SECTION 1. IDENTIFICATION

Product name                           Citric Acid Anhydrous
Substance name                          Citric Acid Anhydrous
Molecular formula                      C6-H8-O7
Chemical identity                      2-hydroxypropane-1,2,3-tricarboxylic acid
CAS-No.                                77-92-9
Chemical nature                        Solid

Manufacturer or supplier’s details
Details of the supplier of the safety data sheet
Company                                 PRO Chemical & Dye.
                                        126 Shove Street
                                        Fall River, MA  02724
                                        USA
Telephone                               508-676-3838

Emergency telephone number
Emergency telephone number              Emergency Telephone Numbers:
                                        800-255-3924 ChemTel.   (United States)
                                        + 1  01  813-248-0585 (Outside the United States)

Recommended use of the chemical and restrictions on use
Recommended use                         Food/ feedstuff additives
                                        Cosmetic additive
                                        Medical aids
                                        Industrial use
Restrictions on use                     None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Eye irritation                          Category 2A

GHS label elements
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Hazard pictograms

Signal word  Warning

Hazard statements  H319 Causes serious eye irritation.

Precautionary statements  Prevention:
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 IF eye irritation persists: Get medical advice/attention.

Hazards Not Otherwise Classified
May form combustible dust concentrations in air (during processing).

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Pure substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance name</td>
<td>Citric Acid Anhydrous</td>
</tr>
<tr>
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<td>77-92-9</td>
</tr>
<tr>
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<td>Solid</td>
</tr>
</tbody>
</table>

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration ( %w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric acid anhydrous</td>
<td>77-92-9</td>
<td>100</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

General advice  Avoid inhalation, ingestion and contact with skin and eyes. Consult a physician.

If inhaled  If breathed in, move person into fresh air.
If symptoms persist, call a physician.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.

In case of skin contact
In case of contact, immediately flush skin with plenty of water. Get medical attention if symptoms occur.

In case of eye contact
If easy to do, remove contact lens, if worn. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.

If swallowed
Drink plenty of water. If swallowed, DO NOT induce vomiting.

Most important symptoms and effects, both acute and delayed
Eye irritation may cause mild and mechanical irritation and thus symptoms which would be redness and pain. Causes serious eye irritation.

Notes to physician
Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media
- Water spray
- Dry powder
- Foam
- Carbon dioxide (C02)

Unsuitable extinguishing media
- High volume water jet

Specific hazards during firefighting
Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Do not use a solid water stream as it may scatter and spread fire. Hazardous decomposition products formed under fire conditions.

Hazardous combustion products
- Carbon dioxide (C02)
- Carbon monoxide

Specific extinguishing methods
- Standard procedure for chemical fires.

Further information
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. In the event of fire and/or explosion do not breathe fumes.

Special protective equipment for firefighters
In the event of fire, wear self-contained breathing apparatus. Wear fire resistant or flame retardant clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emerg-
- Avoid dust formation.
- Dust deposits should not be allowed to accumulate on surfac-
### SAFETY DATA SHEET

**Citric Acid Crystals**

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<thead>
<tr>
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</tr>
</tbody>
</table>

- **Emergency procedures**
  - es, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
  - Avoid breathing dust.
  - Ensure adequate ventilation, especially in confined areas.
  - Wear personal protective equipment.
  - Avoid contact with skin and eyes.
  - Refer to protective measures listed in sections 7 and 8.

- **Environmental precautions**
  - No special environmental precautions required.
  - Prevent further leakage or spillage if safe to do so.

- **Methods and materials for containment and cleaning up**
  - Use mechanical handling equipment.
  - Keep in suitable, closed containers for disposal.
  - Clean contaminated surface thoroughly.
  - Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

### SECTION 7. HANDLING AND STORAGE

| Advice on protection against fire and explosion | Normal measures for preventive fire protection. |
| Advice on safe handling | Risk of dust explosion. Do not breathe dust. Avoid contact with skin and eyes. Wear personal protective equipment. For personal protection see section 8. |
| Conditions for safe storage | Keep in an area equipped with acid resistant flooring. Keep container tightly closed in a dry and well-ventilated place. Minimize dust generation and accumulation. Take measures to prevent the build up of electrostatic charge. |
| Materials to avoid | Incompatible with strong bases and oxidizing agents. |

### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

- Contains no substances with occupational exposure limit values.

**Engineering measures**

- Provide adequate ventilation.
  - Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

**Personal protective equipment**

- **Respiratory protection**
  - In the case of dust or aerosol formation use respirator with an approved filter.
  - Use NIOSH approved respiratory protection.

- Hand protection
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Citric Acid Anhydrous

Remarks
Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer.

Eye protection
Safety glasses
Ensure that eyewash stations and safety showers are close to the workstation location.

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product. Remove contaminated clothing and protective equipment before entering eating areas.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance crystalline
Colour white
Odour odourless
Odour Threshold Not relevant
pH 1.8 (77 OF)
Concentration: 5%
Melting point/range ca. 307°F
Boiling point/boiling range Not applicable
Flash point Not applicable
Evaporation rate Not applicable
Flammability (solid, gas) does not ignite
Upper explosion limit No data available
Lower explosion limit No data available
Vapour pressure Not applicable
Relative vapour density Not applicable
Relative density No data available
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Citric Acid Crystals

Density
1.665 g/cm³ (68°F)

Solubility(ies)
Water solubility
ca. 1,450 g/l (68°F)

Partition coefficient: n-octanol/water
log Pow: -1.8 - -0.2 Calculation

Ignition temperature
No data available

Decomposition temperature
No data available

Viscosity
Viscosity, dynamic
Not applicable

Viscosity, kinematic
Not applicable

Explosive properties
Not explosive

Oxidizing properties
No oxidising effect.

Molecular weight
192.12 g/mol

Dust explosion class
St1

SECTION 10. STABILITY AND REACTIVITY

Reactivity
No decomposition if stored and applied as directed.

Chemical stability
Stable under normal conditions.

Possibility of hazardous reactions
No dangerous reaction known under conditions of normal use.

Conditions to avoid
Avoid dust formation.

Incompatible materials
Strong bases
Oxidizing agents

Hazardous decomposition products
Build-up of dangerous/toxic fumes possible in cases of fire/high temperature.
Carbon dioxide (CO2)
Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Components:

Citric acid anhydrous: LD50 Oral (Mouse): 5.400 mg/kg body weight

Acute oral toxicity
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Acute dermal toxicity

LD50 Dermal (Rat): > 2.000 mg/kg body weight

Acute toxicity (other routes of administration)

LD50 (Rat): 725 mg/kg

Application Route: i.p.

LD50 (Mouse): 940 mg/kg

Application Route: i.p.

Skin corrosion/irritation

Components:

Citric acid anhydrous:

Species: Rabbit

Method: OECD Test Guideline 401

LD50 Oral (Rat): 11.700 mg/kg body weight

Method: OECD Test Guideline 401

Serious eye damage/eye irritation

Components:

Citric acid anhydrous:

Species: Rabbit

Result: Irritating to eyes.

Method: OECD Test Guideline 405

Respiratory or skin sensitization

Components:

Citric acid anhydrous:

No data available

Germ cell mutagenicity

Components:

Citric acid anhydrous:

Genotoxicity in vitro

Test Type: Ames test
Species: Salmonella typhimurium
Concentration: 0 - 5 mg/plate
Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
Result: negative

Genotoxicity in vivo

Test Type: in vivo assay
Species: Rat
Application Route: Oral
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Citric Acid Crystals

Carcinogenicity

Components:

Citric acid anhydrous:
Carcinogenicity - Assessment

Not classifiable as a human carcinogen.

Reproductive toxicity

Components:

Citric acid anhydrous:
Reproductive toxicity - Assessment

No toxicity to reproduction

STOT - single exposure

Components:

Citric acid anhydrous:
No data available

STOT - repeated exposure

Components:

Citric acid anhydrous:
No data available

Repeated dose toxicity

Components:

Citric acid anhydrous:
Species: Rat
NOAEL: 4,000 mg/kg
LOAEL: 8,000 mg/kg
Application Route: Oral
Exposure time: 10 d
Dose: 2, 4, 8, 16 g/kg bw/day

Method: OECD Test Guideline 475
Result: negative

Germ cell mutagenicity - Assessment

In vitro tests did not show mutagenic effects

No data available
SAFETY DATA SHEET

Citric Acid Crystals

Aspiration toxicity

Components:

Citric acid anhydrous:
No aspiration toxicity classification

Experience with human exposure

Product:
Inhalation

Skin contact

Target Organs: Skin
Symptoms: May cause skin irritation in susceptible persons.

Eye contact

Target Organs: Eyes
Symptoms: Redness, Itching

Ingestion

Target Organs: Digestive organs
Symptoms: No information available.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Citric acid anhydrous:
Toxicity to fish
LC50 (Leuciscus idus (Golden orfe)): 440 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates
LC50 (Daphnia magna (Water flea)): 1,535 mg/l
Exposure time: 24 h
Test Type: static test

NOEC (Scenedesmus quadricauda (Green algae)): 425 mg/l
Exposure time: 8 d
Test Type: static test

Toxicity to algae

TT (Pseudomonas putida): > 10,000 mg/l
Exposure time: 16 h

Persistence and degradability

Components:

Citric acid anhydrous:
Biodegradability
Biodegradation: 97%
Testing period: 28 d
Method: OECD Test Guideline 301 B
Readily biodegradable.
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Citric Acid Anhydrous

Biodegradation: 100%
Testing period: 19 d
Method: OECD Test Guideline 301 E
Readily biodegradable.

Biochemical Oxygen Demand (BOD) 526 mg/g

Chemical Oxygen Demand (COD) 728 mg/g

Physico-chemical removability
Readily biodegradable.

Bioaccumulative potential

Product: log Pow: -1.8 - -0.2
Partition coefficient: n-octanol:water Calculation

Components:

Citric acid anhydrous: The product is miscible in water and readily biodegradable in both water and soil. Accumulation is not expected.
Bioaccumulation

Mobility in soil
No data available

Other adverse effects

Components:

Citric acid anhydrous: This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
Results of PBT and vPvB assessment
This product has no known ecotoxicological effects.

Additional ecological information

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues Where possible recycling is preferred to disposal or incineration. Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Dispose of as unused product.
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SECTION 14. TRANSPORT INFORMATION

International Regulations
IATA-OGI
Not regulated as a dangerous good
IMO-Code
Not regulated as a dangerous good
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations
DOT
Not regulated as a hazardous material

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act
SARA 311/312 Hazards
Acute Health Hazard
Fire Hazard
SARA 302
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65
Water Act Section 307
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Clean Water Act
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

The components of this product are reported in the following inventories:
EINECS
On the inventory, or in compliance with the inventory
TSCA
On TSCA Inventory
TSCA_12b
Not applicable
DSL
All components of this product are on the Canadian DSL
REACH
On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION
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Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardization; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50% of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MAR POL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observabled Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date 06/22/2017

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.