Firebrake® ZB

1 Chemical product and company identification

Product name: Firebrake ZB
Grade: All
Product use: Flame retardant
Chemical name/synonyms: Zinc borate hydrate (2335), dodecaboron, tetrazinc docosaoxide, heptahydrate
Chemical family: Inorganic borates

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

Substance: Zinc borate
% Content: > 98.8%
Formula: 2ZnO.3B2O3.3.5H2O
CAS#: 138265-88-0
EINECS: 235-804-2

This product contains greater than 99 percent (%) zinc borate, 2ZnO.3B2O3.3.5H2O, 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. Zinc borate, Firebrake ZB, is classified in Europe Dangerous for the Environment N: R50/53. Refer to Sections 3 and 11 for details on hazards.

3 Hazard identification

Overview
Firebrake ZB is a white, odorless, powder substance that is not flammable, combustible, or explosive and has low acute oral and dermal toxicity.

Potential ecological effects
Large amounts of Firebrake ZB can be harmful to plants and other species. Therefore, releases to the environment should be minimized. Zinc borate, Firebrake ZB, is classified in Europe Dangerous for the Environment N: R50/R53 (see Section 12 and 16 for risk phrases) because its dissolution produces soluble zinc ions.

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 Firebrake ZB is poorly absorbed through intact skin.

Inhalation: Occasional mild irritation effects to the nose and throat may occur from inhalation of Firebrake ZB dust at levels greater than 10 mg/m3.

Eye contact: Firebrake ZB is non-irritating to the eyes in normal industrial use.

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.

Cancer: Firebrake ZB is not a known carcinogen.

Reproductive/developmental: Animal ingestion studies in 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.

Signs and symptoms of exposure: Symptoms of accidental over-exposure to Firebrake ZB might include nausea, vomiting and diarrhea, with delayed effects of skin redness and peeling. These symptoms have been associated with the accidental over-exposure to the chemically related substance boric acid.

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 cleanse the 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 of less than a few grams of Firebrake ZB. 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 treatment1. Refer to Section 11 for details.
Firebrake ZB 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.

**General:** Firebrake ZB is a sparingly 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 Firebrake ZB and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during cleanup and disposal. Personal protective equipment is not 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 boron and zinc values to their normal environmental background levels. (Refer to Sections 12, 13 and 15 for additional information.) Firebrake ZB 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.) (Refer to section 8 for personal protective equipment)

**Handling and storage**

**Handling:** 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)

**Occupational exposure limits:** Zinc borate (Firebrake ZB) is treated by OSHA and CAL OSHA as “Particulate Not Otherwise Classified” or “Nuisance Dust.” Rio Tinto Borax recommends and applies internally an Occupational Exposure Limit (OEL) of 1 mg B/m³.

**Engineering controls:** Use local exhaust ventilation to keep airborne concentrations of Firebrake ZB dust below permissible exposure levels.

**Personal protection:** Where airborne concentrations are expected to exceed exposure limits, respirators for dust should be used. Eye goggles and gloves are not required for normal industrial exposure, but rubber, nitrile, or butyl gloves may be warranted if environment is excessively dusty.

**Cal OSHA/PEL:** 10 mg/m³

**OSHA/PEL (total dust):** 15 mg/m³

**OSHA/PEL (respirable dust):** 5 mg/m³

**Appearance:** White, odorless, powder

**Specific gravity:** 2.7

**Vapor pressure:** Negligible @ 20°C

**Solubility in water:** <0.28% @ 25°C

**Melting point:** Phase change at 650°C (1202°F)

**pH @ 20°C:** 6.8-7.5 (aqueous solution)

**Molecular weight:** 434.66

**General:** Firebrake ZB is a stable product.

**Incompatible materials and conditions to avoid:** 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.
Firebrake ZB

11 Toxicological information

Acute toxicity

Ingestion: Low acute oral toxicity; LD₅₀ in rats is greater than 10,000 mg/kg of body weight.

Skin/dermal: Low acute dermal toxicity; LD₅₀ in rabbits is greater than 10,000 mg/kg of body weight. Firebrake ZB is poorly absorbed through intact skin.

Inhalation: Low acute inhalation toxicity; LC₅₀ in rats >5 mg/L based on zinc (4:1) borate monohydrate.

Skin irritation: Non-irritant.

Eye irritation: Draize test in rabbits produced mild eye irritation effects. Many years of occupational and industrial exposure to Firebrake ZB indicates no adverse effects on human eyes. Therefore, Firebrake ZB is not considered to be a human eye irritant in normal industrial use.

Sensitization: Firebrake ZB is not a skin sensitizer.

Note: Firebrake ZB (zinc borate) can decompose, under biological conditions, to form zinc hydroxide and boric acid.

12 Ecological information

Ecotoxicity data

General: Both boron (B) and zinc (Zn) occur naturally in seawater at average concentrations of 5 mg/L B and 8 μg/L Zn, respectively, and at lower concentrations, generally, in freshwater. Firebrake ZB (zinc borate) can decompose, under certain environmental conditions, to form sparingly water soluble zinc hydroxide and water soluble boric acid.

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 Firebrake ZB released to the environment.

Invertebrate toxicity:

Daphnids, Daphnia magna straus
96-hr LC₅₀ = 76 mg Firebrake ZB/l

13 Disposal considerations

Disposal guidance: Small quantities of Firebrake ZB 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 should, if possible, be used for an appropriate application.


California hazardous waste designation: Zinc borate waste material is considered a “hazardous waste” in California because it is a zinc compound with a zinc concentration in excess of the total threshold limit concentration (TTLA).

NPRI (Canada): Zinc borate is not listed on the Canadian National Pollutant Release Inventory.

European Directive: Zinc borate is classified as Dangerous for the Environment N: RSO/RS3 because its dissolution produces soluble zinc ions. This material and its container must be disposed of as hazardous waste.

Refer to Section 15 for additional regulatory information.

14 Transport information

DOT hazardous classification: Zinc borate is classified by the U.S. Department of Transportation (DOT) as a Hazardous Substance with a reportable quantity (RQ) of 1,000 lbs. (454 kg), 49 CFR 172.101, Appendix A, and 49 CFR 171.8. DOT rules apply when transported in quantities equal to or exceeding the RQ (1000 lbs.) in a single package. DOT assigns the number UN 3077 to Hazardous Substances in the category to which zinc borate belongs. When transported in packages less than the RQ, zinc borate is not a DOT Hazardous Material. Bill of lading for DOT shipments should include the description – “Environmentally Hazardous Substance, Solid, N.O.S., 9, UN 3077, PG III, RQ 1000 (Zinc Borate)”.

TDG Canadian transportation: Zinc borate is regulated under Transportation of Dangerous Goods (TDG), and it is listed as “Zinc borate 9.2 NA9155 Packing Group III”. Zinc borate has a regulated limit (RL) of 50 kg.

International transportation: Zinc borate, Firebrake ZB, has no specific UN number. However, it is regulated by hazard category under UN Transport of Dangerous Goods, UN No. 3077 (Environmentally Hazardous Substance, Solid, N.O.S), ADR Class 9, 12c) Packing Group III. The reportable quantity (RQ) of 454kg (1000 lbs.) should always be included in the bill of lading.
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: Zinc borate (Firebrake ZB) is classified as Class D- Division 2A under Canadian WHMIS guidelines.

Chemical inventory listing: Firebrake ZB (138265-88-0) appears on several chemical inventory lists (including the EPA TSCA inventory, Canadian DSL and European EINECS) under the CAS No. representing the anhydrous form of this inorganic salt.

U.S. EPA TSCA Inventory: 1332-07-6
Canadian DSL: 1332-07-6
EINECS: 235-804-2
Germany WGK: 2

RCRA: Zinc borate 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. Zinc borate is listed under CERCLA as a Hazardous Substance with a reportable quantity (RQ) of 1,000 lbs (454 kg), 42 USC 9604, 40 CFR 302. Zinc borate appears on the Emergency Planning and Community Right to Know Act (EPCRA) or Superfund Amendments and Reauthorization Act (SARA), Section 313, Toxic Chemicals Release Inventory list under zinc compounds, 42 USC 11023, 40 CFR 372.65. Zinc borate is not listed under Section 302 of SARA, Extremely Hazardous Substances, 42 USC 1102, 40 CFR 355, but because it is a CERCLA Hazardous Substance, emergency release reporting under SARA may be required if offsite releases exceed RQ.

Clean Water Act (CWA) (Federal Water Pollution Control Act): 33 USC 1251 et seq.

a) Zinc borate (Firebrake ZB) is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314. However, discharges may be covered where total zinc values are an issue.

b) Zinc borate (Firebrake ZB) is on the Section 307 List of Priority Pollutants, 33 USC 1317, 40 CFR 401.15 and 403, Appendix B, under “Zinc and compounds”.

c) Zinc borate (Firebrake ZB) is 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/L.

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

NTP Biennial Report on Carcinogens: Zinc borate is not listed.

OSHA carcinogen: Zinc borate is not listed.

California Proposition 65: Zinc borate (Firebrake ZB) is not listed on the Proposition 65 list of carcinogens or reproductive toxicants.

Clean Air Act (Montreal Protocol): Firebrake ZB was manufactured with and does not contain any Class I or Class II ozone depleting substances.

Other information

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.

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) 0*
*Chronic Effects

For further information contact:
U.S. Borax Inc.
Occupational Health & Product Safety
(661) 287-6050
Technical & Sales Support
(800) 847-0822

©1996 U.S. Borax Inc.