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| *Borates Plus*  Safety Data Sheet  Zinc Borate  Revised: 10/6/2017  1101 S. Orange Blossom Trail  Apopka, FL 32703 |

1. **IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**

**Product identifier**

Commercial Name: Zinc Borate

Chemical Name: Zinc Borate

CAS No: 138265-88-0

**Substance’s identified relevant applications and unadvisable uses:**

**Advisable uses:**

* Flame retardant
* Additive

**Uses advised against:**

* Not specified

**Supplier information from the Safety Information Sheet:**

Producer: Borates Plus

1101 S. Orange Blossom Trail

Apopka, FL 32703

Tel: 724-332-1446 Fax: 440-398-0476

**Emergency line: 440-263-7305**

**2. HAZARDS IDENTIFICATION**

**Classification of the substance**

**GHS-US classification -** Repr. 1B, H360

Acute aquatic toxicity – Category 2

Chronic aquatic toxicity – Category 1

**Label elements:**

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Danger

H360FD: May damage fertility. May damage the unborn child.

H410: Very toxic to aquatic life with long lasting effects

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P281: Use personal protective equipment as required.

P308 + P313: IF exposed or concerned get medical advice/attention.

P405: Store locked up.

P501: Dispose of contents/container in accordance with local / regional / national / international regulations

**3. COMPOSITION**

**Chemical Name:** Zinc Borate

**CAS No:**  138265-88-0

Molecular Formula: 2ZnO∙3B2O3∙3.5H2O

Family: Inorganic Borates

**4. FIRST-AID MEASURES**

**IF INHALED:** Remove victim to fresh air.  Get medical attention. Prolonged exposure to dust levels in excess of regulatory limits should always be avoided.

**IF IN EYES**: Use eye wash fountain or fresh water to cleanse eye. If irritation persists, seek medical attention.

**IF ON SKIN:** Wash off immediately with plenty of water for at least 15 minutes. If symptoms persist, seek medical attention.

**IF SWALLOWED:** 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: for specialist advice, physicians should contact the Poisons Information Service.**

**5. FIRE-FIGHTING MEASURES**

**Fire Extinguishing Media:** Use any means suitable for extinguishing fire.

**Hazards:** Not considered to be a fire hazard, because Zinc Borate is not flammable, combustible or explosive. The product is itself a flame retardant.

**Recommendations for fire-fighters:** In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

**Flammability Classification (29CFR 1910.1200):** Non-flammable solid.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protection, equipment and emergency procedures:**

Personal precautions:

* Avoid dust formation. In case of prolonged exposure or great amounts of dust in the air, use a personal breather in accordance with national laws.
* Avoid inhaling dust.
* Make sure there is adequate ventilation.

Personal protection equipment:

No personal protective equipment is needed to clean up land spills.

Emergency procedures: Unnecessary

**Environment related precautions:**

* Prevent product from entering sewers and watercourses.
* Place containers to eliminate collected residues according to the existing regulations.
* Zinc Borate is a water-soluble white powder that may cause damage to trees or vegetation by root absorption.

**Methods and materials for containment and cleaning material:**

Cleaning

Collect with a vacuum, broom, or shovel without raising dust and use a container which meets the local regulations when discarding. Avoid polluting adjacent water when undergoing cleaning and the elimination of ground spills.

Spilling in water:

* Prevent the solution from being consumed or from polluting water or effluents.
* Zinc Borate 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.
* 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.

Zinc Borate is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261).

**Precautions for safe handling:**

**7. HANDLING AND STORAGE**

* Avoid dust formation, handle in ventilated areas.
* Handle the product far away from sewers, surface and underground water and water sources for human consumption.
* Eating, drinking and smoking are prohibited in the working area.

**Safe Storing Conditions:**

* Though Zinc Borate 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.
* **Storage Temperature:** Room Temperature (72F)
* **Storage Pressure:** Atmospheric
* **Special Sensitivity:** Moisture (Caking)

Though Zinc Borate does not require any special precautions, it is sensitive to moisture

**8. PERSONAL PROTECTION**

**Occupational Exposure Limits:** Zinc Borate 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

**Engineering Controls:** Use local exhaust ventilation to keep airborne concentrations of Zinc Borate dust below permissible exposure levels.

**Individual Protection Measures:** 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.

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**9. PHYSICAL AND CHEMICAL PROPERITES**

**Appearance:** White powder

**Odor:** Odorless

**Specific gravity:** 2.7

**Solubility in water:** <0.28% (25oC)

**Melting point:**  Phase change at 6500C (12020F)

**PH:** 6.8-7.5 (aqueous solution at 200C)

**Vapor Pressure:** Not applicable

**Molecular weight:** 434.66

**10. STABILITY AND REACTIVITY**

**Chemical stability:** Zinc Borate is a stable product.

**Incompatible Materials:** Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.

**11. 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 10,000 mg/kg of body weight. Zinc Borate is poorly absorbed through intact skin.

**Primary Skin Irritation Index:** Non-irritant

**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 Zinc Borate.

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

**Carcinogenicity:** A Technical Report issued by the National Toxicology Program showed “no evidence of carcinogenicity” from a full 2 year bioassay on Zinc Borate in mice at feed doses of 2500 and 5000 ppm in the diet. No mutagenic activity was observed for Zinc Borate 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 appearance. 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.

Animal studies have also demonstrated developmental toxicity due to excess zinc levels, including increased fetal resorption and reduced total weights. However, zinc is essential for normal fetal development.

**Developmental Toxicity:** Boric 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.

**12. ECOLOGICAL INFORMATION**

**Phytotoxicity:** Although both boron (B) and zinc (Zn) occur naturally in seawater at average concentrations of 5mg/L B and 8 mg/L Zn, respectively, and at lower concentrations, generally in freshwater. Zinc borate can decompose, under certain environmental conditions, to form sparingly water-soluble zinc hydroxide and water soluble boric acid. 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 Zinc Borate 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:** Low bio accumulation potential; log Pow,0.2, based on zinc (4:1) borate monohydrate. Additionally, Zinc borate will undergo hydrolysis in water to form boric acid and zinc hydroxide. Neither of these substances will bio magnify through the food chain.

**Soil Mobility:** Zinc Borate is sparingly soluble in water and is leachable through normal soil.

**13. DISPOSAL CONSIDERATIONS**

**Disposal Guidance:** Small quantities of Zinc Borate 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): Zinc Borate is not listed under any sections of the Federal Resource Conservation and Recovery Act (RCRA).

**14. TRANSPORT INFORMATION**

**DOT Hazardous Material Classification:** Zinc Borate is classified by the U.S. Department of Transportation (DOT) as a Hazardous Substance with a reportable quantity (RX) 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)”

**International Transportation:** Zinc Borate has no specific U.N. 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), PG III. The reportable quantity (RQ) of 1000 lbs (545 kg) should always be included in the bill of lading.

**15. REGULATORY INFORMATION**

**RCRA:** Zinc Borate 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. Zinc Borate is listed under CERCLA (the Comprehensive Environmental Response Compensation and Liability Act) as a Hazardous Substance with a reportable quantity (RQ) of 1,000 lbs (545 kg), 42 USC 9604, 40 CFR 302. Zinc Borate appears on the SARA (Superfund Amendments and Reauthorization Act), 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 11002, 40 CFR 355; but because it is a CERCLA Hazardous Substance, emergency release reporting under SARA may be required if offsite releases exceed RQ.

**Safe Drinking Water Act:** Zinc Borate 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) Zinc Borate is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.

(b) It 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) It is 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 Zinc Borate as a carcinogen.

**OSHA Carcinogen:** Zinc Borate is not listed.

**California Proposition 65:** Zinc Borate is not listed on any Proposition 65 lists of carcinogens or reproductive toxicants.

**16. OTHER INFORMATION**

SDS updated on: 10-6-2017

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).