Section 1 - Product and Company Information

Product Name: CITRIC ACID FREE ACID ANHYDROUS CRYSTALLINE
Product Number: C0759
Brand: Sigma Chemical
Company: Sigma-Aldrich
Street Address: 3050 Spruce Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 314 771 5762
Fax: 800 325 5052
Emergency Phone: 414 273 3600 Ext. 5666

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 311</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITRIC ACID ANHYDROUS</td>
<td>77-92-9</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula: C6H8O7
Synonyms: Citric, Anhydrous citric acid, Citreton, Citric acid, anhydrous, Citro, 2-Hydroxy-1,2,3-propanetricarboxylic acid, Beta-hydroxytricarboxylic acid, Kyselina citronova (Czech), Kyselina 2-hydroxy-1,2,3-propanetricarboxylic acid (Czech), NSC 30079, 1,2,3-Propanetricarboxylic acid, 2-hydroxy-

Section 3 - Hazards Identification

Emergency Overview: Irritant.
Risk of serious damage to eyes. Irritating to respiratory system and skin.
Possible sensitizer.

HMIS Rating
Health: 2
Flammability: 0
Reactivity: 0

NFPA Rating
Health: 2
Flammability: 0
Reactivity: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure: If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure: If inhaled, move to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure: In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure: In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Explosion Data
Dust Potential: This material, like most materials in powder form, is capable of creating a dust explosion.

Explosion Limits: Lower: 8 %

Autoignition Temp: N/A

Extinguishing Media
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure(s) of Personal Precaution(s): Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up: Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling: User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage: Suitable: Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

Engineering Controls: Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment: Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.
General Hygiene Measures
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>192.12 AMU</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
</tr>
<tr>
<td>BP/VP Range</td>
<td>N/A</td>
</tr>
<tr>
<td>MP/IP Range</td>
<td>155 - 157 °C</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
<td>N/A</td>
</tr>
<tr>
<td>SG/Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>N/A</td>
</tr>
<tr>
<td>Volatile%</td>
<td>N/A</td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
</tr>
<tr>
<td>Flash Point °F</td>
<td>N/A</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>N/A</td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Lower: 8%</td>
</tr>
<tr>
<td></td>
<td>65 °C</td>
</tr>
<tr>
<td>Flammability</td>
<td>N/A</td>
</tr>
<tr>
<td>Autoignition Temp</td>
<td>N/A</td>
</tr>
<tr>
<td>Solubility</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A = not available

Section 10 - Stability and Reactivity

Stability
Stable

Materials to Avoid
Oxidizing agents, Bases, Reducing agents, Nitrates.

Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure

- Skin Contact: Causes skin irritation.
- Skin Absorption: May be harmful if absorbed through the skin.
- Eye Contact: Causes severe eye irritation.
- Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
- Ingestion: May be harmful if swallowed.

Sensitization
Sensitization: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Sigma and Symptoms of Exposure
Exposure can cause: Vomiting, Diarrhea. Damage to tooth enamel. Dermatitis. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: GE760000

Toxicity Data

- Oral - Rat: 2,500 mg/kg (LD₅₀)
- Intraperitoneal - Rat: 250 mg/kg (LD₅₀)
- Subcutaneous - Rat: 5500 mg/kg (LD₅₀)
  Remarks: Lungs, Thorax, or Respiration; Other changes.
- Other changes
- Oral - Mouse: 5,040 mg/kg (LD₅₀)
  Remarks: Lungs, Thorax, or Respiration; Other changes.
- Other changes
- Intraperitoneal - Mouse: 903 mg/kg (LD₅₀)
- Subcutaneous - Mouse: 2700 mg/kg (LD₅₀)
  Remarks: Lungs, Thorax, or Respiration; Other changes.
- Other changes
- Intravenous - Mouse: 42 mg/kg (LD₅₀)
  Remarks: Behavioral Convulsions or effect on seizure threshold.
  Lungs, Thorax, or Respiration; Cyanosis.
  Gastrointestinal: Changes in structure or function of salivary glands.
- Intravenous - Rabbit: 330 mg/kg (LD₅₀)
  Remarks: Behavioral Convulsions or effect on seizure threshold.
  Lungs, Thorax, or Respiration; Cyanosis.
  Gastrointestinal: Changes in structure or function of salivary glands.

Irritation Data

- Skin - Rabbit: 500 mg 24H
  Remarks: Mild irritation effect
- Eyes - Rabbit: 0.75 mg 24H
  Remarks: Severe irritation effect

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Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification
Symbol of Danger: !
Indication of Danger
Inflam.
Risk Statements R: 37/38 41
Irritating to respiratory system and skin. Risk of serious damage to eyes.
Safety Statements S: 26 36/37/39
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

US Classification and Label Text
Indication of Danger
Inflam.
Risk Statements
Risk of serious damage to eyes. Irritating to respiratory system and skin.
Safety Statements
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.
US Statements
Possible sensitizer.

United States Regulatory Information
SARA Listed: No
TSCA Inventory Item: Yes

Canada Regulatory Information
WHMIS Classification
This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

Disclaimer
For R&D use only. Not for drug, household or other uses.

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Warranty
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.