Section 1 - Product and Company Information

Product Name: CITRIC ACID, ANHYDROUS, MEETS USP TESTING SPECIFICATIONS
Product Number: C1857
Brand: SIGMA
Company: Sigma-Aldrich
Address: 3050 Spruce Street
SAINT LOUIS MO 63103 US
Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITRIC ACID, MEETS USP TESTING SPECS.</td>
<td>77-92-9</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula: C6H8O7
Synonyms: Aciletten * Anhydrous citric acid * Citretten *
Citric acid, anhydrous * Citro *
2-Hydroxy-1,2,3-propanetricarboxylic acid *
beta-Hydroxytricarballylic acid * Kyselina
2-hydroxy-1,2,3-propantrikarbonova (Czech) * NSC
RTECS Number: GE7350000

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, remove 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.

FLASH POINT
N/A

EXPLOSION LIMITS
Lower: 8 %

AUTOIGNITION TEMP
N/A

FLAMMABILITY
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.
Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
   Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
   Respiratory: Use respirators and components tested and approved
   under appropriate government standards such as NIOSH (US) or CEN
   (EU). Where risk assessment shows air-purifying respirators are
   appropriate use a dust mask type N95 (US) or type P1 (EN 143)
   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>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>192.12 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>155.0 – 157.0 °C</td>
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</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Vapor Density</td>
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<td></td>
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<tr>
<td>Saturated Vapor Conc.</td>
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</tr>
<tr>
<td>SG/Density</td>
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<tr>
<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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<td></td>
</tr>
<tr>
<td>Volatile%</td>
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<td></td>
</tr>
<tr>
<td>VOC Content</td>
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<td></td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Solvent Content</td>
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<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
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<td></td>
</tr>
<tr>
<td>Viscosity</td>
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<td></td>
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<tr>
<td>Surface Tension</td>
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<td></td>
</tr>
<tr>
<td>Partition Coefficient</td>
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<td></td>
</tr>
<tr>
<td>Decomposition Temp.</td>
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<td></td>
</tr>
<tr>
<td>Flash Point</td>
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<td></td>
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<tr>
<td>Explosion Limits</td>
<td>Lower: 8 %</td>
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<tr>
<td>Flammability</td>
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</tr>
<tr>
<td>Autoignition Temp</td>
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<td></td>
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<tr>
<td>Refractive Index</td>
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<td>Optical Rotation</td>
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<tr>
<td>Miscellaneous Data</td>
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<tr>
<td>Solubility</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
   Stable: Stable.
   Materials to Avoid: Oxidizing agents, Bases, Reducing agents, Nitrates.
HAZARDOUS DECOMPOSITION PRODUCTS
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: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

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

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

TOXICITY DATA

Oral
Rat
3000 mg/kg
LD50

Intraperitoneal
Rat
290 MG/KG
LD50

Subcutaneous
Rat
5500 MG/KG
LD50
Remarks: Other changes Lungs, Thorax, or Respiration:Other changes.

Oral
Mouse
5040 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: Other changes Lungs, Thorax, or Respiration:Other
Intravenous
Mouse
42 MG/KG
LD50

Intravenous
Rabbit
330 MG/KG
LD50

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
0.75 mg
24H
Remarks: Severe irritation effect

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: Xi
Indication of Danger: Irritant.
R: 37/38-41
Risk Statements: Irritating to respiratory system and skin. Risk of serious damage to eyes.
S: 26-36/37/39
Safety Statements: 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: Irritant.
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 or manufacturing use. Not for prescription compound or other uses.

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. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. 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 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.