TETRA-BOR 21

11-14-08

Material Safety Data Sheet

This MSDS Sheet complies with the style format specified by ANSI Z400.1-1993

SECTION 1: CHEMICAL PRODUCT - COMPANY IDENTIFICATION

TETRA Micronutrients (281) 419-9430
230 Spring Hill Dr., Suite 310 (800) 521-9979
The Woodlands, Texas 77386

(800) 424-9300 - CHEMTREC (24 Hour Emergency Response)

PRODUCT: TETRA-BOR 21
PRODUCT USE: Agricultural Micronutrient
SYNONYMS: Disodium octaborate tetrahydrate
CHEMICAL FAMILY: Inorganic Borates
CHEMICAL FORMULA: $Na_2B_80_{13}.4H_20$
CAS REGISTRY NUMBER: 12280-03-4
MSDS CREATION DATE: 21 SEPT 05
MSDS REVISION DATE: 14 NOV 08

SECTION 2: COMPOSITION, INFORMATION ON INGREDIENTS

This product contains greater than 98 percent (%) Disodium octaborate tetrahydrate, $Na_2B_80.4H_20$ 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. Refer to Section 3 and 11 for details on hazards.

SECTION 3: HAZARDS IDENTIFICATION

NFPA RATINGS: (SCALE 0-4): HEALTH=0, FIRE=0, REACTIVITY=0
HMIS CLASSIFICATIONS: Red (Flammability)=0, Yellow (Reactivity)=0, Blue (Acute Health)=1*
*Chronic Effects

EMERGENCY OVERVIEW TETRA-BOR 21 is a white odorless, powdered substance that is not flammable, combustible, or explosive, and has low acute oral and dermal toxicity.

POTENTIAL ECOLOGICAL EFFECTS:
Large amounts of TETRA-BOR 21 can be harmful to plants and other species. Therefore, the product should only be used as part of a balanced plant nutrition program preferably after soil and/or tissue analysis. Accidental releases to the environment should be minimized.

POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not a concern because TETRA-BOR 21 is not absorbed through intact skin.

INHALATION:
Occasional mild irritation effects to nose and throat may occur from inhalation of TETRA-BOR 21 dusts at levels greater than 10 mg/m^3.

SKIN CONTACT:
TETRA-BOR 21 does not cause irritation to intact skin.

EYE CONTACT:
TETRA-BOR 21 is non-irritating to eyes in normal industrial use.

INGESTION:
Products containing TETRA-BOR 21 are not intended for ingestion. TETRA-BOR 21 has a low acute toxicity. Small amount (e.g. a teaspoon) swallowed accidentally are not likely to cause effects; swallowing amounts large than that may cause gastrointestinal symptoms.
CANCER:
TETRA-BOR 21 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. High dose animal ingestion studies indicate the tests are the target organs in male animals.
SIGNS AND SYMPTOMS OF EXPOSURE:
Symptoms of accidental over-exposure to TETRA-BOR 21 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.

SECTION 4: FIRST AID MEASURES

INHALATION: If symptoms such as nose or throat irritation are observed, remove person to fresh air.
SKIN CONTACT: Wash affected area with soap or mild detergent and large amounts of water.
EYE CONTACT: Flush eyes immediately with large amounts of water or normal saline solution until no evidence of product remains (approximately 15-20 minutes). If irritation persists for more than 30 minutes, seek medical attention.
INGESTION: Swallowing less than one teaspoon will cause not harm to healthy adults. If larger amounts are swallowed, give two glasses of water to drink and seek medical attention.
NOTE TO PHYSICIAN: Observation only is required for adult ingestion of less than 4-8 grams of TETRA-BOR 21. For ingestion, 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 analysis 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).

SECTION 5: FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARD: None, TETRA-BOR 21 is not flammable, combustible or explosive. The product is itself a flame retardant.
EXTINGUISHING MEDIA: Use any standard agent suitable for surrounding structural fire or for other chemicals that may be involved.
FLAMMABILITY CLASSIFICATION (29 CFR 1910.1200): Non-flammable solid.

SECTION 6: ACCIDENTAL RELEASE MEASURES

GENERAL SPILL: TETRA-BOR 21 is a water-soluble white powder 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 TETRA-BOR 21 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.

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 Section 12, 13 and 15 for additional information.) TETRA-BOR 21 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.)

SECTION 7: HANDLING AND STORAGE

STORAGE TEMPERATURE: Ambient
STORAGE PRESSURE: Atmospheric
STORAGE SENSITIVITY: Moisture (Caking)
GENERAL: 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.

SECTION 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS: Use local exhaust ventilation to keep airborne concentrations of TETRA-BOR 21 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: Disodium octaborate tetrahydrate (TETRA-BOR 21) is treated by OSHA, Cal OSHA and ACGIH as “Particulate Not Otherwise Classified” or “Nuisance Dust”.

OSHA: PEL -10 mg/m^3 total dust
ACGIH-TIV -15 mg/m^3 respirable dust
Cal OSHA:PEL -5 mg/m^3
PEL= “Permissible Exposure Limit”
TLV= “Threshold Limit Value”

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION:	White, odorless, crystalline solid
BULK DENSITY:	320 TO 480 kg/m^3
VAPOR PRESSURE:	Negligible @ 20ºC
pH @ 20ºC:	8.3 (3.0% solution) 7.6 (10.0% solution)
MOLECULAR WEIGHT	412.52
MELTING POINT:	815°C
SOLUBILITY IN WATER:	9.7% @ 20ºC; 34.3% @ 50ºC

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: TETRA-BOR 21 is a stable product.
INCOMPATIBILITIES: Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.
HAZARD DECOMPOSITION: None.

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICITY DATA:

Ingestion: Low acute oral toxicity; LD_{50} in rats is 2,660 mg/kg of body weight
Skin/Dermal: Low acute dermal toxicity; LD_{50}: in rabbits is greater than 2000 mg/kg of body weight. TETRA-BOR 21 is poorly absorbed through intact skin.
Primary Skin Irritation Index: 0 (Zero) TETRA-BOR 21 is non-corrosive.
Inhalation: Low acute inhalation toxicity; LC_{50} in rats is greater than 2.0 mg/L (or g/m^3).
Eye Irritation: 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 TETRA-BOR 21.
Sensitization: TETRA-BOR 21 is not a skin sensitizer.
Other: Reproductive/Developmental Toxicity: Animal feeding studies in rate, mouse and dog, at high doses, have demonstrated effects on fertility and testes[2]. Studies with the chemically related boric acid in the rat, mouse and rabbit, a 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].

CARCINOGEN STATUS:

A Technical Report issued by the National Toxicology Program showed "no evidence of carcinogenicity in mice[6]. No mutagenic activity was observed for boric acid in a battery of short-term mutagenicity assays.
Human Data: Human epidemiological studies show no increase in pulmonary disease in occupational population which 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].

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY DATE:

General: Boron (B) is the element is Disodium octaborate tetrahydrate (TETRA-BOR 21) which is used by convention to report borate product ecological effects. It occurs naturally in seawater at an average concentrations up to 5 mg B/L and generally occurs in freshwater at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert Disodium octaborate tetrahydrate into the equivalent boron (B) content, multiply by 0.2096.

PHYTOTOXICITY:

Boron is an essential micronutrient for healthy growth in plants; however, it can be harmful to boron sensitive plants in high quantities. Care should be taken to minimize the amount of TETRA-BOR 21 released to the environment. TETRA-BOR 21 should only be used as part of a balanced plant nutrition program preferably after soil and/or tissue analysis.

Algal Toxicity:

Green algae, Scenedesmus subspicatus

96-hr EC_{10} = 24 mg B/L[=]

Invertebrate Toxicity[8]:

Daphnids, *Daphnia magna Straus*

24-hr EC_{50} = 242 mg B/L[=]

Test Substance: [=] sodium tetraborate

Fish Toxicity:

Seawater[9]:

Dab, *Limanda limanda*

96-hr LC_{50} = 74 mg B/L[=]

Freshwater[10]:

Rainbow trout, S *gairdneri* (embryo-larval stage)

24-day LC_{50} = 88 mg B/L[=]

32-day LC_{50} = 54 mg B/L[=]

Goldfish, *Carassius auratus* (embryo-larval stage)

7-day LC_{50} = 65 mg B/L[=]

3-day LC_{50} = 71 mg B/L[=]

ENVIRONMENTAL FATE DATA:

PERSISTENCE/DEGRADATION: Boron is naturally occurring and ubiquitous in the environment. TETRA-BOR 21 decomposes in the environment to natural borate.

OCTANOL/WATER PARTITION COEFFICIENT: No value. In aqueous solution disodium octaborate tetrahydrate is converted substantially into undissociated boric acid.

SOIL MOBILITY: TETRA-BOR 21 is soluble in water and is leachable through normal soil.

SECTION 13: DISPOSAL INFORMATION

Observe all federal, state and local regulations when disposing of this product.

SECTION 14: TRANSPORT INFORMATION

DOT Shipping Name: Disodium Octaborate tetrahydrate (TETRA-BOR 21) is not a U. S. Department of Transportation (DOT) Hazardous Material.

DOT Hazard Class or Division: TETRA-BOR 21 is not a DOT Hazardous Substance.

DOT Identification Number: TETRA-BOR 21 has no U.N. number and is not regulated under any international rail, highway, water or air transport regulations.

TDG Canadian Transportation: Disodium octaborate tetrahydrate () is not regulated under Transportation of dangerous Goods (TDG).

SECTION 15: REGULATORY INFORMATION

OSHA/Cal OSHA: This MSDS document meets the requirements of both OSHA (29 CFR 1920.1200) and Cal OSHA (Title 8 CCR 5194 (g)) hazardous communication standards. Refer to Section 8 for regulatory exposure limits.
WHMIS classification: Disodium octaborate tetrahydrate (TETRA-BOR 21) is classified as Class D-Division 2A under Canadian WHMIS guidelines.
Chemical Inventory Listing: Disodium octaborate tetrahydrate (TETRA-BOR 21), 12280-03-4, appears on several chemical inventory lists (including the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI, Australian and Korean lists) under the CAS No. representing the anhydrous form of this inorganic salt.

U.S. EPA TSCA Inventory	12008-41-2
Canadian DSL	12008-412
EINECS	234-541-0
South Korea	9312-3213

RCRA: Disodium octaborate tetrahydrate 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 Disodium octaborate tetrahydrate is not listed under CERCLA or its 1966 amendments, SARA, 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 (SDWA): Disodium octaborate tetrahydrate 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 compounds
CLEAN WATER ACT (CWA) (FEDERAL WATER POLLUTION CONTROL ACT): 33 USC 1251 *et seq*.

(a) Disodium octaborate tetrahydrate (TETRA-BOR 21) is not itself a discharge coverage 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
(c) It is not 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 a 5 mg B/L.
IARC: The International Agency for Research on Cancer (IARC) (a unit of the World Health Organization) does not list or categorize disodium octaborate tetrahydrate as a carcinogen.
NTP BIENNIAL REPORT ON CARCINOGENS: Disodium octaborate tetrahydrate is not listed.
OSHA CARCINOGEN: Disodium octaborate tetrahydrate is not listed.
CALIFORNIA PROPOSITION 65: Disodium octaborate tetrahydrate (TETRA-BOR 21) is not listed on any Proposition 65 list of carcinogens or reproductive toxicants.
FEDERAL FOOD, DRUG AND COSMETIC ACT: Pursuant to 21 CFR 175.105, 176.180 and 181.30, 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.
CLEAN AIR ACT (MONTREAL PROTOCOL): was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

SECTION 16: 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 post harvest food,, drugs, or pesticides.
- Refer to MSDS.
- KEEP OUT OF REACH OF CHILDREN.

* Except 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)	1*

*Chronic Effects

Individuals handling this product should be informed of the recommended safety precautions and should have access to this information.

This information relates to the specific product designated and may not be valid for such product used in combination with any other materials or in any other processes. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability, or completeness. It is the user's responsibility to satisfy themselves as to the suitability and completeness of such information for their own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

TETRA Micronutrients reserves the right to refuse shipment of this product to any consumer who fails to demonstrate the ability to consistently handle and use it safely and in compliance with all applicable laws, rules and regulations. Such demonstration may require on-site inspection of any or all storage, processing, packaging and other handling systems that come in contact with it.

Customers are responsible for compliance with local, state and federal regulations that may be pertinent in the storage, application and disposal of this product.