

Material Safety Data Sheet

Material Name: Boric Acid

ID: C1-105

***** Section 1 - Chemical Product and Company Identification *****

Part Number: Granular and Powder Technical Grades

Chemical Name: Boric Acid

Product Use: For Manufacturing Use. Not for Use as a Pesticide.

Synonyms: Boric Acid (H₃BO₃); Boracic acid; Orthoboric acid.

Supplier Information

Chem One Ltd.

8017 Pinemont Drive, Suite 100

Houston, Texas 77040-6519

Phone: (713) 896-9966

Fax: (713) 896-7540

Emergency # 1-800-424-9300 or (703)527-3887

General Comments: FOR COMMERCIAL USE ONLY; NOT TO BE USED AS A PESTICIDE.

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

***** Section 2 - Composition / Information on Ingredients *****

CAS #	Component	Percent
10043-35-3	Boric Acid (H ₃ BO ₃)	> 99

Component Information/Information on Non-Hazardous Components

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). This product contains trace amounts of arsenic which is known to cause cancer.

***** Section 3 - Hazards Identification *****

Emergency Overview

Boric Acid is a colorless, odorless, solid in transparent crystal or white granular form. May be toxic if swallowed, absorbed through broken skin, or inhaled. Overexposure may cause central nervous system effects, and liver or kidney damage.

Reproductive effects have been found in experimental animals. May cause eye, skin, and respiratory tract irritation.

Hazard Statements

WARNING! HARMFUL IF SWALLOWED, ABSORBED THROUGH BROKEN SKIN, OR INHALED. MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS AND LIVER OR KIDNEY DAMAGE. REPRODUCTIVE EFFECTS HAVE BEEN FOUND IN EXPERIMENTAL ANIMALS. Avoid breathing dusts or mists. Do not get in eyes, on skin, or on clothing. Avoid breathing dusts. Wash thoroughly after handling.

Keep container closed. Use only with adequate ventilation.

Potential Health Effects: Eyes

May cause eye irritation. Symptoms may include swelling, tearing, and pain.

Potential Health Effects: Skin

May cause skin irritation with symptoms including redness and pain. Boric acid will not penetrate intact skin. May be absorbed in toxic amounts through abraded or inflamed skin. Chronic exposure may result in borism (dry skin, eruptions, and gastrointestinal disturbances). Toxicity may be delayed for several hours following dermal application to damaged skin areas. The dermatologic manifestations may take 3 to 5 days to develop fully.

Potential Health Effects: Ingestion

May be harmful or fatal if swallowed. Symptoms of nausea, vomiting, and diarrhea can be produced by any route of exposure, followed by lowered body temperature, dehydration, red skin rash, headache, restlessness, weakness, kidney or liver damage, and death from circulatory collapse or shock. Gastrointestinal bleeding may occur, as well as cyanosis, delirium, convulsions and coma. Chronic ingestion can cause anorexia, weight loss, vomiting, mild diarrhea, skin rash, alopecia, convulsions and anemia.

Ingestion of large quantities can cause shock.

Potential Health Effects: Inhalation

May cause respiratory tract irritation. Symptoms may include coughing, nasal irritation, nosebleeds, dryness of the mouth or throat, sore throat, and shortness of breath. Boric Acid can be absorbed in toxic amounts through inhalation.

HMIS Ratings: Health Hazard: 2* Fire Hazard: 0 Physical Hazard: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

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*** Section 4 - First Aid Measures ***

First Aid: Eyes

Immediately flush eyes with large amounts of room temperature water, occasionally lifting the lower and upper lids, for at least 15 minutes. If symptoms persist after 15 minutes of irrigation, seek medical attention.

First Aid: Skin

Remove all contaminated clothing. For skin contact, wash thoroughly with soap and water for at least 20 minutes. Seek immediate medical attention if irritation develops or persists.

First Aid: Ingestion

DO NOT INDUCE VOMITING. If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

First Aid: Inhalation

Remove source of contamination or move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Get immediate medical attention.

First Aid: Notes to Physician

Treat symptomatically. Monitor for the development of hypotension, seizures, renal failure and shock. In the event of ingestion of greater than 8 grams Boric Acid, maintain adequate kidney function and fluids. Gastric lavage is recommended for symptomatic poisoning only. Forced diuresis, dialysis, and exchange transfusion may enhance elimination, but should be used in cases of massive doses of ingestion, or in cases of renal failure. Boron analysis of urine and blood is only useful in documenting exposure and should not be used to evaluate severity of poisoning or as a guide for treatment.

*** Section 5 - Fire Fighting Measures ***

Flash Point: None

Method Used: Not applicable

Upper Flammable Limit (UEL): Not available

Lower Flammable Limit (LEL): Not available

Auto Ignition: Not available

Flammability Classification: Not available

Rate of Burning: Not available

General Fire Hazards

Boric Acid is not flammable and does not support combustion.

Hazardous Combustion Products

Decomposes above 100 deg C, forming water and boric anhydride. Toxic oxides may be released.

Extinguishing Media

Use extinguishing media appropriate for the surrounding fire and other materials involved in the fire.

Fire Fighting Equipment/Instructions

Wear adequate personal protective equipment. Use water spray to keep fire-exposed containers cool. Isolate hazard area.

NFPA Ratings: Health: 2 Fire: 0 Reactivity: 0 Other:

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Stop the flow of material, if this can be done without risk. Contain the discharged material. If sweeping of a contaminated area is necessary use a dust suppressant agent, which does not react with product (see Section 10 for incompatibility information).

Clean-Up Procedures

Wear appropriate protective equipment and clothing during clean-up. Shovel the material into waste container. Thoroughly wash the area after a spill or leak clean-up. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater.

Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. Keep materials which burn away from spilled material. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Remove soiled clothing and laundry before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

*** Section 7 - Handling and Storage ***

Handling Procedures

All employees who handle this material should be trained to handle it safely. Do not breathe dust. Avoid all contact with skin and eyes. Use this product only with adequate ventilation. Wash thoroughly after handling.

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*** Section 7 - Handling and Storage (Continued) ***

Storage Procedures

Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers).

Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers which held this product. Keep this material away from food, drink and animal feed. Do not store this material in open or unlabeled containers. Limit quantity of material stored.

*** Section 8 - Exposure Controls / Personal Protection ***

Exposure Guidelines

A: General Product Information

Based on similar materials, a threshold limit value of 1 mg/m³ is recommended.

B: Component Exposure Limits

ACGIH, OSHA, and NIOSH have not developed exposure limits for any of this product's components.

The exposure limits given are for Particulates Not Otherwise Classified (PNOC).

OSHA: 15 mg/m³ TWA (Total dust)
5 mg/m³ TWA (Respirable fraction)
DFG MAKs 4 mg/m³ TWA (Inhalable fraction)
1.5 mg/m³ TWA (Respirable fraction)

Engineering Controls

Use mechanical ventilation such as dilution and local exhaust. Use a corrosion-resistant ventilation system and exhaust directly to the outside. Supply ample air replacement. Provide dust collectors with explosion vents.

PERSONAL PROTECTIVE EQUIPMENT

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132). Please reference applicable regulations and standards for relevant details.

Personal Protective Equipment: Eyes/Face

Chemical safety goggles and/or face shield. If necessary, refer to U.S. OSHA 29 CFR 1910.133.

Personal Protective Equipment: Skin

Wear impervious gloves. Recommended gloves include butyl, neoprene, viton, and nitrile. Gloves should be tested to determine their suitability for prolonged contact with this material. If necessary, refer to U.S. OSHA 29 CFR 1910.138.

Personal Protective Equipment: Respiratory

None required where adequate ventilation conditions exist. If airborne concentrations are above the applicable exposure limits, use NIOSH-approved respiratory protection. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Personal Protective Equipment: General

Have an eyewash fountain and safety shower available in the work area. Use good hygiene practices when handling this material including changing and laundering work clothing after use.

*** Section 9 - Physical & Chemical Properties ***

Physical Properties: Additional Information

The data provided in this section are to be used for product safety handling purposes. Please refer to Product Data Sheets, Certificates of Conformity or Certificates of Analysis for chemical and physical data for determinations of quality and for formulation purposes.

Appearance: Colorless/white	Odor: Odorless
Physical State: Solid	pH: 5.1 (0.1 molar); 10 g/L (1% soln)
Vapor Pressure: 15 mm Hg (20 deg C)	Vapor Density: Not applicable
Boiling Point: 572 deg F (300 deg C) [decomposes]	Freezing/Melting Point: ~336 deg F (169 deg C)

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*** Section 9 - Physical & Chemical Properties (Continued) ***

Solubility (H2O): 4.88 g/100 mL @ 20 deg C	Other Solubilities: Slightly soluble in acetone; 1 g/6 mL in alcohol; 1 g/mL in glycerol; 20 g/100 mL in methanol @ 19 deg C
Heat Value: Not available	Particle Size: Not available
Softening Point: Not determined	Evaporation Rate: Low
Viscosity: Not available	Bulk Density: Not available
Percent Volatile: 50 lbs/ft3	Molecular Weight: 61.84
Volatile Organic Carbons: Not available	Octanol/H2O Coefficient: Log P(oct) -0.81
Specific Gravity: 1.51 (water = 1)	Sat. Vapor Conc.: 0.3 ppm @ 30 deg C
	Chemical Formula: H3BO3

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

Stable under normal temperature and pressure. Boric Acid is hygroscopic; it will absorb moisture from the air.

Chemical Stability: Conditions to Avoid

Avoid heat, exposure to moisture, and incompatible materials. Keep container tightly closed.

Incompatibility

Boric Acid is incompatible with alkali carbonates and hydroxides. A mixture of potassium and Boric Acid may explode on impact. A mixture with acetic anhydride may explode when heated.

Hazardous Decomposition

Decomposes above 100 deg C, forming water and boric anhydride. Toxic oxides may be produced.

Hazardous Polymerization

Will not occur.

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

May cause eye irritation. Symptoms may include swelling, tearing, and pain. May cause skin irritation with symptoms including redness and pain. Boric Acid will not penetrate intact skin. Toxicity may be delayed for several hours following dermal application to damaged skin areas. The dermatologic manifestations may take 3 to 5 days to develop fully. May cause respiratory tract irritation. Symptoms may include coughing, nasal irritation, nosebleeds, dryness of the mouth or throat, sore throat, and shortness of breath. Boric Acid can be absorbed in toxic amounts through the lungs. Severe and fatal poisonings have rarely been reported following acute ingestion of Boric Acid/borates, but are more common following repeated dermal application to abraded or burned skin and chronic ingestion. Systemic toxicity is more likely to occur following chronic or multiple exposures. Death in exposed adults is rare.

The most common symptoms of Boric Acid poisoning are gastrointestinal (nausea, vomiting, and diarrhea) and dermal effects (erythema and desquamation, not only in areas of rash, but also of mucous membranes) regardless of the route of exposure. CNS effects (excitement or depression) include lethargy, tremors, restlessness, weakness, headache, delirium, seizures, coma. Shock syndrome, cold clammy skin, cyanosis, dehydration, arrhythmias, thready pulse, and low blood pressure may occur. Occasionally kidney injury (oliguria, albuminuria, anuria), and rarely, liver damage (hepatomegaly, jaundice) have been reported. Metabolic acidosis & signs of intravascular coagulation may occur. Death is due to vascular collapse in the early stages or to CNS depression later in the course, usually within 5 days. The fatal dose of Boric Acid, sodium borate, or sodium perborate is 0.1-0.5 g/kg.

In chronic poisoning with low levels of ingestion, there may be little more than dry skin and mucous membranes, followed by appearance of a red tongue, patchy alopecia, cracked lips, conjunctivitis, and sometimes periorbital edema and irritability. The kidneys are more seriously damaged than other organs. Boric Acid and borates can accumulate in the body with repeated exposure. They are found in high levels in the brain and accumulate in the bone. Chronic accumulation of boron-containing compounds is called borism; other symptoms are skin eruptions and gastrointestinal disturbances. Persons with pre-existing skin, respiratory, gastrointestinal, liver, kidney, or neurological diseases might have increased sensitivity, as might those exposed to other borates.

Although rare, disturbances of vision are possible, including hallucinations, decrease in visual acuity to half normal, plus diplopia lasting more than two weeks. Chronic exposure to Boric Acid can cause metabolic acidosis.

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*** Section 11 - Toxicological Information (Continued) ***

Acute Toxicity (continued)

B: Component Analysis - LD50/LC50

Boric Acid (H3BO3) (10043-35-3)

LD₅₀ (Oral-Rat) 2660 mg/kg; LD₅₀ (Oral-Mouse) 3450 mg/kg; LD₅₀ (Subcutaneous-Rat) 1400 mg/kg; LD₅₀ (Subcutaneous-Mouse) 1740 mg/kg; LD₅₀ (Subcutaneous-Guinea Pig) 1200 mg/kg; Behavioral: tremor; Gastrointestinal: hypermotility, diarrhea, nausea or vomiting; LD₅₀ (Intravenous-Rat) 1330 mg/kg; LD₅₀ (Intravenous-Mouse) 1240 mg/kg

B: Component Analysis - TDLo/TCLo/LD/LDLo

Boric Acid (H3BO3) (10043-35-3)

TDLo (Oral-Rat) 45 g/kg (90 days male): Reproductive effects; TDLo (Oral-Child) 500 mg/kg: Gastrointestinal tract effects; TDLo (Oral-Child) 500 mg/kg: Gastrointestinal tract effects; TDLo (Oral-Infant) 800 mg/kg/4 weeks-intermittent; TDLo (Oral-Rat) 45 gm/kg/90 days-continuous: Brain and Coverings: changes in brain weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: changes in testicular weight; TDLo (Oral-Rat) 68 mg/kg/9 weeks-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in calcium, changes in phosphorus; TDLo (Oral-Mouse) 42 gm/kg/14 days-continuous: Related to Chronic Data: death; TDLo (Oral-Mouse) 156 gm/kg/13 weeks-intermittent: Gastrointestinal: other changes; Blood: changes in spleen; Related to Chronic Data: death; TDLo (Oral-Rat) 6600 mg/kg: female 1-21 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: musculoskeletal system, other developmental abnormalities; TDLo (Oral-Rat) 45 gm/kg: male 90 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct; TDLo (Oral-Rat) 5390 mg/kg: female 6-15 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Effects on Embryo or Fetus: fetal, Specific Developmental Abnormalities: musculoskeletal system; TDLo (Oral-Rat) 1596 mg/kg: female 0-20 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: musculoskeletal; TDLo (Oral-Rat) 52 mg/kg: male 26 week(s) pre-mating: Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count); TDLo (Oral-Mouse) 7684 mg/kg: female 1-17 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); TDLo (Oral-Mouse) 17051 mg/kg: female 1-17 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); TDLo (Oral-Mouse) 18054 mg/kg: female 1-18 day(s) after conception: Reproductive: Maternal Effects: uterus, cervix, vagina, Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); TDLo (Oral-Mouse) 8136 mg/kg: female 1-18 day(s) after conception: Reproductive: Maternal Effects: other effects, Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus); TDLo (Oral-Rabbit) 3500 mg/kg: female 6-19 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetal, Specific Developmental Abnormalities: cardiovascular (circulatory) system; TDLo (Oral-Rabbit) 3500 mg/kg: female 6-19 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), litter size (e.g. # fetuses per litter; measured before birth), Specific Developmental Abnormalities: cardiovascular (circulatory) system; TDLo (Oral-Rabbit) 3500 mg/kg: female 7-20 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: musculoskeletal; TDLo (Oral-Rabbit) 3500 mg/kg: female 6-19 day(s) after conception: Reproductive: Specific Developmental Abnormalities: craniofacial (including nose and tongue), other developmental abnormalities; TDLo (Oral-Rabbit) 1750 mg/kg: female 7-20 day(s) after conception: Reproductive: Maternal Effects: uterus, cervix, vagina, other effects; TDLo (Oral-Dog) 23 gm/kg/90 days-continuous: Liver: changes in liver weight; Endocrine: changes in thyroid weight; Related to Chronic Data: changes in testicular weight; TDLo (Unreported-Man) 170 mg/kg: Gastrointestinal tract effects; LDLo (Oral-Man) 429 mg/kg: Cardiovascular effects, Systemic effects; LDLo (Oral-Woman) 200 mg/kg; LDLo (Oral-Infant) 934 mg/kg; LDLo (Oral-Dog) 1780 mg/kg: Brain and Coverings: meningeal changes; Lungs, Thorax, or Respiration: cyanosis; Gastrointestinal: nausea or vomiting; LDLo (Oral-Rabbit) 4 gm/kg: Behavioral: tremor; Gastrointestinal: hypermotility, diarrhea, nausea or vomiting; LDLo (Oral-Guinea Pig) 1 gm/kg; LDLo (Skin-Infant) 1200 mg/kg; LDLo (Skin-Child) 4 g/kg/4 days; LDLo (Skin-Man) 2430 mg/kg; LDLo (Skin-Child) 1500 mg/kg; LDLo (Subcutaneous-Infant) 1100 mg/kg; LDLo (Subcutaneous-Dog, adult) 1000 mg/kg; LDLo (Subcutaneous-Rabbit) 150 mg/kg; LDLo (Intravenous-Rabbit) 800 mg/kg: Behavioral: somnolence (general depressed activity), ataxia; Nutritional and Gross Metabolic: body temperature decrease; LDLo (Unreported-Man) 147 mg/kg; LDLo (Intraperitoneal-Mouse) 800 mg/kg; LDLo (Parenteral-Rabbit) 670 mg/kg; Nutritional and Gross Metabolic: body temperature decrease; LDLo (Parenteral-Dog, adult) 1 g/kg; LCLo (Inhalation-Rat) 28 mg/m³/4 hours; TCLo (Inhalation-Rat) 9600 µg/m³/4 hours: male 16 week(s) pre-mating: Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct

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*** Section 11 - Toxicological Information (Continued) ***

Carcinogenicity

A: General Product Information

When Boric Acid was injected into female mice, one of every twenty developed cancer. However, there is not sufficient evidence to establish that Boric Acid is an animal carcinogen.

B: Component Carcinogenicity

Boric Acid is not listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Epidemiology

Workers exposed to Boric Acid dusts were found to experience statistically significant frequencies of eye irritation, dryness of the mouth or throat, sore throat and productive cough.

Neurotoxicity

CNS effects (excitement or depression) of lethargy, tremors, restlessness, weakness, headache, delirium, seizures, coma can occur with dermal exposure (to non-intact skin) or ingestion, but are less common than gastrointestinal effects. Neurological effects are generally associated with chronic exposure.

Mutagenicity

Boric Acid caused mutations in E. coli, but not in the Ames Salmonella microsomal assay.

Teratogenicity

Boric Acid has selectively damaged the testes, sperm production and fertility in rats and dogs. There are two reports suggesting similar effects in men. An occupational study of Boric Acid or borate exposed workers concluded that there was weakened male sexual activity and fertility, but no quantitative data on exposures or incidence of these effects were given. Men living in an area with high borate levels in the drinking water had decreased fertility. Fetal growth retardation and skeletal defects were produced in rats exposed pre-natally to Boric Acid at levels up to 0.2% in the maternal feed. In other experimental animal studies, Boric Acid has generally not affected female fertility or sex organs, but has caused stillbirths and higher perinatal mortality in rats given high doses. Stillbirths and increased neonatal mortality occurred in offspring of female rats administered Boric Acid (up to 400 mg/kg boron) for 1 or 2 years prior to mating. Higher doses for 8 or 12 months prior to mating were also associated with decreased litter size and increased perinatal mortality.

Other Toxicological Information

Mutation in Microorganisms-Escherichia coli 17,000 ppm/24 hours; Sperm Morphology (Rat-Oral) 6 mg/kg

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

No additional information.

B: Ecotoxicity

Boric Acid (H3BO3) (10043-35-3)

LC₅₀ (trout eggs) = 100 ppm/ soft; LC₅₀ (trout eggs) = 79 ppm/ hard; LC₅₀ (catfish eggs) = 155 ppm/ soft; LC₅₀ (catfish eggs) = 22 ppm/ hard; LC₅₀ (goldfish eggs) = 46 ppm/ soft; LC₅₀ (goldfish eggs) = 75 ppm/ hard; LC₅₀ (*Daphnia magna*) = 133 mg/L/ 48 hours; LC₅₀ (*Daphnia magna* water flea) 48 hours = 115.0-153.0 mg/L. Cond: Static; TLm (mosquito fish) 24 hours = 1800 ppm (freshwater);

Environmental Fate

Some boron is adsorbed by iron and aluminum hydroxy compounds and clay minerals. Finer textured soils retain added boron longer than do coarse, sandy soils. Boron sorption by clay minerals and iron and aluminum oxides is pH dependent, with maximum sorption in the range 7-9. The amount of boron adsorbed depends on the surface area of the clay or oxide and this sorption is only partially reversible. Natural calcium may slowly precipitate out as borate, but not below levels toxic to plants.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

As shipped, not regulated as a hazardous waste.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

Dispose of in accordance with all applicable Federal, State or provincial, and local regulations.

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*** Section 14 - Transportation Information ***

NOTE: The shipping classification information in this section (Section 14) is meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

Shipping Name: Non-regulated.
Hazard Class: Not Applicable
UN/NA #: Not Applicable
Packing Group: Not Applicable
Required Label(s): None
Additional Info.: None.

International Air Transport Association (IATA)

For Shipments by Air transport: We classify this product as hazardous (Class 9) when shipped by air because 49 CFR 173.140 (a). "For the purposes of this subchapter, miscellaneous hazardous material (Class 9) means a material which presents a hazard during transportation, but which does not meet the definition of any other hazard class. This class includes: (a) Any material which has an anesthetic, noxious, or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties."

UN: UN 3077

Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. (boric acid)

Hazard Class: 9

Packing Group: III

Passenger & Cargo Aircraft Packing Instruction: 911

Passenger & Cargo Aircraft Maximum Net Quantity: 400 kg

Limited Quantity Packing Instruction (Passenger & Cargo Aircraft): Y911

Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft): 30 kg

Special Provisions: A97 A149

ERG Code: 9L

International Maritime Organization (I.M.O.) Classification

Boric Acid is not regulated under I.M.O.

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

No other information.

B: Component Analysis

None of this product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA 302 (EHS TPQ) There are no specific Threshold Planning Quantities for Boric Acid. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

C: Sara 311/312 Tier II Hazard Ratings:

Component	CAS #	Fire Hazard	Reactivity Hazard	Pressure Hazard	Immediate Health Hazard	Chronic Health Hazard
Boric Acid	10043-35-3	No	No	No	Yes	Yes

State Regulations

A: General Product Information

Because this product contains trace levels of certain heavy metals (< 15 ppm of lead, mercury and cadmium and 108 ppm of arsenic), the following statements are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): **WARNING!** This product contains a chemical known to the state of California to cause cancer. **WARNING!** This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

B: Component Analysis – State

None of this product's components are listed on the state lists from CA, FL, MA, MN, NJ, or PA.

Component	CAS #	CA	FL	MA	MN	NJ	PA
Boric Acid	10043-35-3	No	No	No	N	No	No

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*** Section 15 - Regulatory Information (Continued) ***

Other Regulations

A: General Product Information

No other information.

B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Boric Acid (H3BO3)	10043-35-3	Yes	Yes	Yes

C: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Boric Acid (H3BO3)	10043-35-3	1% item 204 (67)

ANSI Labeling (Z129.1):

WARNING! HARMFUL IF SWALLOWED, ABSORBED THROUGH BROKEN SKIN, OR INHALED. MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS AND LIVER OR KIDNEY DAMAGE. MAY CAUSE REPRODUCTIVE EFFECTS, BASED ON ANIMAL TESTS. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing dusts or particulates. Keep from contact with clothing. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH-approved respiratory protection, as appropriate. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material. Place residue in suitable container. Consult Material Safety Data Sheet for additional information.

*** Section 16 - Other Information ***

Other Information

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Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration

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Revision log

07/24/00 4:01 PM SEP Changed company name, Sect 1 and 16, from Corporation to Ltd.
05/14/01 9:31 AM HDF Checked exposure limits; made changes to Sect 9; overall review, add SARA 311/312 Haz Ratings.
07/24/01 2:36 CLJ Add Shipments by Air information to Section 14, Changed contact to Sue, added non-800 Chemtrec No.
05/21/03 2:36 PM HDF Overall review of MSDS. Up-date of HMIS categories. Up-date of exposure limits for Particulates Not Otherwise Classified Up-date of Section 8 and Section 14
06/22/05 12:42 PM SEP Updated IATA Section 14.
10/17/07 3:37 PM SEP Update IATA Section 14

This is the end of MSDS # C1-105