



Optibor[®]

Boric Acids

Safety Data Sheet

DATE OF ISSUE July 1999
Supersedes USBA1 August 1997
and USOPTTG January 1999 Versions

1 Chemical product and company identification

Product names*: Optibor TG, Optibor TP,
Optibor NF, Optibor SQ
Product use: Industrial manufacturing
Chemical formula: H_3BO_3
Chemical name/synonyms: Boric acid, Orthoboric acid,
Boracic acid
Chemical family: Inorganic Borates
CAS registry number: 10043-35-3

(Refer to section 15 Chemical inventory listing information)

ISSUED BY: Borax Europe Limited
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United Kingdom

EMERGENCY PHONE NUMBER
(44) 1483 734000

* *Optibor* in the text refers to all the products listed under 'Product names'.

2 Composition/information on ingredients

This product contains greater than 99.9 percent (%) boric acid (H_3BO_3). *Optibor* is not classified as dangerous under the EC

Directive 67/548/EEC and subsequent amendments.

3 Hazard identification

Emergency overview

Optibor is a white odourless, powdered substance that is *not* flammable, combustible, or explosive, and has low acute oral and dermal toxicity.

Potential ecological effects

Large amounts of *Optibor* can be harmful to plants and other species. Therefore releases to the environment should be minimised.

Potential health effects

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

Inhalation: Occasional mild irritation effects to nose and throat may occur from inhalation of *Optibor* dusts at levels greater than 10 mg/m^3 .

Eye contact: *Optibor* is non-irritating to eyes in normal industrial use.

Skin contact: *Optibor* does not cause irritation to intact skin.

Ingestion: Products containing *Optibor* are *not* intended for ingestion. *Optibor* has low acute toxicity. Small amounts (e.g. a teaspoonful) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.

Cancer: *Optibor* is not a known carcinogen.

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.

Signs and symptoms of exposure: Symptoms of accidental over-exposure to *Optibor* 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 (see section 11).

4 First aid measures

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

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

Skin contact: No treatment necessary because non-irritating.

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.

Note to physicians

Observation only is required for adult ingestion of less than 6 grams of *Optibor*. 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 treatment¹ (see section 11)



5 Fire-fighting measures

General hazard: None, because *Optibor* 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

General: *Optibor* is a water-soluble white powder that may cause damage to trees or vegetation by root absorption (see section 12).

Land spill: Vacuum, shovel or sweep up *Optibor* 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

General: No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity and to minimise caking of the product, bags should be handled on a first-in first-out basis. Good housekeeping procedures should be followed to minimise dust generation and accumulation.

Storage temperature: Ambient

Storage pressure: Atmospheric

Special sensitivity: Moisture (Caking)

8 Exposure controls/personal protection

Engineering controls: Use local exhaust ventilation to keep airborne concentrations of *Optibor* dust below permissible exposure levels.

Personal protection: Where airborne concentrations are expected to exceed exposure limits, respirators should be used. Eye goggles and gloves are not required for normal industrial

exposures, but may be warranted if environment is excessively dusty.

Occupational exposure limits: Boric acid is treated by ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust". The ACGIH: TLV (Threshold Limit Value) is 10 mg/m³.

9 Physical and chemical properties

Appearance: White, odourless, crystalline solid

Specific gravity: 1.51

Vapour pressure: Negligible @ 20°C

Solubility in water: 4.7% @ 20°C; 27.5% @ 100°C

Melting point: 171°C (340°F) (Heated in closed space)

pH @ 20°C: 6.1 (0.1% solution)

5.1 (1.0% solution)

3.7 (4.7% solution)

Molecular weight: 61.83

10 Stability and reactivity

General: *Optibor* 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).

Incompatible materials and conditions to avoid: *Optibor* 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.

Hazardous decomposition: None.

11 Toxicological information

Acute toxicity

Ingestion: 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. *Optibor* 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 *Optibor* indicate no adverse effects on human eye. *Optibor* is a constituent of eye lotions.

Sensitisation: *Optibor* is not a skin sensitiser.

Other

Reproductive/developmental toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes². 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: No evidence of carcinogenicity in mice. No mutagenic activity was observed for boric acid in a battery of short-term mutagenicity assays.

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

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 *Optibor* 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 toxicity⁶:

Green algae, *Scenedesmus subspicatus*
96-hr EC₁₀ = 24 mg B/l[†]

Invertebrate toxicity⁷:

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

Test substance [†] Sodium tetraborate
 [‡] *Optibor*

Fish toxicity:

Sea water⁸:

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

Fresh water⁹:

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[†]

Environmental fate data

Persistence/Degradation: Boron is naturally occurring and ubiquitous in the environment. *Optibor* decomposes in the environment to natural borate.

Octanol/Water partition coefficient: Log P_{ow} = -0.7570 at 25°C.

Soil mobility: *Optibor* is soluble in water and is leachable through normal soil.

13 Disposal considerations

Disposal guidance: Small quantities of *Optibor* 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: *Optibor* has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

15 Regulatory information

Chemical inventory listing: (10043-35-3) Boric acid appears on several chemical inventory lists (including the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI, Australian, and Korean) sometimes under the CAS No. representing the anhydrous form of this inorganic salt.

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

General: Ensure all national/local regulations are observed.

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.

Clean Air Act (Montreal Protocol): *Optibor* was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

16 Other information

References

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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

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