SAFETY DATA SHEET
BORIC ACID
REVISION 5, DATE 10 OCT 2021

1. IDENTIFICATION

Product Name	**Boric Acid**
Other Names	Orthoboric acid
Uses	Industrial use; Agriculture; Antiseptic/antibacterial agent; Preservative; Lubricant; Pyrotechnics; Water treatment, Metallurgy, Glass and ceramics.
Chemical Family	No Data Available
Chemical Formula	H3BO3
Chemical Name	Boric acid (H3BO3)
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust)	Schedule 5

Globally Harmonised System

Hazard Classification			Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)
Hazard Categories			Acute Toxicity (Oral) - Category 5 Serious Eye Damage/Irritation - Category 2B Toxic To Reproduction - Category 2
Pictograms			
Signal Word			Warning
Hazard Statements		**H303**	May be harmful if swallowed.
		H320	Causes eye irritation.
		NZ9.1	Designed for biocidal action
		H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.
Precautionary Statements	Prevention	**P201**	Obtain special instructions before use.
		P280	Wear protective gloves/protective clothing/eye protection/face protection and suitable respirator.
	Response	**P308 + P313**	IF exposed or concerned: Get medical 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.
		P337 + P313	If eye irritation persists: Get medical attention.
		P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
	Storage	**P405**	Store locked up.
	Disposal	**P501**	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Safe Work Australia

National Guide for Classifying Hazardous Chemicals under the Model WHS Regulations

Hazard Classification	Hazardous according to the criteria of Safe Work Australia under Model WHS Regulations

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Boric acid	H3BO3	10043-35-3	<=100 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	IF SWALLOWED: Rinse mouth, then drink plenty of water. Do not induce vomiting. Call a Poison Centre or doctor/physician if large amounts (more than one teaspoon) are swallowed or if you feel unwell. For advice, contact a Poisons Information Centre (e.g. phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.
Eye	IF IN EYES: Immediately flush eyes with running water for several minutes, holding eyelids open and occasionally lifting the upper and lower lids. Remove contact lenses if present and easy to do. Continue rinsing for at least 15 minutes. If eye irritation persists, get medical advice/attention.
Skin	IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If respiratory symptoms persist, get medical advice/attention.
Advice to Doctor	If exposed or concerned, get medical advice/attention. Treat symptomatically. Observation only is required for adult ingestion of less than 6 grams of boric acid. For ingestion in excess of 6 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. *Most important symptoms and effects, both acute and delayed: May be harmful if swallowed. Causes eye irritation. Suspected of damaging fertility. Suspected of damaging the unborn child.
Medical Conditions Aggravated by Exposure	No information available.

5. FIRE FIGHTING MEASURES

General Measures	If safe to do so, move undamaged containers from fire area. Cool container with water spray until well after fire is out. Dike fire-control water for later disposal.
Flammability Conditions	Non-combustible; Material does not burn.
Extinguishing Media	If material is involved in a fire, use extinguishing media appropriate to surrounding fire conditions.
Fire and Explosion Hazard	Boric acid is not flammable, combustible or explosive. The product is itself a flame retardant.
Hazardous Products of Combustion	Fire or heat may produce irritating and/or toxic gases, including Boron oxides.
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may cause pollution.
Personal Protective Equipment	Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.
Flash Point	No Data Available
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	No Data Available
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation. Do not touch or walk through spilled materials. Avoid dust formation. Avoid breathing dusts or mists and contact with eyes, skin and clothing.
Clean Up Procedures	Mechanically recover the product and place it in suitable containers for later disposal (see SECTION 13).
Containment	Stop leak if safe to do so - Prevent entry into waterways, drains or confined areas.
Decontamination	No information available.
Environmental Precautionary Measures	Prevent entry into drains and waterways. Notify authorities if product enters sewers or public waters.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away.
Personal Precautionary Measures	Do not attempt to take action without suitable protective equipment (see SECTION 8).

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation. Obtain special instructions before use - Do not handle until all safety precautions have been read and understood. Avoid dust formation. Avoid breathing dusts or mists and contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/protective clothing/eye protection/face protection and suitable respirator (see SECTION 8). Avoid exposure to heat/overheating.
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep containers tightly closed when not in use. Protect from moisture. Avoid exposure to heat. Keep away from food/feedstuffs and incompatible materials (see SECTION 10). Store locked up. *Keep out of reach of children.
Container	Keep in the original container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product. For dusts from solid substances without specific occupational exposure standards: - Safe Work Australia Exposure Standard (Nuisance dusts): 8 hr TWA = 10 mg/m3 (measured as inhalable dust). - New Zealand WES (Particulates not otherwise classified): TWA = 10 mg/m3; TWA = 3 mg/m3 (respirable dust).
Exposure Limits	No Data Available
Biological Limits	No information available.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at is source, prevent dispersion of it into the general work area.
Personal Protection Equipment	- Respiratory protection: Wear respiratory protection in case of inadequate ventilation or if an inhalation risk exists. Recommended: Dust mask/particulate respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to avoid eye contact. Recommended: Safety glasses with side-shields or goggles. - Hand protection: Handle with gloves. Recommended: Impervious gloves, e.g. Nitrile rubber. - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: Impervious clothing; overalls, safety shoes.
Special Hazards Precaustions	No information available.
Work Hygienic Practices	Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Wash hands before breaks and at the end of the workday. Take off contaminated clothing and wash it before storage or reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	Crystalline, powder, granular
Odour	Odourless
Colour	White
pH	5.11 % (20 °C)
Vapour Pressure	0.000099 Pa (@ 25 °C)
Relative Vapour Density	No Data Available
Boiling Point	1,860 °C
Melting Point	450 °C
Freezing Point	No Data Available
Solubility	4.9 % in water 20°C
Specific Gravity	1.49
Flash Point	No Data Available
Auto Ignition Temp	No Data Available
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	1,489 kg/m3
Specific Heat	No Data Available
Molecular Weight	61.83 g/mol
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	No Data Available
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No information available.
Potential for Dust Explosion	Boric acid is not flammable, combustible or explosive.
Fast or Intensely Burning Characteristics	No information available.
Flame Propagation or Burning Rate of Solid Materials	No information available.
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No information available.
Properties That May Initiate or Contribute to Fire Intensity	Non-combustible; Material does not burn.
Reactions That Release Gases or Vapours	Fire or heat may produce irritating and/or toxic gases, including Boron oxides.
Release of Invisible Flammable Vapours and Gases	Reaction with strong reducing agents, such as metal hydrides or alkali metals, will generate hydrogen gas which could create an explosive hazard.

10. STABILITY AND REACTIVITY

General Information	Boric acid reacts as a weak acid which may cause corrosion of base metals.
Chemical Stability	Stable under normal storage and handling conditions. *When heated, water is lost forming Metaboric acid (HBO2); on further heating, the material is converted to Boric oxide (B2O3).
Conditions to Avoid	Avoid dust formation. Avoid exposure to moisture (forms partial hydrate in moist air). Avoid exposure to heat/overheating.
Materials to Avoid	Incompatible/reactive with strong reducing agents, base metals.
Hazardous Decomposition Products	Fire or heat may produce irritating and/or toxic gases, including Boron oxides. *Reaction with strong reducing agents, such as metal hydrides or alkali metals, will generate hydrogen gas which could create an explosive hazard.
Hazardous Polymerisation	Will not occur.

11. TOXICOLOGICAL INFORMATION

General Information	Information on toxicological effects: - Acute toxicity: May be harmful if swallowed. - Skin corrosion/irritation: Non-irritant. - Eye damage/irritation: Causes eye irritation. - Respiratory/skin sensitisation: Not a skin sensitiser. - Germ cell mutagenicity: Not considered to have mutagenic or genotoxic potential. - Carcinogenicity: Not likely to be carcinogenic. - Reproductive toxicity: Suspected of damaging fertility. Suspected of damaging the unborn child. Animal studies have demonstrated effects on testes, foetal weight loss and minor skeletal variations. However, (limited) epidemiological studies of workers and general populations exposed to boron show no reproductive or developmental effects [NICNAS]. - STOT (single exposure): Respiratory effects following inhalation of Boric acid dusts include nasal and eye irritation, throat irritation, coughing and breathlessness; these effects are most likely due to the physical exposure to dust; not considered a 'serious irritation to the respiratory tract' [NICNAS]. - STOT (repeated exposure): The main target organ for boron toxicity are the testes, leading to reproductive and developmental adverse effects. Adverse haematological effects have also been noted. - Aspiration toxicity: No information available. Information on likely routes of exposure: - Ingestion: Ingestion (or absorption) may cause nausea, vomiting, diarrhoea, abdominal cramps; central nervous system (CNS) depression, ataxia and convulsions. - Eye contact: May cause eye irritation due to physical exposure to dust. - Skin contact: Contact with dust can cause mechanical irritation or drying of the skin. - Inhalation: May cause irritation. Chronic effects: Suspected of damaging fertility. Suspected of damaging the unborn child.
Acute	
Ingestion	Acute toxicity (Oral): - LD50, Rat (male): >2,600 mg/kg bw. [OECD Guideline 401; Supplier's SDS].
Other	Acute toxicity (Dermal): - LD50, Rabbits: >2,000 mg/kg bw.
Inhalation	Acute toxicity (Inhalation): - LC50, Rats: >2 mg/L (4 h) [dust]
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: - LC50, Fish (Pimephales promelas (Fathered minnow)): 79.7 mg B/L or 456 mg Boric acid/L (96 h). - EC50, Invertebrates (Daphnia magna): 133 mg B/L or 760 mg Boric acid/L (48 h). - EC50, Algae (Pseudokirchneriella subcapitata) biomass: 40 mg B/L or 229 mg Boric acid/L (72 h).
Persistence/Degradability	Boron is naturally occurring and ubiquitous in the environment. Boric acid decomposes in the environment to natural

	borate.
Mobility	The product is soluble in water and is leachable through normal soil.
Environmental Fate	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. Prevent entry into drains and waterways.
Bioaccumulation Potential	Not significantly bioaccumulative.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of contents/container via a licensed disposal company and in accordance with local/regional/national regulations.
Special Precautions for Land Fill	Small quantities of boric acid can usually be disposed of at landfill sites. Tonnage quantities of product are not recommended to be sent to landfills.

14. TRANSPORT INFORMATION

Land Transport (Australia)
ADG Code

Proper Shipping Name	Boric Acid
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (Malaysia)
ADR Code

Proper Shipping Name	Boric Acid
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	Boric Acid

Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (United States of America)
US DOT

Proper Shipping Name	Boric Acid
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Sea Transport
IMDG Code

Proper Shipping Name	Boric Acid
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
EMS	No Data Available
Marine Pollutant	No
Comments	NON-DANGEROUS GOODS: Not regulated for SEA transport.

Air Transport
IATA DGR

Proper Shipping Name	Boric Acid
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for AIR transport.

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

15. REGULATORY INFORMATION

General Information	BORIC ACID
Poisons Schedule (Aust)	Schedule 5

Environmental Protection Authority (New Zealand)
Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	HSR002995

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Listed
Canada (NDSL)	Not Determined
China (IECSC)	Listed
Europe (EINECS)	233-139-2
Europe (REACh)	Registered
Japan (ENCS/METI)	Listed
Korea (KECI)	Listed
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Listed
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Listed
USA (TSCA)	Listed

16. OTHER INFORMATION

Related Product Codes	BOACID1000, BOACID1001, BOACID1002, BOACID1003, BOACID1004, BOACID1006, BOACID1007, BOACID1008, BOACID1009, BOACID1100, BOACID1200, BOACID1201, BOACID1202, BOACID1203, BOACID1204, BOACID1205, BOACID1206, BOACID1207, BOACID1300, BOACID1301, BOACID1400, BOACID1500, BOACID1501, BOACID1502, BOACID1503, BOACID1504, BOACID1505, BOACID1506, BOACID1600, BOACID1601, BOACID1602, BOACID1603, BOACID1604, BOACID1700, BOACID1701, BOACID1702, BOACID1800, BOACID1801, BOACID1802, BOACID1803,

BOACID1804, BOACID1805, BOACID1806, BOACID1807, BOACID1808, BOACID1809, BOACID1810, BOACID1811, BOACID1812, BOACID1813, BOACID1900, BOACID1901, BOACID2000, BOACID2001, BOACID2002, BOACID2003, BOACID2007, BOACID2017, BOACID2100, BOACID2200, BOACID2300, BOACID2400, BOACID2401, BOACID2500, BOACID2600, BOACID2700, BOACID2800, BOACID2900, BOACID3000, BOACID3001, BOACID3200, BOACID3300, BOACID3500, BOACID3700, BOACID3701, BOACID3800, BOACID4000, BOACID4001, BOACID4002, BOACID4003, BOACID4100, BOACID4200, BOACID4400, BOACID4500, BOACID4501, BOACID4800, BOACID4900, BOACID5000, BOACID5100, BOACID5205, BOACID5500, BOACID6000, BOACID6100, BOACID6105, BOACID6500, BOACID6900, BOACID7000, BOACID7001, BOACID7100, BOACID7200, BOACID7300, BOACID7301, BOACID7302, BOACID7303, BOACID7304, BOACID7305, BOACID7306, BOACID7307, BOACID7308, BOACID7309, BOACID7320, BOACID7330, BOACID7399, BOACID7400, BOACID7401, BOACID7500, BOACID7501, BOACID7502, BOACID7503, BOACID7505, BOACID7530, BOACID7533, BOACID7565, BOACID7600, BOACID7601, BOACID7602, BOACID7620, BOACID7622, BOACID7630, BOACID7700, BOACID7701, BOACID7702, BOACID7703, BOACID7704, BOACID7705, BOACID7706, BOACID7707, BOACID7708, BOACID7709, BOACID7710, BOACID7711, BOACID7712, BOACID7713, BOACID7714, BOACID7715, BOACID7716, BOACID7717, BOACID7718, BOACID7719, BOACID7720, BOACID7721, BOACID7722, BOACID7723, BOACID7724, BOACID7800, BOACID8000, BOACID8001, BOACID8002, BOACID8003, BOACID8004, BOACID8500, BOACID8800, BOACID9000, BOACID9001, BOACID9020, BOACID9100, BOACID9200, BOACID9201, BOACID9300, BOACID9301, BOACID9400, BOACID9500, BOACID9600, BOACID9610, BOACID9700, BOACID9701, BOACID9800, BOACID9805, BOACID9807, BOACID9820, BOACID9900, BOACID9901

Revision	5
Revision Date	10 Oct 2021
Reason for Issue	Updated SDS
Key/Legend	< Less Than > Greater Than **AICS** Australian Inventory of Chemical Substances **atm** Atmosphere **CAS** Chemical Abstracts Service (Registry Number) **cm^2** Square Centimetres **CO2** Carbon Dioxide **COD** Chemical Oxygen Demand **deg C (°C)** Degrees Celcius **EPA (New Zealand)** Environmental Protection Authority of New Zealand **deg F (°F)** Degrees Farenheit **g** Grams **g/cm^3** Grams per Cubic Centimetre **g/l** Grams per Litre **HSNO** Hazardous Substance and New Organism **IDLH** Immediately Dangerous to Life and Health **immiscible** Liquids are insoluable in each other. **inHg** Inch of Mercury **inH2O** Inch of Water **K** Kelvin **kg** Kilogram **kg/m^3** Kilograms per Cubic Metre **lb** Pound **LC50** LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours. **LD50** LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals. **ltr** or **L** Litre **m^3** Cubic Metre **mbar** Millibar **mg** Milligram **mg/24H** Milligrams per 24 Hours **mg/kg** Milligrams per Kilogram **mg/m^3** Milligrams per Cubic Metre **Misc** or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present. **mm** Millimetre **mmH2O** Millimetres of Water **mPa.s** Millipascals per Second **N/A** Not Applicable **NIOSH** National Institute for Occupational Safety and Health **NOHSC** National Occupational Heath and Safety Commission **OECD** Organisation for Economic Co-operation and Development

Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight