**HYDROUS CITRIC ACID**

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MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **HYDROUS CITRIC ACID**

CAS-NUMBER: 5949-29-1

TRADE NAMES/SYNONYMS

1,2,3-Propanetricarboxylic acid, 2-Hydroxy-monohydrate; 2-Hydroxy-1,2,3-Propanetricarboxylic acid, monohydrate; Citric acid, monohydrate; Citric acid monohydrate; Neutralizer for Alkalines (Mallinckrodt), A104, A110, CAS61008, ACC84211

CHEMICAL FAMILY:

Carboxylic Acid, Aliphatic

MOLECULAR FORMULA: C6H8O7

MOL. WEIGHT: 210.14

CERCLA RATING: 3, HAZARDOUS WASTE:

100.0

COMPONENTS AND CONTAMINANTS

COMPONENT: HYDROUS CITRIC ACID

PERCENT: 100.0

CAS# 5949-29-1

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS: NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: Odorless, colorless, orthorhombic prisms with pleasant, sour taste. Efflorescent in dry air; slightly deliquescent in moist air.

MELTING POINT: 212 F (100 C)

SPECIFIC GRAVITY: 1.542

PH: 2.2

SOLUBILITY IN WATER: Complete

SOLVENT SOLUBILITY: Soluble in amyl alcohol, methanol and propanol; moderately soluble in glycerol, amyl acetate, ethyl acetate and ether; very slightly soluble in chloroform.

LOSES WATER OF CRYSTALLIZATION AT ABOUT 104-122 F (40-50 C)

FIRES AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD: Slight fire hazard when exposed to heat or flame.

FIREFIGHTING MEDIA:

Dry Chemical, Carbon Dioxide, Water Spray or Regular Foam

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1996 EMERGENCY RESPONSE GUIDEBOOK, DOT P 58005.5)

FIREFIGHTING MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER SPILED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. BRING FIRE-CONTROL WATER FOR LATER DISPOSAL (1996 EMERGENCY RESPONSE GUIDEBOOK, DOT P 58005.5, GUIDE PAGE 31).

TOXICITY

CITRIC ACID:

IRRITATION DATA:

ANHYDROUS: 500 MG/24 HOURS SKIN-RABBIT MILD; 750 MG/24 HOURS EYE-RABBIT

SEVERE

MONOHYDRATE: 5 MG/30 SECONDS RINSED EYE-RABBIT MILD.

TOXICITY DATA:


CARCINOGENICITY:

LOCAL EFFECTS: Corrosive - EYE, IRRITANT - INHALATION, SKIN.

ACUTE TOXICITY: Slight to toxic by ingestion (Rat, Mouse)

AT INCREASED RISK FROM EXPOSURE PERSONS WITH REPEATED IMPAIRMENT, ADDISON'S DISEASE, DEHYDRATION, OR HYPERALDEMA.

HEALTH EFFECTS AND FIRST AID

INHALATION:

CITRIC ACID:

IRRITANT

ACUTE EXPOSURE - INHALATION MAY CAUSE MUCOUS MEMBRANE IRRITATION WITH SORE THROAT, COUGHING AND SHORTNESS OF BREATH. ALLERGIC REACTIONS MAY OCCUR IN SOME INDIVIDUALS.

CHRONIC EXPOSURE - LONG-TERM OVEREXPOSURE MAY DAMAGE TEGUMENT ENS.

FIRST AID - REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

CITRIC ACID:

IRRITANT

ACUTE EXPOSURE - CONTACT MAY CAUSE MILD IRRITATION WITH REDNESS AND PAIN. ALLERGIC REACTIONS MAY OCCUR IN SOME INDIVIDUALS.

CHRONIC EXPOSURE - REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE DERMATITIS.

FIRST AID - REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

CITRIC ACID:

IRRITANT

ACUTE EXPOSURE - CONTACT MAY CAUSE SEVERE IRRITATION WITH REDNESS, PAIN AND POSSIBLY BURNS. A LARGE QUANTITY OF SATURATED SOLUTION SPLASHED IN THE EYE MAY PRODUCE A SEVERE CONJUNCTIVITIS. IRRIGATION OF THE CORNEA, RESULTING IN EXTENSIVE ADHESIVE LEUKOMA. IRRIGATION WITH A 3% SOLUTION FOR 30 MINUTES CAUSED PERSISTENT CLOUDINESS OF THE CORNEA IN RABBIT EYES, A 2% SOLUTION CAUSED SEVERE DENSE OPACIFICATION.

CHRONIC EXPOSURE - EFFECTS ARE DEPENDENT UPON CONCENTRATION AND DURATION OF EXPOSURE. CONJUNCTIVITIS OR EFFECTS SIMILAR TO THOSE AS FOR ACUTE EXPOSURE MAY OCCUR.

FIRST AID - WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE LIDS, AND ADJUST THE POSITION OF THE EYE UNTIL THE PH HAS RETURNED TO NORMAL (10-20 MINUTES). COVER WITH STERILE BANDAGES. GET TREATMENT IMMEDIATELY.

INGESTION:

CITRIC ACID:

ACUTE EXPOSURE - INGESTION OF LARGE AMOUNTS MAY CAUSE ACUTE BUT TRANSIENT GASTROINTESTINAL IRRITATION WITH VOMITING AND DIARRHEA. CONCENTRATED SOLUTIONS MAY CAUSE MILD CORROSION OF THE UPPER GASTROINTESTINAL TRACT WITH SORE THROAT, ABDOMINAL PAIN, WRINKLING AND BROWNISHING OF THE COLOMEN. SEVERE IRRITATION TO THE MOUTH AND ESOPHAGUS. SWELLING AND DISCOLORATION OF THE STOMACH AND INTESTINE. A HUMAN DEATH HAS BEEN REPORTED FOLLOWING INGESTION OF 20-30 GRAMS OF PURE ACID. LETHAL DOSES IN RATS PRODUCED METABOLIC ACIDOSIS AND CALCIUM DEFICIENCY. CHRONIC EXPOSURE - F'REQUENT OR EXCESSIVE INTAKE OF CITRIC ACID MAY CAUSE EROSION OF THE TEETH AND LOCAL IRRITATION. PROLONGED FEEDING STUDIES IN ANIMALS RESULTED ONLY IN A SLIGHT INCREASE IN DENTAL ATTRACTION.

FIRST AID - TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

**REACTION**
REACTION:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

**INCOMPATIBILITIES**
CITRIC ACID:
BASES, INCOMPATIBLE.
METAL NITRATES: POSSIBLE EXPLOSION HAZARD.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

**DECOMPOSITION**
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

**POLYMERIZATION**
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

**STORAGE AND DISPOSAL**

**STORAGE**
STORE AWAY FROM INCOMPATIBLE SUBSTANCES.
KEEP IN A TIGHTLY CLOSED CONTAINER. STORE IN A COOL, DRY, VENTILATED AREA.

**CONDITIONS TO AVOID**
MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.

**SPILL AND LEAK PROCEDURES**

**OCCUPATIONAL SPILL**
Sweep up and place in suitable clean, dry containers for reclamation or later disposal. Do not flush spilled material into sewer. Keep unnecessary people away.

**PROTECTIVE EQUIPMENT**

**VENTILATION**
PROVIDE LOCAL EXHAUST VENTILATION. VENTILATION EQUIPMENT MUST BE EXPLOSION PROOF.

**RESPIRATOR**
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

ANY DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER.
ANY TYPE C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:
ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.