

## MATERIAL SAFETY DATA SHEET

## CITRIC ACID

PRODUCT CODE NUMBER(S): 2980-1, 2985-5, 3020-1, 3025-5

### PRODUCT IDENTIFICATION

**Chemical Name and Synonyms:** Citric acid, monohydrate or Citric acid, anhydrous; 1,2,3-Propanetricarboxylic acid, 2-hydroxymonohydrate

**Chemical Family:** Saturated aliphatic carboxylic acid,

**Chemical Formula:** C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>/C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>.H<sub>2</sub>O

**Product Use:** Laboratory chemical

**Manufacturer's Name and Address:**

Caledon Laboratories Ltd.  
40 Armstrong Avenue  
Georgetown, Ontario L7G 4R9

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### HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
Citric acid, monohydrate	>99	Not established	5949-29-1
Citric acid, anhydrous	>99	Not established	77-92-9

### PHYSICAL DATA

**Physical State:** Solid

**Odour and Appearance:** Odourless, white granular to fine crystalline powder or orthorhombic crystals with a pleasant sour taste; efflorescent in dry air, slightly deliquescent in moist air.

**Odour Threshold (ppm):** Not applicable

**Vapour Pressure (mm Hg):** Practically zero

**Vapour Density (Air = 1):** Not applicable

**Evaporation Rate:** Not applicable

**Boiling Point (degrees C):** Decomposes before boiling

**Melting Point (degrees C):** 153°C (anhydrous); 135-152°C (monohydrate)

**pH:** 2.2 (1%)

**Specific Gravity:** 1.665 @ 18°C (anhydrous)

**Coefficient of Water/Oil distribution:** LogP (oct)=-1.72

### SHIPPING DESCRIPTION

**UN:** Not regulated

**T.D.G. Class:** Not regulated

**Pkg. Group:** Not regulated

### REACTIVITY DATA

**Chemical Stability:** Stable under normal temperatures and pressures. Hygroscopic.

**Incompatibility with other substances:** May react violently with strong bases, or strong oxidizing agents when heated with increased risk of fire. Mixtures with strong

bases may generate heat and pressure; increased risk of fire. Explosions have occurred with metal nitrates. Corrosive to brass, lead, cast iron, steel; not corrosive to stainless steels. Corrosive to normal concrete and should not be used with nylon, polycarbonates, polyamides, polyimides, acrylics.

**Reactivity:** Fire and explosion hazard with strong oxidizers. Avoid ignition sources, excessive heat, generation of dust, all incompatibles.

**Hazardous Decomposition Products:** CO<sub>x</sub>

### FIRE AND EXPLOSION DATA

**Flammability:** Combustible if strongly heated. As with most organic compounds, fine dust dispersed in air in the presence of an ignition source is a potential dust explosion hazard.

**Extinguishing Media:** Dry chemical, carbon dioxide, water spray or standard foam. Water may cause frothing, however, with a gentle spray or fog the froth will blanket and extinguish the fire. Use water spray to cool containers, disperse vapours, and flush spills away from fire area. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment and clothing sufficient to prevent inhalation of dust or fumes and contact with skin and eyes.

**Flash Point (Method Used):** Not applicable, does not form vapour

**Autoignition Temperature:** 1010°C (powder)

**Upper Flammable Limit (% by volume):** Not available

**Lower Flammable Limit (% by volume):** 8% @ 65 deg C°

**Hazardous Combustion Products:** CO<sub>x</sub>, acrid smoke

**Sensitivity to Impact:** None identified

**Sensitivity to Static discharge:** As with most organic powders, mixtures of dust with air may be sensitive under certain conditions, when ignited by an electrostatic or other high-voltage spark, or other ignition source.

### TOXICOLOGICAL PROPERTIES AND HEALTH DATA

#### Toxicological Data:

**LD<sub>50</sub>:** (oral, rat) 3 g/kg; (oral, mouse) 5 g/kg (both unconfirmed)

**LD<sub>Lo</sub>:** Not available

#### Effects of Acute Exposure to Product:

**Inhaled:** No human or animal information available. May cause temporary mucous membrane irritation with sore throat, coughing, and shortness of breath. Severity of effects would depend on the concentration of dust or mist, and the duration of exposure.

**In contact with skin:** No human or confirmed animal information available. Dust or solutions may cause mild to severe irritation with redness and pain. Concentrated solutions may be corrosive, causing skin damage and possible permanent scarring. May cause allergic reaction.

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**In contact with eyes:** No human information available. Animal testing indicates can cause severe eye irritation, with redness, pain and possible irreversible corrosive eye damage.

**Ingested:** Citric acid is generally considered to be largely innocuous. Concentrated solutions may cause wrinkling and roughening of mucous membranes of the mouth and esophagus and swelling and discoloration of the stomach and intestine. Doses greater than 10 g may cause nausea and vomiting. A human death has been reported following ingestion of 20-30 grams of the pure acid. Lethal doses in rats produced metabolic acidosis and calcium deficiency. Ingestion is not a normal route of industrial exposure.

#### **Effects of Chronic Exposure to Product:**

**Carcinogenicity:** Probably not carcinogenic, normal part of body metabolism

**Teratogenicity:** No human or animal information available. Probably not teratogenic or embryotoxic

**Reproductive Effects:** No human information available. Not harmful in two animal studies. Probably not toxic to reproductive system

**Mutagenicity:** No human or animal in vivo information available. Negative in in vitro testing.

**Synergistic Products:** None known

#### **PREVENTIVE MEASURES**

**Engineering Controls:** Local exhaust ventilation recommended.

**Respiratory Protection:** Dust/mist mask or respirator with high efficiency particulate filter. For high or unknown concentrations, as in fire or spill conditions, NIOSH/MSHA approved supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus, or positive-pressure, full face-piece self-contained breathing apparatus.

**Eye Protection:** Chemical safety goggles, face shield.

**Skin Protection:** Butyl, nitrile or natural rubber, neoprene, PVC, or Viton™ gloves. Other protective clothing, coveralls, apron, boots, etc., sufficient to prevent contact.

**Other Personal Protective Equipment:** Safety shower and eye-wash fountain in work area.

**Leak and Spill Procedure:** Ventilate area. Cleanup personnel must be thoroughly trained in the hazards of this material and must wear protective equipment and clothing sufficient to prevent inhalation of dust or fumes, and contact with skin and eyes. If dust is present, observe explosion prevention measures, use non-sparking tools, keep away from heat, sparks, and all sources of ignition; avoid the accumulation of static charge, ground and bond equipment and containers. Mix with sand or inert absorbent, collect in a manner that does not raise dust, and transfer carefully into labelled, covered container(s) for removal by disposal company. Wash site of spillage thoroughly with water and detergent.

**Waste Disposal:** Follow all federal, provincial and local regulations for disposal.

**Handling Procedures and Equipment:** CORROSIVE; May be COMBUSTIBLE AS DUST. Workers using this chemical must be properly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. If dust is present, observe explosion prevention measures, use non-sparking tools, keep away from heat, sparks, and all sources of ignition; avoid the accumulation of static charge, ground and bond equipment and containers.

Keep work areas free of incompatible materials (see "Incompatibility with other substances"). Use good housekeeping practices to prevent accumulations of dust. Use the smallest amounts possible for the purpose, in designated areas with adequate ventilation. Avoid generating dusts. Avoid all contact and inhalation. Keep containers closed when not in use.

**Storage Requirements:** Store in suitable, labelled containers a cool, dry, well-ventilated, corrosion-proof area out of direct sunlight, away from all ignition sources and incompatible materials. Keep containers tightly closed when not in use and when empty. Storage facilities should be made of fire-resistant materials. Do not expose sealed containers to elevated temperatures. Protect from damage, and inspect frequently for signs of leaking. Protect from moisture.

#### **FIRST AID MEASURES**

##### **Specific Measures:**

**Eyes:** Immediately flush eyes with large amounts of gently running water, for at fifteen to twenty (15-20) minutes, holding eyelids open while flushing. Take care not to flush contaminated water into unaffected eye. Continue irrigating with normal saline until the pH has returned to normal (30-60 minutes). Cover with sterile bandages. Get medical attention immediately.

**Skin:** Remove contaminated clothing, including watches, rings, belts, and shoes. Wash skin with plenty of running water for five to ten (5-10) minutes, or until no trace of chemical remains. If irritation develops get medical attention. Decontaminate clothing before reuse, or discard.

**Inhalation:** Remove to fresh air immediately. Give oxygen and get medical attention for breathing difficulty. Keep person warm and at rest. Treat symptomatically and supportively.

**Ingestion:** Treat symptomatically and supportively. Give several glasses of water or milk to dilute. Do not induce vomiting. Get medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration, rinse mouth and give more water to drink.

#### **REFERENCES USED**

CCINFO disc: MSDS's, February 2007

Budavari: The Merck Index, 12th ed., 1997

Sax, Lewis: Hawleys' Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets

#### **ADDITIONAL INFORMATION**

**Date Issued:** March 10, 1989

**Revision:** February 2010

**MSDS:** 2980-1, 2985-5, 3020-1, 3025-5

**Proposed WHMIS Designation:** E (solutions are corrosive)

Prepared by: Caledon Laboratories Ltd. (905) 877-0101  
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