

DATE: 08/14/93

ACCT: 888235-01

INDEX: 05912870140

CAT NO: BP168500

PO NBR: N/A

\*\*BORIC ACID\*\*  
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## MATERIAL SAFETY DATA SHEET

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 CHEMICAL DIVISION  
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## SUBSTANCE IDENTIFICATION

SUBSTANCE: \*\*BORIC ACID\*\* CAS-NUMBER 10043-35-3

TRADE NAMES/SYNONYMS:  
 BORIC ACID (H3BO3); BORACIC ACID; BORIC TRIHYDROXIDE; ORTHOBORIC ACID;  
 ORTHOBORIC ACID (B(OH)3); ORTHOBORIC ACID (H3BO3); TRIHYDROXYBORANE; A74;  
 A77; BP168; A78; A73; BH3O3; ACC03260

CHEMICAL FAMILY:  
 INORGANIC ACID

MOLECULAR FORMULA: H3-B-O3

MOLECULAR WEIGHT: 61.84

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0  
 NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0

## COMPONENTS AND CONTAMINANTS

COMPONENT: BORIC ACID PERCENT: 100.0  
 CAS# 10043-35-3

OTHER CONTAMINANTS: NONE

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

## PHYSICAL DATA

DESCRIPTION: ODORLESS, COLORLESS, TRANSPARENT CRYSTALS OR WHITE GRANULES OR POWDER; SLIGHTLY UNCTOUS TO THE TOUCH.

MELTING POINT: 338-356 F (170-180 C) (DECOMPOSES)

SPECIFIC GRAVITY: 1.435 @ 15 C VAPOR PRESSURE: 2.6 MMHG @ 20 C

PH: 5.1 @ 0.6% SOLUTION SOLUBILITY IN WATER: 6.35% @ 30 C

SOLVENT SOLUBILITY: SOLUBLE IN BOILING ALCOHOL AND GLYCEROL; MODERATELY SOLUBLE IN LIQUID AMMONIA; SLIGHTLY SOLUBLE IN ACETONE; VERY SLIGHTLY SOLUBLE IN ETHER.

## FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:  
 NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:  
 EXTINGUISH USING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE.

FIREFIGHTING:  
 NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING VAPORS OR DUSTS; KEEP UPWIND.

## TOXICITY

BORIC ACID:  
 IRRITATION DATA: 15 MG/3 DAYS INTERMITTENT SKIN-HUMAN MILD.  
 TOXICITY DATA: 28 MG/M3/4 HOURS INHALATION-RAT LCLO;  
 4 GM/KG/4 DAYS SKIN-CHILD LDLO; 1500 MG/KG SKIN-CHILD LDLO;

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1200 MG/KG SKIN-INFANT LDLO; 2430 MG/KG SKIN-MAN LDLO;  
 500 MG/KG ORAL-CHILD TDLO; 800 MG/KG/4 WEEKS INTERMITTENT ORAL-INFANT TDLO;  
 934 MG/KG ORAL-INFANT LDLO; 200 MG/KG ORAL-WOMAN LDLO;  
 2660 MG/KG ORAL-RAT LD50; 3450 MG/KG ORAL-MOUSE LD50;  
 4 GM/KG ORAL-RABBIT LDLO; 1 GM/KG ORAL-GUINEA PIG LDLO;  
 1780 MG/KG ORAL-DOG LDLO; 1100 MG/KG SUBCUTANEOUS-INFANT LDLO;  
 1400 MG/KG SUBCUTANEOUS-RAT LD50; 1740 MG/KG SUBCUTANEOUS-MOUSE LD50;  
 1200 MG/KG SUBCUTANEOUS-GUINEA PIG LD50; 1000 MG/KG SUBCUTANEOUS-DOG LDLO;  
 150 MG/KG SUBCUTANEOUS-RABBIT LDLO; 1330 MG/KG INTRAVENOUS-RAT LD50;  
 1240 MG/KG INTRAVENOUS-MOUSE LD50; 800 MG/KG INTRAVENOUS-RABBIT LDLO; 800  
 MG/KG INTRAPERITONEAL-MOUSE LDLO; 1 GM/KG PARENTERAL-DOG LDLO; 670 MG/KG  
 PARENTERAL-RABBIT LDLO; 170 MG/KG UNREPORTED-MAN TDLO; 147 MG/KG  
 UNREPORTED-MAN LDLO; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA  
 (RTECS).

CARCINOGEN STATUS: NONE.  
 LOCAL EFFECTS: IRRITANT- INHALATION, SKIN.  
 ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION.  
 TARGET EFFECTS: NEPHROTOXIN; CENTRAL NERVOUS SYSTEM DEPRESSION.  
 POISONING MAY AFFECT THE GASTROINTESTINAL SYSTEM AND CIRCULATORY SYSTEM.  
 ADDITIONAL DATA: MAY CROSS THE PLACENTA.

## HEALTH EFFECTS AND FIRST AID

INHALATION:

BORIC ACID:

IRRITANT/NARCOTIC/NEPHROTOXIN.

ACUTE EXPOSURE- MAY CAUSE IRRITATION TO THE MUCOUS MEMBRANES, SORE THROAT, AND COUGHING. ABSORPTION THROUGH THE MUCOUS MEMBRANES MAY CAUSE SYSTEMIC POISONING AS DESCRIBED IN ACUTE INGESTION.

CHRONIC EXPOSURE- WORKERS EXPOSED TO DUST LEVELS 31 MG/M3 SHOWED ATROPHIC AND SUBATROPHIC CHANGES OF RESPIRATORY MUCOUS MEMBRANES. PROLONGED INHALATION MAY CAUSE POISONING AS DESCRIBED IN CHRONIC INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

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:

BORIC ACID:

IRRITANT/NARCOTIC/NEPHROTOXIN.

ACUTE EXPOSURE- MAY CAUSE IRRITATION. DEATHS HAVE OCCURRED BY SKIN ABSORPTION, PARTICULARLY IN INFANTS AND ESPECIALLY IF SKIN IS DAMAGED, ABRADED OR BURNED. SYSTEMIC POISONING MAY CAUSE EFFECTS AS IN ACUTE INGESTION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS. STUDIES IN OLD LITERATURE INDICATE PROLONGED SKIN ABSORPTION MAY CAUSE HALLUCINATIONS OF VISION, DECREASE OF VISUAL ACUITY, AND DIPLOPIA. OTHER SYSTEMIC EFFECTS MAY OCCUR AS DESCRIBED IN CHRONIC INGESTION.

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:

BORIC ACID:

ACUTE EXPOSURE- REPORTED TO BE NON-IRRITATING TO THE EYES.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

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

INGESTION:

BORIC ACID:

NARCOTIC/NEPHROTOXIN.

ACUTE EXPOSURE- INGESTION MAY CAUSE NAUSEA, EPIGASTRIC PAIN, HEMORRHAGIC GASTRITIS, BLOODY VOMIT AND DIARRHEA, WEAKNESS, LETHARGY, HEADACHE, RESTLESSNESS, TREMORS AND TWITCHING OF FACIAL MUSCLES AND EXTREMITIES, INTERMITTENT CONVULSIONS, AND EVENTUAL CENTRAL NERVOUS SYSTEM DEPRESSION WITH CONFUSION, DROWSINESS, AND PROSTRATION. SHOCK MAY OCCUR WITH COLD, CLAMMY SKIN, CYANOSIS, HYPOTENSION, TACHYCARDIA, WEAK PULSE, DELIRIUM AND COMA. DEATH FROM CIRCULATORY FAILURE, CENTRAL NERVOUS SYSTEM DEPRESSION OR RENAL FAILURE MAY OCCUR IMMEDIATELY OR IN 4-7 DAYS. ERYTHRODERMA MAY OCCUR, FOLLOWED BY DESQUAMATION, EXCORIATION, BLISTERING, BULLAE, AND LESIONS, TYPICALLY LOCATED ON THE PALMS, SOLES, BUTTOCKS, AND SCROTUM. THE PHARYNX AND TYMPANIC MEMBRANES MAY ALSO BE AFFECTED. KIDNEY DAMAGE MAY BE INDICATED BY OLIGURIA, ALBUMINURIA AND ANURIA. LIVER DAMAGE WITH JAUNDICE AND HEPATOMEGALY IS RARE. OTHER SYMPTOMS OF POISONING ARE ACIDOSIS, INTRAVASCULAR COAGULATION, ANEMIA, VISUAL DISTURBANCES, AND FEVER.

CHRONIC EXPOSURE- REPEATED INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION AND DISTURBANCES, LOSS OF APPETITE, DISTURBED DIGESTION, NAUSEA, POSSIBLY VOMITING, ERYTHEMATOUS RASH WHICH MAY BECOME HARD AND PURPURIC, DRYNESS OF SKIN AND MUCOUS MEMBRANES, REDDENING OF THE TONGUE, CRACKING OF THE LIPS, LOSS OF HAIR, CONJUNCTIVITIS, PALPEBRAL EDEMA AND KIDNEY INJURY. ANIMAL STUDIES INDICATE PROLONGED INGESTION MAY CAUSE A VARIETY OF REPRODUCTIVE EFFECTS. IN FEMALE RATS THE OVARIES AND FALLOPIAN TUBES WERE AFFECTED,

AND IN MALES THE TESTES, EPIDIDYMIS, AND SPERM DUCT WERE AFFECTED.

FIRST AID- MAINTAIN RESPIRATION. REMOVE BY IPECAC EMESIS FOLLOWED BY ACTIVATED CHARCOAL. GASTRIC LAVAGE MAY BE USEFUL. TREAT ANURIA. (DREIBACH HANDBOOK OF POISONING, 11TH ED.) GET MEDICAL ATTENTION IMMEDIATELY. TREATMENT SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:  
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

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REACTIVITY

REACTIVITY:  
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

BORIC ACID:  
ACETIC ANHYDRIDE: EXPLOSIVE REACTION ON HEATING.  
IRON: MAY BE CORROSIVE IN PRESENCE OF MOISTURE.  
POTASSIUM: POSSIBLE VIOLENT OR EXPLOSIVE REACTION.

DECOMPOSITION:

THE SUBSTANCE GRADUALLY LOSES WATER @ 100-160 C FORMING METABORIC ACID, THEN PYROBORIC ACID, AND FINALLY BORIC ANHYDRIDE.

POLYMERIZATION:

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

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STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

\*\*STORAGE\*\*

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

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CONDITIONS TO AVOID

NO REPORTS FOUND.

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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.

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PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION SYSTEM.

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.

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

ANY DUST AND MIST RESPIRATOR.

ANY AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.

ANY POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR OPERATED IN THE PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS.

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.

CLOTHING:  
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:  
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:  
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: 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.

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