BORIC ACID
HEALTH AND SAFETY DATA SHEET

Date of Issue : March 2007
Revision No : 3
Date of Revision : July 2008

July 2008
(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:
Pre-registration number under REACH Regulation: 05-2114097659-27-0000
To be registered till 30/11/2010.

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:

Exporter:
Name: ETI MADEN ISLETMELERI GENEL MUDURLUGU (Turkish name)
name: ETI MINE WORKS GENERAL MANAGEMENT (English name)
Address:
Phone No: 00 90 312 294 23 42
Fax No: 00 90 312 232 59 10

Manufacturer:
Name: ETI MADEN ISLETMELERI GENEL MUDURLUGU (Turkish name)
Name: ETI MINE WORKS GENERAL MANAGEMENT (English name)
Address:

1.4. Emergency phone number: 00 90 312 294 23 45 (Available office hours)
Fax No: 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 (H₃BO₃).

Components

<table>
<thead>
<tr>
<th>CAS-No</th>
<th>EINECS</th>
<th>Name</th>
<th>EC Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>10043-35-3</td>
<td>233-139-2</td>
<td>Boric acid</td>
<td>no classification</td>
</tr>
</tbody>
</table>

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”

<table>
<thead>
<tr>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH/TLV</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td>Cal OSHA/PEL</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td>OSHA/PEL (total dust)</td>
<td>15 mg/m³</td>
</tr>
<tr>
<td>OSHA/PEL (respirable dust)</td>
<td>5 mg/m³</td>
</tr>
</tbody>
</table>

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 standard)
  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/m³
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
Green algae, Scenedesmus subspicatus
96-hr EC$_{10}$ = 24 mg B/l $^\dagger$

Invertebrate toxicity
Daphnids, Daphnia magna Straus
48-hr LC$_{50}$ = 133 mg B/l $^\dagger$
21-day NOEC-LOEC = 6-13 mg B/l $^\dagger$

Fish toxicity
Sea water:
Dab, Limanda limanda 96-hr LC$_{50}$ = 74 mg B/l $^\dagger$

Fresh water:
Rainbow trout, Salmo gairdneri (embryo-larval stage)
24-day LC$_{50}$ = 150 mg B/l $^\dagger$
32-day LC$_{50}$ = 100 mg B/l $^\dagger$
Goldfish, Carassius auratus (embryo-larval stage)
7-day LC$_{50}$ = 46 mg B/l $^\dagger$
3-day LC$_{50}$ = 178 mg B/l $^\dagger$

Test substance: $^\dagger$ Sodium tetraborate
$^\ddagger$ 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