Safety Data Sheet

Date of revision: January 2020
Supersedes: May 2016

Liquibor

Section 1 Identification of the chemical and of the supplier

1.1 Product Identifier Liquibor

1.2 Other means of identification 2-aminoethanol, monoester with boric acid

1.3 Recommended use of the chemical and restrictions on use Fertilizer

1.4 Supplier's details (including name, address, phone number, email)

Rio Tinto Minerals Asia Pte Ltd
12 Marina Boulevard
#20-01 Marina Bay Financial Centre
Tower 3
Singapore 018982

+65 6679 9316

rtb.sds@riotinto.com

Borax Europe Limited
6 St. James's Square
London, SW1Y 4AD,
United Kingdom

+44 20 7781 2000

Manufacturer

Borax Français S.A.S.
Usine/Siège Social
Route de Bourbourg
CS 70059
59411 Coudekerque-Branche
Cedex, France

+ (33) 3 28 29 28 30

1.5 Emergency phone number

APAC +65 3158 1074 (24-Hr Non toll-free number) (Rio Tinto Borates)
EIMEA +44 (0) 1235 239 670 (Rio Tinto Borates)

Section 2 Hazards identification

2.1 Classification of the substance or mixture

Not classified as hazardous under GHS Classification. No GHS classification available.

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

Hazard pictograms: None

Signal word: None

Hazard statements: None

Precautionary statements: None

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	Common names and synonyms	CAS No.	% content
2-aminoethanol, monoester with boric acid	2-aminoethanol, monoester with boric acid	10377-81-8	>99.0%

Section 4 First aid measures

4.1 Description of 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: Wash off with soap and water. Remove contaminated clothing and wash before re-use.

Ingestion: Wash out mouth thoroughly with water and give plenty of water to drink. 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 (and unsuitable) extinguishing media
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. May evolve toxic fumes in fire.

5.3 Special protective equipment and precautions for fire-fighters:
Not applicable.

Section 6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:
Eye goggles and gloves are not required for normal industrial exposures, but eye protection according to ANSI Z.87.1 or other national standard. Respirators according to CEN140:1998.

For emergency responders:
Eye goggles and gloves are not required for normal industrial exposures, but eye protection according to ANSI Z.87.1 or other national standard. Respirators according to CEN140:1998.

6.2 Environmental precautions: Large amounts can be harmful to plants and other species. 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: Cover with absorbent material.

Land spill: For small spills soak up with inert absorbent material, transfer to container and arrange removal by disposal company. For larger spillages, liquids should be contained with sand or earth and both liquid and solid transferred to salvage containers. Avoid contamination of water bodies during clean up and disposal.

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
Handle in accordance with good industrial hygiene and safety practice. 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. Indoor, well ventilated storage recommended with protection from strong sunlight and moisture. Cover to minimise evaporation.

Storage temperature: Ambient
Storage pressure: Atmospheric

Section 8 Exposure controls/personal protection

8.1 Control parameters
Occupational exposure limit values:
There is no OEL for 2-aminoethanol, monoester with boric acid (CAS 10377-81-8). In the absence of a national OEL, Rio Tinto Borates recommends and applies internally an Occupational Exposure Limit (OEL) of 1 mg B/m^3.

8.2 Appropriate engineering controls: Use local exhaust ventilation to keep vapour levels 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.
Skin protection: Gloves (nitrile or neoprene).
Respiratory protection: Self-contained breathing apparatus when vapour levels approach or exceed permitted exposure levels (CEN140:1998).

Section 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Pale yellow, slightly viscous liquid
Odour	Slight ammoniac
Odour threshold:	No data
pH @ 20°C:	6.88 (5.0% solution); 9.5 (1.0% solution)
Melting point/ Freezing point:	Not technically feasible
Initial boiling point and boiling range:	Not technically feasible
Flash point:	Not technically feasible
Evaporation rate:	No data
Flammability (solid/gas):	Non-flammable
Upper/lower flammability or explosive limits:	Not applicable: non-flammable
Vapour pressure:	Not technically feasible
Vapour density:	No data

Relative density:	1.34 @ 25ºC
Solubility(ies):	Not technically feasible
Partition coefficient; n-octanol/water:	log Pow = -0.9 for polyborate moiety at 19.7°C, pH 7, log Pow = -2.5 for the organic moiety at 19.7°C, pH 7.
Auto-ignition temperature:	Not applicable: not self-heating
Decomposition temperature:	No data
Viscosity:	15 mm^2/s (static)@ 20ºC
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

Formula: $C_2H_7NO.xBH_3O_3$

Section 10 Stability and reactivity

10.1 Reactivity: Possible release of carbon monoxide/ carbon dioxide

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

10.3 Possibility of hazardous reactions: None known.

10.4 Conditions to avoid: Elevated temperatures.

10.5 Incompatible materials: The product may be incompatible with aluminium, galvanised iron, copper and its alloys, oxidising agents, acids, alkalis, acid chlorides and acid anhydrides.

10.6 Hazardous decomposition products: May evolve toxic fumes in a fire.

Section 11 Toxicological Information

11.1 Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)
Dermal exposure is the most significant route of exposure in occupational and other settings. Product is *not* intended for ingestion.

(a) Acute toxicity
Method: Acute Oral Toxicity Study – OECD Guideline 401
Species: Rat
Dose: single dose 2000 mg/kg body weight
Routes of Exposure: Oral
Results: Low acute oral toxicity. LD_{50} in rats is > 2,000 mg/kg body weight. Based on the available data, the classification criteria are not met.

Method: Acute Dermal Toxicity Study – OECD Guideline 402
Species: Rat
Dose: single dose 2000 mg/kg body weight
Routes of Exposure: Dermal
Results: Low acute dermal toxicity. LD_{50} in rats is > 2,000 mg/kg body weight. Based on the available data, the classification criteria are not met.

No acute inhalation toxicity studies on the product is available, classification is not possible.

(b) Skin corrosion / irritation:
Method: Dermal Irritation Study – similar to OECD Guidelines 404
Species: New Zealand White Rabbit
Dose: 0.5 ml
Routes of Exposure: Dermal
Results: No skin irritation. Based on the available data, the classification criteria are not met.

(c) Serious eye damage / irritation:
Method: Eye Irritation Study
Species: New Zealand White Rabbit
Dose: 0.1 g

Routes of Exposure: Eye
Results: Not irritating.
Classification: Based on mean scores < 1, and the effects were fully reversible within 72 hours, the classification criteria are not met.

(d) Respiratory or skin sensitisation:
Method: Buehler Test – OECD Guideline 406
Species: Guinea Pig
Dose: 0.5 ml
Routes of Exposure: Dermal
Results: Not a skin sensitiser. No respiratory sensitisation studies have been conducted. Based on the available data, the classification criteria are not met.

(e) Germ cell mutagenicity:
Method: OECD Guideline 473 In vitro Mammalian Chromosome Aberration Test
Species: human lymphocytes
Dose: Without S9-mix: 50, 100, 200, 300, 500, 750 and 1000 µg/ml culture medium, With S9-mix: 1000, 3300 and 5000 µg/ml culture medium
Routes of Exposure: *in vitro*
Results: Not mutagenic. Based on the available data, the classification criteria are not met.

(f) Carcinogenicity: No data on the product itself.

(g) Reproductive toxicity: No data on the product itself

(h) STOT-single exposure: No data on the product itself. No target organ has been identified in humans.

(i) STOT-repeated exposure: Since no sub-chronic or chronic toxicity studies of the product are available classification is not possible.

(j) Aspiration hazard: No aspiration toxicity data is available for product. Since, the product is an aqueous complex substance, the aspiration hazard potential is considered low. No classification for aspiration hazard is proposed.

Toxicokinetics
No data

11.2 Symptoms related to the physical, and chemical and toxicological characteristics:
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.

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

Section 12 Ecological information

12.1 Toxicity
Acute (short-term) toxicity:
Fish toxicity:
Brachydanio rerio (new name: Danio rerio) LC_{50} (96h) $\geqslant$ 100 mg/L
Cyprinus carpio LC_{50} (96h): 617 mg/lL
Crustacea:
Daphnia magna EC_{50} (48h): 496 mg/L test material (nominal) based on mobility

Chronic (long-term) toxicity
Fish: No data on product itself. Testing proposal submitted to ECHA.
Crustacea: No data on product itself. Testing proposal submitted to ECHA.
Algae/ aquatic plants:
Pseudokirchnerella subcapitata (algae) NOEC (72h): 3.2 mg/L based on growth rate

12.2 Persistence and Degradability
Activated sludge: ca. 78% Degradation of test substance after 3 weeks (CO_2 evolution)

12.3 Bioaccummulative potential
There is no experimental bioaccumulation data for this product and no log Kow value can be generated based on theoretical considerations.

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
Contact local waste disposal authority for advice, or pass to chemical disposal company. If possible, an alternative application should be sought. Local authorities should be consulted about any specific local requirements.

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

International regulations
Chemical Weapon Convention List Schedule I, II & III Chemicals: Not listed.

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.

Stockholm Convention on Persistent Organic Pollutants: Not listed

Rotterdam Convention on Prior Informed Consent (PIC): Not listed

UNECE Aarhus Protocol on POPs and Heavy Metals: Not listed

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

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

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

United States (TSCA) Active:	10377-81-8
Canada (DSL):	10377-81-8
European Union (EINECS):	233-829-3 Orthoboric acid, compound with 2-aminoethanol EINECS 247-421-8 CAS 26038-87-9 Boric acid (H_3BO_3), reaction products with ethanolamine EINECs 302-207-4 CAS 94095-04-2
Australia (AICS):	Boric acid (H_3BO_3), compound with 2-aminoethanol CAS 26038-87-9
China (IECSC):	10377-81-8
Japan (METI & ISHL):	Listed in CHRIP
New Zealand (NZIoC):	10377-81-8

Philippines (PICCS):	26038-87-9
South Korea (KECI):	KE-01336
Taiwan (NECI):	Listed
Thailand (TECI):	94095-04-2
Vietnam:	Listed

Section 16 Other information

16.1 Date of previous issue: May 2016

16.2 Date of latest revision: January 2020

Revision Details:
Section 1: Updated the information of the manufacturer, suppliers and email.
Section 8 and 9: Updated information.
Section 11, 15 and 16: Additional information.
Minor typographical corrections

16.3 References:
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

Chemical Safety Report “Reaction Products of Monoethanolamine and Boric Acid (1:3)”, https://www.echa.europa.eu/web/guest/registration-dossier/-/registered-dossier/15403

16.4 Abbreviations and acronyms:
EC: Effect concentration
GHS: Global Harmonised System for classification and labelling of chemicals
HC: Hazard Concentration
IATA: International Air Transport Association
IBC: Intermediate Bulk Container
IMDG: International Maritime Dangerous Goods
LC: Lethal Concentration
LD: Lethal Dose
MARPOL: International Convention for the Prevention of Pollutant From Shops, 1973
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:
Do not ingest.
Keep out of reach of children.
Refer to safety data sheet.
Not for use in food, drugs or pesticides.

Disclaimer:
Rio Tinto Minerals Asia Pte. Ltd. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgement in determining its appropriateness for a particular purpose.
RIO TINTO MINERALS ASIA PTE. LTD. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY RIO TINTO MINERALS ASIA PTE. LTD. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OR RELIANCE UPON THIS INFORMATION.