



SAFETY DATA SHEET PHOSPHONATES PBTC REVISION 5, DATE 16 OCT 2022

1. IDENTIFICATION

Product Name	Phosphonates PBTC
Other Names	2-Phosphono-1,2,4-butanetricarboxylic acid; 2-Phosphonobutane-1,2,4-tricarboxylic acid
Uses	Deflocculant & sequestrant; Scale and corrosion inhibitor; Widely used in industry as a sequestering agent and calcium carbonate scale inhibitor for applications in industrial water treatment and industrial cleaning.
Chemical Family	No Data Available
Chemical Formula	C ₇ H ₁₁ O ₉ P
Chemical Name	1,2,4-Butanetricarboxylic acid, 2-phosphono-
Product Description	50% aqueous solution of 2-Phosphonobutane-1,2,4-tricarboxylic acid (PBTC).

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	Suite 13A.03, Menara Summit Persiaran Kewajipan USJ1 47600 UEP Subang Jaya Selangor, 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	Australia – Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
National Poison Centre	Malaysia	+60-4-6536-999
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)

Not Scheduled

Redox Ltd
Corporate Office Sydney
Locked Bag 15 Minto NSW 2566 Australia
2 Swettenham Road Minto NSW 2566 Australia
All Deliveries: 4 Holmes Road Minto NSW 2566 Australia

Phone +61 2 9733 3000
Fax +61 2 9733 3111
E-mail sydney@redox.com
Web www.redox.com
ABN 92 000 762 345

Australia
Adelaide
Brisbane
Melbourne
Perth
Sydney

New Zealand
Auckland
Christchurch
Hawke's Bay
UK
London

Malaysia
Kuala Lumpur
USA
Los Angeles
Oakland
Mexico
Salttilo



Globally Harmonised System

Hazard Classification Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

Hazard Categories

- Corrosive to Metals - Category 1
- Acute Toxicity (Oral) - Category 5
- Acute Toxicity (Dermal) - Category 5
- Acute Toxicity (Inhalation) - Category 5
- Skin Corrosion/Irritation - Category 1C
- Serious Eye Damage/Irritation - Category 1

Pictograms

Signal Word Danger

Hazard Statements		H290	May be corrosive to metals.
		H303 + H313 + H333	May be harmful if swallowed, in contact with skin or if inhaled.
		H314	Causes severe skin burns and eye damage.
Precautionary Statements	Prevention	P260	Do not breathe mist/vapour/spray.
		P280	Wear protective gloves/protective clothing/eye protection/face protection.
		P234	Keep only in original packaging.
	Response	P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
		P310	Immediately call a POISON CENTER or doctor.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
		P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
		P363	Wash contaminated clothing before reuse.
		P304 + P340	IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
		P390	Absorb spillage to prevent material-damage.
	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 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
2-Phosphonobutane-1,2,4-tricarboxylic acid	C7H11O9P	37971-36-1	48 - 52 %
Phosphorous acid	H3O3P	13598-36-2	<1 %
Phosphoric acid	H3O4P	7664-38-2	<=0.2 %
Water	H2O	7732-18-5	Balance %

4. FIRST AID MEASURES*Description of necessary measures according to routes of exposure*

Swallowed	IF SWALLOWED: Rinse mouth thoroughly with water. Do NOT induce vomiting. Immediately call a Poison Centre or doctor/physician for advice. Never give anything by mouth to an unconscious person.
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. Immediately call a Poison Centre or doctor/physician for advice.
Skin	IF ON SKIN (or hair): Remove and isolate contaminated clothing and shoes. Immediately flush skin and hair with running water for at least 15 minutes. Immediately call a Poison Centre or doctor/physician for advice. For minor skin contact, avoid spreading material on unaffected skin. Wash contaminated clothing and shoes before reuse.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a Poison Centre or doctor/physician for advice. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.
Advice to Doctor	Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Keep victim calm and warm. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
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 containers with water spray until well after fire is out. Dike fire-control water for later disposal; do not scatter the material.
Flammability Conditions	Non-combustible; Material does not burn; however, following evaporation of aqueous component, residual material can burn if ignited.
Extinguishing Media	If material is involved in a fire, use dry chemical, Carbon dioxide (CO ₂), foam or water spray for extinction.
Fire and Explosion Hazard	When heated, vapours may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards! Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated.
Hazardous Products of Combustion	Fire or heat may produce irritating, corrosive and/or toxic gases, including Carbon monoxide (CO), phosphorus oxides (P _x O _y).
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may be corrosive and/or toxic and cause pollution.
Personal Protective Equipment	Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing - It may provide little or no thermal protection. Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
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	2X

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation - Ventilate enclosed spaces before entering. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not breathe vapours and prevent contact with eyes, skin and clothing.
Clean Up Procedures	Transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material with dry earth, sand or other non-combustible material and transfer to containers for disposal (see SECTION 13).
Containment	Stop leak if safe to do so – Prevent entry into waterways, sewers, basements or confined areas. Contain large spills with dikes.
Decontamination	Neutralise washings with soda ash or lime. Flush spill area with water. *Equipment should be thoroughly decontaminated after use.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away. Keep upwind and to higher ground.
Personal Precautionary Measures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (see SECTION 8). *Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Do not breathe mist/vapours/spray and prevent contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/protective clothing/eye protection/face protection (see SECTION 8). Do not expose to extreme temperatures. Keep away from sources of ignition - No smoking.
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Storage temperature > -10 °C. Keep container tightly closed. Protect from freezing - Do not expose to extreme temperatures. Keep away from sources of ignition - No smoking. Keep away from incompatible materials (see SECTION 10). Store locked up.
Container	Keep in the original container or qualified materials, i.e. glass lining, PVC, polypropylene, glass reinforced plastic or polyethylene. Do NOT store in mild steel, aluminium or any other metals. *Containers will enclose product residues and vapours after being emptied - Handle contaminated packages in the same way as the substance itself.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No value assigned for this specific material by Safe Work Australia. COMPONENT: Phosphoric acid (CAS No. 7664-38-2): - Safe Work Australia Workplace Exposure Standard: TWA = 1 mg/m ³ . - SafeWork New Zealand Workplace Exposure Standard: TWA = 1 mg/m ³ .
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 its source, preventing dispersion of it into the general work area.

Personal Protection Equipment	<ul style="list-style-type: none"> - Respiratory protection: Wear respiratory protection in case of inadequate ventilation or if an inhalation risk exists. Recommended: Organic vapour/particulate filter (type A/P) respirator (refer to AS/NZS 1715 & 1716). If used, full facepiece replaces the need for face shield and/or chemical goggles. - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Wear chemical goggles. - Hand protection: Wear protective gloves. Recommended: Impervious gloves. - Skin/body protection: Wear appropriate personal protective clothing to prevent skin contact. Recommended: Overalls, safety shoes.
Special Hazards Precautions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash contaminated skin thoroughly after handling. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Characteristic
Colour	Colourless to light yellow
pH	1.0 - 2.0 (1% solution @ 25°C)
Vapour Pressure	No Data Available
Relative Vapour Density	No Data Available
Boiling Point	>=100 °C
Melting Point	No Data Available
Freezing Point	-15 °C
Solubility	Soluble in water
Specific Gravity	>=1.27 (Water = 1)
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	No Data Available
Specific Heat	No Data Available
Molecular Weight	No Data Available
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	Not applicable.

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; however, following evaporation of aqueous component, residual material can burn if ignited.
Reactions That Release Gases or Vapours	Fire or heat may produce irritating, corrosive and/or toxic gases, including Carbon monoxide (CO), phosphorus oxides (PxOy).
Release of Invisible Flammable Vapours and Gases	When heated, vapours may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards!

10. STABILITY AND REACTIVITY

General Information	May be corrosive to metals.
Chemical Stability	Stable under normal temperatures and pressures.
Conditions to Avoid	Do not expose to extreme temperatures. Keep away from sources of ignition.
Materials to Avoid	Incompatible/reactive with strong oxidising agents, alkalis and many metals, e.g. aluminium and mild steel.
Hazardous Decomposition Products	Fire or heat may produce irritating, corrosive and/or toxic gases, including Carbon monoxide (CO), phosphorus oxides (PxOy).
Hazardous Polymerisation	Hazardous polymerisation does not occur.

11. TOXICOLOGICAL INFORMATION

General Information	<ul style="list-style-type: none"> - Acute toxicity: May be harmful if swallowed, in contact with skin and if inhaled. - Skin corrosion/irritation: Causes severe skin burns and eye damage. - Eye damage/irritation: Causes serious eye damage. - Respiratory/skin sensitisation: No information available. - Germ cell mutagenicity: No information available. - Carcinogenicity: No information available. - Reproductive toxicity: No information available. - STOT (single exposure): Can cause respiratory tract injury leading to lung edema. - STOT (repeated exposure): No information available. - Aspiration toxicity: No information available.
Acute	
Ingestion	Acute toxicity (Oral): - LD50, Rats: >2,000 mg/kg [Supplier's SDS].
Other	Acute toxicity (Dermal): - LD50, Rats: >2,000 mg/kg [Supplier's SDS].
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: - LC50, Fish (Rainbow trout): >3,440 mg/L (48 h). - EC50, Invertebrates (Daphnia magna): >265 mg/L (24 h).
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	- EC50, Algae (<i>Scenedesmus subspicatus</i>): 140 mg/L (72 h).
Persistence/Degradability	The total of the organic components contained in the product is not classified as readily biodegradable [OECD-301 A-F]. However, this product is expected to be inherently biodegradable.
Mobility	Accidental spillage may lead to penetration into the soil and groundwater; However, there is no evidence that this would cause adverse ecological effects.
Environmental Fate	Prevent entry into drains and waterways.
Bioaccumulation Potential	There is no evidence to suggest bioaccumulation will occur.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of contents/container as special waste and in accordance with local/regional/national regulations. Product may not be released into water without pre-treatment (biological sewage plant).
Special Precautions for Land Fill	Contaminated packaging: Containers will enclose product residues and vapours after being emptied - Handle contaminated packages in the same way as the substance itself.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG Code

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	37 Toxic And/Or Corrosive Substances Non-Combustible
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available

Land Transport (Malaysia)

ADR Code

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	37 Toxic And/Or Corrosive Substances Non-Combustible
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available

Land Transport (New Zealand)

NZS5433

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
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Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	37 Toxic And/Or Corrosive Substances Non-Combustible
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available

Land Transport (United States of America)

US DOT

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
ERG	153 Substances - Toxic and/or Corrosive (Combustible)
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available

Sea Transport

IMDG Code

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available
EMS	F-A, S-B
Marine Pollutant	No

Air Transport

IATA DGR

Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (2-Phosphonobutane-1,2,4-tricarboxylic acid)
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	3265
Hazchem	2X
Pack Group	III
Special Provision	No Data Available

National Transport Commission (Australia)

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

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)
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15. REGULATORY INFORMATION

General Information No Data Available

Poisons Schedule (Aust) Not Scheduled

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

Approval Code Additives Process Chemicals and Raw Materials Corrosive Group Standard 2020 HSR002491
*HSR004240 (Revoked)

National/Regional Inventories

Australia (AIC)	Listed
Canada (DSL)	Listed
Canada (NDSL)	Not Listed
China (IECSC)	Listed
Europe (EINECS)	253-733-5
Europe (REACH)	Not Determined
Japan (ENCS/METI)	Listed
Korea (KECI)	Listed
Malaysia (List of Classified Substances)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Listed
Taiwan (TCSI)	Listed
USA (TSCA)	Listed
Mexico (INSQ)	Not Determined

16. OTHER INFORMATION

Related Product Codes PHOSPB1000, PHOSPB1001, PHOSPB1002, PHOSPB1003, PHOSPB1004, PHOSPB1005, PHOSPB1006, PHOSPB1007, PHOSPB1010, PHOSPB1100, PHOSPB1101, PHOSPB1500, PHOSPB1800, PHOSPB2200, PHOSPB2202, PHOSPB2203, PHOSPB2220, PHOSPB4300, PHOSPB5000, PHOSPB5100, PHOSPH2203

Revision 5**Revision Date** 16 Oct 2022**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)

cm² 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/cm³ 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/m³ 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

m³ Cubic Metre

mbar Millibar

mg Milligram

mg/24H Milligrams per 24 Hours

mg/kg Milligrams per Kilogram

mg/m³ 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