20 MULE TEAM®

Gerstley Borate
Rasorite®

Material Safety Data Sheet
DATE OF ISSUE May 2000
Supersedes September 1999 Version

1 Chemical product and company identification

Product name:	Gerstley Borate *Rasorite*
Grade:	Technical
Product use:	Industrial manufacturing
Chemical formula:	Mixture of $Ca_2B_6O_{11}\cdot 5H_2O$ and $NaO\cdot 2CaO\cdot 5B_2O_3\cdot 5H_2O$
Chemical name/synonyms:	Mixture of colemanite and Ulexite
Chemical family:	Inorganic Borates
CAS registry number:	12046-09-2 (Mineral form)

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

This product is composed of a mixture of the minerals Colemanite ($Ca_2B_6O_{11}\cdot 5H_2O$) and Ulexite ($NaO\cdot 2CaO\cdot 5B_2O_3\cdot 5H_2O$). Gerstley Borate is mineral-based product and no specific hazardous properties have been observed. Similar borate salts are considered 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.

3 Hazard identification

Emergency overview
Gerstley Borate is a grey-white, odorless mineral product that is *not* flammable, combustible or explosive.

Potential ecological effects
Unknown

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 expected to be readily absorbed through intact skin.
Inhalation: Occasional mild irritation effects to the nose and throat may occur from inhalation of borate dusts at levels greater than 10 mg/m^3.
Eye contact: Not tested.
Skin contact: Not tested.
Ingestion: Gerstley Borate is not intended for ingestion. Inorganic borate salts generally have low acute toxicity. Small amounts (e.g. a teaspoon) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.
Cancer: Not tested.
Reproductive/developmental: Gerstley Borate has not been tested. Animal ingestion studies in several species, at high doses, indicate that similar inorganic borate compounds 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. Several inorganic borate high dose animal ingestion studies indicate the testes are the target organs in male animals for similar borate compounds.
Signs and symptoms of exposure: Symptoms of accidental over-exposure to inorganic borate salts have been associated with ingestion or 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: If symptoms such as nose or throat irritation are observed, remove 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: Flush skin with plenty of water.
Ingestion: Swallowing small quantities (one teaspoon) is not expected to cause 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 in the range of 4-8 grams of most inorganic borate salts. 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. Refer to Section 11 for details.

5 Firefighting 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 CFR1910.1200): Non-flammable solid.

6 Accidental release measures

General: Gerstley Borate is a sparingly soluble grey-white mineral that may, at high concentrations, 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 product and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during clean up and disposal. Personal protective equipment is not needed to clean up 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 value to its normal environmental background level. (Refer to Sections 12, 13 and 15 for additional information).

7 Handling and storage

General: No special handling precautions are required, but dry, indoor storage is recommended. Keep in tightly sealed containers. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

Storage temperature: Ambient

Storage pressure: Atmospheric

Special sensitivity: None.

8 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, respirators should 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: Gerstley Borate is treated by OSHA, Cal OSHA and ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust."

ACGIH/TLV:	10 mg/m^3
Cal OSHA/PEL:	10 mg/m^3
OSHA/PEL (total dust):	15 mg/m^3
OSHA/PEL (respirable dust):	5 mg/m^3

9 Physical and chemical properties

Appearance:	Grey-white, odorless Mineral (ore)	**Vapor pressure:**	Negligible @ 20°C
Bulk density:	49-63lbs /cubic foot	**Melting point:**	Decomposes at 480°C (approx.)

10 Stability and reactivity

General: Gerstley Borate is a stable product.

Incompatible materials and conditions to avoid: Unknown

Hazardous decomposition: None.

11 Toxicological information

Acute toxicity

Ingestion: Not tested. Similar inorganic borate compounds are low in acute oral toxicity; LD_{50} in rats is expected to be greater than 5,000 mg/kg of body weight.
Skin: Not tested. Similar inorganic borate compounds are low in acute dermal toxicity; LD_{50} in rabbits is expected to be greater than 2,000 mg/kg of body weight.
Inhalation: Not tested.
Skin irritation: Not tested. Not expected to be irritating to skin based on experience with other similar inorganic borate compounds.
Eye irritation: Not tested. Not expected to be irritating to eyes based on experience with other similar inorganic borate compounds.
Sensitization: Not tested. Inorganic borate compounds are not known to be dermal sensitizers.

Other

Reproductive/developmental toxicity: Gerstley Borate has not been tested. Animal feeding studies with chemically related inorganic borate substances in the rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes[2]. Also, boric acid studies in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus including fetal weight loss and minor skeletal variations[3,4]. The doses administered were many times in excess of those to which humans would normally be exposed[5].
Carcinogenicity/mutagenicity: Gerstley Borate has not been tested. However, studies conducted with the chemically similar substance boric acid have reported no evidence of carcinogenicity in mice[6] and no mutagenic activity in a battery of short-term mutagenicity assays.
Human data: Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility[7].

12 Ecological information

Ecotoxicity data

General: Boron occurs naturally in sea-water at an average concentration of 5 mg B/L and fresh water at 1 mg B/L or less. In diluted aqueous solutions the predominant boron species present is undissociated boric acid.
Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants, however, it can be harmful to boron sensitive plants in higher quantities. Care should be taken to minimize the amount of borate product released to the environment.
Algal toxicity:
Green algae, *Scenedesmus subspicatus*
96-hr EC_{10} = 24 mg B/L*
Invertebrate toxicity[8]:
Daphnids, *Daphnia magna Straus*
48-hr LC_{50} = 133 mg B/L+
21-day NOEC-LOEC = 6-13 mg B/L+

Test substance * sodium tetraborate
+ boric acid

Fish toxicity:
Sea-water[9]:
Dab, *Limanda limanda*
96-hr LC_{50} = 74 mg B/L*
Fresh water[10]:
Rainbow trout, *S. gairdneri* (embryo-larval stage)
24-day LC_{50} = 150 mg B/L+
32-day LC_{50} = 100 mg B/L+
Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC_{50} = 46 mg B/L+
3-day LC_{50} = 178 mg B/L+

Environmental fate data

Persistence/degradation: Boron and Calcium are both ubiquitous in the environment and occur naturally in various mineral forms. Gerstley Borate should be expected to decompose in the environment to stable calcium and boron containing mineral species.
Octanol/water partition coefficient: N/A
Soil mobility: Unknown

13 Disposal considerations

Disposal guidance: Small quantities of Gerstley Borate 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. Excess product should, if possible, be used for an appropriate commercial or experimental application.

RCRA (40 CFR 261): N/A
NPRI (Canada): N/A

14 Transport information

DOT hazardous classification: The mineral constituents of Gerstley Borate are not regulated by the U.S. Department of Transportation (DOT) and is therefore not considered a Hazardous Material/Substance.

TDG Canadian transportation: The mineral constituents of Gerstley Borate are not regulated under Transportation of Dangerous Goods (TDG).
International transportation: N/A

15 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: The mineral constituents of Gerstley Borate are classified as Class D-Division 2A under Canadian WHMIS guidelines.
Chemical inventory listing: Colemanite, the primary mineral constituent of Gerstley Borate appears on the TSCA chemical inventory list under the CAS No. 12007-56-6.
RCRA: N/A
Superfund: N/A
Canadian drinking water guideline: An "Interim Maximum Acceptable Concentration" (IMAC) is currently set at 5 mg B/L.
IARC: N/A
NTP annual report on carcinogens: N/A
OSHA Carcinogen: N/A
California Proposition 65: : The mineral constituents of Gerstley Borate are not listed on any Proposition 65 list of carcinogens or reproductive toxicants.
Clean Air Act (Montreal Protocol): Gerstley Borate is not manufactured with, and does not contain any Class I or Class II ozone depleting substances.

16 Other information

References

1. 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. **4**: 427-458 (1986).
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3. Fail *et al*., Fund. Appl. Toxicol. **17**: 225-239 (1991).
4. Price *et al*., J. Am. Coll. Toxicol. **14**: (2), 173 (Abst. P-17) (1995).
5. Murray F J, Regul. Toxicol. Pharmacol. (Dec. 1995).
6. National Toxicology Program (NTP) –Toxicology and carcinogenesis studies of boric acid in B6C3F_1 mice, Tech. Report Ser. No. 324, U.S. Dept. of Health and Human Services. NIH Publ. No. 88-2580 (1987).
7. Whorton *et al*., Occup. Environ. Med. **51**: 761-767 (1994).
8. Schöberl *et al.*, Tenside Surfactants Detergents **25**: 99-107 (1988).
9. Hugman S J, Mance G, Water Research Centre Report 616-M (1983).
10. Butterwick L, de Oude N, Raymond K, Ecotoxicol. Environ. Safety **17**: 339-371 (1989).

For general information on the toxicology of inorganic borates, see Patty's Industrial Hygiene and Toxicology, 4th Ed. Vol. II, (1994), Chap. 42, Boron; ECETOC Tech. Report No. 63 (1995).

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.

National Fire Protection Assoc. (NFPA) classification:

Health	0
Flammability	0
Reactivity	0

For further information contact:

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Occupational Health &
Product Safety Department
(661) 287-6050