

**SECTION I: IDENTIFICATION OF PRODUCT**

COMPANY: **Diversity Technologies Corp.** DATE: **January 31, 2011**  
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PRODUCT NAME: **Citric Acid, Anhydrous**

PRODUCT USE: Oil well drilling fluid & cement additive  
 CHEMICAL FAMILY: Organic acid CAS #: 77-92-9

**WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)**

WHMIS CLASSIFICATION: E  
 WORKPLACE HAZARD: Corrosive solid

**TRANSPORTATION OF DANGEROUS GOODS (TDG)**

PROPER SHIPPING NAME: Not regulated under TDG  
 TDG CLASSIFICATION: Not applicable  
 UN NUMBER (PIN): Not applicable  
 PACKING GROUP: Not applicable

**SECTION II: HAZARDOUS INGREDIENTS**

INGREDIENT	% (w/w)	CAS NUMBER	LD <sub>50</sub> Oral-Rat	LC <sub>50</sub> Inhal-Rat	ACGIH-TLV
Citric acid	100	77-92-9	6730 mg/kg	Not available	Not established

**SECTION III: HEALTH HAZARDS**

ROUTE OF ENTRY:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION

EYE CONTACT:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 Dusts and solutions can cause severe irritation and corrosive injury (destruction of eye tissue), based on animal information. Depending on the concentration of the solution and the degree of exposure, permanent eye damage, including blindness may result.

SKIN CONTACT:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 Dusts and solutions can cause severe irritation and corrosive injury based on animal information.

INGESTION:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 Ingestion of large amounts may cause stomach pain and vomiting.

INHALATION:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 Dusts and mists from solutions may cause temporary irritation of the nose and throat. The severity of these effects would depend on the airborne concentration, concentration of the solution and the duration of exposure.

CARCINOGENICITY:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 Not considered to be carcinogenic (NTP, IARC, or OSHA).

TERATOGENICITY:  EYE CONTACT  SKIN CONTACT  INHALATION  INGESTION  
 No information available.

REPRODUCTIVE TOXICITY: No information available.  
MUTAGENICITY: No information available.  
SYNERGISTIC PRODUCTS: No information available.

#### SECTION IV: FIRST AID MEASURES

SKIN CONTACT: Immediately flush with gently flowing warm water for at least 15 minutes. Hold eyelids open to ensure thorough flushing. Obtain medical attention.

EYE CONTACT: Immediately flush with water while removing contaminated clothing. If irritation persists obtain medical attention.

INGESTION: Do not induce vomiting. Rinse mouth thoroughly with water. Have victim drink 240-300 mL (8 to 10 oz) of water to dilute material in stomach. If milk is available, it may be administered after the water has been given. If vomiting occurs keep head below hips to prevent aspiration of vomitus; repeat administration of water. Obtain medical attention. Never give anything by mouth to an unconscious or convulsing victim.

INHALATION: Move to fresh air. Apply oxygen or artificial respiration if required. If breathing difficulties or distress continues, contact a physician.

#### SECTION V: PHYSICAL DATA

APPEARANCE AND ODOUR: Solid white powder or granules; odourless

SPECIFIC GRAVITY: 1.665

BOILING POINT (°C): Not available

MELTING POINT (°C): 153

SOLUBILITY IN WATER: 162 g/100 mL @ pH: pH : 2.2 (1% solution)  
25°C

PERCENT VOLATILE BY VOLUME: 0

EVAPORATION RATE: >1

VAPOUR PRESSURE (mmHg): Not applicable

VAPOUR DENSITY (air = 1): Not applicable

BULK DENSITY: Not available

#### SECTION VI: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Not applicable

FLAMMABLE LIMITS: Upper: 8 g/ft<sup>3</sup> Lower: 65 g/ft<sup>3</sup>

EXTINGUISHING MEDIA: Use media suitable for packaging and surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Self-contained breathing apparatus required for fire fighting personnel.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Auto-ignition temperature = 1010°C. Airborne dust may explode when ignited by an electrostatic spark,

HAZARDOUS COMBUSTION PRODUCTS: other high-voltage sparks or other ignition source.  
No information available.

## SECTION VII: REACTIVITY DATA

STABILITY:  STABLE  UNSTABLE  
INCOMPATIBILITY (CONDITIONS TO AVOID): Strong oxidizing agents - mixtures may react violently if heated. Strong reducing agents - may react vigorously or violently. Strong bases- mixtures may generate heat and pressure. Metal nitrates- a mixture exploded during a vacuum evaporation procedure. Mildly corrosive to carbon steel, gray and nickel cast iron, copper, brass, aluminum and lead.  
CONDITIONS OF REACTIVITY: Not available  
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide  
HAZARDOUS POLYMERIZATION:  WILL NOT OCCUR  MAY OCCUR

## SECTION VIII: PREVENTIVE MEASURES

### SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NIOSH approved dust mask recommended  
VENTILATION: Use local ventilation, process enclosure or other engineering controls to keep airborne dust to a minimum  
PROTECTIVE GLOVES: Suggest plastic or rubber.  
EYE PROTECTION: Suggest chemical goggles and/or full-face shield. Do not wear contact lenses when handling this material.  
OTHER PROTECTIVE EQUIPMENT (SPECIFY): Full body covering clothing recommended. Ensure eye wash and emergency shower are available

### PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Wear suitable protective equipment to prevent skin and eye contact. Avoid inhalation and ingestion. Wash thoroughly after use. Store in a cool, dry area away from incompatibles. Keep containers closed when not in use. Aqueous solutions of citric acid can, if in contact with reactive metal (iron, zinc, aluminum) form hydrogen which may form explosive mixtures. Avoid creating dust clouds when handling.

### STEPS TO BE TAKEN IN CASE THE MATERIAL IS SPILLED OR RELEASED

Use appropriate safety equipment. Sweep up to collect. Collect uncontaminated material for repackaging. Collect contaminated material in an approved container for disposal. Avoid creating dust clouds.

**WASTE DISPOSAL METHOD**

Dispose in accordance with federal, provincial and local regulations. Material is biodegradable in waste treatment facility. It is the responsibility of the end-user to determine if material meets the criteria of hazardous waste at the time of disposal. Empty packages will contain residual material and must be disposed of in accordance with local regulations.

**SECTION IX: PREPARATION**

The information contains herein is given in good faith, but no warranty, expressed or implied, is made.

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BY: Regulatory Affairs  
PHONE: 780-440-4923

## Citric Acid (Anhydrous)

### DESCRIPTION

**Anhydrous citric acid** (C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>) is a multi-purpose weak organic acid. It is widely used in the food, beverage and detergent industry, and also finds some oilfield applications. **Citric acid** is relatively non-toxic, non-corrosive and is biodegradable.

### PROPERTIES

Physical	Chemical
Appearance: White powder or granules Specific Gravity: 1.66 Melting Point: Flash Point:	Type: Organic acid pH: Soluble (60% @ 20°C) Solubility: 2.2 (1% solution) Microtox: Not applicable

### APPLICATION

**Anhydrous citric acid** is widely used in oilfield completion and stimulation operations as an iron sequestrant. It can also aid in reducing water requirements and in retarding of oil well cements. Because of its ease and relative safety of handling, **citric acid** can be used in the pH adjustment of drilling fluids, completion fluids and industrial/oil-well waste fluids.

### MIXING AND HANDLING

Although **citric acid** is of low hazard and toxicity, excess exposure to dust should be avoided to prevent irritation to the eyes, skin and respiratory tract. Use good industrial hygiene practices, wear goggles and a dust mask when handling the material. Ensure that the work area is sufficiently ventilated to avoid dust build-up and wear protective clothing to prevent excess skin contact. **Citric acid** is non-flammable. As with all organic material, caution is advised when storing or handling near strong oxidizing agents, alkali metals or strong bases.

**WHMIS:** Controlled (see MSDS)**TDG:** Not regulated**PACKAGING:** 25 kg sack