

ETİ MINE WORKS
GENERAL MANAGEMENT

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TECHNOLOGY & DEVELOPMENT
DEPARTMENT

BORIC ACID HEALTH AND SAFETY DATA SHEET

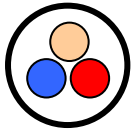
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July 2007
(Safety Data Sheet in compliance with REACH Title IV / Annex II and ISO 11014)



1. Identification of the Substance / Preparation and the Company / Undertaking

1.1. Identification of the substance or preparation

Boric Acid

Registration number:

To be registered under REACH Regulation (CAS No: 10043-35-3).

Trade names : Boric Acid

Chemical name/synonyms : Boric acid, Orthoboric acid, boracic acid

1.2. Use of the substance / preparation

The product is used in industrial manufacturing, in particular in:

- Ceramics
- Cosmetics
- Detergent
- Borosilicate glass
- Textile fibreglass

1.3. Company/undertaking identification

Importer :

Name : AB ETIPRODUCTS OY,

Address : PIISPANPORTTI 9, 02240 ESPOO- FINLAND

Phone No : +358 9 819 4440

Fax No : +358 9 819 444 44

e-mail : sales@etiproducts.com

Manufacturer:

Name : ETİ MINE WORKS GENERAL MANAGEMENT

Address : Sıhhiye, Cihan Sok. No:2, 06430, Ankara, Türkiye.

Phone No : 00 90 312 294 23 42

Fax No : 00 90 312 232 59 10

1.4. Emergency phone number: 00 90 312 294 23 45 (Available office hours)
: 00 90 312 232 59 10 (Available office hours)

2. Hazards Identification

Emergency overview

Boric acid is a white odourless, powdered 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 boric acid is poorly absorbed through intact skin.

Inhalation

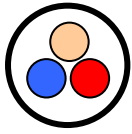
Occasional mild irritation effects to nose and throat may occur from inhalation of boric acid dusts at levels greater than 10 mg/m³.

Eye contact

Boric acid is non-irritating to eyes in normal industrial use.

Skin contact

Boric acid does not cause irritation to intact skin.



Ingestion

Products containing Boric Acid are not intended for ingestion. Boric Acid has a 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.

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.

Potential ecological effects

Large amounts of Boric Acid 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 Boric Acid have been associated with ingestion or absorption through large areas of damaged skin. These may include nausea, vomiting and diarrhoea, with delayed effects of skin redness and peeling.

Refer to section 11 for details on Toxicological data.

3. Composition / Information on Ingredients

3.1. Chemical composition:

Chemical Nature of the Substance / Preparation

The product contains greater than 99.9 percent (%) boric acid (H_3BO_3).

Components

CAS- N°	EINECS	Name	EC Classification
10043-35-3	233-139-2	Boric acid	no classification

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

4. First aid measures

Skin contact

No treatment necessary because non-irritating.

Eye contact

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

Inhalation

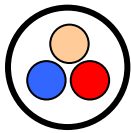
If symptoms such as nose or throat irritation are observed, remove person to fresh air.

Ingestion

If large amounts are swallowed (i.e. more than one teaspoon), give two glasses of water or milk to drink and seek medical attention.

Note to physicians

Observation only is required for adult ingestion of less than 6 grams of boric acid. For ingestion in excess of 6 grams, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only. Haemodialysis 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).



5. Fire-fighting measures

General hazard

None, because boric acid 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.

6. Accidental release measures

Personal precautions

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

Environmental precautions

Boric acid is a water-soluble white powder that may, at high concentrations cause damage to trees or vegetation by root absorption (see section 12).

Methods for cleaning up (Land spill)

Vacuum, shovel or sweep up boric acid 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).

7. Handling and Storage

7.1. Safe Handling Advice and storage

To maintain package integrity and to minimise 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 minimise dust generation and accumulation. Your supplier can advise you on safe handling, please contact the supplier.

7.2. Storage

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.

7.3. Specific Use(s)

The product should be kept away from strong reducing agents. Apply above handling advice when mixing with other substances.

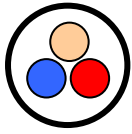
8. Exposure controls / Personal protection

8.1. Exposure limit values

Respect regulatory provisions for dust (total and respirable).

- *Occupational exposure limits : Boric acid 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/m³

8.2. Exposure controls

8.2.1. OCCUPATIONAL EXPOSURE CONTROLS

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.

- *Respiratory protection*

In case of prolonged exposure to dust wear a personal respirator in compliance with national legislation (make reference to the appropriate CEN standart)

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

- *Eyes and hands protection*

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

8.2.2. ENVIRONMENTAL EXPOSURE CONTROLS

No special requirement.

9. Physical and chemical properties

9.1. General information

Physical state	crystalline solid
Colour	white
Odour	odourless
Molecular weight	61.83
Bulk density	780-815 kg/m ³
Specific gravity	1.51

9.2. Important health, safety and environmental information

Melting temperature	171°C (heated in closed space)
Boiling point	Not applicable
Flash point	Non flammable
Explosion hazard	Non explosive
Solubility in water	4.7% @ 20°C; 27.5% @ 100°C
Vapour pressure	Negligible @ 20°C
pH @ 20°C	6.1 (0.1 % solution) 5.1 (1.0% solution) 3.7 (4.7 % solution)

10. Stability and Reactivity

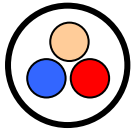
General

Boric acid is a stable product, but when heated it loses water, first forming metaboric acid (HBO₂), and on further heating it is converted into boric oxide (B₂O₃).

Hazardous decomposition or polymerisation

None

Incompatible materials and conditions to avoid:



Boric acid reacts as a weak acid which may cause corrosion of base metals. Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.

11. Toxicological information

11.1. Acute effects

Ingestion^[2]

Low acute oral toxicity; LD₅₀ in rats is 3,500 to 4,100 mg/kg of body weight.

Skin

Low acute dermal toxicity; LD₅₀ in rabbits is greater than 2,000 mg/kg of body weight. Boric acid is poorly absorbed through intact skin.

Inhalation

Low acute inhalation toxicity; LC₅₀ in rats is greater than 2.0 mg/l (or g/m³).

Skin irritation

Non-irritant.

Eye irritation

Non-irritant. Fifty years of occupational exposure to boric acid indicate no adverse effects on human eye.

Sensitisation

Boric acid is not a skin sensitiser.

11.2. Chronic effects

Reproductive/Developmental toxicity

Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes^[2]. 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^[3,4,5].

Carcinogenicity/Mutagenicity

Not a carcinogen.

Not a mutagen.

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.

12. Ecological information

Not persistent, not bioaccumulative.

ECOTOXICITY DATA

General

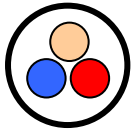
Boron occurs naturally in sea water at an average concentration of 5 mg B/l and fresh water at 1 mg B/l or less. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert boric acid into equivalent boron (B) content, multiply by 0.1748.

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 minimise the amount of borate product released to the environment.

Algal toxicity^[6]

Green algae, *Scenedesmus subspicatus*



96-hr EC₁₀ = 24 mg B/l †

Invertebrate toxicity^[7]

Daphnids, *Daphnia magna* Straus
48-hr LC₅₀ = 133 mg B/l ‡
21-day NOEC-LOEC = 6-13 mg B/l ‡

Fish toxicity

Sea water^[8]:

Dab, *Limanda limanda* 96-hr LC₅₀ = 74 mg B/l †

Fresh water^[9]:

Rainbow trout, *Salmo gairdneri* (embryo-larval stage)
24-day LC₅₀ = 150 mg B/l ‡
32-day LC₅₀ = 100 mg B/l ‡
Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC₅₀ = 46 mg B/l ‡
3-day LC₅₀ = 178 mg B/l ‡

Test substance: † Sodium tetraborate
‡ Boric acid

ENVIRONMENTAL FATE DATA

Persistence/Degradation

Boron is naturally occurring and ubiquitous in the environment. Boric acid decomposes in the environment to natural borate.

Octanol/Water partition coefficient

Log P_{ow} = -0.7570 at 25°C.

Soil mobility

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

13. Disposal considerations

Disposal guidance

Small quantities of boric acid 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.

14. Transport information

International transportation

Boric acid has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

15. Regulatory information

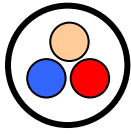
General

Ensure all national/local regulations are observed.

Clean Air Act (Montreal Protocol)

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

Cosmetics



The EC Directive 76/768/EEC sets an upper limit of 5% Boric acid in talcs, 0.5% in oral hygiene products and 3% in other products. In addition, the talcs should not be used on children under 3 years of age.

Chemical inventory listing

- | | |
|---------------------------|------------|
| - U.S. EPA TSCA Inventory | 10043-35-3 |
| - Canadian DSL | 10043-35-3 |
| - EINECS | 233-139-2 |
| - South Korea | 1-439 |
| - Japanese MITI | (1)-63 |

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. (1986), 4, 427-458
2. Weir R J, Fisher R S, Toxicol. Appl. Pharmacol., (1972), 23, 351-364
3. National Toxicology Program (NTP) – Technical Report Series No. TR324, NIH Publication No. 88-2580 (1987), PB88 213475/XAB
4. Fail *et al.*, Fund. Appl. Toxicol. (1991) 17, 225-239
5. Heindel *et al.*, Fund. Appl. Toxicol. (1992) 18, 266-277
6. Guhl W, SÖFW-Journal (1992) 181 (18/92), 1159-1168
7. Schöberl P, Marl and Huber L (1988) Tenside Surfactants Detergents 25, 99-107
8. Hugman S J and Mance G (1983) Water Research Centre Report 616-M
9. Birge W J, Black J A, EPA-560/-76-008 (April 1977) PB 267 085

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'.