1. IDENTIFICATION

Product Name	**Poly(hexamethylenebiguanide) hydrochloride (PHMB)**
Other Names	PHMB 20% Solution; Polyhexamethylene biguanide hydrochloride [CAS#27083-27-8]
Uses	Preservative and antimicrobial agent.
Chemical Family	Polihexanide
Chemical Formula	Unspecified
Chemical Name	Aqueous solution containing ca. 20% PHMB
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 6

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 (Inhalation) - Category 4

Serious Eye Damage/Irritation - Category 1

Sensitisation (Skin) - Category 1B

Carcinogenicity - Category 2

Specific Target Organ Toxicity (Repeated Exposure) - Category 1

Acute Hazard To The Aquatic Environment - Category 1

Long-term Hazard To The Aquatic Environment - Category 1

Pictograms

Signal Word

Danger

Hazard Statements

H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention	**P260**	Do not breathe mist/vapour/spray.
	P201	Obtain special instructions before use.
	P273	Avoid release to the environment.
	P271	Use only outdoors or in a well-ventilated area.
	P272	Contaminated work clothing should not be allowed out of the workplace.
	P270	Do not eat, drink or smoke when using this product.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
Response	**P304 + P340**	IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
	P302 + P352	IF ON SKIN: Wash with plenty of water.
	P333 + P313	If skin irritation or rash occurs: Get medical attention.
	P363	Wash contaminated clothing before reuse.
	P391	Collect spillage.
	P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTRE/doctor.
	P308 + P313	IF exposed or concerned: Get medical attention.
	P312	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
Poly(hexamethylenebiguanide) hydrochloride	Unspecified	32289-58-0	19 - 21 %
Contains: Hydrochloric acid	HCl	7647-01-0	<1 %
Water	H2O	7732-18-5	Balance %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	IF SWALLOWED: Rinse mouth, then drink a glass of water. Do not induce vomiting. 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. *Protect the uncontaminated eye!
Skin	IF ON SKIN: Remove and isolate contaminated clothing and shoes. Immediately flush skin with running water for at least 15 minutes. For minor skin contact, avoid spreading material on unaffected skin. If skin irritation or rash occurs, get medical advice/attention. Wash contaminated clothing and shoes before reuse. *In case of gross contamination, rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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	Symptomatic treatment. Keep victim calm and warm. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Medical Conditions Aggravated by Exposure	May cause an allergic skin reaction.

5. FIRE FIGHTING MEASURES

General Measures	Move containers from fire area if you can do it without risk. 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; however, following evaporation of aqueous component under fire conditions, the residual material may decompose and or burn.

Extinguishing Media	If material is involved in a fire, use dry chemical, Carbon dioxide (CO2), foam, water spray or fog for extinction; do not use straight streams. Alcohol resistant foam is the preferred firefighting medium but, if it is not available, normal foam can be used.
Fire and Explosion Hazard	Containers may explode when heated.
Hazardous Products of Combustion	Fire may produce irritating, corrosive and/or toxic gases, including Carbon oxides, NOx and HCl fumes.
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. ELIMINATE all ignition sources. Do not touch or walk through spilled material - Product is slippery when spilled! Do not breathe vapour or aerosol and avoid contact with eyes, skin and clothing.
Clean Up Procedures	Recover as much as possible (by pumping). Absorb remaining product with dry earth, sand or other non-combustible material and transfer to suitable containers for later disposal (see SECTION 13).
Containment	Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Cover with plastic sheet to prevent spreading. Dike far ahead of large spill for later disposal.
Decontamination	Wash spill site after material pickup is complete.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses. If the product contaminates rivers and lakes or drains, inform respective local authorities.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away. Stay upwind and/or uphill.
Personal Precautionary Measures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (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 - Use only outdoors or in a well-ventilated area. Obtain special instructions before use - Do not handle until all safety precautions have been read and understood. Do not breathe fume/gas/mist/vapours/spray and avoid contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/protective clothing/eye protection/face protection (see SECTION 8). Do not use high pressure systems to transfer the substance to an open container to prevent accidental aerosol generation. Avoid splashing and misting or spray generation. Avoid release to the environment - Collect spillage (see SECTION 6).
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep container tightly closed. Keep away from heat and sources of ignition - No smoking. Keep away from food/feedstuffs and incompatible materials (see SECTION 10). Store locked up. *Maintain at temperature >6°C to avoid precipitation (white jellified solid in the bottom of containers).
Container	Keep the product in its original container or recommended materials, i.e. High Density Polyethylene (HDPE), Polypropylene (PP), PVC, Stainless Steels. *Not suitable: metals (Cu, Fe, Zn, ordinary steels, etc) and some rubbers (pay particular attention to sealing gaskets).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product. COMPONENT: Hydrochloric acid: - Safe Work Australia Exposure Standard: TWA = 5 ppm (7.5 mg/m3) Peak limitation.
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	- Respiratory protection: In case of mist/vapours/aerosols, wear respiratory protection. Recommended: Approved ABEK-Particulate filter respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Chemical safety goggles. - Hand protection: Wear protective gloves. Recommended: Impervious gloves. - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommend: Impervious clothing/working clothes covering all parts of the body. When exposure to high concentrations are prolonged or repeated, use protective boots and apron.
Special Hazards Precaustions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Take off contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Liquid
Odour	Odourless
Colour	Colourless to yellowish
pH	4 - 5 (20%-PHMB solution)
Vapour Pressure	4 kPa (@ 20 °C)
Relative Vapour Density	No Data Available
Boiling Point	102 - 105 °C
Melting Point	Decomposes
Freezing Point	<6
Solubility	Miscible with water in any proportions - Miscible with aliphatic polar alcohols and glycol
Specific Gravity	No Data Available
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	After water evaporation, remaining solid decomposes - 200 - 300 °C
Density	1.04 - 1.05 kg/L
Specific Heat	No Data Available
Molecular Weight	No Data Available
Net Propellant Weight	No Data Available
Octanol Water Coefficient	0.004 at 22°C
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	1.2 - 10 mPa.s (@ 20 °C)

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; however, following evaporation of aqueous component under fire conditions, the residual material may decompose and or burn.
Reactions That Release Gases or Vapours	Fire/decomposition may produce irritating, corrosive and/or toxic gases, including Carbon oxides, NOx and HCl fumes.
Release of Invisible Flammable Vapours and Gases	No information available.

10. STABILITY AND REACTIVITY

General Information	No information available.
Chemical Stability	Stable at standard temperature and pressure.
Conditions to Avoid	Avoid temperature extremes and ignition sources.
Materials to Avoid	Incompatible with metallic materials and their alloys (copper, iron and steel, etc) and some rubbers. Incompatible with anionic substances or their preparations -> precipitate.
Hazardous Decomposition Products	Fire/decomposition may produce irritating, corrosive and/or toxic gases, including Carbon oxides, NOx and HCl fumes.
Hazardous Polymerisation	Will not occur.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: May be harmful if swallowed. Harmful if inhaled.
- Skin corrosion/irritation: Polihexanide is reported to slightly irritate skin.
- Eye damage/irritation: Causes serious eye damage. Severe persistent irritant.
- Respiratory/skin sensitisation: May cause an allergic skin reaction. PHMB is considered a skin sensitizer based on animal data and human studies.
- Germ cell mutagenicity: No genotoxic properties evident in in vitro assays with or without metabolic activation.
- Carcinogenicity: Suspected of causing cancer. Rat, oral: Hamartomas in liver, Hepatocellular adenomas and follicular adenoma in thyroid. Other types of benign neoplastic lesions in both males and females are also observed.
- Reproductive toxicity: Based on the data available from several animal studies, there is no evidence of reproductive toxicity. Polihexanide does not show specific developmental toxicity. The developmental effects observed in studies are secondary to maternal toxicity [NICNAS].
- STOT (single exposure): Polihexanide was reported to cause respiratory irritation in a repeat dose inhalation toxicity study in rats [NICNAS].
- STOT (repeated exposure): Causes damage to organs (respiratory tract) through prolonged or repeated exposure by inhalation. Based on the treatment-related effects reported in repeated dose toxicity studies, repeated inhalation exposure polihexanide is considered to cause serious damage to health [NICNAS].
- Aspiration toxicity: No information available.

Acute

Ingestion	Acute toxicity (Oral): COMPONENT: PHMB (CAS No. 32289-58-0): - LD50, Rat: 500 mg/kg bw. *ATEmix = 2,500 mg/kg bw. (Category 5)
Other	Acute toxicity (Dermal): COMPONENT: PHMB (CAS No. 32289-58-0): - LD50, Rat: >2,000 mg/kg bw.
Inhalation	Acute toxicity (Inhalation): COMPONENT: PHMB (CAS No. 32289-58-0): - LC50, Rat (males & females): 0.37 mg/L (4 h) [Dust/mist]. *ATEmix = 1.85 mg/L (Category 4)
Carcinogen Category	Cat. 2

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: COMPONENT: PHMB (CAS No. 32289-58-0): - LC50, Fish (Oncorhynchus mykiss): 0.2676 mg/L (96 h). - EC50, Invertebrates (Daphnia magna): 0.11707 mg/L (48 h). - ErC50, Algae (Pseudokirchneriella subcapitata): 2.06E-02 mg/L (72 h). - EC50, Microorganisms (Activated sludge): 32.3 mg/L (3 h).
Persistence/Degradability	Not readily biodegradable (PHMB).
Mobility	No information available.
Environmental Fate	Very toxic to aquatic life with long lasting effects - Avoid release to the environment.
Bioaccumulation Potential	No bioaccumulation potential (PHMB). *Bioconcentration factor (BCF): 1.86 x 10-3 L/kg (calculation based on log Kow of -2.39).
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Unusable products, out of date, residues and contaminated packagings are considered hazardous waste. Dispose of in accordance with local/regional/national regulations. Contact a licensed disposal company. Do not re-use empty containers.
Special Precautions for Land Fill	No information available.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG Code

Proper Shipping Name	PHMB 20% Solution
Class	No Data Available
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	No Data Available

Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	AU01
Comments	Not regulated as DG when transported by road or rail in packagings that do not incorporate a receptacle exceeding 500 kg(L) or IBCs.

Land Transport (Malaysia)
ADR Code

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PHMB 20% Solution)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PHMB 20% Solution)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Land Transport (United States of America)
US DOT

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PHMB 20% Solution)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
ERG	171 Substances (Low to Moderate Hazard)
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Sea Transport
IMDG Code

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PHMB 20% Solution)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

EMS	F-A, S-F
Marine Pollutant	Yes

Air Transport
IATA DGR

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PHMB 20% Solution)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3082
Hazchem	•3Z
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	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	POLIHEXANIDE
Poisons Schedule (Aust)	Schedule 6

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

Approval Code	Not Assessed

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	Not Determined
Europe (REACh)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Not Determined
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed

Philippines (PICCS)	Not Determined
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Not Determined

16. OTHER INFORMATION

Related Product Codes	POHEBI2001, POHEBI2002, POHEBI2101, POHEBI2110, POHEBI2115, POHEBI2125, POHEBI2200, POHEBI2300, POHEBI4500, POHEBI4510, POHEBI8000, POHEBI9900
Revision	5
Revision Date	18 May 2021
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