

# Granubor<sup>®</sup> Natur

## Sodium Borate

### 1 Chemical product and company identification

**Product name:** Granubor Natur  
**Grades:** Technical  
**Product use:** Fertiliser manufacture;  
Micronutrient fertiliser  
**Chemical name/synonyms:** Sodium tetraborate  
pentahydrate, disodium  
tetraborate pentahydrate,  
borax pentahydrate  
**Chemical family:** Inorganic Borates

**SUPPLIED BY:** Borax Europe Limited  
1A Guildford Business Park  
Guildford, GU2 8XG  
United Kingdom

**EMERGENCY PHONE NUMBER**  
**(44) 1483 242000**

### 2 Composition/information on ingredients

**Substance:** Sodium tetraborate pentahydrate  
**% Content:** ≥ 98%  
**Formula:** Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·5H<sub>2</sub>O  
**CAS#:** 12179-04-3  
**EINECS:** 215-540-4  
(Refer to section 15 – ‘Chemical inventory listing’)

Granubor Natur is not classified as dangerous under the EC Directive 67/548/EEC and subsequent amendments.

### 3 Hazard identification

#### Overview

Granubor Natur is an odourless, white granular substance that is *not* flammable, combustible, or explosive, and has low acute oral and dermal toxicity.

#### Potential ecological effects

Large amounts of Granubor Natur can be harmful to plants and other species. Therefore releases to the environment should be minimised, except when its use on farms has been recommended to correct a boron deficiency.

#### Potential health effects

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

**Inhalation:** Occasional mild irritation effects to nose and throat may occur from inhalation of Granubor Natur dusts at levels greater than 10 mg/m<sup>3</sup>.

**Eye contact:** Granubor Natur is a mild eye irritant.

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

**Ingestion:** Products containing Granubor Natur are *not* intended for ingestion. Granubor Natur 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:** Granubor Natur 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 Granubor Natur 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 7 grams of Granubor Natur. For ingestion in excess of 7 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<sup>1</sup> (see section 11).

## 5 Fire-fighting measures

**General hazard:** None, because *Granubor* Natur 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:** *Granubor* Natur is a water-soluble white granule that may cause damage to trees or vegetation by root absorption. (Refer to section 12, Ecological information, for specific information.)

**Land spill:** Vacuum, shovel or sweep up *Granubor* Natur 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)

Refer to section 8 for personal protective equipment.

## 7 Handling and storage

**Handling:** 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

**Occupational exposure limits:** Borax pentahydrate is listed by ACGIH and has a TLV (Threshold Limit Value) of 1 mg/m<sup>3</sup>.

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

**Personal protection:** Where airborne concentrations are expected to exceed exposure limits, dust respirators should be used. Eye goggles and gloves are not required for normal exposures, but rubber, nitrile, or butyl gloves may be warranted if environment is excessively dusty.

The UK OES (Occupational Exposure Standard) is 1 mg/m<sup>3</sup>.

## 9 Physical and chemical properties

**Appearance:** White, odourless, granular solid

**Specific gravity:** 1.81

**Vapour pressure:** Negligible @ 20°C

**Solubility in water:** 3.59% @ 20°C; 50.1% @ 100°C

**pH @ 20°C:** 9.23 (3.5% solution)

**Molecular weight:** 291.35

**Melting point:** <200°C (heated in closed space)

**Flash point:** None

**Octanol/Water Partition Coefficient:**

LogP<sub>ow</sub> = -0.7570@25°C, based on boric acid. Sodium tetraborate hydrolyses in water to give undissociated boric acid. No biodegradation data is available, as sodium tetraborate is an inorganic substance.

## 10 Stability and reactivity

**General:** *Granubor* Natur is a stable product, but when heated it loses water, eventually forming anhydrous borax (Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>).

**Incompatible materials and conditions to avoid:** 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; LD<sub>50</sub> in rats is 3,200 to 3,400 mg/kg of body weight.

**Skin:** Low acute dermal toxicity; LD<sub>50</sub> in rabbits is greater than 2,000 mg/kg of body weight. *Granubor* Natur is poorly absorbed through intact skin.

**Inhalation:** Low acute inhalation toxicity; LC<sub>50</sub> in rats is greater than 2.0 mg/l (or g/m<sup>3</sup>).

**Skin irritation:** Non-irritant.

**Eye irritation:** Mild eye irritant in rabbits. Fifty years of occupational exposure to *Granubor* Natur indicate no adverse effects on human eye.

**Sensitisation:** *Granubor* Natur 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 testes<sup>2</sup>. Studies with the chemically related boric acid 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<sup>3,4,5</sup>.

**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 a nearly uniform average concentration of 5 mg B/l and fresh water between 0.01 and 0.4 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert *Granubor* Natur into equivalent boron (B) content, multiply by 0.1484.

**Phytotoxicity:** Boron is an essential micronutrient for healthy growth of plants, however, it can be harmful to boron sensitive plants in higher concentrations. Care should be taken to minimise the amount of borate product released to the environment, except as part of a balanced plant nutrition programme preferably after soil and/or tissue analysis.

### Algal toxicity<sup>6</sup>:

Green algae, *Scenedesmus subspicatus*  
96-hr EC<sub>10</sub> = 24 mg B/l†

### Invertebrate toxicity:

Daphnids, *Daphnia magna* Straus<sup>7</sup>  
24-hr EC<sub>50</sub> = 242 mg B/l†  
Midge larva, *Chironomus riparius*  
28-day LC<sub>50</sub> = 278 mg B/kg dw†  
Earthworm, *Eisenia fetida*  
14-day LC50 = 175 mg B/kg dry soil†  
Respiration rate activated sludge  
3-hr EC50 = 175 mg B/l

Test substance: †Sodium tetraborate +boric acid

### Fish toxicity:

Sea water<sup>8</sup>:

Dab, *Limanda limanda*  
96-hr LC<sub>50</sub> = 74 mg B/l†

Fresh water<sup>9</sup>:

Rainbow trout, *Oncorhynchus mykiss* (embryo-larval stage)  
24-day LC<sub>50</sub> = 88 mg B/l†  
32-day LC<sub>50</sub> = 54 mg B/l†  
Goldfish, *Carassius auratus* (embryo-larval stage)  
7-day LC<sub>50</sub> = 65 mg B/l†  
3-day LC<sub>50</sub> = 71 mg B/l†

### Environmental fate data

**Bioaccumulation/Degradation:** Low bioaccumulation potential; log P<sub>ow</sub> = 0.7570@25°C, based on boric acid. Additionally, Sodium tetraborate will undergo hydrolysis in water to form undissociated boric acid. Boric acid will not biomagnify through the foodchain.

**Soil mobility:** Sodium tetraborate is soluble in water. Adsorption coefficients indicate that sodium tetraborate is adsorbed to sandy loam soil, loam soil, and low humic content sand soil and that adsorption to humic sand soil is insignificant. Adsorption of sodium tetraborate to sediments is insignificant.

## 13 Disposal considerations

**Disposal guidance:** Like all agricultural products, the safest and best method of disposal is on agricultural land as part of a programme of crop nutrition, where use of boron has been indicated. If this proves impossible, disposal in a landfill site will

usually prove the best alternative method. No special disposal treatment is required, but local authorities should be consulted about any specific local requirements.

## 14 Transport information

**International transportation:** *Granubor* Natur has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

## 15 Regulatory information

**Chemical inventory listing:** (12179-04-3) Disodium tetraborate pentahydrate 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	1330-43-4
Canadian DSL	1330-43-4
EINECS	215-540-4
South Korea	1-760
Japanese MITI	(1)-69

**General:** Ensure all national/local regulations are observed.

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

**Label Information:** No classification requirements.

**SDS Directive:** This safety data sheet complies with EU Commission Directive 2001/58/EC.

## 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'.

### Product Label

**Safety Phrases:** None.

**Risk Phrases:** None.

### Other Precautionary Phrases:

Keep out of reach of children  
Do not ingest  
Not for use in drugs, pesticides or for food preservation  
Refer to Safety Data Sheet

### Revision Details

Formatting and content placement modified to comply with EU Commission Directive 2001/58/EC for SDS's; clarification of bioaccumulation; additional ecotoxicity data. Change of manufacturing location.

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