

PHOTOGRAPHERS' FORMULARY INC.

FORMULARY RAPID FIX WITH HARDENER FOR FILM AND PAPER

To make 1 liter of concentrate

Formulary Rapid Fix uses ammonium thiosulfate to convert the silver halides to soluble salts. This formula will fix films and papers in about one-half the time required by sodium thiosulfate fixers.

After development, the residual, water-insoluble silver salts in the film (or paper) must be removed. A fixer is used to convert these salts to water-soluble compounds, which can be washed from the film or paper. Permanence depends on the thoroughness of fixing and washing. Excess washing will not compensate for insufficient fixing, nor will excess fixing compensate for insufficient washing.

CHEMICALS CONTAINED IN THIS KIT:

CHEMICAL	AMOUNT
AMMONIUM THIOSULFATE, 60%	950 ml
SODIUM SULFITE	42 g
BORIC ACID	21 g
GLACIAL ACETIC ACID	30 ml
ALUMINUM SULFATE	28 g
SODIUM BISULFATE	2.6 g

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the warnings on each package. Pay particular attention to the warning labels on the bottle of acetic acid and ammonium thiosulfate and to the warning on the package of boric acid.

Glacial Acetic Acid is 100% acetic acid. While it is not as dangerous as concentrated hydrochloric acid or sulfuric acid, glacial acetic acid must still be used carefully. It has a strong, almost overwhelming odor and should be used only in a well-ventilated area. If any of the liquid should spill either on the work area or on skin, it should be washed up immediately with cold water.

In spite of the fact that the freezing point of glacial acetic acid is 17° C/63° F, it normally solidifies at a temperature far below this value depending on the amount of trace water present. However, like water, when acetic acid does solidify it expands. Thus, there is the possibility that the container or cap will rupture. It is wise to store a container of glacial acetic acid in a warm room.

Boric Acid is used in medicine as a mild antiseptic. However, continual use can cause dry skin, skin eruptions, and gastric disturbances. We recommend that you wear rubber gloves when working with solutions of boric acid.

The user assumes all risks upon accepting these chemicals. **IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISKS, PLEASE RETURN THE CHEMICALS FOR A FULL REFUND WITHIN THIRTY DAYS.**

Please consult with local sewer and water authorities regarding proper disposal of darkroom chemicals in your area.

MIXING THE SOLUTIONS

The chemicals in this kit are used to prepare two concentrated stock solutions, which are then mixed and diluted as needed. A total of 4 liters of film fixer or 8 liters of paper fixer can be prepared. We recommend that you prepare 2 liters of film working solution, which can then be used to prepare the paper fixer or it can be replenished with the unused stock solutions.

To mix the stock solutions, you will need a 1-liter container to store Stock Solution A and a 100 ml container to store Solution B. A wide-mouth glass mixing-bowl with at least a 2-liter capacity will also be needed to mix Stock Solution A.

Stock Solution A (the fixer)

CHEMICAL	AMOUNT
AMMONIUM THIOSULFATE, 60%	950 ml
SODIUM SULFITE	42 g
GLACIAL ACETIC ACID	30 ml
BORIC ACID	21 g



MSDS Date: December 2, 2003
Emergency Contact: 1-800-424-9300

SECTION I

PRODUCT NAME: Ammonium Thiosulfate Solution
CHEMICAL FAMILY: Thiosulfates
FORMULA: $(\text{NH}_4)_2\text{S}_2\text{O}_3$

DOT SHIPPING INFORMATION: Not DOT Regulated

SECTION II - HAZARDOUS INGREDIENTS

This material contains no ingredients which are known by Thatcher Company to be hazardous unless listed below.

HAZARDOUS MATERIAL	CAS NUMBER	w/w %	EXPOSURE LIMITS IN AIR
Ammonium Thiosulfate (less than 15% Ammonia)	7783-18-8	57-59	Unknown

The specific identity of some ingredients may be withheld for confidential business purposes. However, all known potential health effects from exposure to these ingredients are being addressed.

Ammonia is subject to the reporting requirements of EPCRA Section 313 (40 CFR Part 372)

SECTION III - PHYSICAL DATA

BOILING POINT (F): Approx. 215
SPECIFIC GRAVITY: 1.32 @ 15EC
VAPOR PRESSURE (mm Hg): Essentially water
% VOLATILE, BY VOLUME: 40%
VAPOR DENSITY (air = 1): Essentially water
EVAPORATION RATE: Unknown
SOLUBILITY IN WATER: Complete
APPEARANCE AND ODOR: Clear, colorless solution with a characteristic, pungent odor.

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: Nonflammable
FLAMMABLE LIMITS:
Lel: N/A Uel: N/A
EXTINGUISHING MEDIA:
Use any.
SPECIAL FIRE-FIGHTING PROCEDURES:
None.
UNUSUAL FIRE AND EXPLOSION HAZARDS:



None.

SECTION V - REACTIVITY DATA

STABILITY:

Stable

HAZARDOUS POLYMERIZATION:

Will not occur.

CONDITIONS OR MATERIALS TO AVOID:

Acids, strong oxidizers, magnesium, aluminum and heat.

HAZARDOUS DECOMPOSITION PRODUCTS:

Sulfur oxides if heated or mixed with any of the above materials.

SECTION VI - HEALTH HAZARD DATA

NFPA HAZARDOUS RATING: Health = 1 Flammability = 0 Reactivity = 1

CARCINOGENIC LISTING:

NTP: No ingredients listed in this section.

IARC MONOGRAPHS: No ingredients listed in this section.

OSHA 29 CFR 1910: No ingredients listed in this section.

ENTRY ROUTES & EFFECTS OF OVEREXPOSURE:

Contact: Can cause irritation to skin and eyes.

Ingestion: Irritating to the gastrointestinal tract; large amounts can act as a laxative.

STATEMENT OF PRACTICAL TREATMENT:

Contact: Flush exposed area thoroughly with water. For eyes, flush with cool water for at least 15 minutes and get medical attention.

Ingestion: Give several glasses of water or milk. **Do not** induce vomiting. Call a physician immediately.

SECTION VII - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

Avoid contact with skin and eyes. Do not take internally. Wash thoroughly after handling.

STEPS TO BE TAKEN IF MATERIAL SPILLS OR LEAKS:

Wear safety equipment. Dike spill and recover into drums. Flush residue to the sewer with large amounts of water.



WASTE DISPOSAL METHOD:

Dispose of in landfill or other disposal site. Comply with all local, state and federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:

None required.

VENTILATION:

None required.

EYE PROTECTION:

Goggles.

SKIN PROTECTION:

Rubber gloves.

OTHER PROTECTIVE EQUIPMENT:

As needed to prevent contact with skin and eyes.

ACGIH = American Conference of Governmental Industrial Hygienists

CL = Ceiling Level

IARC = International Agency for Research on Cancer: Monographs

OSHA = Occupational Safety and Health Administration

N/A = Not Applicable

NTP = National Toxicology Program: Annual Report on Carcinogens

PEL = Permissible Exposure Level (OSHA)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average over 8 Hours

STEL = Short Term Exposure Limit (ACGIH)

ND = Not Determined



THATCHER COMPANY MATERIAL SAFETY DATA SHEET

PRODUCT: AMMONIUM THIOSULFATE SOLUTION

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This information is, to the best of our knowledge, accurate but may not be complete. THATCHER COMPANY furnishes this information in good faith, but without warranty, representation or guarantee of its accuracy, completeness, or reliability.

**THATCHER COMPANY MATERIAL SAFETY DATA SHEET****PRODUCT: SODIUM SULFITE, CATALYZED**

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MSDS Date: December 2, 2003

Emergency Contact: 1-800-424-9300

SECTION I**PRODUCT NAME:** Sodium Sulfite, Catalyzed**CHEMICAL NAME:** Sodium Sulfite, catalyzed**CHEMICAL FAMILY:** Inorganic Sulfite**SYNONYMS:** B 501; Catalyzed Anhydrous Sodium Sulfite**FORMULA:** Na_2SO_3 + catalyst**DOT SHIPPING INFORMATION:**

Not DOT Regulated

SECTION II - HAZARDOUS INGREDIENTS

This material contains no ingredients which are known by Thatcher Company to be hazardous unless listed below.

HAZARDOUS MATERIAL	CAS NUMBER	w/w %	EXPOSURE LIMITS IN AIR
Sodium Sulfite	7757-83-7		TLV = 5 mg/m ³ *
Cobalt Sulfate (as Co)	10124-43-3		TLV = 0.05 mg/m ³ * PEL = 0.1 mg/m ³

*recommended

The specific identity of some ingredients may be withheld for confidential business purposes. However, all known potential health effects from exposure to these ingredients are being addressed.

SECTION III - PHYSICAL DATA**BOILING POINT (F):** N/A**SPECIFIC GRAVITY:** 2.633 @ 15.4 EC**VAPOR PRESSURE (mm Hg):** N/A**% VOLATILE, BY VOLUME:** N/A**VAPOR DENSITY (air = 1):** N/A**EVAPORATION RATE:** N/A**SOLUBILITY IN WATER:** Soluble**APPEARANCE AND ODOR:** White to pink crystals or powder with saline, sulfurous taste.**SECTION IV - FIRE AND EXPLOSION DATA****FLASH POINT:** Nonflammable**FLAMMABLE LIMITS:**

Lel: N/A Uel: N/A

EXTINGUISHING MEDIA:



THATCHER COMPANY MATERIAL SAFETY DATA SHEET
PRODUCT: SODIUM SULFITE, CATALYZED
Page 2 of 3

Use any.

SPECIAL FIRE-FIGHTING PROCEDURES:

Wear self-contained breathing apparatus if necessary.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

When heated, catalyzed sodium sulfite decomposes and emits highly toxic fumes of sodium oxide and sulfur oxides.

SECTION V - REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS OR MATERIALS TO AVOID:

None.

HAZARDOUS DECOMPOSITION PRODUCTS:

When heated, catalyzed sodium sulfite decomposes and emits toxic fumes of sodium oxide and sulfur oxides.

SECTION VI - HEALTH HAZARD DATA

CARCINOGENIC LISTING:

NTP: No ingredients listed in this section.

IARC MONOGRAPHS: No ingredients listed in this section.

OSHA 29 CFR 1910: No ingredients listed in this section.

ENTRY ROUTES & EFFECTS OF OVEREXPOSURE:

Contact: Contact may irritate eyes.

Ingestion: If swallowed, can cause irritation of stomach, nausea and gas.

STATEMENT OF PRACTICAL TREATMENT:

Contact: Flush exposed area thoroughly with soap and water. For eyes, flush with cool water for at least 15 minutes. If irritation persists, get medical attention.

Ingestion: If swallowed, give several glasses of water and call a physician immediately.

SECTION VII - SPECIAL PRECAUTIONS



THATCHER COMPANY MATERIAL SAFETY DATA SHEET

PRODUCT: SODIUM SULFITE, CATALYZED

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HANDLING AND STORAGE PRECAUTIONS:

Store in a cool, dry area.

STEPS TO BE TAKEN IF MATERIAL SPILLS OR LEAKS:

Wear proper safety equipment. Sweep up material and put into drums. Flush residue to sewer with large amounts of water (if permitted).

WASTE DISPOSAL METHOD:

Dispose of in landfill. Comply with all local, state and federal regulations.

OTHER PRECAUTIONS:

N/A

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:

Use dust mask as needed to avoid breathing dust.

VENTILATION:

Use adequate ventilation.

EYE PROTECTION:

Wear goggles or safety glasses.

SKIN PROTECTION:

Wear rubber gloves.

OTHER PROTECTIVE EQUIPMENT:

None required.

ACGIH = American Conference of Governmental Industrial Hygienists

CL = Ceiling Level

IARC = International Agency for Research on Cancer: Monographs

OSHA = Occupational Safety and Health Administration

N/A = Not Applicable

NTP = National Toxicology Program: Annual Report on Carcinogens

PEL = Permissible Exposure Level (OSHA)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average over 8 Hours

STEL = Short Term Exposure Limit (ACGIH)

ND = Not Determined

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PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228761
PROD NO : 500639

PHOTOGRAPHERS FORMULARY
CALL IN ADVANCE TO MEET
7079 HWY 83 N.
BOX 89
CONDON ,MT 59826

UNIVAR USA INC. (425)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT NAME:
OPTIBOR BORIC ACIDS

MSDS #: BXOPT

MATERIAL SAFETY DATA SHEET
DATE OF ISSUE MAY 2003
SUPERSEDES MAY 2000
OPTIBOR(TM) BORIC ACIDS

1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: OPTIBOR

GRADE: TECHNICAL, NF, S.Q.

PRODUCT USE: INDUSTRIAL MANUFACTURING

CHEMICAL FORMULA: H3BO3
CHEMICAL NAME/SYNONYMS: BORIC ACID, ORTHOBORIC ACID,
BORACIC ACID

CHEMICAL FAMILY: INORGANIC BORATES

CAS REGISTRY NUMBER: 10043-35-3 (11113-50-1)
(REFER TO SECTION 15 FOR TSCA/DSL CHEMICAL INVENTORY LISTING)

PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228761

PROD NO : 500639

MANUFACTURER:

U.S. BORAX INC.

26877 TOURNEY ROAD

VALENCIA, CA 91355-1847

EMERGENCY PHONE NUMBERS

24 HR. MEDICAL INFO. SERVICE: (661) 284-5200

CHEMTREC (SPILLS): (800) 424-9300

2 COMPOSITION/INFORMATION ON INGREDIENTS

THIS PRODUCT CONTAINS GREATER THAN 99 PERCENT (X) BORIC ACID (H3B03), WHICH IS HAZARDOUS UNDER THE OSHA HAZARD COMMUNICATION STANDARD AND UNDER THE CANADIAN CONTROLLED PRODUCTS REGULATIONS OF THE HAZARDOUS PRODUCTS ACT (WHMIS), BASED ON ANIMAL CHRONIC TOXICITY STUDIES. REFER TO SECTIONS 3 AND 11 FOR DETAILS ON HAZARDS.

3 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

OPTIBOR IS A WHITE, ODORLESS, POWDERED SUBSTANCE THAT IS NOT FLAMMABLE, COMBUSTIBLE, OR EXPLOSIVE AND HAS LOW ACUTE ORAL AND DERMAL TOXICITY.

POTENTIAL ECOLOGICAL EFFECTS

LARGE AMOUNTS OF OPTIBOR CAN BE HARMFUL TO PLANTS AND OTHER SPECIES. THEREFORE, RELEASES TO THE ENVIRONMENT SHOULD BE MINIMIZED.

POTENTIAL HEALTH EFFECTS

ROUTES OF EXPOSURE: INHALATION IS THE MOST SIGNIFICANT ROUTE OF EXPOSURE IN OCCUPATIONAL AND OTHER SETTINGS. DERMAL EXPOSURE IS NOT USUALLY A CONCERN BECAUSE OPTIBOR IS POORLY ABSORBED THROUGH INTACT SKIN.

INHALATION: OCCASIONAL MILD IRRITATION EFFECTS TO NOSE AND THROAT MAY OCCUR FROM INHALATION OF OPTIBOR DUST AT LEVELS GREATER THAN 10 MG/M3.

EYE CONTACT: OPTIBOR IS NON-IRRITATING TO EYES IN NORMAL INDUSTRIAL USE.

SKIN CONTACT: OPTIBOR DOES NOT CAUSE IRRITATION TO INTACT SKIN.

INGESTION: PRODUCTS CONTAINING OPTIBOR ARE NOT INTENDED FOR INGESTION. OPTIBOR HAS A LOW ACUTE TOXICITY. SMALL AMOUNTS (E.G., A TEASPOONFUL) SWALLOWED ACCIDENTALLY ARE NOT LIKELY TO CAUSE EFFECTS; SWALLOWING AMOUNTS LARGER THAN THAT MAY CAUSE GASTROINTESTINAL SYMPTOMS.

CANCER: OPTIBOR IS NOT A KNOWN CARCINOGEN.

REPRODUCTIVE/DEVELOPMENTAL: ANIMAL INGESTION STUDIES IN

PRODUCT: OPTIBOR BORIC ACIDS

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SEVERAL SPECIES, AT HIGH DOSES, INDICATE THAT BORATES CAUSE REPRODUCTIVE AND DEVELOPMENTAL EFFECTS. A HUMAN STUDY OF OCCUPATIONAL EXPOSURE TO BORATE DUST SHOWED NO ADVERSE EFFECT ON REPRODUCTION.

TARGET ORGANS: NO TARGET ORGAN HAS BEEN IDENTIFIED IN HUMANS. HIGH DOSE ANIMAL INGESTION STUDIES INDICATE THE TESTES ARE THE TARGET ORGANS IN MALE ANIMALS.

SIGNS AND SYMPTOMS OF EXPOSURE: SYMPTOMS OF ACCIDENTAL OVER-EXPOSURE TO OPTIBOR HAVE BEEN ASSOCIATED WITH INGESTION OR ABSORPTION THROUGH LARGE AREAS OF DAMAGED SKIN. THESE MAY INCLUDE NAUSEA, VOMITING AND DIARRHEA, WITH DELAYED EFFECTS OF SKIN REDNESS AND FEELING.

REFER TO SECTION 11 FOR DETAILS ON TOXICOLOGICAL DATA.

4 FIRST AID MEASURES

INHALATION: IF SYMPTOMS SUCH AS NOSE OR THROAT IRRITATION ARE OBSERVED, REMOVE PERSON TO FRESH AIR.

EYE CONTACT: USE EYE WASH FOUNTAIN OR FRESH WATER TO CLEANS EYE. IF IRRITATION PERSISTS FOR MORE THAN 30 MINUTES, SEEK MEDICAL ATTENTION.

SKIN CONTACT: NO TREATMENT NECESSARY BECAUSE NON-IRRITATING.

INGESTION: SWALLOWING SMALL QUANTITIES (ONE TEASPOON) WILL CAUSE NO HARM TO HEALTHY ADULTS. IF LARGER AMOUNTS ARE SWALLOWED, GIVE TWO GLASSES OF WATER TO DRINK AND SEEK MEDICAL ATTENTION.

NOTE TO PHYSICIANS: OBSERVATION ONLY IS REQUIRED FOR ADULT INGESTION IN THE RANGE OF 4-8 GRAMS OF OPTIBOR. FOR INGESTION OF LARGER AMOUNTS, MAINTAIN ADEQUATE KIDNEY FUNCTION AND FORCE FLUIDS. GASTRIC LAVAGE IS RECOMMENDED FOR SYMPTOMATIC PATIENTS ONLY. HEMODIALYSIS SHOULD BE RESERVED FOR MASSIVE ACUTE INGESTION OR PATIENTS WITH RENAL FAILURE. BORON ANALYSES OF URINE OR BLOOD ARE ONLY USEFUL FOR DOCUMENTING EXPOSURE AND SHOULD NOT BE USED TO EVALUATE SEVERITY OF POISONING OR TO GUIDE TREATMENT. REFER TO SECTION 11 FOR DETAILS.

5 FIRE FIGHTING MEASURES

GENERAL HAZARD: NONE, BECAUSE OPTIBOR IS NOT FLAMMABLE, COMBUSTIBLE OR EXPLOSIVE. THE PRODUCT IS ITSELF A FLAME RETARDANT.

EXTINGUISHING MEDIA: ANY FIRE EXTINGUISHING MEDIA MAY BE USED ON NEARBY FIRES.

FLAMMABILITY CLASSIFICATION (29 CFR 1910.1200): NON-FLAMMABLE SOLID.

6 ACCIDENTAL RELEASE MEASURES

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GENERAL: OPTIBOR IS A WATER-SOLUBLE WHITE POWDER THAT MAY, AT HIGH CONCENTRATIONS, CAUSE DAMAGE TO TREES OR VEGETATION BY ROOT ABSORPTION. (REFER TO ECOLOGICAL INFORMATION, SECTION 12, FOR SPECIFIC INFORMATION.)

LAND SPILL: VACUUM, SHOVEL OR SWEEP UP OPTIBOR AND PLACE IN CONTAINERS FOR DISPOSAL IN ACCORDANCE WITH APPLICABLE LOCAL REGULATIONS. AVOID CONTAMINATION OF WATER BODIES DURING CLEANUP AND DISPOSAL. NO PERSONAL PROTECTIVE EQUIPMENT IS NEEDED TO CLEANUP LAND SPILLS.

SPILLAGE INTO WATER: WHERE POSSIBLE, REMOVE ANY INTACT CONTAINERS FROM THE WATER. ADVISE LOCAL WATER AUTHORITY THAT NONE OF THE AFFECTED WATER SHOULD BE USED FOR IRRIGATION OR FOR THE ABSTRACTION OF POTABLE WATER UNTIL NATURAL DILUTION RETURNS THE BORDON VALUE TO ITS NORMAL ENVIRONMENTAL BACKGROUND LEVEL. (REFER TO SECTIONS 12, 13 AND 15 FOR ADDITIONAL INFORMATION.) OPTIBOR IS A NON-HAZARDOUS WASTE WHEN SPILLED OR DISPOSED OF, AS DEFINED IN THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REGULATIONS (40 CFR 261). (REFER TO REGULATORY INFORMATION, SECTION 15, FOR ADDITIONAL REFERENCES.)

7 HANDLING AND STORAGE

GENERAL: NO SPECIAL HANDLING PRECAUTIONS ARE REQUIRED, BUT DRY, INDOOR STORAGE IS RECOMMENDED. TO MAINTAIN PACKAGE INTEGRITY AND TO MINIMIZE CAKING OF THE PRODUCT, BAGS SHOULD BE HANDLED ON A FIRST-IN, FIRST-OUT BASIS. GOOD HOUSEKEEPING PROCEDURES SHOULD BE FOLLOWED TO MINIMIZE DUST GENERATION AND ACCUMULATION.

STORAGE TEMPERATURE: AMBIENT

STORAGE PRESSURE: ATMOSPHERIC

SPECIAL SENSITIVITY: MOISTURE (CAKING)

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: USE LOCAL EXHAUST VENTILATION TO KEEP AIRBORNE CONCENTRATIONS OF OPTIBOR DUST BELOW PERMISSIBLE EXPOSURE LEVELS.

PERSONAL PROTECTION: WHERE AIRBORNE CONCENTRATIONS ARE EXPECTED TO EXCEED EXPOSURE LIMITS, NIOSH/MSHA CERTIFIED RESPIRATORS SHOULD BE USED. EYE GOGGLES AND GLOVES ARE NOT REQUIRED FOR NORMAL INDUSTRIAL EXPOSURES, BUT MAY BE WARRANTED IF ENVIRONMENT IS EXCESSIVELY DUSTY.

OCCUPATIONAL EXPOSURE LIMITS: OPTIBOR IS TREATED BY OSHA, CAL OSHA AND ACGIH AS "PARTICULATE NOT OTHERWISE CLASSIFIED" OR NUISANCE DUST. THE OSHA/PEL (PERMISSIBLE EXPOSURE LEVEL) IS 15 MG/M3 TOTAL DUST AND 5 MG/M3 RESPIRABLE DUST. THE CAL OSHA/PEL IS 10 MG/M3. THE ACGIH/TLV (THRESHOLD

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LIMIT VALUE) IS 10 MG/M3.

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: WHITE, ODORLESS, CRYSTALLINE SOLID
SPECIFIC GRAVITY: 1.51
VAPOR PRESSURE: NEGLIGIBLE @ 20 C
SOLUBILITY IN WATER: 4.7% @ 20 C; 27.5% @ 100 C
MELTING POINT: 170.9 C (340 F) (HEATED IN CLOSED SPACE)
PH @ 20 C: 6.1 (0.1% SOLUTION); 5.1 (1.0% SOLUTION); 3.7 (4.7% SOLUTION)
MOLECULAR WEIGHT: 61.84

10 STABILITY AND REACTIVITY

GENERAL: OPTIBOR IS A STABLE PRODUCT, BUT WHEN HEATED IT LOSES WATER, FIRST FORMING METABORIC ACID (HBO_2), AND ON FURTHER HEATING IT IS CONVERTED INTO BORIC OXIDE (B_2O_3).
INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: OPTIBOR REACTS AS A WEAK ACID WHICH MAY CAUSE CORROSION OF BASE METALS.
REACTION WITH STRONG REDUCING AGENTS, SUCH AS METAL HYDRIDES OR ALKALI METALS, WILL GENERATE HYDROGEN GAS, WHICH COULD CREATE AN EXPLOSIVE HAZARD.
HAZARDOUS DECOMPOSITION: NONE.

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

INGESTION: LOW ACUTE ORAL TOXICITY; LD50 IN RATS IS 3,500 TO 4,100 MG/KG OF BODY WEIGHT.

SKIN/DERMAL: LOW ACUTE DERMAL TOXICITY; LD50 IN RABBITS IS GREATER THAN 2,000 MG/KG OF BODY WEIGHT. OPTIBOR IS POORLY ABSORBED THROUGH INTACT SKIN.

INHALATION: LOW ACUTE INHALATION TOXICITY; LC50 IN RATS IS GREATER THAN 2.0 MG/L (OR G/M3).

SKIN IRRITATION: NON-IRRITANT.

EYE IRRITATION: DRAIZE TEST IN RABBITS PRODUCED MILD EYE IRRITATION EFFECTS. FIFTY YEARS OF OCCUPATIONAL EXPOSURE TO OPTIBOR INDICATES NO ADVERSE EFFECTS ON HUMAN EYE. THEREFORE, OPTIBOR IS NOT CONSIDERED TO BE A HUMAN EYE IRRITANT IN NORMAL INDUSTRIAL USE.

SENSITIZATION: OPTIBOR IS NOT A SKIN SENSITIZER.

OTHER

REPRODUCTIVE/DEVELOPMENTAL TOXICITY: ANIMAL FEEDING STUDIES IN RAT, MOUSE AND DOG, AT HIGH DOSES, HAVE DEMONSTRATED EFFECTS ON FERTILITY AND TESTES. BORIC ACID STUDIES IN RAT, MOUSE AND RABBIT, AT HIGH DOSES, DEMONSTRATE DEVELOPMENTAL EFFECTS

PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228741

PROD NO : 500439

ON THE FETUS, INCLUDING FETAL WEIGHT LOSS AND MINOR SKELETAL VARIATIONS³, 4. THE DOSES ADMINISTERED WERE MANY TIMES IN EXCESS OF THOSE TO WHICH HUMANS WOULD NORMALLY BE EXPOSED⁵.

CARCINOGENICITY/MUTAGENICITY: NO EVIDENCE OF CARCINOGENICITY IN MICE⁶. NO MUTAGENIC ACTIVITY WAS OBSERVED FOR BORIC ACID IN A BATTERY OF SHORT-TERM MUTAGENICITY ASSAYS.

HUMAN DATA: HUMAN EPIDEMIOLOGICAL STUDIES SHOW NO INCREASE IN PULMONARY DISEASE IN OCCUPATIONAL POPULATIONS WITH CHRONIC EXPOSURES TO BORIC ACID DUST AND SODIUM BORATE DUST. A RECENT EPIDEMIOLOGY STUDY UNDER THE CONDITIONS OF NORMAL OCCUPATIONAL EXPOSURE TO BORATE DUSTS INDICATED NO EFFECT ON FERTILITY⁷.

12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA

GENERAL: BORON (B) IS THE ELEMENT IN BORIC ACID (OPTIBOR) WHICH IS USED BY CONVENTION TO REPORT BORATE PRODUCT ECOLOGICAL EFFECTS. IT OCCURS NATURALLY IN SEA-WATER AT AN AVERAGE CONCENTRATION OF 5 MG B/L AND GENERALLY OCCURS IN FRESH WATER AT CONCENTRATIONS UP TO 1 MG B/L. IN DILUTE AQUEOUS SOLUTIONS THE PREDOMINANT BORON SPECIES PRESENT IS UNDISSOCIATED BORIC ACID. TO CONVERT BORIC ACID INTO EQUIVALENT BORON (B) CONTENT, MULTIPLY BY 0.1748.

PHYTOTOXICITY: BORON IS AN ESSENTIAL MICRONUTRIENT FOR HEALTHY GROWTH OF PLANTS; HOWEVER, IT CAN BE HARMFUL TO BORON SENSITIVE PLANTS IN HIGH QUANTITIES. CARE SHOULD BE TAKEN TO MINIMIZE THE AMOUNT OF OPTIBOR RELEASED TO THE ENVIRONMENT.

ALGAL TOXICITY:

GREEN ALGAE, SCENEDESMUS SUBSPICATUS

96-HR EC10 = 24 MG B/L*

INVERTEBRATE TOXICITY⁸:

DAPHNIIDS, DAPHNIA MAGNA STRAUS

48-HR LC50 = 133 MG B/L+

21-DAY NOEC-LOEC = 6-13 MG B/L+

TEST SUBSTANCE: *SODIUM TETRABORATE

+ BORIC ACID

FISH TOXICITY:

SEA-WATER⁹:

DAB, LIMANDA LIMANDA

96-HR LC50 = 74 MG B/L+

FRESH WATER¹⁰:

RAINBOW TROUT, S. GAIRDNERI (EMBRYO-LARVAL STAGE)

24-DAY LC50 = 150 MG B/L+

32-DAY LC50 = 100 MG B/L+

GOLDFISH, CARASSIUS AURATUS (EMBRYO-LARVAL STAGE)

7-DAY LC50 = 46 MG B/L+

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3-DAY LC50 = 178 MG B/L+

ENVIRONMENTAL FATE DATA

PERSISTENCE/DEGRADATION: BORON IS NATURALLY OCCURRING AND
UBIQUITOUS IN THE ENVIRONMENT. OPTIBOR DECOMPOSES IN THE
ENVIRONMENT TO NATURAL BORATE.

OCTANOL/WATER PARTITION COEFFICIENT: LOG POW: -0.7570 AT 25 C.

SOIL MOBILITY: OPTIBOR IS SOLUBLE IN WATER AND IS LEACHABLE
THROUGH NORMAL SOIL.

13 DISPOSAL CONSIDERATIONS

DISPOSAL GUIDANCE: SMALL QUANTITIES OF OPTIBOR CAN USUALLY BE
DISPOSED OF AT LANDFILL SITES. NO SPECIAL DISPOSAL TREATMENT IS
REQUIRED, BUT LOCAL AUTHORITIES SHOULD BE CONSULTED ABOUT ANY
SPECIFIC LOCAL REQUIREMENTS. TONNAGE QUANTITIES OF PRODUCT ARE
NOT RECOMMENDED TO BE SENT TO LANDFILLS. SUCH PRODUCT SHOULD,
IF POSSIBLE, BE USED FOR AN APPROPRIATE APPLICATION.

RCRA (40 CFR 261): OPTIBOR IS NOT LISTED UNDER ANY SECTIONS
OF THE FEDERAL RESOURCE CONSERVATION AND RECOVERY ACT
(RCRA).

NPRI (CANADA): OPTIBOR IS NOT LISTED ON THE CANADIAN NATIONAL
POLLUTANT RELEASE INVENTORY.

REFER TO SECTION 15 FOR ADDITIONAL REGULATORY INFORMATION.

14 TRANSPORT INFORMATION

DOT HAZARDOUS CLASSIFICATION: OPTIBOR IS NOT REGULATED BY THE
U.S. DEPARTMENT OF TRANSPORTATION (DOT) AND IS THEREFORE NOT
CONSIDERED A HAZARDOUS MATERIAL/SUBSTANCE.

TDG CANADIAN TRANSPORTATION: BORIC ACID (OPTIBOR) IS NOT
REGULATED UNDER TRANSPORTATION OF DANGEROUS GOODS (TDG).

INTERNATIONAL TRANSPORTATION: BORIC ACID (OPTIBOR) HAS NO UN
NUMBER, AND IS NOT REGULATED UNDER INTERNATIONAL RAIL, ROAD,
WATER OR AIR TRANSPORT REGULATIONS.

15 REGULATORY INFORMATION

OSHA/CAL OSHA: THIS MSDS DOCUMENT MEETS THE
REQUIREMENTS OF BOTH OSHA (29 CFR 1910.1200) AND CAL
OSHA (TITLE 8 CCR 5194 (G)) HAZARD COMMUNICATION
STANDARDS. REFER TO SECTION 8 FOR REGULATORY EXPOSURE LIMITS.

WHMIS CLASSIFICATION: BORIC ACID (OPTIBOR) IS CLASSIFIED AS
CLASS D- DIVISION 2A UNDER CANADIAN WHMIS GUIDELINES.

CHEMICAL INVENTORY LISTING: BORIC ACID (OPTIBOR) (10043-35-3)
APPEARS ON SEVERAL CHEMICAL INVENTORY LISTS (INCLUDING THE EPA
TSCA INVENTORY, CANADIAN DSL, EUROPEAN EINECS, JAPANESE
NITI, AUSTRALIAN AND KOREAN LISTS) UNDER THE CAS NO.

REPRESENTING THE ANHYDROUS FORM OF THIS INORGANIC SALT.

U.S. EPA TSCA INVENTORY 10043-35-3

CANADIAN DSL 10043-35-3

PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228761

PROD NO : 500639

EINECS 233-139-2

SOUTH KOREA 1-439

JAPANESE MITI (1)-63

RCRA: BORIC ACID (OPTIBOR) IS NOT LISTED AS A HAZARDOUS WASTE UNDER ANY SECTIONS OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) OR REGULATIONS (40 CFR 261 ET SEQ).

SUPERFUND: CERCLA/SARA. BORIC ACID (OPTIBOR) IS NOT LISTED UNDER CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT) OR ITS 1986 AMENDMENTS, SARA (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT), INCLUDING SUBSTANCES LISTED UNDER SECTION 313 OF SARA, TOXIC CHEMICALS, 42 USC 11023, 40 CFR 372.65, SECTION 302 OF SARA, EXTREMELY HAZARDOUS SUBSTANCES, 42 USC 11002, 40 CFR 355, OR THE CERCLA HAZARDOUS SUBSTANCES LIST, 42 USC 9604, 40 CFR 302.

SAFE DRINKING WATER ACT (SDWA): BORIC ACID (OPTIBOR) IS NOT REGULATED UNDER THE SDWA, 42 USC 3006-1, 40 CFR 141 ET SEQ. CONSULT STATE AND LOCAL REGULATIONS FOR POSSIBLE WATER QUALITY ADVISORIES REGARDING BORON COMPOUNDS.

CLEAN WATER ACT (CWA) (FEDERAL WATER POLLUTION CONTROL ACT): 33 USC 1251 ET SEQ.

A) BORIC ACID (OPTIBOR) IS NOT ITSELF A DISCHARGE COVERED BY ANY WATER QUALITY CRITERIA OF SECTION 304 OF THE CWA, 33 USC 1314.

B) IT IS NOT ON THE SECTION 307 LIST OF PRIORITY POLLUTANTS, 33 USC 1317, 40 CFR 129.

C) IT IS NOT ON THE SECTION 311 LIST OF HAZARDOUS SUBSTANCES, 33 USC 1321, 40 CFR 116.

CANADIAN DRINKING WATER GUIDELINE: AN "INTERIM MAXIMUM ACCEPTABLE CONCENTRATION" (IMAC) FOR BORON IS CURRENTLY SET AT 5 MG B/L.

IARC: THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) (A UNIT OF THE WORLD HEALTH ORGANIZATION) DOES NOT LIST OR CATEGORIZE BORIC ACID AS A CARCINOGEN.

NTP BIENNIAL REPORT ON CARCINOGENS: BORIC ACID IS NOT LISTED.

OSHA CARCINOGEN: BORIC ACID IS NOT LISTED.

CALIFORNIA PROPOSITION 65: BORIC ACID (OPTIBOR) IS NOT LISTED ON THE PROPOSITION 65 LIST OF CARCINOGENS OR REPRODUCTIVE TOXICANTS.

FEDERAL FOOD, DRUG AND COSMETIC ACT: PURSUANT TO 21 CFR 175.105, 176.180 AND 181.30, OPTIBOR IS APPROVED BY THE FDA FOR USE IN ADHESIVE COMPONENTS OF PACKAGING MATERIALS, AS A COMPONENT OF PAPER COATINGS ON SUCH MATERIALS, OR FOR USE IN THE MANUFACTURE THEREOF, WHICH MATERIALS ARE EXPECTED TO COME IN CONTACT WITH DRY FOOD PRODUCTS.

CLEAN AIR ACT (MONTREAL PROTOCOL): OPTIBOR WAS NOT MANUFACTURED WITH AND DOES NOT CONTAIN ANY CLASS I OR CLASS II OZONE DEPLETING SUBSTANCES.

PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228761

PROD NO : 500639

16 OTHER INFORMATION

REFERENCES

- 1) LITOVITZ T L, NORMAN S A, VELTRI J C, ANNUAL REPORT OF THE AMERICAN ASSOCIATION OF POISON CONTROL CENTERS DATA COLLECTION SYSTEM. AM. J EMERG. MED. 4: 427-458 (1986).
- 2) WEIR R J, FISHER R S, TOXICOL. APPL. PHARMACOL. 23: 351-364 (1972).
- 3) FAIL ET AL., FUND. APPL. TOXICOL. 17: 225-239 (1991).
- 4) PRICE ET AL., J. AM. COLL. TOXICOL. 14: (2), 173 (ABST. P-17) (1995).
- 5) MURRAY F J, REGUL. TOXICOL. PHARMACOL. (DEC. 1995).
- 6) NATIONAL TOXICOLOGY PROGRAM (NTP)-TOXICOLOGY AND CARCINOGENESIS STUDIES OF BORIC ACID IN B6C3F1 MICE, TECH. REPORT SER. NO. 324, U.S. DEPT. OF HEALTH AND HUMAN SERVICES. NIH PUBL. NO. 88-2580 (1987).
- 7) WHORTON ET AL., OCCUP. ENVIRON. MED. 51: 761-767 (1994).
- 8) SCHOBEL ET AL., TENSIDE SURFACTANTS DETERGENTS 25: 99-107 (1988).
- 9) HUGHAN S J, MANCE G, WATER RESEARCH CENTRE REPORT 616-M (1983).
- 10) BUTTERWICK L, DE OUDE N, RAYMOND K, ECOTOXICOL. ENVIRON. SAFETY 17: 339-371 (1989).

FOR GENERAL INFORMATION ON THE TOXICOLOGY OF INORGANIC BORATES, SEE PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, 4TH ED. VOL. II, (1994), CHAP. 42, BORON; ECETOC TECH. REPORT NO. 63 (1995).

PRODUCT LABEL TEXT HAZARD INFORMATION*:

- DO NOT INGEST.
- INGESTION MAY CAUSE REPRODUCTIVE HARM OR BIRTH DEFECTS BASED ON ANIMAL
- DATA. AVOID CONTAMINATION OF FOOD OR FEED.
- NOT FOR USE IN FOOD, DRUG OR PESTICIDES+.
- REFER TO MSDS.
- KEEP OUT OF REACH OF CHILDREN.

*THE WHMIS PANEL FORMAT IS USED FOR CANADIAN PRODUCT.

+EXCEPT FOR NF (PHARMACEUTICAL GRADE) PRODUCTS.

NATIONAL FIRE PROTECTION ASSOC. (NFPA) CLASSIFICATION:

HEALTH 0

FLAMMABILITY 0

REACTIVITY 0

HAZARDOUS MATERIALS INFORMATION SYSTEMS (HMIS):

RED: (FLAMMABILITY) 0

YELLOW: (REACTIVITY) 0

BLUE: (ACUTE HEALTH) 1*

*CHRONIC EFFECTS

FOR FURTHER INFORMATION CONTACT:

U.S. BORAX INC.

OCCUPATIONAL HEALTH & PRODUCT SAFETY DEPARTMENT

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 010

MSDS NO: BXOPT

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 12/24/03

VERSION: 002

PRODUCT: OPTIBOR BORIC ACIDS

ORDER NO: 228761

PROD NO : 500639

(661) 287-6050

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

01/05/05 07:13

PRODUCT: 500639

CUST NO: 113365

ORDER NO: 228761

----- NOTICE -----

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PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED

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CONSEQUENTIAL DAMAGES. **

DO NOT USE INGREDIENT INFORMATION AND/OR PERCENTAGES IN THIS MSDS AS A
PRODUCT SPECIFICATION. FOR PRODUCT SPECIFICATION INFORMATION REFER TO A PRODUCT
SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM
YOUR LOCAL UNIVAR SALES OFFICE.

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MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS
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SUFFICIENCY. CONDITIONS OF USE ARE BEYOND UNIVARS CONTROL AND THEREFORE USERS
ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO
DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY
ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM
THE PUBLICATION OR USE OF, OR RELIANCE UPON , INFORMATION CONTAINED HEREIN.
THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

*** END OF MSDS ***

10-0010
REPORT NUMBER: 971
MSDS NO: EZ060433
MAINFRAME UPLOAD DATE: 04/20/00

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 001
VERSION: 004

PRODUCT: GLACIAL ACETIC ACID

ORDER NO:
PROD NO :

VAN WATERS & ROGERS INC. , A ROYAL VOPAK COMPANY (425)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT NAME: GLACIAL ACETIC ACID

MSDS #: EZ060433

EFFECTIVE DATE: 4/19/00

CHEMICAL NAME: ACETIC ACID
MOLECULAR FORMULA: C2H4O2
MOLECULAR WEIGHT: 60.05
PRODUCT USE: SOLVENT

2. COMPOSITION/INFORMATION ON INGREDIENTS
WEIGHT % - COMPONENT - (CAS REGISTRY NUMBER)
100 ACETIC ACID (000064-19-7)

3. HAZARDS IDENTIFICATION
DANGER!

CAUSES SEVERE SKIN AND EYE BURNS
HARMFUL IF SWALLOWED

VAPOR IRRITATING TO THE EYES AND RESPIRATORY TRACT
COMBUSTIBLE LIQUID AND VAPOR

HMIS HAZARD RATINGS: HEALTH - 3, FLAMMABILITY - 2, CHEMICAL REACTIVITY - 0
NOTE: HMIS AND NFPA RATINGS INVOLVE DATA AND INTERPRETATIONS THAT MAY VARY
FROM COMPANY TO COMPANY. THEY ARE INTENDED ONLY FOR RAPID, GENERAL

IDENTIFICATION OF THE MAGNITUDE OF THE SPECIFIC HAZARD. TO DEAL ADEQUATELY
WITH THE SAFE HANDLING OF THIS MATERIAL, ALL THE INFORMATION CONTAINED IN THIS

PRODUCT: GLACIAL ACETIC ACID

ORDER NO:

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MSDS MUST BE CONSIDERED.

4. FIRST-AID MEASURES

INHALATION: MOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION IMMEDIATELY.

EYES: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. IF EASY TO DO, REMOVE CONTACT LENSES. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

SKIN: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. GET MEDICAL ATTENTION IMMEDIATELY. WASH CONTAMINATED CLOTHING BEFORE REUSE. DESTROY OR THOROUGHLY CLEAN CONTAMINATED SHOES.

INGESTION: DO NOT INDUCE VOMITING. IF VICTIM IS FULLY CONSCIOUS, GIVE A CUPFUL OF WATER. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: WATER SPRAY, DRY CHEMICAL, CARBON DIOXIDE (CO2), ALCOHOL FOAM

SPECIAL FIRE-FIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING. USE WATER SPRAY TO KEEP FIRE-EXPOSED CONTAINERS COOL.

HAZARDOUS COMBUSTION PRODUCTS: CARBON DIOXIDE, CARBON MONOXIDE

UNUSUAL FIRE AND EXPLOSION HAZARDS: COMBUSTIBLE.

6. ACCIDENTAL RELEASE MEASURES

ELIMINATE ALL IGNITION SOURCES. WEAR A SELF-CONTAINED BREATHING APPARATUS AND APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT. (SEE EXPOSURE CONTROLS/PERSONAL PROTECTION.) NEUTRALIZE WITH: LIME, SODA ASH. ABSORB SPILL WITH VERMICULITE OR OTHER INERT MATERIAL, THEN PLACE IN A CONTAINER FOR CHEMICAL WASTE.

FOR LARGE SPILLS: FLUSH SPILL AREA WITH WATER SPRAY. PREVENT RUNOFF FROM ENTERING DRAINS, SEWERS, OR STREAMS.

7. HANDLING AND STORAGE

PERSONAL PRECAUTIONARY MEASURES: DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT TASTE OR SWALLOW. AVOID BREATHING VAPOR. USE ONLY WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

PREVENTION OF FIRE AND EXPLOSION: KEEP AWAY FROM HEAT AND FLAME. KEEP FROM CONTACT WITH OXIDIZING MATERIALS.

STORAGE: THIS MATERIAL MAY BE USED IN FOOD. KEEP AWAY FROM TOXIC SUBSTANCES. KEEP CONTAINER CLOSED.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

ACGIH THRESHOLD LIMIT VALUE (TLV):

ACETIC ACID: 10 PPM TWA, 15 PPM STEL

OSHA (USA) PERMISSIBLE EXPOSURE LIMIT (PEL, 1989 TABLE Z-1-A VALUES OR SECTION-SPECIFIC STANDARDS):

ACETIC ACID: 10 PPM TWA

VENTILATION: GOOD GENERAL VENTILATION (TYPICALLY 10 AIR CHANGES PER HOUR)

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SHOULD BE USED. VENTILATION RATES SHOULD BE MATCHED TO CONDITIONS. USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION, OR OTHER ENGINEERING CONTROLS TO MAINTAIN AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS.

RESPIRATORY PROTECTION: IF ENGINEERING CONTROLS DO NOT MAINTAIN AIRBORNE CONCENTRATIONS BELOW RECOMMENDED EXPOSURE LIMITS, AN APPROVED RESPIRATOR MUST BE WORN. RESPIRATOR TYPE: ORGANIC VAPOR. IF RESPIRATORS ARE USED, A PROGRAM SHOULD BE INSTITUTED TO ASSURE COMPLIANCE WITH OSHA STANDARD 43 FR 1152, JANUARY 8, 1998.

EYE PROTECTION: WEAR SAFETY GLASSES WITH SIDE SHIELDS (OR GOGGLES) AND A FACE SHIELD. WEAR A FULL-FACE RESPIRATOR, IF NEEDED.

SKIN PROTECTION: WEAR CHEMICAL-RESISTANT GLOVES, BOOTS, AND PROTECTIVE CLOTHING APPROPRIATE FOR THE RISK OF EXPOSURE. CONTACT GLOVE MANUFACTURER FOR SPECIFIC INFORMATION.

RECOMMENDED DECONTAMINATION FACILITIES: EYE BATH, WASHING FACILITIES, SAFETY SHOWER

9. PHYSICAL AND CHEMICAL PROPERTIES

- PHYSICAL FORM: LIQUID
- COLOR: COLORLESS
- ODOR: PUNGENT, VINEGAR
- ODOR THRESHOLD: 0.48 PPM
- SPECIFIC GRAVITY AT 20 C (68 F) (WATER = 1): 1.05
- VAPOR PRESSURE AT 20 C (68 F): 15.2 MBAR (11.4 MM HG)
- VAPOR DENSITY (AIR = 1): 2.1
- EVAPORATION RATE (N-BUTYL ACETATE = 1): 0.97
- BOILING POINT: 118 C (244 F)
- MELTING POINT: 17 C (63 F)
- VISCOSITY AT 20 C (68 F): 1.20 MPA.S OR CP
- SOLUBILITY IN WATER AT AMBIENT TEMPERATURE: COMPLETE
- PH: 2.4 (AT 60 G/L WATER)
- OCTANOL/WATER PARTITION COEFFICIENT: LOG P = -0.31, P = 0.49
- FLASH POINT (TAG CLOSED CUP): 39 C (103 F)
- LOWER FLAMMABLE LIMIT AT 59 C (139 F): 4 VOLUME %
- UPPER FLAMMABLE LIMIT AT 93 C (199 F): 19.3 VOLUME %
- AUTOIGNITION TEMPERATURE (ASTM D 2155): 516 C (960 F)
- SENSITIVITY TO MECHANICAL IMPACT: NOT AVAILABLE
- SENSITIVITY TO STATIC DISCHARGE: MATERIAL IS UNLIKELY TO ACCUMULATE A STATIC CHARGE WHICH COULD ACT AS AN IGNITION SOURCE.

10. STABILITY AND REACTIVITY

STABILITY: STABLE

INCOMPATIBILITY: MATERIAL CAN REACT VIOLENTLY WITH STRONG OXIDIZING AGENTS. MATERIAL CAN REACT WITH METALS, STRONG BASES, AMINES.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

11. TOXICOLOGICAL INFORMATION

EFFECTS OF EXPOSURE:

INHALATION: VAPOR IRRITATING.

EYES: CAUSES SEVERE BURNS. VAPOR IRRITATING.

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SKIN: CAUSES SEVERE BURNS.

INGESTION: MAY CAUSE BURNS OF THE GASTROINTESTINAL TRACT IF SWALLOWED.

ACUTE TOXICITY DATA:

ORAL LD-50 (MOUSE): 4960 MG/KG

INHALATION LC-50 (MOUSE): 5620 PPM/1 HOUR(S)

DERMAL LD-50 (RABBIT): 1060 MG/KG

SKIN IRRITATION (RABBIT): SEVERE

EYE IRRITATION (RABBIT): SEVERE

12. ECOLOGICAL INFORMATION

INTRODUCTION: THIS ENVIRONMENTAL EFFECTS SUMMARY IS WRITTEN TO ASSIST IN ADDRESSING EMERGENCIES CREATED BY AN ACCIDENTAL SPILL WHICH MIGHT OCCUR DURING THE SHIPMENT OF THIS MATERIAL, AND, IN GENERAL, IT IS NOT MEANT TO ADDRESS DISCHARGES TO SANITARY SEWERS OR PUBLICLY OWNED TREATMENT WORKS.

DATA FOR THIS MATERIAL HAVE BEEN USED TO ESTIMATE ITS ENVIRONMENTAL IMPACT. THIS MATERIAL IS A STRONGLY ACIDIC AQUEOUS SOLUTION, AND THIS PROPERTY MAY CAUSE ADVERSE ENVIRONMENTAL EFFECTS. IT HAS THE FOLLOWING PROPERTIES: A HIGH BIOCHEMICAL OXYGEN DEMAND AND A POTENTIAL TO CAUSE OXYGEN DEPLETION IN AQUEOUS SYSTEMS, A LOW POTENTIAL TO AFFECT AQUATIC ORGANISMS, A LOW POTENTIAL TO AFFECT SECONDARY WASTE TREATMENT MICROBIAL METABOLISM, A MODERATE POTENTIAL TO AFFECT THE GERMINATION AND/OR EARLY GROWTH OF SOME PLANTS, A LOW POTENTIAL TO AFFECT THE GROWTH OF SOME PLANT SEEDLINGS, A HIGH POTENTIAL TO BIODEGRADE (LOW PERSISTENCE) WITH UNACCLIMATED MICROORGANISMS FROM ACTIVATED SLUDGE, A LOW POTENTIAL TO BIOCONCENTRATE. AFTER DILUTION WITH A LARGE AMOUNT OF WATER, FOLLOWED BY SECONDARY WASTE TREATMENT, THIS MATERIAL IS NOT EXPECTED TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS.

OXYGEN DEMAND DATA:

COD: 1.03 G OXYGEN/G

BOD-5: 0.34-0.88 G OXYGEN/G

BOD-20: 0.9 G OXYGEN/G

ACUTE AQUATIC EFFECTS DATA:

96-H LC-50 (FATHEAD MINNOW): >100 MG/L

96-H LC-50 (DAPHNID): >100 MG/L

48-H LC-50 (MOSQUITO FISH): 251 MG/L

48-H LC-50 (GOLDEN ORFE): 410 MG/L

SECONDARY WASTE WATER TREATMENT EFFECTS: 5-HOUR IC-50: >5000 MG/L

7-DAY PLANT GERMINATION EFFECTS - NO-ADVERSE-EFFECT CONCENTRATION:

RYEGRASS: 1 MG/L

RADISH: 10 MG/L

LETTUCE: 10 MG/L

7-DAY PLANT SEEDLING EFFECTS - NO-ADVERSE-EFFECT CONCENTRATION:

MARIGOLD: 100 MG/L

RADISH: 100 MG/L

LETTUCE: 100 MG/L

13. DISPOSAL CONSIDERATIONS

DISCHARGE, TREATMENT, OR DISPOSAL MAY BE SUBJECT TO NATIONAL, STATE, OR LOCAL LAWS. INCINERATE.

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ORDER NO:

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SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUE, FOLLOW LABEL WARNINGS EVEN AFTER CONTAINER IS EMPTIED.

14. TRANSPORT INFORMATION

- DOT (USA) STATUS: REGULATED
- CLASS 8, PACKING GROUP II
- DOT SUBSIDIARY RISK: CLASS 3, PACKING GROUP III
- DOT REPORTABLE QUANTITY: 5000 LB (2270 KG)
- AIR - INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)
- ICAO STATUS: REGULATED
- CLASS 8, PACKING GROUP II
- ICAO SUBSIDIARY RISK: CLASS 3, PACKING GROUP III
- SEA - INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)
- IMDG STATUS: REGULATED
- CLASS 8, PACKING GROUP II
- IMDG SUBSIDIARY RISK: CLASS 3, PACKING GROUP III

15. REGULATORY INFORMATION

- THIS DOCUMENT HAS BEEN PREPARED IN ACCORDANCE WITH THE MSDS REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200.
- OSHA CLASSIFICATION: HAZARDOUS
- CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986): MATERIAL(S) KNOWN TO THE STATE TO CAUSE CANCER: NONE
- CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986): MATERIAL(S) KNOWN TO THE STATE TO CAUSE ADVERSE REPRODUCTIVE EFFECTS: NONE
- THIS DOCUMENT HAS BEEN PREPARED IN ACCORDANCE WITH THE MSDS REQUIREMENTS OF THE WHMIS CONTROLLED PRODUCTS REGULATION.
- WHMIS (CANADA) STATUS: CONTROLLED
- WHMIS (CANADA) HAZARD CLASSIFICATION: B/3, E
 - INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC): NOT LISTED
 - AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH): NOT LISTED
 - NATIONAL TOXICOLOGY PROGRAM (NTP): NOT LISTED
 - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA): NOT LISTED
- CHEMICAL(S) SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OR TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 AND 40 CFR PART 372: NONE
- SARA (U.S.A.) SECTIONS 311 AND 312 HAZARD CLASSIFICATION(S): FIRE HAZARD, IMMEDIATE (ACUTE) HEALTH HAZARD
- US TOXIC SUBSTANCES CONTROL ACT (TSCA): THIS PRODUCT IS LISTED ON THE TSCA INVENTORY. ANY IMPURITIES PRESENT IN THIS PRODUCT ARE EXEMPT FROM LISTING.
- CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) AND DOMESTIC SUBSTANCES LIST (DSL): THIS PRODUCT IS LISTED ON THE DSL. ANY IMPURITIES PRESENT IN THIS PRODUCT ARE EXEMPT FROM LISTING.
- EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS): THIS PRODUCT IS LISTED ON EINECS. EINECS NUMBER: 2005807
- AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) AND NATIONAL INDUSTRIAL

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CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS): THIS PRODUCT IS LISTED ON AICS OR OTHERWISE COMPLIES WITH NICNAS.

- JAPANESE HANDBOOK OF EXISTING AND NEW CHEMICAL SUBSTANCES: THIS PRODUCT IS LISTED IN THE HANDBOOK OR HAS BEEN APPROVED IN JAPAN BY NEW SUBSTANCE NOTIFICATION.

16. OTHER INFORMATION

LABEL STATEMENTS:

DANGER!

CAUSES SEVERE SKIN AND EYE BURNS

HARMFUL IF SWALLOWED

VAPOR IRRITATING TO THE EYES AND RESPIRATORY TRACT

COMBUSTIBLE LIQUID AND VAPOR

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

DO NOT TASTE OR SWALLOW.

AVOID BREATHING VAPOR.

KEEP AWAY FROM HEAT AND FLAME.

KEEP CONTAINER CLOSED.

USE ONLY WITH ADEQUATE VENTILATION.

FIRST AID: IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES AND SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. IF EASY TO DO, REMOVE CONTACT LENSES. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. WASH CLOTHING BEFORE REUSE. DESTROY OR THOROUGHLY CLEAN CONTAMINATED SHOES. IF SWALLOWED, DO NOT INDUCE VOMITING. IF VICTIM IS FULLY CONSCIOUS, GIVE A CUPFUL OF WATER. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. IF INHALED, MOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF FIRE: USE WATER SPRAY, DRY CHEMICAL, CARBON DIOXIDE (CO2), ALCOHOL FOAM. USE WATER SPRAY TO KEEP FIRE-EXPOSED CONTAINERS COOL. WEAR A SELF-CONTAINED BREATHING APPARATUS AND APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT.

IN CASE OF SPILL: ELIMINATE ALL IGNITION SOURCES. WEAR A SELF-CONTAINED BREATHING APPARATUS AND APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT. FLUSH SPILL AREA WITH WATER SPRAY. NEUTRALIZE SPILL AREA AND WASHINGS WITH SODA ASH OR LIME. PREVENT RUNOFF FROM ENTERING DRAINS, SEWERS, AND STREAMS. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUE, FOLLOW LABEL WARNINGS EVEN AFTER CONTAINER IS EMPTIED.

CAUTION: FOR MANUFACTURING, PROCESSING OR REPACKING BY TRAINED PERSONNEL

REPORT NUMBER: 971

MSDS NO: EZ060433

MAINFRAME UPLOAD DATE: 04/20/00

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 007

VERSION: 004

PRODUCT: GLACIAL ACETIC ACID

ORDER NO:

PROD NO :

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR

VAN WATERS & ROGERS INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

08/03/00 11:34

PRODUCT:

CUST NO:

ORDER NO:

----- NOTICE -----

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PROCESS.

*** E N D O F M S D S ***



Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment						
	<table><tr><td>Health Hazard</td><td>1</td></tr><tr><td>Fire Hazard</td><td>0</td></tr><tr><td>Reactivity</td><td>0</td></tr></table>	Health Hazard	1	Fire Hazard	0	Reactivity	0	<div></div> <div>See Section 15.</div>
Health Hazard	1							
Fire Hazard	0							
Reactivity	0							

Section 1. Chemical Product and Company Identification

Page Number: 1

Common Name/ Trade Name	Aluminum sulfate	Code	A3665
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90243	CAS#	10043-01-3
Commercial Name(s)		RTECS	BD1700000
Synonym	Not available.	TSCA	On the TSCA list.
Chemical Name	Dialuminum trisulfate	CI#	Not applicable.
Chemical Family	Metal salt. (Salt.)	IN CASE OF EMERGENCY CHEMTREC (24hr) 800-424-9300 Emergency phone: (310)516-8300	
Chemical Formula	Al ₂ (SO ₄) ₃		
Supplier	SPECTRUM QUALITY PRODUCTS, INC. 14422 S. SAN PEDRO STREET GARDENA, CA 90243		

Section 2. Composition and Information on Ingredients

Name	CAS #	Exposure Limits			
		TWA (mg/m ³)	STEL (mg/m ³)	CEIL (mg/m ³)	% by Weight
Dialuminum trisulfate	10043-01-3	0.14			100

Toxicological Data on Ingredients Not applicable.

Section 3. Hazards Identification

Potential Acute Health Effects	Very slightly to slightly dangerous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.
Potential Chronic Health Effects	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. Toxicity of the product to the reproductive system: Not available. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used.
Skin Contact	If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.
Serious Skin Contact	No additional information.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation	No additional information.
Ingestion	Remove dentures if any. Watch for an obstruction in the victim's mouth. Remove if possible what is causing the obstruction but do not force fingers or a hard object between the victim's teeth. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Seek immediate medical attention.
Serious Ingestion	No additional information.

Section 5. Fire and Explosion Data

Flammability of the Product	Non-flammable.
Auto-Ignition Temperature	Not applicable.
Flash Points	Not applicable.
Flammable Limits	Not applicable.
Products of Combustion	Not applicable.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our data base regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	Non-flammable.
Special Remarks on Fire Hazards	When heated to decomposition it emits toxic fumes. Non combustible.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our data base contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container.

Section 7. Handling and Storage

Precautions	No specific safety phrase has been found applicable for this product.
Storage	No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Safety glasses. Lab coat.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	TWA: 0.14 (ppm) Consult local authorities for acceptable exposure limits.

Aluminum sulfate

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Section 9. Physical and Chemical Properties

Physical state and appearance	Solid. (Crystals solid.)	Odor	Not available.
Molecular Weight	342.14	Taste	Sweet.
pH (1% soln/water)	7	Color	White.
Boiling Point	Not available.		
Melting Point	Decomposes.		
Critical Temperature	Not available.		
Specific Gravity	2.71 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water, hot water. Insoluble in methanol.		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with various substances	Very slightly to slightly reactive with oxidizing agents, moisture.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 6207 mg/kg (Mouse.).
Chronic Effects on Humans	Toxicity of the product to the reproductive system: Not available.
Other Toxic Effects on Humans	Very slightly to slightly dangerous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.
Special Remarks on Toxicity to Animals	No additional remark.
Special Remarks on Chronic Effects on Humans	No additional remark.
Special Remarks on other Toxic Effects on Humans	No additional remark.

Aluminum sulfate

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Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Not applicable.
Toxicity of the Products of Biodegradation	The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation	No additional remark.


Section 13. Disposal Considerations



Waste Disposal	Recycle to process, if possible. Consult your local or regional authorities.
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Section 14. Transport Information

DOT Classification	Not a DOT controlled material (United States).
Identification	UN: 9078 PG: III
Special Provisions for Transport	Not applicable.
DOT (Pictograms)	

Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations	The following product(s) is (are) listed by CERCLA: Aluminum sulfate The following product(s) is (are) listed by the State of Massachusetts: Aluminum sulfate The following product(s) is (are) listed by the State of Pennsylvania: Aluminum sulfate The following product(s) is (are) listed on TSCA: Aluminum sulfate																
California Proposition 65 Warnings	WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning: NONE WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE																
Other Regulations	Our data base contains no special consideration on the product.																
Other Classifications	WHMIS (Canada)	Not controlled under WHMIS (Canada).															
	DSCL (EEC)	Not controlled under DSCL (Europe).															
HMIS (U.S.A.)	<table><tr><td>Health Hazard</td><td>1</td></tr><tr><td>Fire Hazard</td><td>0</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>a</td></tr></table>	Health Hazard	1	Fire Hazard	0	Reactivity	0	Personal Protection	a	National Fire Protection Association (U.S.A.)	<table><tr><td>Flammability</td><td>0</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Specific hazard</td><td>0</td></tr></table>	Flammability	0	Reactivity	0	Specific hazard	0
Health Hazard	1																
Fire Hazard	0																
Reactivity	0																
Personal Protection	a																
Flammability	0																
Reactivity	0																
Specific hazard	0																
WHMIS (Canada) (Pictograms)																	

Aluminum sulfate		Page Number: 5
DSCL (Europe) (Pictograms)		
TDG (Canada) (Pictograms)		
ADR (Europe) (Pictograms)		
Protective Equipment		

Section 16. Other Information	
Catalog Number(s)	A1114, A1115, AL300
References	-The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto. Van Nostrand Reinold, 6e ed. 1984. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
Other Special Considerations	No additional remark.
Validated by E. Brull on 2/19/96.	Verified by E. Brull. Printed 3/26/96.
Emergency phone: (310)516-8000	
Notice to Reader <i>All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Quality Products, Inc. assumes no responsibility for the completeness or accuracy of the information contained herein.</i>	

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VERSION: 011

VERSION: 011

PROD NO : 344820

, WA 98033

Name/Address: 30354 Tracy Road

PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

ORDER NO: 232929

PROD NO : 344820

Walbridge, OH 43465

24-Hour Emergency Phone Numbers (U.S.A.):

Ohio: (419) 666-9838

CHEMTREC: (800) 424-9300

SECTION 2 HAZARDOUS IDENTIFICATION

EMERGENCY OVERVIEW

Off-white granular material, with the consistency of salt.

WARNING: Causes eye irritation. May cause skin and respiratory tract irritation. Avoid contact with eyes and skin. Avoid breathing dust. Wash exposed skin thoroughly after handling.

Potential Health Effects: See Section 11 for more information. Likely

Routes of Exposure: Eye contact, skin contact, inhalation.

Eye: Causes mild to severe irritation. May cause burn if not flushed with water.

Skin: Prolonged exposure may cause moderate irritation. May cause burn if not flushed with water.

Inhalation: Inhalation of dust may irritate or burn nose, throat and lungs.

Ingestion: Small amounts (tablespoonful) swallowed are not likely to cause injury; however, swallowing large amounts may irritate or burn digestive tract.

Medical Conditions Aggravated by Exposure: Pre-existing respiratory conditions.

This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC, or NTP.

This material meets the definition of an irritant as defined in OSHA's Hazard Communication Standard (29 CFR 1910.1200).

Potential Environmental Effects: Material in dry form is not hazardous to the environment. However, readily dissolves in water to form a weak acidic solution that is harmful to aquatic life.

SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	% (by weight)
Sodium bisulfate	7681-38-1	91.5 - 94.7
Sodium sulfate	7757-82-6	4.8 - 8.0
Moisture	7732-18-5	0.1 - 0.5

PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

ORDER NO: 232929

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SECTION 4 FIRST AID MEASURES

NOTE TO PHYSICIAN: Supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May aggravate pre-existing respiratory conditions.

Eyes: Immediately flush eyes with water for at least 15 minutes, lifting eyelids to thoroughly flush. If redness or irritation persists, get prompt medical attention.

Skin: Immediately flush affected area with water for at least 15 minutes. If burn occurs, seek immediate medical attention.

Inhalation: Remove to fresh air. If irritation or discomfort persists, seek medical attention.

Ingestion: If large amounts are ingested (greater than tablespoonful), drink large quantities of milk or water. Follow with Milk of Magnesia, beaten eggs or vegetable oil. DO NOT induce vomiting. Contact Physician immediately.

SECTION 5 FIRE FIGHTING MEASURES

Extinguishing Media: Use extinguishing media appropriate for surrounding fire. Because material will readily dissolve in water to form a weak acid solution, avoid water contact with material if possible.

Hazardous Combustion Products: At temperatures over 8060 F (430 deg C), product will decompose generating oxides of sulfur.

Fire Fighting Instructions: Product readily dissolves in water to form a weak acid solution. If using water, wear acid protective equipment. No gases or toxic fumes are emitted from this reaction. However, if elevated temperatures (> 806 deg F) are reached, self-contained breathing apparatus should be worn.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use personal protection recommended in Section 8.

Land Spill: Vacuum or shovel material and place in disposal container. Avoid excessive dust generation. Dilute residual material with ample supply of water and direct to sanitary sewer if Federal, State or Local regulations permit.

Water Spill: Readily dissolves in water to form a weak acid solution. If water is isolated or can be contained, neutralize with weak alkaline

PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

ORDER NO: 232929

PROD NO : 344820

solution.

Notify appropriate authorities if required by regulations.

SECTION 7 HANDLING AND STORAGE

Handling: Wear all recommended personal protective clothing when handling. Avoid contact with eyes. Wash thoroughly after handling. Minimize dust generation. Avoid breathing dust.

Storage: Material is hygroscopic and will readily absorb moisture. Keep containers tightly closed. DO NOT store where exposed to moist conditions. DO NOT store near strong alkalis.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Sodium bisulfate - Not established.

Sodium sulfate - Not established.

Engineering Controls: Provide general and/or local exhaust ventilation to maintain airborne particulate below nuisance levels (>10 mg/m³).

Eye/Face Protection: Safety glasses or goggles.

Skin Protection: Rubber gloves and cotton-blend coveralls.

Respiratory Protection: In dusty atmospheres (>10 mg/m³), use a NIOSH-approved dust respirator.

General Hygiene Considerations: There are no known health hazards associated with this material when used as recommended. Follow good industrial hygiene practices including but not limited to: (1) avoid breathing dust; (2) avoid contact with eyes; and (3) wash thoroughly after handling.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Off-white granular material.

Odor: Fresh to Pungent

Physical State: Dry (Anhydrous) crystalline solid

pH: <1 @ 5% aqueous solution spherical shape beads

Solubility (in water): 1060 g/L @ 68 deg F (20 deg C)

Particle Size: 10.75 mm diameter

Flammability (solid): Material is non-combustible

Melting Point: 350 deg F (177 deg C)

Bulk Density: 80 - 85 lbs/ft³ (loose)

Molecular Formula: NaHSO₄

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 005

MSDS NO: P12108VS

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PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

ORDER NO: 232929

PROD NO : 344820

Molecular Weight: 120

SECTION 10 STABILITY AND REACTIVITY

Stability: Stable.

Conditions to Avoid: DO NOT store dry product where exposed to moist conditions.

Incompatible Materials: Avoid contact with strong alkaline material such as caustic. Dissolves readily in water to form a weak acid solution. DO NOT MIX with liquid chlorine bleach, ammonia cleansers or similar products.

Hazardous Decomposition Products: Only if heated over 806 deg F (430 deg C), at which sulfur dioxide and sulfur trioxide are formed.

Possibility of Hazardous Reactions: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Reported Human Effects: No human data are available for this product.

Reported Animal Effects: Oral - LD50 (rat) 2800 mg/kg.

Skin irritation - This material is neither corrosive nor destructive to the skin of New Zealand rabbits. Occasionally, a very slight rash may appear.

SECTION 12 ECOLOGICAL INFORMATION

Ecotoxicity: This product readily dissolves in water to form a weak acid solution. A 0.05 percent or greater (by weight) solution of this product will likely be acutely harmful to aquatic life.

Chemical Fate Information: Material will decompose in soil. Studies show that there are no adverse effects of applying the main ingredient in this product (sodium bisulfate) directly to crops. In fact, there are existing products on the market that use sodium bisulfate as a soil additive to improve crop production. However, do not apply excessive quantities to soil.

SECTION 13 DISPOSAL CONSIDERATIONS

If this product as supplied becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA), 40 CFR Part 261. Dispose of in accordance with local, State and Federal laws and regulations.

SECTION 14 TRANSPORT INFORMATION

PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

ORDER NO: 232929

PROD NO : 344820

Shipment in the United States of America (DOT): Not regulated.

Shipment by water (IMO): Not regulated. Shipment by air (ICAO & IATA):
Not regulated.

Shipment in Canada (TDG): Not regulated. Surface Shipments in Europe:
Not regulated.

SECTION 15 REGULATORY INFORMATION

TSCA: All chemical substances in this product are listed in U.S. TSCA
Section 8(b) Inventory.

CERCLA (RQ): This product contains no Hazardous Substances listed in 40 CFR
Part 302. SARA Title III: Section 311/312 Hazard Class - Acute.
This product contains none of the substances subject to the reporting
requirements of Section 313 (40 CFR Part 372).

California Proposition 65: This product does not contain any ingredient
known to the State of California to cause cancer or reproductive toxicity
as listed under the Safe Drinking Water and Toxic Enforcement Act of 1986.

New Jersey: Department of Health RTK List - sn 1704. Special Hazardous
Substances - Corrosive Australia: List of Designated Hazardous Substances -
Corrosive (R34), Harmful (R37)

Canada - WHMIS: Controlled Product Hazard Class 02B. This product has been
classified in accordance with the hazard criteria of the CPR and the MSDS
contains all the information required by the CPR.

Canada - CEPA: All components of this product are on the Domestic
Substances List (DSL), and acceptable for use under the provisions of CEPA.

European Union (EU): Dangerous Substances (Annex I)

- EC No. 231-665-7
- Labels: Xi (irritant)
- Risk Phrases: R41
- Safety Phrases: S(2-)24-26

Germany: Water Classification (VwVwS) - Water Hazard Class: 1

Switzerland: Toxic Substance Classification - Giftklasse 3

Inventories: Australian Inventory of Chemical Substances; China; European
Industry of Existing Commercial Chemical Substances (231-665-7); European
Union Inventory of Cosmetic Ingredients, Other Ingredients; ICCA High
Production Volume Working List; Japan Existing and New Chemical Substances

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PRODUCT: SODIUM BISULFATE, ANHYDROUS GLOBULAR, TECHNICAL

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(1-83, 1-491, 1-501); Korea Existing and Evaluated Chemical Substances (KE-31481); Philippines Inventory of Chemicals and Chemical Substances; OECD List of High Production Volume Chemicals.

SECTION 16 OTHER INFORMATION

HMIS Rating: Health - 1; Flammability - 0; Physical Hazard - 0

NFPA 704 Rating: Health - 1; Fire - 0; Reactivity - 0

(0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard)

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR UNIVAR USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400

07/06/05 07:16 PRODUCT: 344820 CUST NO: 113365 ORDER NO: 232929

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