

BOROKSİT

SAFETY DATA SHEET

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ETİ MADEN İŞLETMELERİ GENEL MÜDÜRLÜĞÜ

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

SECTION 1. Identification

1.1. GHS Product Identifier

BOROKSİT (Boron oxide)

1.2. Other means of identification

Chemical name/synonyms: Boron oxide, boron trioxide, diboron trioxide, anhydrous boric acid, boric oxide

1.3. Recommended use of the chemical and restrictions on use

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

- Ceramics
- Detergent
- Borosilicate glass
- Textile fiberglass

There is no restriction on use of chemical.

1.4. Supplier's details

Name : ETİ MADEN İŞLETMELERİ GENEL MÜDÜRLÜĞÜ

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SECTION 2. Hazard Identification

2.1. Classification of the substance

Reproductive toxicant, Category 2

H361d: Suspected of damaging the unborn child

Acute Oral 5

H303: May be harmful if swallowed.

2.2. GHS Label elements, including precautionary statements



H361d: Suspected of damaging the unborn child

H303 : May be harmful if swallowed

Warning

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.

P312: Call a POISON CENTER/doctor/physician if you feel unwell.

P405: Store locked up.

2.3. Other hazards which do not result in classification

Boroksit is a white odourless solid (glassy/porous) 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 Boroksit is poorly absorbed through intact skin.

Inhalation

Occasional mild irritation effects to nose and throat may occur from inhalation of Boroksit dusts at levels higher than 10 mg/m³.

Eye contact

Boroksit is non-irritating to eyes in normal industrial use.

Skin contact

Boroksit does not cause irritation to intact skin.

Ingestion

Products containing Boroksit are not intended for ingestion. Boroksit 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.

Potential ecological effects

Large amounts of Boroksit can be harmful to plants and other species. Therefore releases to the environment should be minimized.

Signs and symptoms of exposure

Symptoms of accidental over-exposure to Boroksit 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.

SECTION 3. Composition / Information on Ingredients

3.1. Substances

The product contains greater than 98.0 percent (%) Boroksit (B₂O₃).

Chemical Name	CAS No	EC No	Purity, %
Boron Oxide (Boron trioxide, diboron trioxide, anhydrous boric acid, boric oxide)	1303-86-2	215-125-8	min. 98.0

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 Boroksit does not cause irritation to intact skin.

Eye contact

No treatment necessary because non-irritant.

Inhalation

If symptoms such as nose or throat irritation are observed, remove person to fresh air. Boroksit has low inhalation toxicity.

Ingestion

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

Note to physicians

Observation only is required for adult ingestion of less than 4 grams of Boroksit. 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 [1] (see section 11).

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

N.A.

SECTION 5. Fire-fighting measures

5.1. Suitable extinguishing media

Any fire extinguishing media may be used on nearby fires.

5.2. Specific hazards arising from the chemical

Boroksit is not flammable, combustible or explosive. The product is itself a flame retardant.

5.3. Special protective actions for fire-fighters

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

Boroksit 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 Boroksit 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).

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 and dust prevention 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

Dry, indoor storage is recommended since the product is highly hygroscopic. The product should be kept away from strong reducing agents.

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

8.2. Appropriate engineering controls

Maintain air concentrations below occupational exposure standards.

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

8.3. Individual protection measures, such as personal protective equipment (PPE)

Respiratory protection

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

Eyes and hands protection

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

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	: White solid, glassy/porous
Odour	: Odourless
Odour threshold	: N.A.
pH @ 20°C	: 4.4 (1.0% solution)
Melting point	: 450°C
Boiling point	: 1860°
Flash point	: Non flammable
Evaporation rate	: N.A.
Flammability	: N.A.
Upper/lower flammability or explosive limits	: Non explosive
Vapour pressure	: Negligible @ 20°C
Relative density	: N.A.
Solubility in water	: 2.7% @ 20°C
Heat of hydration to boric acid	: 75.94 kJ/mol
Partition coefficient: n-octanol/water	: N.A.
Auto-ignition temperature	: N.A.
Decomposition temperature	: N.A.
Viscosity	: N.A.

9.2. Other information

Molecular weight	: 69.6
Specific gravity	: 2.04 @ 20°C

SECTION 10. Stability and reactivity

10.1. Reactivity

Boroksit is a stable product.

10.2. Chemical stability

Boroksit is a stable but hygroscopic product which absorbs moisture from the air. If moisture is present, Boroksit may cause corrosion of base metals.

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

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; LD50 in rats > 2,600 mg/kg of body weight (Test material: Boron oxide) [2].

Skin corrosion/irritation

Low acute dermal toxicity; LD50 in rabbits is greater than 2,000 mg/kg of body weight [3]. Boron oxide is poorly absorbed through intact skin. Non-irritant.

Serious eye damage/irritation

Boron oxide has no eye damage/irritation.

Respiratory or skin sensitization

Boron oxide has no respiratory or skin sensitization.

Germ cell mutagenicity

Boron oxide is not mutagenic.

Carcinogenicity

Boron oxide is not carcinogenic.

Reproductive toxicity

Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes [4]. 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 [5, 6]. 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. An epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility. [7]. Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to borate dusts. 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 [8, 9].

STOT-single exposure

N.A.

STOT-repeated exposure

N.A.

Aspiration hazard

Boron oxide 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 boron oxide into equivalent boron (B) content, multiply by 0.3105.

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, *Pseudokirchneriella subcapitata*

72-hr EC₅₀ – biomass = 40 mg B/L, or 129 mg boron oxide/L [10]

Invertebrate toxicity

Daphnia, Daphnids, *Daphnia magna*

48-hr LC₅₀ = 133 mg B/L or 428 mg boron oxide/L [11]

Fish toxicity

Fish, Fathead minnow, *Pimephales promelas*

96-hr LC₅₀ = 79.7 mg B/L or 256 mg boron oxide/L [12]

12.2 Persistence and degradability

Boron is naturally occurring and ubiquitous in the environment. Boron oxide 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 Other adverse effects

No data available.

SECTION 13. Disposal considerations

13.1. Disposal methods

Small quantities of Boroksit 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

Boron oxide 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 of hazard classes : 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 MARPOL 73/78 and the IBC Code: N.A.

SECTION 15. Regulatory information

15.1. Safety, health and environmental regulations

It should be noted that borates are safe under conditions of normal handling and use, besides, they are essential nutrients to plants, and research shows that they play a beneficial role in human health. CLP classification has been solely based on animal tests where animals were exposed to high doses of boric acid over long periods of time. These doses were many times higher than humans are exposed to under conditions of normal handling and use. Consequently, a precautionary decision was taken by the European Commission. Although we will comply with the body of legislation triggered by that decision, we are in process of all possible legal actions.

Clean Air Act (Montreal Protocol)

Boron oxide was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

Chemical inventory listing

U.S. EPA TSCA	: 1303-86-2
Canadian DSL	: 1303-86-2
EINECS	: 215-125-8
South Korea KECI	: KE-09919
South Korea PECs	: 231
Japan ENCS	: MITI 1-71, MITI 9-2403
China IESCS	: 1303-86-2
New Zealand NZIoC	: 1303-86-2
Philippines PICCS	: 1303-86-2
Australia AICS	: 1303-86-2

Ensure all national/local regulations are observed.

SECTION 16. Other information

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

This SDS complies with ISO 11014; the requirements of UN-GHS.

Revision No	Revision Date	Revision content
05	January 2016	<ul style="list-style-type: none"> This SDS was updated in accordance with the GHS (Rev.6) (2015)-Guidance on the Compilation of Safety data Sheets. This SDS was updated in line with “Eti Maden Corporate Identity”
06	January 2018	<ul style="list-style-type: none"> This SDS was updated in line with “Standardization and Simplification of Bag Printings”

16.2. List of abbreviation and acronyms used in this SDS

ACGIH	: American Conference of Governmental Industrial Hygienists
Acute Oral Cat.5:	Substance which is of relatively low acute oral toxicity.
AICS	: Australian Inventory of Chemical Substances
Cal OSHA	: The State of California Division of Occupational Safety and Health (DOSH)
Canadian DSL	: Canadian Domestic Substances List
CAS No	: Chemical Abstracts Service number
EC No	: EINECS Number: European Inventory of Existing Commercial Substances
EC₅₀	: Half maximal effective concentration
ENCS	: Japan Inventory of Existing and New Chemical Substances
Eti Maden	: Eti Maden İşletmeleri Genel Müdürlüğü
GHS	: Globally Harmonised System of Classification and Labelling
IECSC	: Inventory of Existing Chemical Substances Produced or Imported in China
Index N°	: Atomic number of the element most characteristic of the properties of the substance
KECI	: South Korea Existing Chemicals List
LC50	: Lethal Concentration, 50%
LD50	: Median Lethal Dose
N.A.	: Not Applicable
NZIoC	: New Zealand Inventory of Chemicals
OSHA	: Occupational Safety & Health Administration
PECs	: South Korea Priority Existing Chemicals
PEL	: Permissible Exposure Limits
PICCS	: Philippines Inventory of Chemicals and Chemical Substances
Repr. Cat. 2	: Substance presumed human reproductive toxicant
SDS	: Safety Data Sheet
TLV	: Threshold Limit Value
U.S. EPA TSCA	: United States Environmental Protection Agency Toxic Substances Control Act
UN	: United Nations

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

Hazard Statement
H361d: Suspected of damaging the unborn child H303: May be harmful if swallowed
Precautionary Statements
<u>Prevention</u> 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.
<u>Response</u> P308+P313: If exposed or concerned: get medical advice/attention. P312: Call a POISON CENTER/doctor/physician if you feel unwell
<u>Storage</u> P405: Store locked up.
<u>Disposal:</u> P501: Dispose of contents/container to in accordance with local regulations.

16.4. References

- [1] 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.
- [2] 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.
- [3] 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.
- [4] 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.
- [5] 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.
- [6] Price, C.J., Marr, M.C., Myers, C.B., Heindel, J.J., & Schwetz, B.A. (1991). Final Report on the Developmental Toxicity of Boric Acid (CAS No 10043-35-3) in New Zealand White Rabbits. National Toxicology Program, National Institute of Environmental Health Sciences. Testing laboratory: National Toxicology Program, National Institute of Environmental Health Sciences (TER 90-003; NTIS Accession No PB92-129550). Report no.: TER 90-003; NTIS Accession No PB92-129550.
- [7] 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.
- [8] 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.

- [9] 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.
- [10] Hanstveit, A.O. & Oldersma, H. (2000). Determination of the effect of Boric acid, Manufacturing grade on the growth of the fresh water green alga *Selenastrum capricornutum*. Testing laboratory: TNO Nutrition and Food Research Institute. Report no.: V99.157. Owner Company: Borax Europe Limited. Study number: IMW-99-9047-05. Report date: 2000-03-06.
- [11] Gersich, F.M. (1984a). Evaluation of a Static Renewal Chronic Toxicity Test Method for *Daphnia magna* using Boric Acid. *Environmental Toxicology and Chemistry*, 3(1), 89-94.
- [12] Soucek, D., Dickinson, A., & Major, K. (2010). Acute and chronic toxicity of boron to freshwater organisms. Testing laboratory: Illinois Natural History Survey, University of Illinois, Champaign, Illinois. Owner Company: Illinois Natural History Survey, University of Illinois.

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

The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its accuracy, reliability or completeness. The conditions or methods of handling, storage use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use.

This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

Safety Data Sheet Prepared by Arzu DEMİŞ

Certificate Date: 30.09.2015

Certificate Number: 01.58.04

Safety Data Sheet Prepared by Zeynep GÜRTÜRK

Certificate Date: 30.09.2015

Certificate Number: 01.58.07