

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: Wash with soap and water.

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 PHYSICIANS: Observation only is required for adult ingestion of less than 6 grams

of Boric Acid. For ingestion in excess of 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. (For further information: 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. 1986; 4:427-458)

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.

ACCIDENTAL RELEASE MEASURES

General: Boric Acid is a water-soluble white powder that may cause damage to trees or vegetation by root absorption.

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. At high concentrations some damage to local vegetation, fish and other aquatic life may be expected.

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).

HANDLING AND STORAGE

Storage Temperature: Room Temperature (72°F)

Storage Pressure: Atmospheric

Special Sensitivity: Moisture (Caking)

General: Though Boric Acid does not require any special precautions, it is sensitive to moisture

and will cake. Therefore, the bags should be kept tightly sealed and be stored indoors in a dry environment. Also, the bags should be rotated on a "first-in first-out" basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

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.

Occupational 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/m³ total dust
-5 mg/m³ respirable dust
- * ACGIH:TIV -10 mg/m³
- * Cal OSHA:PEL -10 mg/m³
- * PEL= “Permissible Exposure Limit”
- * TLV= “Threshold Limit Value”

PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White, odorless, crystalline solid

Specific Gravity: 1.43

Sol. in Water: 5.46% by wt. (25°C)

27.5% by wt. (100°C)

Melting Point: 171°C (heated in closed space)

Ph: 6.1 (0.1% solution)

5.1 (1.0% solution)

STABILITY AND REACTIVITY

Boric Acid is a stable product, but when heated it loses water, first forming Metaboric Acid (H₃BO₂), and on further heating it is converted into Boric Oxide (B₂O₃).

Incompatible Materials: 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.

TOXICOLOGICAL INFORMATION

Ingestion (Acute Oral Toxicity): Low acute oral toxicity; LD₅₀ in rats is 3500-4100 mg/kg of body weight.

Skin (Acute Dermal Toxicity): Low acute dermal toxicity; LD₅₀ 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 show 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 exposure to Boric Acid dust. 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.

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 Toxicity: Dietary Boric Acid levels of 6,700 ppm in chronic feeding studies in rats and dogs produced testicular atrophy, while dogs and rats receiving 2000 ppm did not develop testicular changes¹. 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 atrophy². In a reproduction study on rats, 2000 ppm of dietary Boric Acid had no adverse effect on lactation, litter size, weight and appearance¹. 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 Acid³.

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 malformation 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.

¹Weir, 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), PB-88-213475/XAB.

³ Fail et al., Fund. Appl. Toxicol. 17, 225-239 (1991).

ECOLOGICAL INFORMATION

Phytotoxicity: Although boron is an essential micronutrient for healthy growth of plants, it can be harmful to boron-sensitive plants in higher quantities. Care should be taken to minimize the amount of Boric Acid released to the environment.

Fish Toxicity:

Rainbow Trout (*S. gairdneri*)

24 day LC₅₀=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 LC₅₀=178 mg B/L

Persistence/Degradation: Boron is naturally occurring and ubiquitous in the environment.

Soil Mobility: Boric Acid is soluble in water and is leachable through normal soil.

DISPOSAL

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 products should 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).

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 Substance.

International Transportation: Boric Acid has

no U.N. number and is not regulated under any international rail, highway, water or air transport regulations.

REGULATORY INFORMATION

RCRA: Boric Acid is not listed as a 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 (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: 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): 33 USC 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, 33 USC 1317, 40 CFR 129.

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

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

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, 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.

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

Dated: 01/01/2010

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