SAFETY DATA SHEET

1. Product Identification

Product name	EndRot Borate Powder
SDS Number	9051510
Product type	Disodium octaborate tetrahydrate
Recommended use of the chemical and restrictions on use	Compound for control of wood rot decay and insect infestation of wood
Restrictions	None known.
Manufacturer/Supplier information	
Company name	SYSTEM THREE RESINS, INC.
Address	3500 W. Valley Hwy Suite 105 Auburn, WA 98001-2436 United States
Telephone	1-253-333-8118
Website	www.systemthree.com
Email	support@systemthree.com
Emergency Contact	CHEMTREC (U.S. and CANADA) 1-800-424-9300 CHEMTREC (Outside the U.S.) 1-703-527-0585

2. Hazard(s) Identification

Classification of substance or mixture/Signal Word	WARNING Reproductive Toxicity – Category 2
GHS Label Elements **Hazard Pictograms**	
Hazard Statements/Classification of substance or mixture	H361 Suspected of damaging fertility or the unborn child.
Precautionary statements	
Precautionary Statements **Prevention**	P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response	P308+P313 IF exposed or concerned: Get medical advice/attention.
Storage	P405 Store locked up.
Disposal	P501 Dispose of contents/container in accordance with local regulation.
Hazards not otherwise classified (HNOC)	None known.

3. Composition/Information On Ingredients

Chemical Name	CAS Number	Content (%)
Disodium octaborate tetrahydrate	12280-03-4	>98.0%

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section. Occupational exposure limits, if available, are listed in Section 8.

4. First-Aid Measures

Skin contact — No treatment necessary.

Eye contact — Use eye wash fountain or fresh water to cleanse eye. If irritation persists for more than 30 minutes, seek medical attention.

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.

Inhalation — If symptoms such as nose or throat irritation are observed, remove to fresh air.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician — Supportive care only is required for adult ingestion of less than a few grams of the product. For ingestion of larger amounts, maintain fluid and electrolyte balance and maintain adequate kidney function.

Specific treatments — Gastric lavage is only recommended for heavily exposed, symptomatic patients in whom emesis has not emptied the stomach. Hemodialysis should be reserved for patients with massive acute absorption, especially for patients with compromised renal function. Boron analyses of urine or blood are only useful for verifying exposure and are not useful for evaluating severity or as a guide in treatment.

5. Fire-Fighting Measures

Suitable extinguishing media — Use extinguishing media that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media — None.

Specific hazards arising from the chemical
Hazardous decomposition products — None. The product is not flammable, combustible, or explosive.

Special protective actions for fire-fighters — Not applicable.

Special protective equipment for fire-fighters — Not applicable. The product itself is a flame retardant.

Further information — None known.

6. Accidental Release Measures

Personal precautions — Eye goggles and gloves are not required for normal industrial exposures, but eye protection according to ANSI Z.87.1 or other national standard. Respirators should be considered if environment is excessively dusty.

Emergency procedures — Eye goggles and gloves are not required for normal industrial exposures, but eye protection according to ANSI Z.87.1 or other national standard. Respirators should be considered if environment is excessively dusty.

Methods and materials for containment/cleanup — **Appropriate containment:** Avoid spillage into water and cover drains.
Land spill: Vacuum, shovel or sweep up and place in containers for disposal in accordance with applicable local regulations.

Spillage into water: Where possible, remove any intact containers from the water.

Environmental precautions

The product is a water-soluble white powder that may cause damage to trees or vegetation by root absorption. Avoid contamination of water bodies during clean up and disposal. Advise local water authority that none of the affected water should be used for irrigation or for the abstraction of potable water until dilution returns the boron value to its normal environmental background level or meets local water quality standards.

7. Handling and Storage

Precautions for safe handling

Good housekeeping procedures should be followed to minimize dust generation and accumulation. Avoid spills. Do not eat, drink and smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

Precautions/Recommendations for safe/proper storage

No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity and it minimize caking of the product, bags should be handled on a first-in first-out basis.

Storage: Ambient
Storage pressure: Atmospheric
Special sensitivity: Moisture (Caking)

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

In the absence of a national OEL, Rio Tinto Borax recommends and applies internally an Occupational Exposure Limit (OEL) of 1 mg B/m^3. To convert product into equivalent boron (B) content, multiply by 0.21.

OSHA/PEL (total dust)	15 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust
OSHA/PEL (respirable dust)	5 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust
Cal OSHA/PEL	5 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust

Appropriate engineering controls

Use local exhaust ventilation to keep airborne concentrations of dust below permissible exposure limits.

Environmental exposure controls

None.

Individual protection measures/Personal protective equipment

Eye/face protection

Eye protection according to ANSI Z.87.1 or other national standards may be warranted if environment is excessively dusty.

Skin protection

Standard work gloves (cotton, canvas or leather) may be warranted if environment is excessively dusty.

Respiratory protection

Where airborne concentrations are expected to exceed exposure limits, respirators should be used.

Special instructions for protection and hygiene

None.

9. Physical and Chemical Properties

Chemical family

Borate powder

Appearance

White, crystalline solid

Physical State	
Form	Solid
Color	White
Odor	Odorless
Density (Specific Gravity)	1.87 @ 22°C
Viscosity	Not applicable
pH	8.3 (3.0% solution); 7.6 (10.0% solution) @ 20°C
Melting point/freezing point	815°C
Initial boiling point and boiling range	Not applicable: melting point 815°C
Flash point	Not applicable: inorganic substance
Evaporation rate	Not applicable: non-volatile
Flammability (solid, gas)	Non-flammable (used as a flame retardant)
Upper/lower flammability limit (by volume)	Not applicable: non-flammable
Material VOC	Not available
Vapor density	Not applicable
Relative density	Not applicable
Solubility in water	223.65 g/L @ 20°C
Partition coefficient: n-octanol/water	Not applicable: inorganic substance
Auto-ignition temperature	Not applicable: not self-heating
Decomposition temperature	Not applicable

10.Stability and Reactivity

Reactivity	None known.
Chemical Stability	Under normal ambient temperatures (-40°C to +40°C), the product is stable.
Possibility of hazardous reactions	Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.
Conditions to avoid	Avoid contact with strong reducing agents by storing according to good industrial practice.
Incompatible materials	Strong reducing agents.
Hazardous decomposition products	None.
Other hazards	None.

11. Toxicological Information

Acute Health Hazard	Acute Toxicity (Oral) Category 5 (Hazard statement: H303: May be harmful if swallowed). Poorly absorbed through intact skin. Based on the available data, the classification criteria are not met. Low acute inhalation toxicity. Based on the available data, the classification criteria are not met.

Component	Result	Species	Dose	Exposure
Disodium octaborate tetrahydrate	Acute Oral Toxicity Study – OECD Guidelines 401: LD50 Oral	Rat	2,550 mg/kg	-

	Acute Dermal Toxicity Study – OECD Guideline 402: LD50 Dermal	Rabbit	>2,000 mg/kg	-
	Acute Inhalation Toxicity Study – OECD Guideline 403: LC50 Inhalation	Rat	>2.0 mg/L	-

Irritation/Corrosion

Skin Corrosion/Irritation: No skin irritation. Based on the available data for the hydrated forms of sodium tetraborate, the classification criteria are not met.

Serious Eye Damage: Based on mean scores of ≤ 1, and the effects were fully reversible within 7 days, the classification criteria are not met. Many years of occupational exposure indicate no adverse effects on human eye.

Component	Result	Species	Test	Exposure
Disodium octaborate tetrahydrate	Mean Primary Irritation Score: 0.5.	New Zealand White Rabbit	Primary Dermal Irritation Study – U.S. EPA FIFRA Guidelines	Dose: 0.5g
	Eyes - Not irritating. Induced slight iritis, conjunctivae redness and chemosis, reversible after 4-7 days with a return to near normal by 7 days after exposure.	New Zealand White Rabbit	Eye Irritation Study – similar to OECD Guideline 405	Dose: 0.1g

Sensitization

Not a skin sensitizer. No respiratory sensitization studies have been conducted. There are no data to suggest that boric acid or sodium borates are respiratory sensitizers. Base on the available data, the classification criteria are not met.

Component	Result	Species	Dose	Exposure
Disodium octaborate tetrahydrate	Not a skin sensitizer.	Guinea Pig	0.4g of a 95% w/w mixture in distilled water.	Dermal – Buehler Test OECD Guideline 406

Mutagenicity

Based on the available data, the classification criteria are not met.

Component	Result	Species	Dose	Exposure
Disodium octaborate tetrahydrate	Not mutagenic (based on boric acid).	L5178Y mouse lymphoma, V79 Chinese hamster cells, C3H/10T1/2 cells, hepatocytes, Chinese hamster ovary (CHO cells)	1.0 – 10.0 mg/ml (1000 – 10000 ppm) boric acid	Several in vitro mutagenicity studies have been carried out on boric acid including gene mutation in mammalian cells, unscheduled DNA synthesis, chromosomal aberration and sister chromatid exchange in mammalian cells.

Carcinogenicity

No evidence of carcinogenicity (based on boric acid). Based on the available data, the classification criteria are not met.

Component	Result	Species	Dose	Exposure
Disodium octaborate tetrahydrate	Not carcinogenic.	B6C3F1 mice	446; 1150 mg boric acid/kg bw/day	Oral - OECD 451 equivalent

Reproductive Toxicity

Reproductive Toxicity Category 2 (Hazard statement: H361: Suspected of damaging fertility or the unborn child.)

Component	Result	Species	Dose	Exposure
Disodium octaborate tetrahydrate	NOAEL in rats for effects on fertility in males is 100 mg boric acid.kg bw equivalent to 17.5 mg B/kg bw	Rat	0; 34 (5.9); 100 (17.5); and 336 (58.5) mg boric acid (mg B)/kg bw/day	Oral feeding study – Three generation feeding study, similar to OECD 416 Two-Generation Study

	NOAEL in rats for developmental effects on the fetus including fetal weight loss and minor skeletal variations is 55 mg boric acid/kg bw or 9.6 mg B/kg.	Rat	0; 19 (3.3); 36 (6.3); 55 (9.6); 76 (13.3) and 143 (25) mg boric acid (mg B)/kg bw.	Oral Feeding Study – Prenatal Developmental Toxicity Study of Boric Acid – OECD Guideline 414
	No adverse fertility effects in male workers. Epidemiological studies of human developmental effects have shown an absence of effects in exposed borate workers and populations living in areas with high environmental levels of boron.	Human	A subset of workers was exposed to 125 mg B/day.	Combined oral ingestion and inhalation – Occupational studies evaluating sensitive sperm parameters in highly exposed borate workers. Epidemiological studies evaluating high environmental exposures to boron and developmental effects in humans have been conducted.

Specific target organ toxicity (single exposure) Based on the available data, the classification criteria are not met.

Specific target organ toxicity (repeated exposure) Based on the available data, the classification criteria are not met.

Aspiration hazard Physical form of solid powder indicates no aspiration hazard potential.

Symptoms related to the physical, chemical and toxicological characteristics Products are not intended for ingestion. Small amounts (e.g. a teaspoon) swallowed accidentally are not likely to cause effects. Symptoms of accidental over-exposure to high doses of inorganic borate salts have been associated with ingestion or absorption through large areas of severely damaged skin. These may include nausea, vomiting, and diarrhea, with delayed effects of skin redness and peeling.

Delayed and immediate effects and also chronic effects from short and long term exposure Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid and sodium borate dust. Human epidemiological studies indicate no effect on fertility in occupational populations with chronic exposures to borate dust and indicate no effect to a general population with high exposures to borates in the environment.

Numerical measures of toxicity None. This product is a substance.

12. Ecological Information

Ecotoxicity (aquatic and terrestrial, where available) Note that the data values are expressed as boron equivalents. To convert to this product, divide the boron equivalent by 0.21. Studies judged to be unreliable or with insufficient information to evaluate are not included.

Freshwater

Chronic Studies

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Algal	4	10 mg B/L (Chlorella pyrenoidosa) to 50 mg B/L (Anacystis nidulans)	3, 4
Higher plants	3	4.0 mg B/L (Phragmites australis) to 60 mg B/L (Lemna minor)	5, 6
Invertebrate and protozoan	7	5.7 mg B/L (Daphnia magna) 32 mg B/L (Chironomus riparius)	7, 8
Fish	6	2.9 mg B/L (Micropterus salmoides) to 17 mg B/L (Carassius auratus)	9
Amphibian	2	29 mg B/L (Rana pipiens) to 41 mg B/L (Bufo fowlen)	9

Results[2]: Based on the complete data set of 22 species, the HC_5 value of the species sensitivity distribution is 4.05 mg B/L.

Acute Studies

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Algal	2	10 mg B/L (Chlorella pyrenoidosa) to 28 mg B/L (Selenastrum capricornutum)	3, 10
Invertebrate and protozoan	9	113 mg B/L (Ceriodaphnia dubia) to 1376 mg B/L (Chironomus decorus)	11, 12
Fish	7	80 mg B/L (Pimephales promelas) to 627 mg B/L (Onchorhynchus tschawytscha)	11, 13
Amphibian	2	86 mg B/L (Rana pipiens) to 104 mg B/L (Bufo fowlen)	9

Results[2]: Based on the complete data set from 46 studies with 20 species, the HC_5 value of the species sensitivity distribution is 27.3 mg B/L.

Classification: Based on the acute data for freshwater species, this substance is not classified as hazardous to the environment.

Marine and Estuarine Data

Chronic Studies

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Algal	2	5 mg B/L (Emiliana huxleyi) to >100 mg B/L (Agmenellum quadruplicatum, Anacystis marina, Thallassiorsira pseudonana)	4

Results: No data are available for invertebrate or vertebrate species. The results from the freshwater data set are recommended as applicable to marine and estuarine species.

Acute Studies

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Invertebrate	3	45 mg B/L (ELitopenaeus vannamei) to 83 mg B/L (Americamysis bahia)	14, 15
Fish	2	74 mg B/L (Limanda limanda) to 600 mg B/L (Oncorhynchus tschawytscha)	13, 16

No data are available for algal species.

Sediment

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Invertebrate	1	82.4 mg B/L sediment dw (Chironomus riparius)	17, 18

Results: Although limited, the data suggest that sediment organisms are within range of toxicity of aquatic organisms. In addition, the substance will not partition to the sediment, so a sediment/water partitioning approach is justified.

Sewage Treatment Plants (STP)

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Activated sludge	NA	>17.5 mg B/L to 100 mg B/L	19
Microbes	3	10 mg B/L (Opercularia bimarginata) to 20 mg B/L (Paramecium caudatum)	20

Terrestrial Data

Chronic Studies

Taxonomic Group	Number of Taxa Tested	Range of Endpoint Vales (geometric NOEC/EC10)	References
Plant	28	7.2 mg B/kg dw (Zea mays) to 56 mg B/kg dw (Allium cepa)	21, 22

Invertebrates	9	15.4 mg B/kg dw (Folsomia candida) to 87 mg B/kg dw (Caenorhabditis elegans)	23, 24
Soil micro	3	12 mg B/kg dw (nitrogen mineralization and nitrification test) to 420 mg B/kg dw (soil nitrogen transformation test)	25, 26

Results[2]: Based on the complete data set, the HC_5 value of the species sensitivity distribution is 10.8 mg B/kg dw.

Phytotoxicity: 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 borate product released to the environment.

Persistence and degradability — Biodegradation is not an applicable endpoint since the product is an inorganic substance.

Bioaccumulative Potential — This product will undergo hydrolysis in water to form undissociated boric acid. Boric acid will not biomagnify through the food chain.
Octanol/Water partition coefficient: Log Pow = -0.7570 @ 25°C (based on boric acid).

Mobility in Soil — The product is soluble in water and is leachable through normal soil. Adsorption to soils or sediments is insignificant.

Other adverse effects — None

13. Disposal Considerations

Waste from residues/ unused products — Local authorities should be consulted about any specific local requirements. Such product should, if possible, be used for an appropriate application.

Contaminated packaging — Product packaging should be recycled where possible.

14.Transport Information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International Transport Regulations

Regulatory information	UN/NA number	Proper Shipping Name	Classes/*PG	Additional Information
DOT		Not regulated		
TDG		Not regulated		
IMO/IMDG		Not regulated		
IATA (Cargo)		Not regulated		

*PG: Packing group

Special precautions for user: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

15. Regulatory Information

Clean Air Act (Montreal Protocol) – Ozone Depleting Substances (ODS) — Not manufactured with and does not contain any Class I or Class II ozone depleting substances.

Regulation (EC) No 689/2008 – Export and Import of Dangerous Chemicals — Not listed.

National Regulations — Ensure all national/local regulations are observed.

USA EPA RCRA	This product is not listed as hazardous waste under any sections of the Resource Conservation and Recovery Act (RCRA) or regulations (40 CFR 261 et seq).
EPA FIFRA	This product is a pesticide registered by the Environmental Protection Agency (EPA Reg. No. 65105-2) and is subject to certain labeling requirements under federal -pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.
Superfund: CERCLA/SARA	This product is not listed under CERCLA (Comprehensive Environmental Response Compensation and Liability Act) or its 1986 amendments, SARA (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 (SDWA)	This product 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) This product 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.
Pest Management Regulatory Agency	Registration No. 33244
Chemical Inventory Listing	**U.S. EPA TSCA Inventory:** All components are listed or exempted. **Australia inventory (AICS):** All components are listed or exempted. **Canada inventory (DSL):** All components are listed or exempted. **South Korea inventory (KECI):** All components are listed or exempted. **Japan inventory (METI & ISHL):** All components are listed or exempted. **China inventory (IECSC):** All components are listed or exempted. **New Zealand inventory (NZIoC):** All components are listed or exempted. **Philippines inventory (PICCS):** All components are listed or exempted. **Taiwan inventory (CSNN):** All components are listed or exempted.

16. Other Information, Including Date of Preparation or Last Revision

HMIS Rating

Health 1
Flammability 0
Physical Hazard 0

Date of Preparation	November 15, 2018
Date of Last Revision	April 11, 2017
Revision #	2.0
More Information	1-253-333-8118
Prepared by	N. Kim, System Three Resins Inc.

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