



## 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: GERSTLEY BORATE  
 Grades: Technical  
 Chemical Formula: Mixture of  $\text{Ca}_2\text{B}_6\text{O}_{11} \cdot 5\text{H}_2\text{O}$ /  
 $\text{Na}_2\text{O} \cdot 2\text{CaO} \cdot 5\text{B}_2\text{O}_3 \cdot 16\text{H}_2\text{O}$   
 Chemical Name/Synonyms: Mixture of Colemanite and  
 Ulexite  
 Chemical Family: Inorganic Borates  
 CAS Registry Numbers: 12007-56-6 and 1319-33-1

MANUFACTURER: U.S. Borax Inc.\*  
 26877 Tourney Rd.  
 Valencia, CA 91355

\*Formerly United States Borax & Chemical Corporation

EMERGENCY PHONE NUMBERS:  
 24 Hr. Info. Service: (800) 228-5635 EXT. 144  
 CHEMTREC: (800) 424-9300

## 2 COMPOSITION/INFORMATION ON INGREDIENTS' OSHA HAZARDS

This product is composed of a mixture of the minerals Colemanite ( $\text{Ca}_2\text{B}_6\text{O}_{11} \cdot 5\text{H}_2\text{O}$ ) and Ulexite ( $\text{Na}_2\text{O} \cdot 2\text{CaO} \cdot 5\text{B}_2\text{O}_3 \cdot 16\text{H}_2\text{O}$ ). This

material contains approximately 28.0% Boric Oxide ( $\text{B}_2\text{O}_3$ ), 5.3% Sodium Oxide ( $\text{Na}_2\text{O}$ ), 20.6% Calcium oxide ( $\text{CaO}$ ) and 25% water of crystallization.

## 3 HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:**

Gerstley Borate is a gray-white mineral that is not flammable, combustible, or explosive, and it presents no unusual hazard if involved in a fire. Gerstley Borate presents little or no hazard (to humans) and has low acute oral and dermal toxicities. Care should be taken to minimize the amounts of Gerstley Borate released to the environment to avoid ecological effects.

**POTENTIAL ECOLOGICAL EFFECTS:**

An excess of Gerstley Borate 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 Gerstley Borate is not absorbed through intact skin.

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

**Eye Contact:** Gerstley Borate is not irritating to eyes in normal industrial use.

**Skin Contact:** Gerstley Borate does not cause irritation to intact skin.

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

**Cancer:** Gerstley Borate 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 borate products 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 Gerstley Borate 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 PHYSICIANS:** Observation only is required for adult ingestion of a few grams of Gerstley Borate. 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 treatment. (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). 24 hour Medical consultation is available at (800) 228-5635 EXT. 144.

## FIRE-FIGHTING MEASURES

**General Hazard:** None, because Gerstley Borate 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.

## ACCIDENTAL RELEASE MEASURES

**General:** Excessive amounts of Gerstley Borate released to the environment 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 Gerstley Borate and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during clean up and disposal. The use of eye goggles is recommended during the clean up of spills.

**Water Spill:** Gerstley Borate 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 Sections 12, 13 and 15 for additional information).

Gerstley 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). (Refer to Regulatory Information Section 15 for additional references and information regarding EPA and California regulations.)

## HANDLING AND STORAGE

**Storage Temperature:** Ambient

**Storage Pressure:** Atmospheric

**Special Sensitivity:** Moisture (Caking)

**General:** Avoid contact with eyes and wash thoroughly after handling. Dry indoor storage is recommended. 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 Gerstley Borate 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 recommended, especially in excessively dusty environments.

**Occupational Exposure Limits:**

Gerstley Borate 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**		5 mg/m <sup>3</sup>
Cal OSHA: PEL*		5 mg/m <sup>3</sup>

\* PEL = "Permissible Exposure Limit"

\*\* TLV = "Threshold Limit Value"

## PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Grey-White Mineral (Ore)  
**Bulk Density:** 49-62 lbs./ft<sup>3</sup>  
**Vapor Pressure:** Negligible @ 20°C

**Viscosity:** Not applicable  
**Boiling Point:** Not applicable  
**Flash Point:** None

## STABILITY AND REACTIVITY

**General:** Gerstley Borate 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

**INGESTION (ACUTE ORAL TOXICITY):** Low acute oral toxicity; LD<sub>50</sub> of Gerstley Borate in rats is expected to be greater than 5000 mg/kg of body weight based on results from similar borate chemicals.

**SKIN (ACUTE DERMAL TOXICITY):** Low acute dermal toxicity; LD<sub>50</sub> of Gerstley Borate in rabbits is expected to be greater than 2000 mg/kg of body weight.

**PRIMARY SKIN IRRITATION INDEX:** Expected to be 0 (zero). No effect.

**EYE:** Many years of occupational exposure history reflect no indication of human eye injury from exposure to Gerstley Borate.

**NOTE:** Gerstley Borate is chemically and toxicologically similar to the common borate chemical, Boric Acid. The majority of the borate chronic toxicology studies were conducted on 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/DEVELOPMENTAL 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 feeding 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 of 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].

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

ECOLOGICAL INFORMATION

**ECOTOXICITY DATA:**

**Phytotoxicity:** Although boron is an essential micronutrient for healthy growth of plants, it can be harmful to boron-sensitive plants in higher quantities. Plants and trees can easily be exposed by root absorption to toxic levels of boron in the form of water-soluble borate leached into nearby soil or waters. Care should be taken not to exceed recommended application rates.

**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. Gerstley Borate decomposes in the environment to natural borate.

**Soil Mobility:** The product is soluble in water and is leachable through normal soil.

**NOTE:** Boron (B) is the element in Gerstley Borate which is used to characterize borate product ecological effects.

DISPOSAL CONSIDERATIONS

**Disposal Guidance:** Small quantities of Gerstley 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 product should, if possible, be re-used for an appropriate application.

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

Refer to Section 15 for additional regulatory information

TRANSPORT INFORMATION

**DOT Hazardous Material Classification:** Gerstley Borate is not a U.S. Department of Transportation (DOT) Hazardous Material.

**DOT Hazardous Substances Classification:** Fertilizer

Borate Granular is not a DOT Hazardous Substance.

**International Transportation:** Gerstley Borate has no U.N. Number, and is not regulated under international rail, highway, water or air transport regulations.

REGULATORY INFORMATION

**TSCA No.:** Colemanite appears on the EPA TSCA inventory list under the CAS No. 12007-56-8.

**RCRA:** Gerstley 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. Gerstley Borate 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; 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:** Gerstley 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) Gerstley Borate 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.

**OSHA/Cal OSHA:** This MSDS document meets the requirements of both OSHA (29 CFR 1910.1200) and Cal OSHA (Title 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 Gerstley Borate as a carcinogen.

**NTP Annual Report on Carcinogens:** Fertilizer Borate Granular is not listed.

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

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

OTHER INFORMATION

**Product Label Text Hazard Information:**

- 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 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)	0*

\* Chronic Effects

Contact U.S. Borax Inc.  
Occupational Health &  
Product Safety Department  
for further information:

(805) 287-6050