Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

CITRIC ACID ANHYDROUS, SOLID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http://www.brenntag.ca

WHMIS#: 00060156
Index: GCD0872/11D
Effective Date: 2011 October 17
Date of Revision: 2011 October 17

EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name:	Citric Acid Anhydrous, Solid.
Chemical Name:	2-Hydroxy-1,2,3-propanetricarballylic acid.
Synonyms:	Citric Acid USP-FCC (Food Grade); Beta-hydroxytricarballylic acid; Citric Acid USP23; Citric Acid BP93.
Chemical Family:	Organic Acid.
Molecular Formula:	C6H8O7.
Product Use:	Acidulant, pH regulator, pharmaceutical preparations, antioxidant synergist, flavour enhancer and sequestering agent in processed food and beverages. Food additive.

WHMIS Classification / Symbol:

E: Corrosive

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV (TWA)*	*% Concentration*
Citric Acid	77-92-9	---	95 - 100

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Corrosive! Toxic effects are principally related to its corrosive properties. Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3) Human experience and animal studies indicate that acidic compounds (pH less than 3.5) may cause irritation and burns. (3) Causes severe skin and eye burns. Dust is irritating to respiratory tract. See "Other Studies Relevant to Material". Powdered material may form explosive dust-air mixtures. Can decompose at high temperatures forming toxic gases.

POTENTIAL HEALTH EFFECTS

Inhalation: Corrosive! Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3) Excessive contact with powder may cause drying of mucous membranes of nose and throat due to absorption of moisture and oils.

Skin Contact:	Corrosive! Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3)
Skin Absorption:	Not likely to be absorbed through the skin.
Eye Contact:	Corrosive! Human experience and animal studies indicate that acidic compounds (pH less than 3.5) may cause irritation and burns. (3) This product causes immediate pain, severe burns and permanent corneal damage which may result in blindness. Excessive contact with powder may cause drying of mucous membranes of the eyes due to absorption of moisture and oils.
Ingestion:	Corrosive! This product causes severe burning and pain in the mouth, throat and abdomen. Vomiting, diarrhea and perforation of the esophagus and stomach lining may occur. Prolonged and repeated exposure may cause tooth erosion and nausea and vomiting.
Other Health Effects:	Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. In general, long-term exposure to high concentrations of dust may cause increased mucous flow in the nose and respiratory system airways. This condition usually disappears after exposure stops. (4) May cause tooth erosion. Ingestion of citric acid frequently or in large quantites can cause tooth erosion and irritation to the digestive system. (4)

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.
Skin Contact:	Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Obtain medical attention IMMEDIATELY. See "Note to Physicians" below.
Eye Contact:	Immediately flush eyes with running water for a minimum of 30 minutes, preferably up to 60 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.
Note to Physicians:	Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. (3) Mucosal injury following ingestion of this corrosive material may contraindicate the induction of vomiting in the treatment of possible intoxication. Similarly, if gastric lavage is performed, intubation should be done with great care. If oral burns are present or a corrosive ingestion is suspected by the patient's history, perform esophagoscopy as soon as possible. Scope should not be passed beyond the first burn because of the risk of perforation. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	***AutoIgnition Temperature (°C)***	**Flammability Limits in Air (%):** ***LEL***	***UEL***
345 (3)	1010 (3)	Not available.	Not available.

Flammability Class (WHMIS):	Not regulated.
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases.

Unusual Fire or Explosion Hazards:	In common with many organic chemicals in powder form, this product may be capable of forming flammable dust clouds in air. Avoid accumulation and dispersion of dust to reduce explosion potential. Minimize air borne spreading of dust. Spilled material may cause floors and contact surfaces to become slippery. Enforce NO SMOKING rules in area of use.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when dust is present between the lower and upper explosive limits.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Alcohol or polymer foam is preferred. Dry chemical, carbon dioxide or water spray. Water may cause frothing if it gets below the surface of the liquid and turns to steam. Water fog gently applied to the surface may cause frothing which may extinguish the fire. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours. Clean up immediately to eliminate slipping hazard. Isolate materials that are not involved in the fire and protect personnel. Spilled material may cause floors and contact surfaces to become slippery. Do not use solid water streams near ruptured tanks or spills. Reacts violently with water and can splatter onto personnel. (3)
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing. Protective clothing for skin and eye protection should be worn to protect against corrosive materials.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Minimize air borne spreading of dust. Ventilate enclosed spaces. Eliminate all sources of ignition. Spilled material may cause floors and contact surfaces to become slippery. Wear respirator, protective clothing and gloves. Avoid dry sweeping. Do not use compressed air to clean surfaces. Vacuuming is preferred. Return all material possible to container for proper disposal. Where a package (drum or bag) is damaged and / or leaking, repair it, or place it into an over-pack drum immediately so as to avoid or minimize material loss and contamination of surrounding environment. Any recovered product can be used for the usual purpose, depending on the extent and kind of contamination. Collect product for recovery or disposal. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Avoid accumulation and dispersion of dust to reduce explosion potential. Use normal "good" industrial hygiene and housekeeping practices. Clean up immediately to eliminate slipping hazard. Avoid moisture contamination. When diluting, add this material/product to water in small amounts to avoid spattering. Never add water to this material/product. The water should be lukewarm. Always add product slowly to liquid surface, with constant stirring to assure that product is completely dissolved as it is added to dissipate heat.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing dusts (vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Corrosive residue is most likely to be deposited at process vents or storage tanks, especially during filling operations. The use of compressed air to force corrosive materials from delivery trucks is of special concern. Scrubbing the exhaust of these vents is highly recommended. Jurisdictional regulations should be consulted to determine required practices.

STORAGE

Storage Temperature (°C):	10 to 30 °C. (3)

Ventilation Requirements:	Ventilation should be corrosion and explosion proof.
Storage Requirements:	Prolonged storage may result in lumping or caking. Store in a clean, cool well ventilated area, away from organic chemicals, strong bases, strong acids, metal powders, carbides, sulfides, and any readily oxidizable material. Protect from direct sunlight. Protect against physical damage. Storage area should be equipped with corrosion-resistant floors, sumps and should have controlled drainage to a recovery tank.
Special Materials to be Used for Packaging or Containers:	Materials of construction for storing the product include: fiberglass-reinforced polyester, polyethylene, polypropylene, 316 stainless steel or nickel-molybdenum alloys. Equipment for storage, handling or transport should NOT be made from the following material, or, where applicable, its alloys: 304 stainless steel, carbon steel, cast iron, copper, brass, aluminum, lead, nylon and Concrete. (4) Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Ventilation should be corrosion and explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Avoid accumulation and dispersion of dust to reduce explosion potential. Ventilate low lying areas such as sumps or pits where dense dust may collect.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection:	Safety glasses with side shields are recommended as minimal eye protection. Use dust-tight chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from nitrile rubber, neoprene, butyl rubber, viton, polyethylene, PVC or natural rubber should be impervious under conditions of use. Do not use gloves or protective clothing made from polyvinyl alcohol (PVA). (4) Prior to use, user should confirm impermeability. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. A NIOSH/MSHA approved dust mask for concentrations of nuisance dust up to 100 mg/m³ particulate may be adequate. An air-supplied respirator if concentrations are higher or unknown.
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

Particulate Not Otherwise Classified:

ACGIH	OSHA
10 mg/m³ - Inhalable particulate	50 mppcf* or 15 mg/m³ - Total Dust
3 mg/m³ - Respirable particulate	15 mppcf* or 5 mg/m³ - Respirable Fraction

* mppcf = million particles per cubic foot

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Solid.
Appearance:	Colourless transparent crystals or white powder.
Odour:	Odourless.
Odour Threshold (ppm):	Not applicable.
Boiling Range (°C):	Decomposes at 175. (4)
Melting/Freezing Point (°C):	153 - 154. (3,4)
Vapour Pressure (mm Hg at 20° C):	Not applicable.
Vapour Density (Air = 1.0):	Not applicable.
Relative Density (g/cc):	1.542 - 1.665. (3,4)
Bulk Density:	54 - 63 lb/ft³. (3)
Viscosity:	Not applicable.
Evaporation Rate (Butyl Acetate = 1.0):	Not applicable.
Solubility:	Soluble in water. 59.2 g / 100 g. (4) Deliquescent. Substances that absorbs moisture from the air and forms a wet solid or solution are termed "Deliquescent". Soluble in

	Ethyl Alcohol. Moderately soluble in Amyl Acetate and Diethyl Ether. (4)
% Volatile by Volume:	0.
pH:	1.8 (0.15 % solution); 2.2 (1 % solution). (3)
Coefficient of Water/Oil Distribution:	< 0. (3)
Volatile Organic Compounds (VOC):	Not applicable.
Flashpoint (°C):	345 (3)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	In common with many organic chemicals in powder form, this product may be capable of forming flammable dust clouds in air. Material will not burn unless preheated.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Avoid accumulation and dispersion of dust to reduce explosion potential. Minimize air borne spreading of dust. Clean up immediately to eliminate slipping hazard. Temperatures above 40 °C. (3) Keep tightly closed to protect quality.
Materials to Avoid:	Strong oxidizers. Reducing agents. Strong bases. Metallic nitrates. Corrosive to aluminum, tin, zinc, copper and their alloys. Lead. Brass. 304 Stainless Steel. Carbon steel. Concrete.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	*LD50 (Oral, Rat)*	*LD50 (Dermal, Rabbit)*	*LC50 (Inhalation, Rat, 4h)*
Citric Acid	1 700 - 11 700 mg/kg (1)	---	---

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP. See "Other Studies Relevant to Material".
Reproductive Data:	No adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated.
Teratogenicity Data:	No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	None known.
Other Studies Relevant to Material:	A single drop of a 2% or 5% solution in water causes little or no irritation. A 0.5% solution held in contact with the eye causes irreversible tissue damage to the cornea. (4) Citric Acid caused mild irritation when 500 mg was tested on rabbit skin in a 24-hour test. (4) A daily dose of 1,380 mg/Kg fed to dogs for 112 to 120 days did not produce any symptoms of kidney damage or other toxic effects. Citric Acid (as the sodium salt) in the diet of rabbits at 7.7% for 150 days did not produce any toxic effects. (4) Diets containing 1.2% Citric Acid fed to rats over 2 successive generations (90 weeks) had no harmful effects on growth or reproduction. (4) A diet containing 5% Citric Acid fed to pregnant guinea pigs and rats had no adverse effects to growth or survival of young pups. This dietary level did not cause a slight retardation in body weight gain and survival of young rats on a calcium-reduced diet. (4) Citric Acid is an essential component of the body's processed for producing energy. It is continually produced and boken down. Even high doses would be rapidly cleared from the body. (4)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Not available. May be harmful to aquatic life. Toxicity is primarily associated with pH.
Environmental Fate:	Not available. Product has an unaesthetic appearance and can be a nuisance. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	Neutralize carefully with soda ash or sodium bicarbonate to a pH of 6 to 9. Neutralization is expected to be exothermic. Vigourous effervescence results. Confirm pH using pH paper.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Deactivating Chemicals". See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue and can be dangerous. Treat package in the same manner as the product.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

This product is not regulated by TDG.

Label(s): Not applicable. Placard: Not applicable.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

This product is not regulated by DOT.

Label(s): Not applicable. Placard: Not applicable.

CERCLA-RQ: Not available. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR:	All components of this product are included on the DSL.
CEPA - NPRI:	Not included.
CANADIAN FOOD AND DRUG ACT/REGULATIONS:	The use of this material/product as a food additive is regulated by Health Canada in the Food and Drug Act and the Food and Drug Regulations. It is incumbent on the user of this material/product to ensure any intended food application is consistent with Health Canada guidelines. Food Grade designation in no way implies that the product is safe for consumption by humans. (3)

Controlled Products Regulations Classification (WHMIS):

E: Corrosive

USA

Environmental Protection Act:	All components of this product are included on the TSCA inventory.
OSHA HCS (29CFR 1910.1200):	Corrosive.
U.S. FOOD AND DRUG ADMINISTRATION:	This material/product is regulated for use by the US FDA. It is incumbent on the user of this material/product to ensure any intended food application is consistent with US FDA guidelines. Food Grade designation in no way implies that the product is safe for consumption by humans. (3)

NFPA: 1 Health, 1 Fire, 0 Reactivity (3)

HMIS: Health, Fire, Reactivity (Not available.)

INTERNATIONAL

All components of this product are found on the following inventories: EINECS (European Inventory of Existing Commercial Chemical Substances), China Inventory (IECS), Korea (ECL), Australia (ACOIN), Philippines Inventory of Chemicals and Chemical Substances

(PICCS).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
Phone: (416) 259-8231 Facsimile: (416) 259-5333

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7
Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.