



MSDS - Solubor

Issued May 2003

Section 1. Product Identification

Product Name: Solubor

Product Use: Agricultural Micronutrient

Chemical Formula: $\text{Na}_2\text{B}_8\text{O}_{13} \cdot 4\text{H}_2\text{O}$

Chemical Name/Synonyms: Disodium Octaborate Tetrahydrate

Chemical Family: Inorganic Borates

CAS Registry No.: 12280-0

Distributed by Pestell Minerals & Ingredients, New Hamburg, ON Canada

24 Hour Emergency Telephone (Canutec): 613-996-6666

Section 2. Hazards Identification

This product contains greater than 98% disodium octaborate tetrahydrate $\text{Na}_2\text{B}_8\text{O}_{13} \cdot 4\text{H}_2\text{O}$ which is hazardous under the OSHA Hazard Communication Standard and under the Canadian Controlled Products Regulations of the Hazardous Products Act (WHMIS), based on animal chronic toxicity studies.

Emergency Overview

Solubor is a white, odorless powder substance that is not flammable, combustible or explosive and has low acute oral and dermal toxicity.

Potential Ecological Effects

Large amounts of Solubor can be harmful to plants and other species. Therefore, the product should only be used as part of a balanced plant nutrition program preferably after soil and/or tissue analysis. Accidental releases to the environment should be minimized.

Potential Health Effects

Routes of Exposure

Inhalation: The most significant route of exposure in occupational and other settings. Occasional mild irritation effects to the nose and throat may occur from inhalation of Solubor dust at levels greater than 10mg/m³.

Eye Contact: Solubor is non-irritating to the eyes in normal industrial use.

Skin: Dermal exposure is not usually a concern because Solubor is poorly absorbed through intact skin.

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

Cancer: Solubor is not known to be a 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.

Target Organs: No target organs has been identified in humans. High dose animal ingestion studies indicate the testes are the target organ in male animals.

Signs and Symptoms of Exposure: Symptoms of accidental over-exposure to Solubor might include nausea, vomiting and diarrhea, with delayed effects of skin redness and peeling. These symptoms have been associated with the accidental over-exposure to the chemically related substance boric acid.

Section 3. Physical and Chemical Properties

Appearance: White, odorless, crystalline solid

Bulk Density: 320 to 480kg/m³

Vapor Pressure: Negligible at 20°C

Solubility in Water: 9.7% at 20°C; 34.3% at 50°C

Melting Point: 815°C

pH at 20°C: 8.3 (3.0% solution)

7.6 (10.0% solution)

Molecular Weight: 412.52

Section 4. Fire Fighting Measures

General Hazard: None, because Solubor is not flammable, combustible or explosive. The product itself is a flame retardant.

Extinguishing Media: Any fire extinguishing media may be used on nearby fires.

Flammability Classification (29 CFR 1910.1200): Non Flammable Solid

Section 5. Stability and Reactivity

General: Solubor is a stable product

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

Section 6. Toxicological Information

Acute Toxicity

Ingestion: Low acute oral toxicity; LD50 in rats is 2,550 mg/kg of body weight

Skin/Dermal: Low acute dermal toxicity; LD50 in rabbits is greater than 2,000 mg/kg of body weight.

Solubor is poorly absorbed through intact skin.

Inhalation: Low acute inhalation toxicity; LC50 in rats is greater than 2.0 mg/kg/L (or g/m³)

Skin Irritation: Non irritant

Eye Irritation: Draize test in rabbits produced mild eye irritation effects. Years of occupational exposure to Solubor indicates no adverse effects on human eye. Therefore, Solubor is not considered to be a human eye irritant in normal industrial use.

Sensitization: Solubor is not a skin sensitizer

Other

Reproductive/Developmental Toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility on testes. Studies with the chemically related boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations. The doses administered were many times in excess of those to which humans would normally be exposed.

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 dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility.

Ecological Information

Ecotoxicity Data

General: Boron (B) is the element in disodium octaborate tetrahydrate (Solubor) which is used by convention to report borate product ecological effects. It occurs naturally in seawater at an average concentration of 5mg B/L and generally occurs in freshwater at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert disodium octaborate tetrahydrate into the equivalent boron (B) content, multiply by 0.2096.

Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants; however, it can be harmful to boron sensitive plants in high quantities. Care should be given to minimize the amount of Solubor released to the environment. Solubor should only be used as part of a balance plant nutrition program preferably after soil and/or tissue analysis.

Algal Toxicity

Green Algae, *Scenedesmus subspicatus*: 96 hr EC10 = 242 mg B/L

Invertebrate Toxicity; Daphnids, *Daphnia magna Straus*: 24 hr EC50 = 242 mg B/L

Fish Toxicity; Seawater; Dab, *Limanda, limanda*: 96 hr LC50 = 74 mg B/L

Freshwater; Rainbow Trout, *S. gairdneri* (embryo-larval stage): 24 day LC50 = 88 mg B/L - 32 day LC50 = 54 mg B/L

Goldfish; *Carassius auratus* (embryo-larval stage): 7 day LC50 = 65 mg B/L - 3 day LC50 = 71 mg B/L

Environmental Fate Data

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

Octanol/Water Partition Coefficient: No value. In aqueous solution disodium octaborate tetrahydrate is converted substantially into undissociated boric acid.

Soil Mobility: Solubor is soluble in water and is leachable through normal soil.

Disposal Considerations

Disposal Guidance: Small quantities of Solubor 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 should, if possible, be used for an appropriate application.

RCRA (40 CFR 261): Solubor is not listed under any sections of the Federal Resource Conservation and Recovery Act.

NPRI (Canada): Solubor is not listed on the Canadian National Pollutant Release Inventory

Section 7. Accidental Release Measures

General: Solubor is a water soluble white powder that may, at high concentrations, cause damage to trees or vegetation by root absorption.

Land Spill: Vacuum, shovel or sweep up Solubor and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during cleanup and disposal. Personal protection equipment is not needed to cleanup land spills.

Spillage Into Water: Where possible, remove any intact containers from water. Advise local water authorities that none of the affected water should be used for irrigation or for the abstraction of potable water until natural dilution return the boron value to its normal environmental background level.

Solubor is a non-hazardous waste when spilled or disposed of, as defined in the RCRA Regulations (40 CFR 261).

Handling and Storage

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

Storage Temperatures: Ambient

Storage Pressure: Atmospheric

Special Sensitivity: Moisture (caking)

Exposure Controls/Personal Protection

Engineering Controls: Use local exhaust ventilation to keep airborne concentrations of Solubor dust below permissible exposure levels.

Personal Protection: Where airborne concentrations are expected to exceed exposure limits,

NIOSH/MSHA certified 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: Nuisance dust

ACGIH: 10mg/m³

OSHA/PEL (Total Dust): 15mg/m³

OSHA/PEL (Respirable Dust): 5mg/m³

Section 8. First Aid Measures

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

Eye Contact: Use eyewash fountains or fresh water to cleanse the eye. If irritation persists for more than 30 minutes, seek medical attention.

Skin Contact: No treatment necessary because non-irritating

Ingestion: Swallowing small quantities (1 tsp) 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 Physician

Observation only is required for adult ingestion in the range of 4-8 grams of Solubor. For ingestion of larger amounts, 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 analysis of urine or blood are only useful for documenting exposure and should not be used to evaluate the severity of poisoning or to guide treatment.

Section 9. Transportation Information

DOT Hazardous Classification: Disodium octaborate tetrahydrate (Solubor) is not regulated by the U.S. Department of Transportation and is therefore not considered a hazardous material/substance.

TDG Canadian Transportation: Disodium octaborate tetrahydrate (Solubor) is not regulated under Transportation of Dangerous Goods.

International Transportation: Disodium octaborate tetrahydrate (Solubor) has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

Regulatory Information

OSHA/Cal OSHA: This MSDS document meets the requirements of both OSHA (29 CFR 1910.1200

and Cal)

WHMIS Classification: Disodium octaborate tetrahydrate (Solubor) is classified as Class D-Division 2A under Canadian WHMIS guidelines

Chemical Inventory Listing: Disodium octaborate tetrahydrate (Solubor) 12280-03-4, appears on several chemical inventory lists including the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI, Australian and Korean lists, under the CAS No. representing anhydrous form of this inorganic borate.

US EPA TSCA Inventory: 12008-41-2

Canadian DSL: 12008-41-2

EINECS: 234-541-0

South Korea: 9312-3213

RCRA: Disodium octaborate tetrahydrate (Solubor) is not listed as a hazardous waste under any sections of the Resource Conservation and Recovery Act (RCRA) or regulations (40 CFR 261 *et seq.*).

Superfund: CERCLA/SARA: Disodium octaborate tetrahydrate (Solubor) is not listed under CERCLA or its 1986 amendments, including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023.40 CFR 372.65, Section 313 of SARA, Toxic Chemicals, 42 USC 11023.40 CFR 372.65, Section 302 of SARA Extremely Hazardous Substances List, 42 USC 11002, 40 CFR 355, or the CERCLA Hazardous Substances List, 42 USC 9604, 40 CFR 302.

Safe Drinking Water Act (SDWA): Disodium octaborate tetrahydrate (Solubor) is not regulated under the SDWA, 42 USC 300(g)-1, 40 CFR 141 *et seq.* Consult state and local regulations for possible water quality advisories regarding boron compounds.

Clean Water Act (CWA) (Federal Water Pollution Control Act): 33 USC 1251 *et seq.*

a) Disodium octaborate tetrahydrate (Solubor) is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.

b) It is not on the Section 307 List of Priority Pollutants, 33 USC 1317, 40 CFR 129.

c) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.

Canadian Drinking Water Guidelines: An "Interim Maximum Acceptable Concentration" (IMAC) for boron is currently set at 5 mg/B/L.

IARC: The International Agency for Research on Cancer (IARC) (a unit of the World Health Organization) does not list or categorize Disodium octaborate tetrahydrate (Solubor) as a carcinogen.

NTP Biennial Report on Carcinogens: Disodium octaborate tetrahydrate (Solubor) is not listed.

OSHA Carcinogen: Disodium octaborate tetrahydrate (Solubor) is not listed

California Proposition 65: Disodium octaborate tetrahydrate (Solubor) is not listed on the

Proposition 65 list of carcinogens or reproductive toxicants.

Federal Food, Drug and Cosmetic Act: Pursuant to 21 CFR 175.105, 176.180 and 181.30, Solubor is approved by the FDA for use in adhesive compounds of packaging materials, as a component of paper coatings on such materials or for use in the manufacture thereof, which materials are expected to come in contact with dry food products.

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

Other Information

Product Label Text Hazard Information *:

Do not ingest. Ingestion may cause reproductive harm or birth defects based on animal data.

Avoid contamination of food or feed.

Not for use in post harvest food, drugs or pesticides.

Keep out of reach of children

* Except for Canadian Product

National Fire Protection Assoc. (NFPA) Classification

Health: 0

Flammability: 0

Reactivity: 0

Hazardous Materials Information System (HMIS)

Red (Flammability): 0

Yellow (Reactivity): 0

Blue (Acute Health): 1*

*Chronic Effects

Disclaimer: The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Pestell Minerals & Ingredients makes no warranty of any kind, expressed or implied, concerning the safe use of this material in your process or combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use

contemplated. User must meet all applicable safety and health standards.