

KITTRICH CORPORATION  
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**ROACH TABLETS  
MATERIAL SAFETY DATA SHEET**

**BORIC ACID**

**1. CHEMICAL PRODUCT:**

Product Name: Boric Acid  
Grades: Technical, S.Q. NF  
Chemical Formula:  $H_3BO_3$   
Chemical Name/Synonyms: Boric Acid, Orthoboric Acid, Boracic Acid  
Chemical Family: Inorganic Borates  
CAS Registry Number: 10043-35-3  
TSCA Inventory Number: 10043-35-3

**2. COMPOSITION/INFORMATION ON INGREDIENTS' OSHA HAZARDS**

This product contains \*\*\*\*\* 40% percent (Z) Boric Acid ( $H_3BO_3$ )  
CAS No. 10043-35-3. Boric Acid is hazardous under the OSHA Hazard Communication Standard based on animal chronic toxicity studies. Refer to Sections 3 and 11 for details on hazards.

**3. HAZARD IDENTIFICATION:**

**EMERGENCY OVERVIEW:** Boric Acid is a white odorless, powdered substance that is not flammable, combustible, or explosive, and it presents no unusual hazard if involved in a fire. Boric Acid presents little or no hazard (to humans) and has low acute oral and dermal toxicities. Care should be taken to minimize the amount of Boric Acid released to the environment to avoid ecological effects.

**POTENTIAL ECOLOGICAL EFFECTS:** Large amounts of Boric Acid can be harmful to boron-sensitive plants and other ecological systems.

**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 Boric Acid is not absorbed through intact skin.

**INHALATION:** Occasional mild irritation effects to nose and throat may occur from inhalation of Boric Acid dusts at levels greater than  $10 \text{ mg/m}^3$ .

**EYE CONTACT:** Boric Acid is non-irritating to eyes in normal industrial use.

**SKIN CONTACT:** Boric Acid does not cause irritation to intact skin.

**INGESTION:** Products containing Boric Acid are not intended for ingestion. Boric Acid has a relatively low acute toxicity. Small amounts (e.g. a teaspoonful) swallowed accidentally are not likely to cause effects; swallowing amounts large than that may cause gastrointestinal symptoms.

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**CANCER:** Boric Acid did not cause cancer in long term animal studies, and is not considered a carcinogen.

**REPRODUCTIVE:** Long-term, high dose animal ingestion studies have demonstrated reproductive effects in male animals. A human study of occupational exposure to borate dust showed no adverse effect to reproduction.

**DEVELOPMENTAL:** High dose animal ingestion studies have demonstrated developmental effects in fetuses of pregnant animals, including fetal weight loss.

**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 Boric Acid have been associated with ingestion or by absorption through large areas of damaged skin. These may include nausea, vomiting, and diarrhea, with delayed effects of skin redness and peeling. Refer to Section 11 for details on Toxicological Data.

**4. FIRST AID MEASURES:**

**INHALATION:** No specific treatment is necessary since Boric Acid is not likely to be hazardous by inhalation. Prolonged exposure to dust levels in excess of regulatory limits should always be avoided.

**EYE CONTACT:** Use eye wash fountain or fresh water to cleanse eye. If irritation persists for more than 30 minutes, seek medical attention.

**SKIN CONTACT:** No treatment necessary because non-irritating.

**INGESTION:** Swallowing less than 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 PHYSICIAN:** Observation only is required for adult ingestion of less than 6 grams, 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. Boric Acid 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. (Further information: Litovitz T.L., Norma, S.A. Veitri, J.C., Annual Report of the American Association of Poison Control Centers Data Collection System. Am. J. Emerg. Med. 1986;4:427-458). 24 hour Medical consultation is available at (800)228-5635 Ext. 144.)

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5. FIRE-FIGHTING MEASURES:

GENERAL HAZARD: None, because Boric Acid 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 (29CFR 1910.1200): Non-flammable solid.

6. ACCIDENTAL RELEASE MEASURES:

GENERAL: Boric Acid is a water-soluble white powder that may 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 Boric Acid and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during clean up and disposal. No personal protective equipment is needed to clean up land spills.

WATER SPILLS: Boric Acid will cause localized contamination of surrounding waters depending on the quantity dissolved in these waters. At high concentrations some damage to local vegetation, fish and other aquatic life may be expected. (Refer to Section 12, 13 and 15 for additional information.)

Boric Acid 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 and information regarding EPA and California regulations.)

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE: Ambient

STORAGE PRESSURE: Atmospheric

SPECIAL SENSITIVITY: Moisture (Caking)

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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

ENGINEERING CONTROLS: Use local exhaust ventilation to keep airborne concentrations of Boric Acid dust below permissible exposure levels.

**PERSONAL PROTECTION:** Where airborne concentrations are expected to exceed exposure limits. NIOSH/MSHA certified respirators must be used. Eye goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

**OCCUPATION EXPOSURE LIMITS:** Boric Acid is listed/regulated by OSHA, CAL OSHA and ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust".

OSHA: PEL\* - 15 mg/m<sup>3</sup> total dust and 5 mg/m<sup>3</sup> respirable dust.  
ACGIH: TLV\*\* - 10 mg/m<sup>3</sup>  
Cal OSHA: PEL\* - 10 mg/m<sup>3</sup>  
\*PEL = "Permissible Exposure Limit"  
\*\*TLV = "Threshold Limit Value"

#### 9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: White odorless, crystalline solid	BOILING POINT: Not Applicable
SPECIFIC GRAVITY: 1.51	FLASH POINT: None
VAPOR PRESSURE: Negligible @ 20°C	pH: 6.1 (0.1% solution); 5.1
SOLUBILITY IN WATER: 4.7% @20°C; 27.5% @100°C	(1.0% solution); 3.7
MELTING POINT: 170.0°C (340°F) (Heated in closed space)	(4.7% solution); @ 20°C
VISCOSITY: Not applicable.	FORMULA WEIGHT: 61.84

#### 10. STABILITY AND REACTIVITY:

**GENERAL:** Boric Acid is a stable product, but when heated it loses water, first forming Metaboric Acid (HBO<sub>2</sub>), and on further heating it is converted into Boric Oxide (B<sub>2</sub>O<sub>3</sub>).

**INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:** Boric Acid 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:

**INGESTION:** (ACUTE ORAL TOXICITY): Low acute oral toxicity; LD<sub>50</sub> of Boric Acid in rats is 3500 to 4100 mg/kg of body weight.

**SKIN:** (ACUTE DERMAL TOXICITY): Low acute dermal toxicity. LD<sub>50</sub> of Boric Acid in rabbits is greater than 2000 mg/kg of body weight. Boric Acid is not absorbed through intact skin.

**PRIMARY SKIN IRRITATION INDEX:** 0 (zero). Boric Acid is non-corrosive.

**EYE:** Draize test in rabbits produced mild eye irritation effects. Fifty years of occupational exposure history reflect no indication of human eye injury from exposure to Boric Acid.

**INHALATION:** Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to Boric Acid dust and Sodium Borate dust.

**CARCINOGENICITY:** A Technical Report issued by the National Toxicology Program showed "no evidence of carcinogenicity" from a full 2-year bioassay on Boric Acid in mice at feed doses of 2500 and 5000 ppm in the diet. No mutagenic activity was observed for Boric Acid in a recent battery of four short-term mutagenicity assays.

**REPRODUCTIVE/DEVELOPMENT TOXICITY:** Animal studies indicate Boric Acid reduces or inhibits sperm production, causes testicular atrophy, and when given to pregnant animals during gestation may cause developmental changes. These feed studies were conducted under chronic exposure conditions leading to doses many times in excess of those that could occur through inhalation of dust in occupational settings.

**REPRODUCTIVE TOXICITY (FERTILITY):** Dietary Boric Acid levels of 6,700 ppm in chronic feed studies in rats and dogs produced testicular atrophy, while dogs and rats receiving 2000 ppm did not develop testicular changes (Weir, Fisher, 1972). In chronic feeding studies of mice on diets containing 5000 ppm (550 mg/kg/d) Boric Acid, testicular atrophy was present, while mice fed 2500 ppm (275 mg/kg/d) Boric Acid showed no significant increase in testicular atrophy (NTP, 1987). In another Boric Acid chronic study, in mice given 4500 ppm (636 mg/kg/d), degeneration of seminiferous tubules was present together with a reduction of germ cells while at 1000 ppm (152 mg/kg/d) no effect was seen (Fail et al., 1991).

In a reproduction study on rats, 2000 ppm dietary Boric Acid had no adverse effect on lactation, litter size, weight and appearance (Weir, Fisher 1972). In a continuous breeding study in mice there was a reduction in fertility rates for males receiving 4500 ppm (636 mg/kg/d) Boric Acid but not for females receiving 4500 ppm Boric Acid (Fail et al., 1991).

**DEVELOPMENTAL TOXICITY:** Boric Acid at dietary levels of 1000 ppm (78 mg/kg/d) administered to pregnant female rats throughout gestation caused a slight reduction in fetal weight but was considered to be close to the NOAEL. Doses of 2000 ppm (163 mg/kg/d) and above caused fetal malformations and maternal toxicity. In mice the no effect level for fetal weight reduction and maternal toxicity was 1000 ppm (248 mg/kg/d) Boric Acid. Fetal weight loss was noted at dietary Boric Acid levels of 2000 ppm (452 mg/kg/d) and above. Malformations

(agenesis or shortening of the thirteenth rib) were seen at 4000 ppm (1003 mg/kg/d). (Heindel et al., 1992)

1. (Weir, R.J. and Fisher, R.S., Toxicol. Appl. Pharmacol., 23:351-364(1972)
2. (National Toxicology Program (NTP) - Technical Report Series No. TR324, NIH Publication No. 88-2580 (1987), PB88-213475/XAB).
3. (Pail et al., Fund. Appl. Toxicol. 17, 225-239 (1991)
4. (Heindel et al., Fund Appl. Toxicol. 18,266-277 (1992)

## 12. ECOLOGICAL INFORMATION:

### ECOTOXICITY DATA:

**PHYTOTOXICITY:** Although boron is essential micronutrient for healthy growth of plants, it can be harmful to boron sensitive plants in higher quantities. Plants and trees can be exposed by root absorption to toxic levels of boron in the form of water-soluble borate leached into nearby soil or water. Care should be taken to minimize the amount of borate product released to the environment.

**FISH TOXICITY:** Boron naturally occurs in seawater at an average concentration of 5 mg/B/liter. In laboratory studies the acute toxicity (96-hr LC<sub>50</sub>) for under-yearling Coho salmon (Onchorhynchus kisutch) in seawater was determined as 40 mg B/L (added as sodium metaborate).

Boron concentrations in fresh surface waters are generally less than 1 mg B/L. Laboratory studies on the toxicity of freshwater fish were determined using early life (embryo-larval) stages in natural water and Boric Acid as a test substance. The results were:

Rainbow trout (*S. gairdneri*)  
24-day LC<sub>50</sub>=150.0 mg B/L  
36-day NOEC-LOEC=0.75-1 mg B/L

Goldfish (*Carassius auratus*)  
7-day NOEC-LOEC=26.50 mg B/L  
3-day LC<sub>50</sub>=178 mg B/L

**INVERTEBRATE TOXICITY:** The acute toxicity (48-hour) LC<sub>50</sub> to Daphnids (*Daphnia magna* Straus) in natural water is reported to be 133 mg B/L (added as Boric Acid). Estimated chronic toxicity (21-day NOEC-LOEC) values of 6-13 mg B/L (added as Boric Acid) have also been reported.

### ENVIRONMENTAL FATE DATA:

**PERSISTENCE/DEGRADATION:** Boron is naturally occurring and ubiquitous in the environment. Boric Acid decomposes in the environment to natural borate.

OCTANOL/WATER PARTITION COEFFICIENT: Log P : -0.7570 at 25°C

SOIL MOBILITY: the product is soluble in water and is leachable through normal soil.

NOTE: Boron(B) is the element in Boric Acid which is used to characterize borate product ecological effects. To convert Boric Acid data to Boron(B), multiply by 0.1748.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL GUIDANCE: Small quantities of Boric Acid can usually be disposed of at Municipal Landfill sites. No special disposal treatment is required, but refer to state and local regulations for applicable site-specific requirements. Tonnage quantities of product are not recommended to be sent to landfills. Such product should, if possible, be re-used for an appropriate application.

RCRA (40 CFR 261): Boric Acid is not listed under any sections of the Federal Resource Conservation and Recovery Act (RCRA).

CALIFORNIA HAZARDOUS WASTE DESIGNATION: California identifies substances with acute LD<sub>50</sub>'s less than 5000 mg/kg as "hazardous waste" if spilled in California and should be handled in accordance with applicable state regulations.

Refer to Section 15 for additional regulatory information.

14. TRANSPORT INFORMATION:

DOT HAZARDOUS MATERIAL CLASSIFICATION: Boric Acid is not a U.S. Department of Transportation (DOT) Hazardous Material.

DOT HAZARDOUS SUBSTANCES CLASSIFICATION: Boric Acid is not a DOT Hazardous Substances.

INTERNATIONAL TRANSPORTATION: Boric Acid has no U.N. Number, and is not regulated under international rail, highway, water or air transport regulations.

15. REGULATORY INFORMATION:

TSCA No: (10043-35-3) Boric Acid appears on the EPA TSCA inventory list.

RCRA: Boric Acid is not listed as hazardous waste under any sections of the Resource Conservation and Recovery Act or regulations (40 CFR 261 et seq.).

SUPERFUND: CERCLA/SARA. Boric Acid is not listed under CERCLA (the Comprehensive Environmental Response Compensation and Liability Act) or its 1986 amendments, SARA, (the Superfund Amendments and Reauthorization Act), including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023, 40 CFR 372.65;



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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: Boric Acid is not regulated under the SDWA, 42 USC 300g-1, 40 CFR 141 et seq. Consult state and local regulations for possible water quality advisories regarding boron.

CLEAN WATER ACT (FEDERAL WATER POLLUTION CONTROL ACT): 33USC 1251 et seq.

(a) Boric Acid 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, 33USC 1317, 40 CFR 129.

(c) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.

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.

IARC: The International Agency for Research on Cancer, (of the World Health Organization) does not list or categorize Boric Acid as a carcinogen.

NTP ANNUAL REPORT ON CARCINOGENS: Boric Acid is not listed.

OSHA CARCINOGEN: Boric Acid is not listed.

CALIFORNIA PROPOSITION 65: Boric Acid is not listed on any Proposition 65 lists of carcinogens or reproductive toxicants.

FEDERAL FOOD, DRUG AND COSMETIC ACT: Pursuant to 21 CFR 175.105, 176.180 and 181.30, Boric Acid is approved by the FDA for use in adhesive components of packaging materials, or for use in the manufacture thereof, which materials are expected to come in contact with dry food products.

CONEG MODEL LEGISLATIONS: Boric Acid meets all the CONEG requirements relating to heavy metal limitations on components of packaging materials.

16. OTHER INFORMATION:

PRODUCT LABEL TEXT HAZARD INFORMATION:

TECHNICAL/S.G. GRADES:

\*May be harmful if swallowed.

\*May cause reproductive harm or birth defects based on animal data.

\*Avoid contamination of food or feed.

\*Not for food, drug or pesticidal use.

\*Refer to MSDS.

\*KEEP OUT OF THE REACH OF CHILDREN.



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NF GRADE:

- \*May be harmful if swallowed.
- \*May cause reproductive harm or birth defects based on animal data.
- \*Avoid contamination of food or feed.
- \*Not for internal use.
- \*Not for food or pesticidal use.
- \*Refer to MSDS.
- \*KEEP OUT OF THE REACH OF CHILDREN.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CLASSIFICATION:

Health	0
Flammability	0
Reactivity	0

HAZARDOUS MATERIALS INFORMATION SYSTEMS (HMIS):

Red:	(Flammability)	0
Yellow:	(Reactivity)	0
Blue:	(Acute Health)	1*

EMERGENCY PHONE NUMBERS:

24 Hr. Information Service	800-228-5635 Ext. 144
CHEMTREC:	800-424-9300