Sodium Metaborate 4-Mol

Safety Data Sheet

Revision Date: October 2014
Supersedes: April 2013 version

Section 1 Identification of the chemical and of the supplier

1.1	**Product Identifier**	Sodium Metaborate 4-Mol
1.2	**Other means of identification** **Chemical name:**	Sodium metaborate dihydrate
	Synonyms:	Sodium metaborate dihydrate
	Grades:	Technical
1.3	**Recommended use of the chemical and restrictions on use**	Industrial manufacturing
1.4	**Supplier's details** **Company name:** **Address:**	**U.S. Borax Inc.** 14486 Borax Road Boron, CA 93516-2000, USA
	Telephone number:	+1 (760) 762-7000
	Email:	rtm.msds@riotinto.com
1.5	**Emergency phone number**	(1) 866 928 0789 (24-Hr Toll-free number) (1) 215 207 0061 (24-Hr Non toll-free number)

Section 2 Hazards identification

2.1 Classification of the substance or mixture

Reproductive Toxicity Category 2
Serious Eye Damage / Eye Irritation Category 2A

2.2 GHS label elements, including pictogram or symbol, signal word, hazard and precautionary statements

Hazard pictograms

Signal word: Warning

Hazard statements:
H361: Suspected of damaging fertility or the unborn child.
H319: Causes serious eye irritation.

Precautionary statements:
P202: Do not handle until all safety precautions have been read and understood.
P280: Wear eye protection.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501: Dispose of contents/container in accordance with local regulation.

Other hazards which do not result in classification (e.g. dust explosion hazard): None

Section 3 Composition/information on ingredients

3.1 Substances

Chemical name	CAS No.	% content	See Section 8 for Occupational Exposure Limits
Sodium metaborate dihydrate	16800-11-6	>99.0	

Section 4 First aid measures

4.1 Description of necessary first aid measures
Protection of first-aiders: No special protective clothing is required.

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.

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.

4.2 Most important symptoms and effects both acute and delayed: Symptoms of accidental over-exposure to high doses of inorganic borate salts have been associated with ingestion or absorption through large areas of severely damaged skin. These may include nausea, vomiting, and diarrhoea, with delayed effects of skin redness and peeling (see Section 11).

4.3 Indication of any immediate medical attention and special treatment needed: Note to physicians: Supportive care only is required for adult ingestion of less than a few grams of the product. For ingestion of larger amounts, maintain fluid and electrolyte balance and maintain adequate kidney function. Gastric lavage is only recommended for heavily exposed, symptomatic patients in whom emesis has not emptied the stomach. Hemodialysis should be reserved for patients with massive acute absorption, especially for patients with compromised renal function. Boron analyses of urine or blood are only useful for verifying exposure and are not useful for evaluating severity of poisoning or as a guide in treatment[1].

Section 5 Fire-fighting measures

5.1 Suitable extinguishing media: Use extinguishing media that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media: None

5.2 Special hazards arising from the chemical
None. The product is not flammable, combustible or explosive.

5.3 Special protective equipment and precautions for fire fighters:
Not applicable. The product itself is a flame retardant.

Section 6 Accidental release measures

6.1 Personal precaution, protective equipment and emergency procedures

For non-emergency personnel:
Eye protection according to ANSI Z.87.1 or other national standards.

For emergency responders:
Eye protection according to ANSI Z.87.1 or other national standards.

6.2 Environmental precautions: The product is a water-soluble white powder that may cause damage to trees or vegetation by root absorption. Avoid contamination of water bodies during clean up and disposal. 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 or meets local water quality standards.

6.3 Methods and material for containment and cleaning up

Appropriate containment: Avoid spillage into water and cover drains.

Land spill: Vacuum, shovel or sweep up and place in containers for disposal in accordance with applicable local regulations.

Spillage into water: Where possible, remove any intact containers from the water.

6.4 Reference to other sections
Refer to sections 8, 12 and 13.

Section 7 Handling and storage

7.1 Precautions for safe handling
Good housekeeping procedures should be followed to minimise dust generation and accumulation. Avoid spills. Do not eat, drink and smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities
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.

Storage temperature: Ambient
Storage pressure: Atmospheric
Special sensitivity: Moisture (Caking)

Section 8 Exposure controls/personal protection

8.1 Control parameters
Occupational exposure limit values: In the absence of a national OEL, Rio Tinto Borax recommends and applies internally an Occupational Exposure Limit (OEL) of 1 mg B/m^3. To convert product into equivalent boron (B) content, multiply by 0.1062.

Occupational Exposure Limits:

OSHA/PEL (total dust)	15 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust
OSHA/PEL (respirable dust)	5 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust
Cal OSHA/PEL	5 mg/m^3	Particulate Not Otherwise Classified or Nuisance Dust

8.2 Appropriate engineering controls: Use local exhaust ventilation to keep airborne concentrations of dust below permissible exposure limits.

8.3 Personal protection equipment:
Eye and face protection: Eye protection according to ANSI Z.87.1 or other national standards are required.
Skin protection: Standard work gloves (cotton, canvas or leather) may be warranted if environment is excessively dusty.
Respiratory protection: Where airborne concentrations are expected to exceed exposure limits, respirators should be used.

Section 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	White, crystalline solid
Odour	Odourless
Odour threshold:	Not applicable: odourless
pH @ 20°C:	10.6 (0.1% solution); 11.1 (1.0% solution); 11.5 (4.0% solution)
Melting point/ Freezing point:	>500°C
Initial boiling point and boiling range:	Not applicable: melting point >300°C
Flash point:	Not applicable: inorganic substance
Evaporation rate:	Not applicable: non-volatile
Flammability:	Non-flammable (used as a flame retardant)
Upper/lower flammability or explosive limits:	Not applicable: non-flammable
Vapour pressure:	Not applicable: melting point >300°C
Vapour density:	Not applicable: melting point >300°C
Relative density:	1.9
Solubility(ies):	Water**:** 31.0% @ 20°C; 81.1% @100°C
Partition coefficient; n-octanol/water:	Not applicable: inorganic substance
Auto-ignition temperature:	Not applicable: not self-heating
Decomposition temperature:	Not applicable: melting point >300°C
Viscosity:	Not applicable: solid substance
Explosive properties:	Not explosive: does not contain chemical groups associated with explosive properties
Oxidising properties:	Not oxidising: does not contain chemical groups associated with oxidising properties

9.2 Other information

Molecular weight:	101.83
Formula:	$NaBO_2.2H_2O$

Section 10 Stability and reactivity

10.1 Reactivity: None known.

10.2 Chemical stability: Under normal ambient temperatures (-40°C to +40°C), the product is stable.

10.3 Possibility of hazardous reactions: Reaction with strong reducing agents such as metal hydrides or alkali metals will generate hydrogen gas which could create an explosive hazard.

10.4 Conditions to avoid: Avoid contact with strong acids.

10.5 Incompatible materials: Material is alkaline and can cause corrosion of metals such as aluminium, tin and zinc.

10.6 Hazardous decomposition products: None.

Section 11 Toxicological Information

11.1 Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)
Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because product is poorly absorbed through intact skin. Product is *not* intended for ingestion.

(a) Acute toxicity
Method: Acute Inhalation Toxicity Study – OECD Guideline 401 equivalent
Species: Rat
Dose: 0.2, 1.6, 2, 25 g/kg body weight
Routes of Exposure: Oral
Results: Low acute oral toxicity. LD_{50} in rats is 3,251 mg/kg of body weight. Based on the available data, the classification criteria are not met.

(b) Skin corrosion / irritation:
Method: Primary Dermal Irritation Study – OECD Guideline 404

Species: New Zealand White Rabbit
Dose: 0.5 g
Routes of Exposure: Dermal
Results: No skin irritation. Based on the available data, the classification criteria are not met.

(c) Serious eye damage / irritation:
No data on the product itself. However, based on pH and alkaline reserve, the product is likely to be an eye irritant. A solution of >pH14 should be classified as corrosive.

(d) Respiratory or skin sensitisation: No data on the product itself.

(e) Germ cell mutagenicity: No data on the product itself. Not mutagenic based on boric acid.

(f) Carcinogenicity: No data on the product itself. Not carcinogenic based on boric acid.

(g) Reproductive toxicity:
No data on the product itself. However, animal feeding studies with boric acid and sodium tetraborate in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes[2]. 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 lowest NOAEL is 9.6 mg B/kg in rats, based on developmental effects. The doses administered were many times in excess of those which humans would normally be exposed to [3,4,5].

(h) STOT-single exposure: No data on the product itself.

(i) STOT-repeated exposure: No data on the product itself.

(j) Aspiration hazard: Physical form of solid powder indicates no aspiration hazard potential.

11.2 Symptoms related to the physical, and chemical and toxicological characteristics:
At high concentrations irritation of nose, throat and eye may be observed. Products are *not* intended for ingestion. Small amounts (e.g. a teaspoonful) swallowed accidentally are not likely to cause effects. Symptoms of accidental over-exposure to high doses of inorganic borate salts have been associated with ingestion or absorption through large areas of severely damaged skin. These may include nausea, vomiting, and diarrhoea, with delayed effects of skin redness and peeling.

11.3 Delayed and immediate effects as well as chronic effects from short and long-term exposure:
Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid and sodium borate dust. Human epidemiological studies indicate no effect on fertility in occupational populations with chronic exposures to borate dust and indicate no effect to a general population with high exposures to borates in the environment.

11.4 Numerical measures of toxicity (such as acute toxicity)
None. This product is a substance.

Section 12 Ecological information

12.1 Ecotoxicity (aquatic and terrestrial, where available)
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 diluted aqueous solutions the predominant boron species present is undissociated boric acid. To convert the product into equivalent boron (B) content, multiply by 0.1062.

Algal toxicity [6]:
Green algae, *Scenedesmus subspicatus*
96-hr EC10=24 mg B/l†

Invertebrate toxicity:
Daphnids, *Daphnia magna Straus*[7]
48-hr LC50 = 242mg B/l†
Fish toxicity:
Sea water[8]:
Dab, *Limanda limanda*
96-hr LC50 = 74 mg B/l†

Fresh water[9] :
Rainbow trout, *Oncorhynchus mykiss* (embryo-larval stage)

24-day LC_{50} = 65 B/l†
32-day LC_{50} = 54 mg B/l†

Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC_{50} = 65 mg B/l†
3-days LC_{50} = 71 mg B/l†

Test substance: † Sodium tetraborate

Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants. 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.

12.2 Persistence and Degradability
Biodegradation is not an applicable endpoint since the product is an inorganic substance.

12.3 Bioaccummulative potential
This product will undergo hydrolysis in water to form undissociated boric acid. Boric acid will not biomagnify through the foodchain. Octanol/Water partition coefficient: Log P_{ow} = -0.7570 @ 25°C (based on boric acid).

12.4 Mobility in soil
The product is soluble in water and is leachable through normal soil. Adsorption to soils or sediments is insignificant.

12.5 Other adverse effects
None

Section 13 Disposal considerations

13.1 Disposal methods
Product packaging should be recycled where possible.
Local authorities should be consulted about any specific local requirements

Such product should, if possible, be used for an appropriate application.

Section 14 Transport information

Transport Classification for Road (ADR) / Rail (RID); Inland waterways (ADN); Sea (IMDG); Air (ICAO/IATA)

14.1	**UN Number:**	Not Regulated
14.2	**UN Proper Shipping Name:**	Not Regulated
14.3	**Transport hazard class(es):**	Not Regulated
14.4	**Packing Group:**	Not Regulated
14.5	**Environmental Hazards (e.g. marine pollutant)**	Not Regulated
14.6	**Special precautions for user:**	Not Regulated
14.7	**Transport in bulk according to Annex II of Marpol 73/78 and the IBC code:**	Not Regulated

Section 15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Clean Air Act (Montreal Protocol) - Substances that deplete the ozone layer: Not manufactured with and does not contain any Class I or Class II ozone depleting substances.

Regulation (EC) No 689/2008 - Export and Import of Dangerous Chemicals: Not listed.

National Regulations: Ensure all national/local regulations are observed.

U.S. EPA RCRA: This product 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. This product is not listed under CERCLA (Comprehensive Environmental Response Compensation and Liability Act) or its 1986 amendments, SARA (Superfund Amendments and Reauthorization Act),

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): This product is not regulated under the SDWA, 42 USC 300g-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) This product 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.

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

NTP Biennial Report on Carcinogens: This product is not listed.

OSHA carcinogen: This product is not listed.

California Proposition 65: This product is not listed on the Proposition 65 list of carcinogens or reproductive toxicants.

Chemical inventory listing: The listing is sometimes under the Inventory number of the anhydrous form of this inorganic salt.

U.S. EPA TSCA Inventory:	7775-19-1
Canada DSL:	7775-19-1
EINECS:	231-891-6
Australia AICS:	10555-76-7
China IECSC:	10555-76-7
Japanese METI & ISHL:	(1)-69
New Zealand NZIoC:	10555-76-7
Philippines PICCS:	10555-76-7
South Korea KECI:	KE-03507

Section 16 Other information

16.1 Date of revision: October 2014

16.2 Revision Details: Format change to GHS

16.3 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. National Toxicology Program (NTP) – Technical Report Series No. TR324, NIH Publication No. 88-2580 (1987), PB88 213475/XAB
3. Fail *et al*., Fund. Appl. Toxicol. (1991) 17, 225-239
4. Heindel *et al*., Fund. Appl. Toxicol. (1992) 18, 266-267
5. Guhl W, SÖFW-Journal (1992) 181 (18/92), 1159-1168
6. Schöberl P, Marl and Huber L (1988) Tenside Surfactants Detergents 25, 99-107
7. Birge W J, Black J A, EPA-560/-76-008 (April 1977) PB 267 085

For general information on the toxicology of borates see Patty's Toxicology, 6th Edition Vol. I, (2012) Chap. 23, 'Boron'.

16.4 Abbreviations and acronyms:

EC: Effect concentration
GHS: Global Harmonised System for classification and labelling of chemicals
LC: Lethal Concentration
LD: Lethal Dose
STOT: Specific Target Organ Toxicity
LOEC: Lowest Observed Effect Concentration
NA: Not applicable.
NOAEL: No observed adverse effect level
NOEC: No Observed Effect Concentration
STP: Sewage Treatment Plant

Precautionary Phrases:
KEEP OUT OF REACH OF CHILDREN.
Do not ingest.
Not for use in food, drug, or pesticides.
Refer to safety data sheet.

National Fire Protection Assoc. (NFPA) classification:
Health 1
Flammability 0
Reactivity 0

Hazardous Materials Information Systems (HMIS):
Red: (Flammability) 0
Yellow: (Reactivity) 0
Blue: (Acute Health) 1*
*Chronic Effects

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