MATERIAL SAFETY DATA SHEET
BORAX 5 mol
sodium tetraborate pentahydrate

PRODUCT NAME: SODIUM TETRABORATE
PENTAHYDRATE, Borax 5 mol

COMPOSITION/INFORMATION ON INGREDIENTS
FORMULA: \( \text{Na}_2\text{B}_4\text{O}_7:5\text{H}_2\text{O} \)

CHEMICAL NAME: Sodium Tetraborate Pentahydrate
SYNONYMS: Borax, Disodium Tetraborate Pentahydrate, Sodium Diborate Pentahydrate, Penta Borax, Borax 5 mol
CAS Number: 1330-43-4
Composition: >99%

NFPA
Health 0
Flammability 0
Reactivity 0

HMIS
Health 0
Flammability 0
Reactivity 1*

*Chronic Effects

HAZARDS IDENTIFICATION

Emergency overview: Borax 10 mol is a white, odorless, granular or powdery substance that is not flammable, combustible, or explosive. It has low acute oral and dermal toxicity.

Potential ecological effects: Large amounts of borax can be harmful to plants and other species. Releases to the environment should be minimized.

Routes of exposure: Inhalation of small particles is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern since borax 5 mol is poorly absorbed through intact skin.

Inhalation: Occasional mild irritation effects to the nose and throat may occur from inhalation of borax 5 mol dust at levels greater than 10 mg/m³.

Eye contact: Borax 5 mol is not irritating to the eyes in normal industrial use.

Skin contact: Borax 5 mol does not cause irritation to intact skin.

Ingestion: Products containing borax 5 mol are not intended for human ingestion. Borax 5 mol has a low acute toxicity. Small amounts (such as a teaspoon) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal discomfort or other symptoms.

Cancer: Borax 5 mol 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.

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

Signs and symptoms of exposure: Accidental over-exposure to borax 5 mol might include nausea, vomiting, diarrhea, with delayed effects of skin redness and peeling. These symptoms have been associated with the accidental overexposure to the chemically related substance boric acid.

FIRST AID

Inhalation: Remove person to fresh air if symptoms such as nose or throat irritation are observed.

Eye contact: Use eye wash fountain or fresh water to clean eyes. Seek medical attention if irritation persists for more than 30 minutes.

Skin contact: No treatment necessary because non-irritating.

Ingestion: Swallowing small quantities (such as a teaspoon) will cause no harm to healthy adults. Give two glasses of water if larger amounts are swallowed and seek medical advice.

Note to physicians: Observation only is required for adult ingestion in the range of 4-8 grams of borax 5 mol. 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 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.

FIRE FIGHTING MEASURES

General hazard: None. Borax 5 mol is non-flammable, non-combustible and not explosive. The product is often used as a flame retardant.

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


ACCIDENTAL RELEASE INFORMATION

General: Borax 5 mol is a water-soluble white granule or powder that may, at high
concentrations, cause damage to trees or vegetation by root absorption.

**Spill:** Vacuum, shovel or sweep borax 5 mol and place in containers for disposal in accordance with applicable regulations for your area. Avoid contamination of bodies of water during cleanup and disposal. Personal protective equipment is not needed to cleanup land spills.

**Release into water:** Remove any intact containers from the water where possible. 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. Borax 5 mol is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261).

**HANDLING AND STORAGE**

**General:** No special handling precautions are required. Dry, indoor storage is recommended. Use good manufacturing procedures and common sense to minimize dust generation related to handling.

**Storage temperature:** Ambient

**Storage pressure:** Atmospheric

**Special sensitivity:** Moisture (caking when exposed to high-humidity environments)

**EXPOSURE AND PERSONAL PROTECTION**

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

**Personal protection:** NIOSH/MSHA certified respirators should be used where airborne concentrations are expected to exceed exposure limits. Eye goggles and gloves are not required for normal industrial exposures, but should be used if environment is excessively dusty.

**Occupational exposure limits:** Sodium tetraborate pentahydrate is regulated by OSHA, Cal OSHA and ACGIH.

- ACGIH/TLV: 1 mg/m³
- Cal OSHA/PEL: 5 mg/m³
- OSHA/PEL (total dust): 10 mg/m³

**PHYSICAL PROPERTIES**

**Appearance:** White, odorless, crystalline solid

**Specific gravity:** 1.81

**Vapor pressure:** Negligible @ 20°C

**Solubility in water:** 3.8% @ 20°C; 51.2% @ 100°C

**Melting point:** 200°C (144°F) (heated in closed space)

**pH @ 20°C:** 9.3 (3% solution); 9.2 (1.0% solution); 9.3 (4.7% solution)

**Molecular weight:** 291.35

**STABILITY AND REACTIVITY**

**General:** Borax 5 mol is a stable product but loses water when heated and may eventually forming anhydrous borax (Na2B4O7).

**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.

**TOXICITY INFORMATION**

**Acute toxicity**

**Ingestion:** Low acute oral toxicity; LD₅₀ in rats is 4,500 to 5,000 mg/kg of body weight.

**Skin/dermal:** Low acute dermal toxicity; LD₅₀ in rabbits is greater than 10,000 mg/kg of body weight. Borax 5 mol 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:** Draize test in rabbits produced eye irritation effects. Fifty years of occupational exposure to borax 5 mol indicates no adverse effects on human eye. Borax 5 mol is not considered to be a human eye irritant in normal industrial use.

**Sensitization:** Borax 5 mol is not a skin sensitizer.

**Reproductive/developmental toxicity:** Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. 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, a chemically related substance, 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 sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility.

**ECOLOGICAL INFORMATION**

**General:** Boron (B) is the element in sodium tetraborate pentahydrate (borax 5 mol) which is used by convention to report borate product ecological effects. It occurs naturally in seawater at an average concentration of 5 mg B/L and generally occurs in fresh water at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert sodium tetraborate pentahydrate into the equivalent boron (B) content, multiply by 0.1484.
**Regulatory Information**

**WHMIS Classification:** Sodium tetraborate pentahydrate (borax 5 mol) is classified as Class D- Division 2A under Canadian WHMIS guidelines.

**Chemical Inventory Listing:** Sodium tetraborate pentahydrate (borax 5 mol), CAS 1330-43-4, appears on several chemical inventory lists (including the EPA TSCA inventory 1330-43-4, Canadian DSL 1330-43-4, European EINECS 215-540-4, Japanese MITI (1)-69, Australian, and Korean 1-760 lists) under the CAS No. representing this inorganic salt.

**RCRA:** Sodium tetraborate pentahydrate 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. Sodium tetraborate pentahydrate is not listed under CERCLA or its 1986 amendments, SARA, including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023, 40 CFR 372.65, Section 302 of SARA, Extremely Hazardous Substances, 42 USC 11002, 40 CFR 355, or the CERCLA Hazardous Substances list, 42 USC 9604, 40 CFR 302.

**Safe Drinking Water Act (SDWA):** Sodium tetraborate pentahydrate is not regulated under the SDWA, 42 USC 300g-1, 40CFR 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) Sodium tetraborate pentahydrate (borax 5 mol) 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, 33USC 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 sodium tetraborate pentahydrate as a carcinogen.

**NTP Biennial Report on Carcinogens:** Sodium tetraborate pentahydrate is not listed.

**OSHA Carcinogen:** Sodium tetraborate pentahydrate is not listed.

**California Proposition 65:** Sodium tetraborate pentahydrate (borax 5 mol) 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, Borax is approved by the FDA for use in adhesive components of packaging materials.

**Chem_Borax5Mol_MSDS**

**Fish Toxicity:**
- **Magna straus**
  - Embryo-larval stage:
    - 32-day LC50 = 54 mg B/L†
    - 24-day LC50 = 88 mg B/L†

**Invertebrate Toxicity:**
- **Daphnias, Daphnia magna straus** 24-hr EC50 = 242 mg B/L†

**Fish Toxicity:**
- **Limanda limanda** 96-hr LC50 = 74 mg B/L†

**Soil Mobility:**
- Undissociated boric acid is leachable through normal soil.
- Pentahydrate is converted substantially into borate in aqueous solution.
- Sodium tetraborate is soluble in water and is leachable through normal soil.

**Environmental Fate Data**

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

**Octanol/Water Partition Coefficient:** No value.

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

**Disposal Guidelines**

**Disposal Guidance:** Small quantities of borax 5 mol can usually be disposed of at landfill sites. No special disposal treatment is required. Local authorities should be consulted about any specific local regulations. Tonnage quantities of product should be used for an appropriate application.

**Transportation**

**DOT Hazardous Classification:** Sodium tetraborate pentahydrate (borax 5 mol) is not regulated by the U.S. Department of Transportation (DOT) and is therefore not considered a hazardous material/ substance.

**TDG Canadian Transportation:** Sodium tetraborate pentahydrate (borax 5 mol) is not regulated under Transportation of Dangerous Goods (TDG).

**International Transportation:** Sodium tetraborate pentahydrate (borax 5 mol) has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

**Phytotoxicity:** Boron is an essential micronutrient for healthy growth of plants; however, it can be harmful to boron sensitive plants in large quantities. Care should be taken to minimize the amount of borax 5 mol released to the environment.

**Algal Toxicity:**
- Green algae, *Scenedesmus subspicatus* 96-hr EC10 = 24 mg B/L†

**Fish Toxicity:**
- Sea-water 9:
  - Dab, *Limanda limanda* 96-hr LC50 = 74 mg B/L†
  - 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†

**Test Substance:** † Sodium tetraborate

**Chem_Borax5Mol_MSDS** Revised: 1/12/05 Supersedes: 10/27/04
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):** Borax 5 mol was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

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