
<td>Melting point</td>
<td>275 - 305.6 °F (135 - 152 °C)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>275 - 305.6 °F (135 - 152 °C)</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Decomposes</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability limits in air, upper, % by volume</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability limits in air, lower, % by volume</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.542</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility (water)</td>
<td>Soluble</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>1850 °F (1010 °C)</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>210.14 g/mol</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>C6-H10-O8</td>
</tr>
</tbody>
</table>

10. Chemical Stability & Reactivity Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical stability</td>
<td>Stable under normal temperature conditions.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Avoid dust formation. Excessive heat. Exposure to moisture.</td>
</tr>
<tr>
<td>Incompatible materials</td>
<td>Strong oxidizing agents.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon Dioxide. Carbon monoxide.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Hazardous polymerization does not occur.</td>
</tr>
</tbody>
</table>

11. Toxicological Information

<table>
<thead>
<tr>
<th>Toxicological data</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Test Results</td>
</tr>
<tr>
<td>CITRIC ACID MONOHYDRATE (5949-29-1)</td>
<td>Acute Oral LD50 Rat: 6730 mg/kg</td>
</tr>
</tbody>
</table>
Sensitization
Not a skin sensitizer.

Local effects
Severe eye irritation. May cause burns. Irritating to respiratory system and skin.

Chronic effects
None known.

Carcinogenicity
This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Skin corrosion/Irritation
Causes skin irritation.

Epidemiology
No epidemiological data is available for this product.

Mutagenicity
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Neurological effects
None known.

Reproductive effects
Contains no ingredient listed as toxic to reproduction.

Teratogenicity
No data available to indicate product or any components present at greater than 0.1% may cause birth defects.

Symptoms and target organs
Irritant effects.

12. Ecological Information

Ecotoxicological data
Product | Test Results
--- | ---
CITRIC ACID MONOHYDRATE (5949-29-1) | LC50 Green or European shore crab (Carcinus maenas): 160 mg/l 48.00 hours

Ecotoxicity
This product has no known eco-toxicological effects.

Environmental effects
Ecological injuries are not known or expected under normal use. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability
This material is readily biodegraded and is not likely to bioconcentrate.

Partition coefficient
Not available

13. Disposal Considerations

Disposal instructions
Dispose of contents/container in accordance with local/regional/national/international regulations.

Contaminated packaging
Offer rinsed packaging material to local recycling facilities. Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT
Not regulated as dangerous goods.

IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
CERCLA/SARA Hazardous Substances - Not applicable.

This product is not listed on the U.S. EPA TSCA Inventory. Under TSCA, hydrates are considered mixtures of their anhydrous salt and water. Accordingly, the anhydrous form is subject to TSCA reporting requirements.

CERCLA (Superfund) reportable quantity
None
Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
- Immediate Hazard - Yes
- Delayed Hazard - No
- Fire Hazard - No
- Pressure Hazard - No
- Reactivity Hazard - No

Section 311 hazardous chemical
Yes

Food and Drug Administration (FDA)
Total food additive
Direct food additive
GRAS food additive

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>No</td>
</tr>
</tbody>
</table>

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Saf-T-Data
Health: 1 - Slight
Flammability: 2 - Moderate
Reactivity: 1 - Slight
Contact: 3 - Severe
Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: G - Green (General Storage)

16. Labeling Info

Label Hazard Warning
DANGER

Contact will irritate or burn eyes. Irritating to respiratory system and skin.

Label Precautions
Keep away from heat, sparks and flame. Avoid breathing dust. Do not get in eyes and avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Label First Aid
Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention. Flush skin thoroughly with water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Get medical attention if irritation develops or persists. If ingestion of a large amount does occur, call a poison control center immediately.

17. Other Information

NFPA ratings
- Health: 2
- Flammability: 1
- Instability: 0

Material name: CITRIC ACID MONOHYDRATE
MSDS ID: C4730 Version #: 02 Revision date: 06-17-2011
Disclaimer

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Issue date

06-17-2011

This data sheet contains changes from the previous version in section(s):

This document has undergone significant changes and should be reviewed in its entirety.