

CITRIC ACID

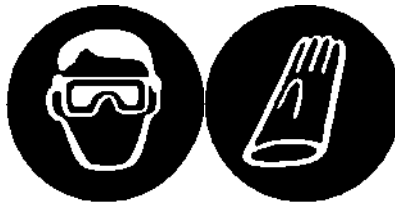
MATERIAL SAFETY DATA SHEET



JLM MARKETING, INC.

8675 Hidden River Parkway
Tampa, FL 33637
In case of Emergency call CHEMTREC 1-800-424-9300

CITRIC ACID



Product MSDS No.
US11 002

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

SUPPLIER.....JLM MARKETING, INC.
8675 HIDDEN RIVER PARKWAY
TAMPA, FL 33637
PHONE: 813-632-3300
FAX: 813-632-3301

CITRIC ACID

EMERGENCY PHONE NUMBER(S)...CHEMTREC DAY OR NIGHT 1-800-424-9300
REVISION DATE.....1999/06/23
REVISION.....SECTION 17 - LABEL INFORMATION
TRADE NAMES/SYNONYMS:.....BETA-HYDROXY-TRICARBOXYLIC ACID;
BETA-HYDROXYTRICARBALLYLIC ACID;
2-HYDROXY-1,2,3-PROPANETRICARBOXYLIC ACID;
CITRIC ACID; ACIDE CITRIQUE.
CHEMICAL FAMILY.....SATURATED ALIPHATIC CARBOXYLIC ACID
PRODUCT USE.....ACIDULANT, PH REGULATOR, FLAVOUR ENHANCER,
PRESERVATIVE AND ANTIOXIDANT IN FOOD AND
BEVERAGE PRODUCTS; PHARMACEUTICALS; METAL
CLEANING, POLISHING AND FINISHING; SCALE
REMOVER; HARD SURFACE CLEANER; BUILDER IN
DETERGENTS; SHAMPOOS AND COSMETICS; MORDANT ;
CHELATING AGENT; ANIMAL FEEDS; OIL RECOVERY;
REMOVAL OF HYDROGEN SULFIDE FROM NATURAL AND
REFINERY GAS; FLUE GAS DESULFURIZATION;
DISPERSING AGENT; ELECTROPLATING; CONCRETE,
MORTAR AND PLASTER FORMULATIONS; TEXTILE
MANUFACTURING; MANUFACTURE OF ALKYD RESINS AND
PLASTICS; CHEMICAL INTERMEDIATE; DENTURE
CLEANSERS.
CHEMICAL FORMULA.....C6-H8-O7
HAZARD RATING
FIRE.....1
HEALTH.....2
REACTIVITY.....0

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	%CONC.	C.A.S.	ACGIH-TLV	OSHA-PEL
CITRIC ACID	100	77-92-9	NOT ESTABLISHED	NOT ESTABLISHED

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW.....COLOURLESS CRYSTALS, OR WHITE, GRANULAR TO FINE
CRYSTALLINE POWDER. DELIQUESCENT. MAY BURN IF
STRONGLY HEATED. MAY BE A COMBUSTIBLE DUST. MAY
FORM EXPLOSIVE DUST-AIR MIXTURES. CORROSIVE TO
THE EYES AND SKIN. CAN CAUSE PERMANENT EYE
DAMAGE, INCLUDING BLINDNESS, OR PERMANENT
SCARRING OF THE SKIN.
POTENTIAL HEALTH EFFECTS:
INGESTION.....INGESTION OF LARGE AMOUNTS MAY CAUSE STOMACH
PAIN AND VOMITING.
SKIN CONTACT.....MILD SKIN IRRITATION AND REDNESS.
PROLONGED CONTACT MAY CAUSE SENSITIZATION.
INHALATION.....MAY CAUSE IRRITATION
COUGHING, SNEEZING, DIFFICULTY BREATHING AND
SORE THROAT.
EYE CONTACT.....MAY CAUSE IRRITATION TO THE EYES, INCLUDING
PAIN, REDNESS AND REVERSIBLE DAMAGE.
OVEREXPOSURE TO THE EYE MAY CAUSE SEVERE,
IRREVERSIBLE DAMAGE.
MEDICAL CONDITIONS

CITRIC ACID

AGGRAVATED.....PREEXISTING SKIN CONDITIONS
SUBCHRONIC (TARGET ORGAN)
EFFECTS.....NO DATA
CHRONIC EFFECTS.....BASED UPON ANIMAL TESTING INFORMATION,
CONTINUOUS INGESTION OF LARGE AMOUNTS MAY CAUSE
TOOTH EROSION.

CARCINOGENICITY
NTP.....NO
IARC.....NO
OSHA.....NO

OTHER TOXICOLOGICAL DATA...CITRIC ACID WAS NOT HARMFUL TO REPRODUCTION IN
TWO ANIMAL STUDIES.
CITRIC IS AN ESSENTIAL COMPONENT OF THE BODY'S
PROCESSES FOR PRODUCING ENERGY. IT IS
CONTINUALLY PRODUCED AND BROKEN DOWN.

PRINCIPAL ROUTES OF ENTRY...EYE CONTACT
SKIN CONTACT
INHALATION
INGESTION

SECTION 4: FIRST AID MEASURES

EYE CONTACT.....WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF
WATER OR NORMAL SALINE, OCCASIONALLY LIFTING
UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF
CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). GET
MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT.....REMOVE CONTAMINATED CLOTHING. WASH SKIN WITH
PLENTY OF WATER FOR AT LEAST FIFTEEN (15)
MINUTES. IF IRRITATION DEVELOPS SEEK MEDICAL
ATTENTION.

INHALATION.....IMMEDIATELY REMOVE VICTIM TO FRESH AIR, IF
VICTIM IS NOT BREATHING A QUALIFIED PERSON
SHOULD IMMEDIATELY BEGIN ARTIFICIAL
RESPIRATION, OBTAIN IMMEDIATE MEDICAL
ASSISTANCE !

INGESTION.....GIVE TWO GLASSES OF WATER. GET IMMEDIATE
MEDICAL ASSISTANCE. DO NOT INDUCE VOMITING.

NOTE TO PHYSICIAN.....TREAT SYMPTOMATICALLY

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT.....NO DATA
METHOD.....NO DATA
IGNITION TEMPERATURE.....NO DATA
UPPER FLAMMABLE LIMIT.....NO DATA
LOWER FLAMMABILITY LIMIT...8.0 @ 149°F (65°C)
SENSITIVITY TO MECHANICAL
IMPACT.....NO
SENSITIVITY TO STATIC
DISCHARGE.....DUSTS MAY FORM AN EXPLOSIVE MIXTURE WITH AIR.
EXTINGUISHING MEDIA.....USE SUITABLE EXTINGUISHING AGENTS FOR
SURROUNDING FIRE.

SPECIAL FIREFIGHTING
PROCEDURES.....STANDARD EQUIPMENT
FLAMMABILITY CLASS (OSHA)...NOT APPLICABLE

CITRIC ACID

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN FOR

SPILLS OR RELEASES.....STOP FLOW OF MATERIAL, IF WITHOUT RISK.
ELIMINATE ALL SOURCES OF IGNITION. DO NOT ALLOW
PRODUCT TO ENTER SEWERS, DRAINS OR OTHER
WATERWAYS.
SWEEP UP AND PLACE IN SUITABLE CLEAN, PROPERLY
IDENTIFIED, DRY CONTAINERS FOR RECLAMATION OR
LATER DISPOSAL. AVOID GENERATING DUST. KEEP
UNNECESSARY PEOPLE AWAY.
WEAR ADEQUATE PROTECTION TO AVOID ALL CONTACT
WITH MATERIAL.

SECTION 7: HANDLING AND STORAGE

HANDLING PROCEDURES.....THIS PRODUCT MUST BE HANDLED BY PROPERLY
TRAINED PERSONNEL.

DO NOT BREATHE DUST OR VAPORS.
AVOID ALL SKIN AND EYE CONTACT BY WEARING
PROPER PROTECTIVE EQUIPMENT.
HANDLE AWAY FROM ALL SOURCES OF IGNITION AND
INCOMPATIBLE MATERIALS. WASH THOROUGHLY AFTER
USING THIS PRODUCT, ESPECIALLY BEFORE EATING,
DRINKING OR SMOKING. WASH CONTAMINATED
CLOTHING BEFORE RE-USE. EMPTY CONTAINERS
RETAIN HAZARDOUS RESIDUE, DISPOSE OF
ACCORDINGLY.

STORAGE PROCEDURES.....STORE IN A COOL, DRY, WELL VENTILATED AREA AWAY
FROM INCOMPATIBLE MATERIALS.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS.....DESIGN AND IMPLEMENT CONTROLS AND PROCEDURES TO
AVOID ACCUMULATION OF DUST.

RESPIRATORY PROTECTION.....THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED
ON CONTAMINATION LEVELS FOUND IN THE WORK
PLACE, MUST NOT EXCEED THE WORKING LIMITS OF
THE RESPIRATOR AND BE JOINTLY APPROVED BY THE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND
HEALTH AND THE MINE SAFETY AND HEALTH
ADMINISTRATION (NIOSH-MSHA).

PROTECTIVE CLOTHES.....IMPERVIOUS GLOVES AND CLOTHING TO PREVENT SKIN
CONTACT.

EYE AND FACE PROTECTION.....WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY
GOGGLES TO PREVENT EYE CONTACT WITH THIS
SUBSTANCE.

OTHER PROTECTIVE EQUIPMENT..WHERE THERE IS ANY POSSIBILITY THAT AN
EMPLOYEE'S EYES MAY BE EXPOSED TO THIS
SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE
WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA
FOR EMERGENCY USE.
EMPLOYEES SHOULD BE TRAINED IN EMERGENCY
MEASURES IN CASE OF LEAK, SPILL, FIRE OR
EXPLOSION. TRAINING IN USE OF EMERGENCY
RESPONSE EQUIPMENT SHOULD BE PROVIDED TO

CITRIC ACID

INCLUDE LOCATION OF PHONE, FIRST AID KITS,
ALARMS, FIRE EXTINGUISHERS FOR THE SPECIFIC
WORKPLACE.
VENTILATION.....PROVIDE LOCAL EXHAUST OR GENERAL DILUTION
VENTILATION SYSTEM.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

VAPOR DENSITY (AIR=1).....NOT APPLICABLE
FREEZING/MELTING POINT.....307°F (153°C)
PHYSICAL STATE.....SOLID
ODOR.....ODORLESS
COLOR.....COLORLESS OR WHITE CRYSTALS
ODOR THRESHOLD (PPM).....ODORLESS
VOLATILES % VOLUME.....NOT APPLICABLE
EVAPORATION RATE (BUTYL
ACETATE=1.0).....NOT APPLICABLE
SPECIFIC GRAVITY
(WATER=1.0).....1.665
MOLECULAR WEIGHT.....192.13
ACID/ALKALINITY (MEQ/G)....MODERATELY STRONG ACID: pKa1 = 3.14; pKa2 =
4.77; pKa3 = 6.39 @ 20°C
PH.....2.2 (1% SOLUTION); 1.7 (10% SOLUTION); 1.2 (30%
SOLUTION); 0.8 (50% SOLUTION)
VOC (EPA METHOD 24).....NOT APPLICABLE
SOLUBILITY IN ORGANIC
SOLVENTS.....VERY SOLUBLE IN ABSOLUTE ETHANOL AND MODERATELY
SOLUBLE IN AMYL ACETATE AND DIETHYL ETHER AT
25°C.
BOILING POINT.....DECOMPOSES @ 347°F (175°C)
VAPOR PRESSURE MM/HG
(20°C).....NEARLY ZERO (0)
SOLUBILITY IN WATER (20°C)..VERY SOLUBLE: 59.2 g/100g @ 20°C
OCTANOL/WATER PARTITION
COEFFICIENT.....Log P (oct) = -1.72

SECTION 10: STABILITY AND REACTIVITY

STABILITY.....STABLE
HAZARDOUS POLYMERIZATION....WILL NOT OCCUR
HAZARDOUS THERMAL
DECOMPOSITION/COMBUSTION
PRODUCTS.....OXIDES OF CARBON
INCOMPATIBILITY
(MATERIALS TO AVOID).....REDUCING AGENTS
BASES
STRONG OXIDIZING AGENTS
METAL NITRATES
MILDLY CORROSIVE TO CARBON STEEL, GRAY AND
NICKEL CAST IRON, COPPER, BRASS, ALUMINUM AND
LEAD.
CONDITIONS TO AVOID.....EXPOSURE TO HEAT, FLAME OR IGNITION SOURCES.
GENERATING DUST

SECTION 11: TOXICOLOGICAL INFORMATION

LD50 ORAL.....3 g/kg RAT
5040 mg/kg MOUSE
LD50 DERMAL.....NO DATA
LC50 INHALATION.....NO DATA
OTHER.....NO DATA
AMES TEST RESULTS.....NO DATA AVAILABLE COVERING AMES TEST RESULTS

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL
INFORMATION.....NO DATA AT THIS TIME
CHEMICAL FATE INFORMATION...NO DATA AT THIS TIME

SECTION 13: DISPOSAL CONSIDERATION

DISPOSAL METHOD.....IN ACCORDANCE WITH FEDERAL, STATE, LOCAL
REGULATIONS
REPORTABLE QUANTITY.....MAY MEET THE REQUIREMENTS OF CORROSIVE WASTE:
D002

SECTION 14: TRANSPORT INFORMATION

DOT SHIPPING NAME.....NOT REGULATED
DOT HAZARD CLASS.....NOT APPLICABLE
DOT LABELS.....NONE REQUIRED
UN NUMBER.....NOT APPLICABLE
PLACARDS.....NOT APPLICABLE
IATA.....REFER TO AIR CARRIER
IMO/IMDG.....REFER TO TRANSPORTER
TRANSPORT EMERGENCY
PROCEDURES.....CONTACT CHEMTREC 1-800-424-9300
IN CANADA CONTACT CANUTEC 1-613-996-6666
OTHER.....NOT APPLICABLE

SECTION 15: REGULATORY INFORMATION

SARA SECTION 302.....NO
SARA SECTION 304.....NO
SARA (313) CHEMICALS.....NO
EPA TSCA INVENTORY.....APPEARS
CERCLA SECTION 103.....NO
CANADIAN WHMIS
CLASSIFICATION.....E
CANADIAN DOMESTIC
SUBSTANCES LIST (DSL).....APPEARS
CALIFORNIA PROPOSITION 65...NO
EINECS INVENTORY.....201-069-1
OTHER.....NO DATA

CITRIC ACID

SECTION 16: ADDITIONAL INFORMATION

DISCLAIMER.....THIS MATERIAL SAFETY DATA SHEET WAS PRODUCED FROM RELIABLE SOURCES. HOWEVER, IT IS PROVIDED WITHOUT REPRESENTATION OR WARRANTY EXPRESSED OR IMPLIED REGARDING ACCURACY OR CORRECTNESS. CONDITIONS AND METHODS OF USE ARE BEYOND THE CONTROL AND KNOWLEDGE OF JLM MARKETING, INC. JLM MARKETING, INC. DOES NOT ASSUME ANY RESPONSIBILITY AND EXPRESSLY DISCLAIMS LIABILITY FOR INJURY, LOSS, DAMAGE OR EXPENSES ARISING FROM THE USE OF THIS PRODUCT.

ABBREVIATIONS USED.....ABBREVIATIONS USED THROUGHOUT THIS MSDS ARE:
ACGIH = AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
TWA = TIME WEIGHTED AVERAGE (EXPOSURE VALUES)
STEL = SHORT TERM EXPOSURE LIMITS
OSHA = OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PEL = PERMITTED EXPOSURE LIMITS
ppm = PARTS PER MILLION
mg = MILLIGRAMS
NIOSH = NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH AND SAFETY
MSHA = MINE SAFETY AND HEALTH ADMINISTRATION
lb = POUNDS
m3 = PER METRE CUBED
NTP = NATIONAL TOXICOLOGICAL PROGRAM
g = GRAMS
ml = MILLILITRE
RTECS = REGISTRY OF TOXICS EFFECTS OF CHEMICAL SUBSTANCES (NIOSH)

DATA PREPARED BY:.....CONFORM ACTION DATA SYSTEMS (U.S.) INC.
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TEL: (888) 623-8637 FAX: (888) 681-4740

SECTION 17: LABEL INFORMATION

WARNING/PRECAUTIONS.....COLOURLESS CRYSTALS, OR WHITE, GRANULAR TO FINE CRYSTALLINE POWDER. DELIQUESCENT. MAY BURN IF STRONGLY HEATED. MAY BE A COMBUSTIBLE DUST. MAY FORM EXPLOSIVE DUST-AIR MIXTURES. CORROSIVE TO THE EYES AND SKIN. CAN CAUSE PERMANENT EYE DAMAGE, INCLUDING BLINDNESS, OR PERMANENT SCARRING OF THE SKIN.

FOR FURTHER INFORMATION.....SEE THE MATERIAL SAFETY DATA SHEET
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