1. Product Identification.

Product Name: Borax Decahydrate.

Grades: Technical and EP.

Product Use: Industrial manufacturing.

2. Composition/ Information on Ingredients.

Chemical Formula: $Na_2B_4O_7\ 10H_2O$.

Chemical Name/ Synonyms: Sodium tetraborate decahydrate, Disodium tetraborate decahydrate, Borax.

Chemical Family: Inorganic Borates.

CAS No.: 1303-96-4

3. Hazard Identification.

Emergency Overview:

Borax decahydrate 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 borax decahydrate 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 borax decahydrate is poorly absorbed through intact skin.

Inhalation:

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

Eye Contact:

Borax decahydrate is a mild eye irritant.

Skin Contact:

Borax decahydrate does not cause irritation to intact skin.

Ingestion:

Products containing borax decahydrate are not intended for ingestion. Borax decahydrate 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:

Borax decahydrate is not a known carcinogen.

Reproductive/ Development:

Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and development 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 borax decahydrate 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 required for adult ingestion of less than 9 grams of borax decahydrate. For ingestion in excess of 9 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 (see section 11).

5. Fire Fighting Measures.

General Hazard:

None, because borax decahydrate 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:

Borax decahydrate 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 borax decahydrate 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 portable water until natural dilution returns the boron value to its normal environment background level (see sections 12,13 and 15).

7. Handling and Storage.

General Information:

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 house-keeping 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 borax decahydrate dust below permissible exposure levels.

Personal Protection:

Respiratory Protection: Where airborne concentrations are expected to exceed exposure limits, respirators should be used.

Eye/ Skin Protection: Eye goggles and gloves are not required for normal industrial exposures , but may be warranted if environment is excessively dusty.

Occupational Exposure Limits:

Borax decahydrate is listed by ACGIH and has a TLV (Threshold Limit Value) of 10 mg/m^3. The UK OES (Occupational Exposure Standard) is 5 mg/m^3 (8 hour TWA reference period).

9. Physical and Chemical Properties.

(a)	Appearance:	White, odourless, crystalline solid.
(b)	Specific Gravity:	1.71
(c)	Vapour Pressure:	Negligible @ 20^0C.
(d)	Solubility in Water:	4.7% @ 20^0C; 65.6% @ 100^0C.
(e)	Melting Point:	62^0C (Heated in closed space).
(f)	pH @ 20^0C:	9.3 (0.1 % solution). 9.2 (1.0 % solution). 9.3 (4.7 % solution).
(g)	Molecular Weight:	381.37

10. Stability & Reactivity.

General:

Borax decahydrate is a stable product, but when heated it loses water, eventually forming anhydrous borax ($Na_2B_4O_7$).

Incompatible Materials and Conditions to Avoid:

Reaction with strong reducing agents such as metal hybrids or alkali metals will generate hydrogen gas which gas which could create an explosive hazard.

Hazardous Decomposition:

None.

11. Toxicological Information.

Acute Toxicity:

Ingestion:

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

Skin Contact:

Low acute dermal; LD50 in rabbits is greater than 10,000 mg/kg of body weight. Borax decahydrate is poorly absorbed through intact skin.

Inhalation:

Low acute inhalation toxicity; LC50 in rats is greater than 2.0 mg/l (or g/m^3).

Irritation:

Skin irritation; Non-irritant.

Eye irritation; Mild eye irritant in rabbits. Fifty years of occupational exposure to borax decahydrate indicate no adverse effects on human eye. Borax decahydrate is a constituent of eye lotions.

Sensitisation:

Borax decahydrate is not a skin sensitiser.

Reproductive/ Development Toxicity

Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. Studies with the chemically related boric acid in rat, mouse and rabbit, at high doses, demonstrate development 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.

Carcinogenicity/ Mutagenicity:

No evidence of carcinogenicity in mice. No mutagenic activity was observed for borax decahydrate 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:

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 unassociated boric acid. To convert disodium tetraborate decahydrate into equivalent boron (B) content, multiply by 0.1134.

Phytoxicity:

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 EC10 = 24 mg B/l[+]

Invertebrate Toxicity:

Daphnids, Daphnia magna Stratus; 24 hr LC50 = 242 mg B/l[+]

Test substance: [+] Sodium tetraborate.

Fish Toxicity:

Sea water: Dab, Limanda limanda; 96 hr LC50 = 74 mg B/l[+].

Fresh water: Rainbow trout, Salmo 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. Borax decahydrate decomposes in the environment to natural borate.

Octanol/ Water Partition Coefficient:

No value. In aqueous solution borax decahydrate is converted substantially into associated through normal soil.

Soil Mobility:

The product is soluble in water and is leachable through normal skin.

13. Disposal Considerations.

Disposal Guidance:

Small quantities of borax decahydrate 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:

Borax decahydrate has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

15. Regulatory Information.

Chemical Inventory Listing:

(1303-96-4) Disodium tetraborate appears on several chemical inventory lists (including the EPA TSCA inventory, Canadian DSL, European EINCES, Japanese MITI, Australian and Korean) sometimes under the CAS No. representing the anhydrous form of this inorganic salt.

US EPA TSCA Inventory:	1303-96-4
Canadian DSL:	1303-96-4
EINCES:	215-540-4
South Korea:	9212-848
Japanese MITI:	(1)-69

General:

Ensure all national/ local regulations are observed.

Clean Air Act (Montreal Protocol):

Borax decahydrate was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

16. Other Information.

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Supplier:
Carbon Group,
Ringaskiddy,
Co. Cork.

Tel: 021 - 4378988
Fax: 021 - 4378950