

## SECTION 1. Identification of the Substance and the Company

### 1.1. Product identifier

**Substance name :** Disodium octaborate tetrahydrate

**Trade name :** ETİDOT-67 (Disodium octaborate tetrahydrate)

**Chemical name/synonyms:** Disodium octaborate tetrahydrate

**Index No :** 005-020-00-3

**CAS No :** 12280-03-4

**EC No :** 234-541-0

**REACH Registration number :** 01-2119490860-33-0001

### 1.2. Relevant identified uses of the substance and uses advised against

#### Relevant identified uses

The product is used in industrial manufacturing and formulation, among others in:

- Agriculture (micronutrient, insecticide)
- Wood protection (insecticide, fungicide)
- Flame retardant

For area-specific use, see the exposure scenarios in the annex of this extended Safety Data Sheet (eSDS).

#### Uses advised against

Not applicable, there are no uses of Disodium octaborate tetrahydrate advised against.

### 1.3. Details of the supplier of the safety data sheet

#### Importer

**Name :** AB ETIPRODUCTS OY

**Address :** Piispanportti 5, 02240 Espoo/FINLAND

**Phone No :** + 358 9 819 444 40

**Fax No :** + 358 9 819 444 44

**e-mail :** sales@etiproducts.com

#### Manufacturer

**Name :** ETİ MADEN İŞLETMELERİ GENEL MÜDÜRLÜĞÜ

**Address :** Ayvalı Mah. Halil Sezai Erkut Cad. Afra Sok. No:1/A 06010 Keçiören/Ankara TÜRKİYE

**Phone No :** +90 312 294 20 00

**Fax No :** +90 312 232 71 84

### 1.4. Emergency phone number : +49 (0)6132-84463 (24-Hour-Number) GBK GmbH

## SECTION 2. Hazard Identification

### 2.1. Classification of the substance

#### 2.1.1. Classification according to CLP (1272/2008) Regulation of EU

Repr. Cat. 1B; H360FD

Specific concentrations limits : Repr. 1B; H360FD: C  $\geq$ 0.3%

H360FD: May damage fertility or the unborn child.

Precautionary Statement Prevention : P201; P202; P280

Precautionary Statement Response : P308+P313

Precautionary Statement Storage : P405

Precautionary Statement Disposal : P501

#### 2.1.2. Additional information

For the full text of Hazard Class/Statements and Precautionary Statements see SECTION 16.3.

### 2.2. Label elements

#### 2.2.1. Label according to Regulation (EC) N°1272/2008 (CLP)

Hazard pictograms:



Signal word : Danger

Hazard Statements : H360FD: May damage fertility or the unborn child.

#### Precautionary Statements:

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.

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

P405 : Store locked up.

#### 2.2.2. According to REACH, Annex XVII

Restricted to professional users

### 2.3. Other hazards

#### Emergency overview

Etidot-67 is a white odourless, powder substance that is not flammable, combustible, or explosive, and has low acute oral and dermal toxicity.

#### Potential health effects

Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because Etidot-67 is poorly absorbed through intact skin.

#### Inhalation

Occasional mild irritation effects to nose and throat may occur from inhalation of Etidot-67 dusts at levels higher than 10 mg/m<sup>3</sup>.

#### Eye contact

Etidot-67 is non-irritating to eyes in normal industrial use.

#### Skin contact

Etidot-67 does not cause irritation to intact skin.

### Ingestion

Products containing Etidot-67 are not intended for ingestion. Etidot-67 has 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

Etidot-67 is not a known carcinogen.

### Reproductive/developmental

Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects [1]. A human study of occupational exposure to borate dust showed no adverse effect on reproduction. A recent epidemiological study and a peer reviewing report of the past epidemiological studies conducted in China didn't show any negative effect of boron on human fertility [2]. A study conducted in Turkey with boron exposed mine workers showed that mean blood concentrations of the high exposure group is ~6 times and ~9 times lower than those of the highest no effect level of boron in blood with regard to developmental and reprotoxic effects (respectively) in rats. With those findings, no unfavourable effects of boron exposure on reproductive indicators are observed in humans [3, 4].

### Potential ecological effects

Large amounts of Etidot-67 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.

### Signs and symptoms of exposure

Symptoms of accidental over-exposure to Etidot-67 have been associated with ingestion or absorption through large areas of damaged skin. These may include nausea, vomiting, and diarrheal, with delayed effects of skin redness and peeling (see SECTION 11).

## SECTION 3. Composition / Information on Ingredients

### 3.1. Substance

The product contains greater than 99.25 percent (%) Etidot-67 ( $\text{Na}_2\text{B}_8\text{O}_{13}\cdot 4\text{H}_2\text{O}$ ).

Identification Name	EC N°	CAS N°	Registration Number	Wt. %
Disodium octaborate tetrahydrate	234-541-0	12280-03-4	01-2119490860-33-0001	> 99.25
Impurities (insolubles in water, SO <sub>4</sub> , Ca, Na Mg, etc.)	-	-	-	0.01

**Etidot-67 does not have any heavy metals content.**

For other "Chemical inventory listing", please refer to SECTION 15.

## SECTION 4. First aid measures

### 4.1. Description of first aid measures

#### Skin contact

No treatment necessary because Etidot-67 does not cause irritation to intact skin.

#### Eye contact

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

### **Inhalation**

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

### **Ingestion**

If large amounts are swallowed (i.e. more than one teaspoon), contact a doctor or toxicity centre immediately.

### **4.2. Most important symptoms and effects, both acute and delayed**

N.A.

### **4.3. Indication of any immediate medical attention and special treatment needed.**

Observation only is required for adult ingestion of less than 4 grams of Etidot-67. For ingestion in excess of 4 grams, 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 [5] (see SECTION 11).

## **SECTION 5. Fire-fighting measures**

### **5.1. Extinguishing media**

Any appropriate fire extinguishing media may be used on nearby fires.

### **5.2. Special hazards arising from the substance**

Etidot-67 is not flammable, combustible or explosive. The product is itself a flame retardant.

### **5.3. Advice for firefighters**

N.A.

## **SECTION 6. Accidental release measures**

### **6.1. Personal precautions, protective equipment and emergency procedures**

Avoid dust formation. In case of exposure to high level of airborne dust, wear a personal respirator in compliance with national legislation.

### **6.2. Environmental precautions**

Etidot-67 is a water-soluble white product that may, at high concentrations cause damage to trees or vegetation by root absorption (see SECTION 12).

### **6.3. Methods and material for containment and cleaning up**

#### **Land spill**

Vacuum, shovel or sweep up Etidot-67 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 (see SECTIONS 12, 13 and 15).

### **6.4. Reference to other sections**

See SECTIONS 8 and 13 for further information.

## SECTION 7. Handling and Storage

### 7.1. Precautions for safe handling

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. Your supplier can advise you on safe handling, please contact the supplier.

### 7.2. Conditions for safe storage, including any incompatibilities

No special handling precautions are required, but dry, indoor storage is recommended. No specific requirements. Provide appropriate ventilation and store bags such as to prevent any accidental damage. The product should be kept away from strong reducing agents.

### 7.3. Specific end use(s)

See exposure scenario in Annex to the SDS

## SECTION 8. Exposure controls / Personal protection

### 8.1. Control parameters

Occupational exposure limits for dust (total and respirable) are treated by OSHA, Cal OSHA and ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust"

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

### DNEL values

Exposure pattern	Type/site of effect	Exposure route	DNEL value (for Boron)
<b>DNELs for workers</b>			
Long-term	Systemic	Inhalation	1.45 mg BA/m <sup>3</sup>
Long-term	Systemic	Dermal	4800 mg BA/day
<b>DNELs for the general public</b>			
Acute	Systemic	Oral	0.17 mg BA/kg bw/day
Long-term	Systemic	Dermal (external)	34.3 mg BA/kg bw/day
Long-term	Systemic	Dermal (systemic)	0.17 mg BA/kg bw/day
Long-term	Systemic	Inhalation	0.73 mg BA/m <sup>3</sup>
Long-term	Systemic	Oral	0.17 mg BA/kg bw/day

Source: Chemical Safety Assessment Report of disodium octaborate tetrahydrate

### PNEC values

PNEC add, freshwater, marine water = 1.35 mg B/L

PNEC add aqua intermittent = 9.1 mg B/L

PNEC add freshwater sediment, marine water sediment = 1.8 mg B/kg sediment dry weight

PNEC add, STP = 1.75 mg B/L

Source: Chemical Safety Assessment Report of disodium octaborate tetrahydrate

## 8.2. Exposure controls

### 8.2.1. Appropriate engineering controls

Maintain air concentrations below occupational exposure standards.

Use local exhaust ventilation to keep airborne concentrations of boric acid dust below permissible exposure levels. Wash hands before breaks and at the end of the workday. Remove and wash soiled clothing.

### 8.2.2. Individual protection measures, such as personal protective equipment

Individual protection measures should be preferred taking into account the Council Directive 89/966/EEC and the appropriate CEN standard.

#### Respiratory protection

In case of prolonged exposure to dust, wear a personal respirator in compliance with national/international legislation (CEN standard).

#### Eyes and hands protection

Goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

### 8.2.3. Environmental exposure controls

No special requirement.

## SECTION 9. Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Appearance	: Solid, white
Odour	: Odourless
Odour threshold	: N.A.
pH @ 20°C	: 8.5 (1.0% solution)
Melting point	: 815 °C
Boiling point	: No data available
Flash point	: Non flammable
Evaporation rate	: N.A.
Flammability (solid, gas)	: N.A.
Upper/lower flammability or explosive limits	: N.A.
Vapour pressure	: Negligible @ 20°C
Vapour density	: N.A.
Relative density	: N.A.
Solubility in water	: 9.7 % @ 20°C; 27.4 @ 40°C
Partition coefficient: n-octanol/water	: N.A.
Auto-ignition temperature	: N.A.
Decomposition temperature	: No data available
Viscosity	: N.A.
Explosive properties	: N.A.
Oxidising properties	: N.A.

### 9.2. Other information

Molecular weight	: 412.5
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## **SECTION 10. Stability and reactivity**

### **10.1. Reactivity**

Etidot-67 is a stable product.

### **10.2. Chemical stability**

Etidot-67 is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

### **10.3. 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.

### **10.4. Conditions to avoid**

Avoid contact with strong reducing agents.

### **10.5. Incompatible materials and conditions to avoid**

Avoid contact with strong reducing agents such as metal hydrides or alkali metals.

### **10.6. Hazardous decomposition products**

N.A.

## **SECTION 11. Toxicological information**

### **11.1. Information on toxicological effect**

#### **11.1.1. Substances**

##### **Acute toxicity**

Low acute oral toxicity; LD<sub>50</sub> in rats is 2,550 mg/kg of body weight (Test material: disodium octaborate) [6]

##### **Skin corrosion/ irritation**

Low acute dermal toxicity; LD<sub>50</sub> in rabbits is greater than 2,000 mg/kg of body weight [7]. Disodium octaborate tetrahydrate is poorly absorbed through intact skin. Non-irritant.

##### **Serious eye damage/ irritation**

Disodium octaborate tetrahydrate has no eye damage/irritation.

##### **Skin sensitization**

Disodium octaborate tetrahydrate is not a skin sensitizer.

##### **Germcell mutagenicity**

Disodium octaborate tetrahydrate is not mutagenic.

##### **Carcinogenicity**

Disodium octaborate tetrahydrate is not carcinogenic.

##### **Reproductive toxicity**

Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes [1]. Studies in rat, mouse and rabbit, at high doses, demonstrate developmental effects on the foetus including foetal weight loss and minor skeletal variations. The doses administered were many times in excess of those which humans would normally be exposed to [8, 9]. While boron has been shown to adversely affect male reproduction in laboratory animals, there is no clear evidence of male reproductive effects attributable to boron in studies of highly exposed workers. Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to borate dusts. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility [2]. A study conducted in Turkey with boron exposed mine workers showed that mean blood concentrations of the high exposure group is ~6 times and ~9 times lower than those of the highest no effect level of boron in blood with regard to developmental and reprotoxic effects (respectively) in rats. With those findings, no unfavourable effects of boron exposure on reproductive indicators are observed in humans [3, 4].

**STOT-single exposure**

N.A.

**STOT-repeated exposure**

N.A.

**Aspiration hazard**

Disodium octaborate tetrahydrate has no aspiration hazard.

## SECTION 12. Ecological information

### 12.1. Toxicity

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 dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert disodium octaborate tetrahydrate into equivalent boron (B) content, multiply by 0.2096.

#### 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. Disodium octaborate tetrahydrate should only be used as part of a balanced plant nutrition program preferably after soil and/or tissue analysis.

#### Algal toxicity

Green algae, *Pseudokirchneriella subcapitata*

72-hr EC<sub>50</sub> –biomass = 40 mg B/L or 191 mg disodium octaborate tetrahydrate/L [10]

#### Invertebrate toxicity <sup>(7)</sup>

Daphnia, Daphnids, *Daphnia magna*

48-hr LC<sub>50</sub> = 133 mg B/L or 635 mg disodium octaborate tetrahydrate/L [11]

#### Fish toxicity <sup>(8)</sup>

Fish, Fatheted minnow, *Pimephales promelas*

96-hr LC<sub>50</sub> = 79.7 mg B/L or 380 mg disodium octaborate tetrahydrate/L [12]

### 12.2. Persistence and degradability

Disodium octaborate tetrahydrate Boron is naturally occurring and ubiquitous in the environment. Disodium octaborate tetrahydrate decomposes in the environment to natural borate.

### 12.3. Bioaccumulative potential

Not bioaccumulative.

### 12.4. Mobility in soil

The product is soluble in water and is leachable through normal soil.

### 12.5. Results of PBT and vPvB assessment

N.A.

### 12.6. Other adverse effects

No data available.

## SECTION 13. Disposal considerations

### 13.1. Waste treatment methods

Small quantities of Etidot-67 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. Tonnage quantities of product are not recommended to be sent to landfills. Such product should, if possible, be used for an appropriate application.



## SECTION 14. Transport information

Disodium octaborate tetrahydrate has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

- 14.1. UN number** : N.A.  
**14.2. UN proper shipping name** : N.A.  
**14.3. Transport hazard class(s)** : N.A.  
**14.4. Packing group** : N.A.  
**14.5. Environmental hazards** : N.A.  
**14.6. Special precautions for user** : N.A.  
**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** : N.A.

## SECTION 15. Regulatory information

### 15.1. Safety, health and environmental regulations

**OSHA/Cal OSHA:** This SDS document meets the requirements of both OSHA (29 CFR 1910.1200) and Cal OSHA (title 8CCR 5194 (g)) hazards communication standards.

**WHMIS Classification:** Disodium octaborate tetrahydrate is classified as Class D-Division 2A under Canadian WHMIS guidelines

**Chemical Inventory Listing:** Disodium octaborate tetrahydrate 12280-03-4, appears on several chemical inventory lists including the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI&ISHL, South Korea KECI, Australia AICS, Philippines PICCS, New Zealand NZIoC and China IESCS under the CAS No. representing anhydrous form of this inorganic borate.

- U.S. EPA TSCA Inventory :12008-41-2
- Canadian DSL :12008-41-2
- EINECS : 234-541-0
- South Korea : 9312-3213
- China IESCS : 12280-03-4/12008-41-2
- New Zealand NZIoC : 12280-03-4/12008-41-2
- Philippines PICCS : 12280-03-4/12008-41-2
- Australia AICS : 12008-41-2
- Japanese CSCL : (1)-69
- South Korea KECI : KE-12358

**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 1986 amendments, including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023.40 CFR 372.65, Section 302 of SARA Extremely Hazardous Substances List, 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 300(g)-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 is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.

e) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.

**Canadian Drinking Water Guidelines:** An "Interim Maximum Acceptable Concentration" (IMAC) for boron is currently set at 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 is not listed on the 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, : Disodium octaborate tetrahydrate is approved by the FDA for use in adhesive compounds 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):** It was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

Ensure all national/local regulations are observed.

### 15.2. Chemical safety assessment

Chemical Safety Assessment of Disodium octaborate tetrahydrate has been carried out under REACH Regulation of the EU.

## SECTION 16. Other information

### 16.1. Mainly changes made to the previous version of this Material Safety Data Sheet (SDS)

This SDS complies with ISO 11014; the requirements of REACH Title IV and was updated to be in compliance with Annex II of REACH duly amended by **Commission Regulation (EU) No 2015/830 of 28 May 2015**. Following **Commission Regulation (EU) No 2017/1510 of 30 August 2017**, disodium octaborate tetrahydrate is added to the Annex XVII (Restrictions) of REACH and prohibited to consumer use.

Revision No	Revision date	Revision content
07	February 2016	<ul style="list-style-type: none"> <li>This SDS was updated in accordance with the ECHA Guidance on the Compilation of Safety data Sheets, Ver. 3.1 dated November 2015.</li> </ul>
08	January 2018	<ul style="list-style-type: none"> <li>This product is classified under Commission Regulation (EU) 2016/1179 on 19 July 2016 as Category 1B.</li> <li>This SDS was updated in line with "Standardization and Simplification of Bag Printings".</li> </ul>

### 16.2. List of abbreviation and acronyms used in this SDS

<b>ACGIH</b>	: American Conference of Governmental Industrial Hygienists
<b>AICS</b>	: Australian Inventory of Chemical Substance
<b>Cal OSHA</b>	: The State of California Division of Occupational Safety and Health (DOSH)
<b>Canadian DSL</b>	: Canadian Domestic Substances List
<b>CAS N°</b>	: Chemical Abstracts Service number
<b>CERCLA</b>	: US Comprehensive Environmental Response, Compensation, and Liability Act
<b>CLP</b>	: Classification Labelling Packaging Regulation: Regulation (EC) N°1272/2008 communication standard
<b>CSCL</b>	: Chemical Substances Control Act
<b>CSR</b>	: Chemical Safety Report
<b>DNEL</b>	: Derived No effect Level

<b>EC<sub>50</sub></b>	: Half maximal effective concentration
<b>EINECS</b>	: European INventory of Existing Commercial chemical Substances
<b>Eti Maden</b>	: Eti Maden İşletmeleri Genel Müdürlüğü
<b>IECSC</b>	: Inventory of Existing Chemical Substances Produced or Imported in China
<b>Index N°</b>	: Atomic number of the element most characteristic of the properties of the substance
<b>KECI</b>	: Korea Existing Chemicals Inventory
<b>LC<sub>50</sub></b>	: Lethal Concentration, 50%
<b>LD<sub>50</sub></b>	: Median Lethal Dose
<b>N.A.</b>	: Not Applicable
<b>NZIoC</b>	: New Zealand Inventory of Chemicals
<b>OSHA</b>	: Occupational Safety & Health Administration
<b>PBT</b>	: Persistent, Bioaccumulative and Toxic substance
<b>PEL</b>	: Permissible Exposure Limits
<b>PICCS</b>	: Philippines Inventory of Chemicals and Chemical Substances
<b>PNEC</b>	: Predicted No Effect Concentration
<b>RCRA</b>	: Resource Conservation and Recovery Act.
<b>REACH</b>	: Registration, Evaluation, Authorisation and Restrictions of Chemicals Regulation (EC) N°1907/2006
<b>SARA</b>	: US Superfund Amendments and Reauthorization Act amended the CERCLA
<b>SDS</b>	: Safety Data Sheet
<b>TLV</b>	: Threshold Limit Value
<b>U.S. EPA TSCA</b>	: United States Environmental Protection Agency Toxic Substances Control Act
<b>UN</b>	: United Nations
<b>vPvB</b>	: Very Persistent and Very Bioaccumulative
<b>WHMIS</b>	: Workplace Hazardous Materials Information System is Canada's national hazard

### 16.3. List of relevant hazard statements and precautionary statements used in this SDS

<b>Hazard Statement</b>
<b>H360FD</b> : May damage fertility or the unborn child.
<b>Precautionary Statements</b>
<b><u>Prevention</u></b>
<b>P201</b> : Obtain special instructions before use.
<b>P202</b> : Do not handle until all safety precautions have been read and understood.
<b>P280</b> : Wear protective gloves/protective clothing/eye protection/face protection.
<b><u>Response</u></b>
<b>P308+P313</b> : If exposed or concerned: get medical advice/attention.
<b><u>Storage</u></b>
<b>P405</b> : Store locked up.
<b><u>Disposal:</u></b>
<b>P501</b> : Dispose of contents/container to in accordance with local regulations.

#### 16.4. Key literature references and sources for data

- [1] Fail, P.A., George, J.D., Seely, J.C., Grizzle, T.B., & Heindel, J.J. (1991). Reproductive toxicity of boric acid in Swiss (CD-1) mice: Assessment using the continuous breeding protocol. *Fundamental and Applied Toxicology*, 17(2), 225-239.
- [2] Scialli, A.R., Bonde, J.P., Brüske-Hohlfeld, I., Culver, D.B., Li, Y., & Sullivan, F.M. (2010). An overview of male reproductive studies of boron with an emphasis on studies of highly exposed Chinese workers. *Reproductive Toxicology*, 29(1), 10-24.
- [3] Duydu, Y., Başaran, A., & Bolt, H. (2012). Exposure assessment of boron in Bandırma boric acid production plant. *Journal of Trace Elements in Medicine and Biology*, 26(2-3), 161-164.
- [4] Başaran, N., Duydu, Y., & Bolt, H. (2012). Reproductive toxicity in boron exposed workers in Bandırma, Turkey. *Journal of Trace Elements in Medicine and Biology*, 26(2-3), 165-167.
- [5] Litovitz, T.L., Norman, S.A., & Veltri, J.C. (1986). Annual Report of the American Association of Poison Control Centers National Data Collection System. *The American Journal of Emergency Medicine*, 4(5), 427-458.
- [6] Denton, S.M. (1996). Acute oral toxicity study in the rat: anhydrous boric acid. Final report. Testing laboratory: Corning Hazleton (Europe) Otley Road, Harrogate, North Yorkshire, UK. Report no.: 1341/7-1032. Owner Company: Borax Europe Ltd. Report date: 1996-03-06.
- [7] Weiner, A.S., Conine, D.L., & Doyle, R.L. (1982). Acute Dermal Toxicity Screen in Rabbits; Primary Skin Irritation Study in Rabbits of Boric Acid. Testing laboratory: Hill Top Research, Inc. Report no.: 82-0280-21. Owner Company: US Borax Chemical Corporation. Report date: 1982-03-15.
- [8] Heindel, J.J., Price, C.J., Field, E.A., Marr, M.C., Myers, C.B., Morrissey, R.E. & Schwetz, B.A. (1992). Developmental toxicity of boric acid in mice and rats. *Fundamental and Applied Toxicology*, 18(2), 266-277.
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For general information on the toxicology of borates see ECETOC Technical Report No. 63 (1995); Patty's Industrial Hygiene and Toxicology, 4th Edition Vol. II, (1994) Chap. 42, 'Boron'.

### **16.5. Disclaimer of Liability**

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