ZBM3
Safety Data Sheet

1. PRODUCT IDENTIFICATION

TRADE NAME AS LABELLED:	ZBM3
PRODUCT NUMBER:	ZBM3
CHEMICAL NAME:	Mixture
INTENDED USE:	Energy storage
U.N. NUMBER, NAME & DESCRIPTION:	2794 BATTERIES, WET, FILLED WITH ACID (contains zinc bromide, polybromide oil)
U.N. DANGEROUS GOODS CLASS:	8
SUBSIDIARY RISK:	None
MANUFACTURER'S NAME:	Redflow International Pty Ltd
ADDRESS:	27 Counihan Road, Seventeen Mile Rocks, Brisbane, QLD, Australia, 4073
BUSINESS PHONE:	+61 (0) 7 3376 0008
24 HR EMERGENCY CONTACT: **Account No.:**	3E Company 14934
EMERGENCY PHONE:	Refer to *17. Global Emergency Contact*.
DATE OF PREPARATION:	19 October 2022
DATE OF LAST REVISION:	19 October 2022

2. HAZARDS IDENTIFICATION


Health Hazard


Acute Toxicity


Corrosion


Aquatic Pollutant

Signal word: **Danger**

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H341	Suspected of causing genetic defects
H400	Very toxic to aquatic life
H410	Toxic to aquatic life with long lasting consequences
P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dusts or mists
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P264	Wash hands thoroughly after handling
P270	Do not eat, drink, or smoke when using this product
P272	Contaminated clothing should not be allowed out of the workplace
P280	Wear protective gloves/protective clothing
P281	Use personal protective equipment as required
P301+P312	If SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P301+P330+P331	If SWALLOWED: Rinse mouth. DO NOT induce vomiting.
P302+P352	If ON SKIN: Wash with soap and water.
P303+P361+P353	If on skin or hair: Remove/Take off immediately all contaminated clothing. Rinse skin (hair) with water shower.
P308+313	If exposed or concerned: Get medical advice/attention.
P321	In the case of accident or if you feel unwell seek medical advice immediately (show this SDS where possible)
P330	Rinse mouth.
P333+313	If skin irritation or a rash occurs: Get medical advice/attention.

P363	Wash contaminated clothing before re-use.
P405	Store locked up.
P501	Dispose of contents/container in accordance with the local regulations in force.

This product is classified as Dangerous Goods according to the ADG code (7th edition) of Australia, and Regulation (EC) no. 1272/2008 of the European Union, and contains corrosive, toxic (Cat. 4), and possible mutagenic (Cat. 2) components.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS#	WT %	Hazard Statement Code(s)	Hazard Class and category Codes
N-Ethyl-N-methylpyrrolidinium bromide (MEP)	69227-51-6	< 8%	H341	Muta. 2
Zinc bromide	7699-45-8	17-21%	H302, H314, H317, H400, H410	Acute Tox. 4 Skin Corr. 1B Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1
Zinc chloride	7646-85-7	< 3%	H302, H314, H400, H410	Acute Tox. 4 Skin Corr. 1B Aquatic Acute 1 Aquatic Chronic 1
Potassium chloride	7447-40-7	< 3%	No information	
Water	7732-18-5	> 20%	No information	
Polybromide oil	N/A	< 1%	No information	
Carbon plastic electrode (25% carbon, 75% polyethylene)	N/A	3%	No information	
Polyethylene	9002-88-4	30%	No information	
Polyolefin	N/A	1%	No information	
Electrical and steel parts	N/A	7%	No information	
Copper parts (bus bars)	7440-50-8	>1%	No information	

Precautionary Statements

H302	P264, P270, P301+312, P330, P501
H314	P260, P264, P280, P301+330+331, P303+361+353, P363, P304+340, P310, P321, P305+351+338
H317	P261, P272, P280, P302+352, P333+313, P321, P363, P501
H341	P201, P202, P281, P308+313, P405, P501
H400	P501
H410	P501

4. FIRST AID MEASURES

Eye

If electrolyte from this product is in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre (or a doctor), or for at least 15 minutes.

Inhalation

If electrolyte from this product is inhaled, remove affected person(s) from contaminated area. To protect rescuer use a Type B (Inorganic and acid gas) respirator where an inhalation risk exists. Apply artificial respiration if not breathing. Contact emergency personnel.

Skin

If skin or hair contact with electrolyte from this product occurs, remove contaminated clothing and flush skin and / or hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.

Ingestion

For advice if electrolyte from this product is ingested, refer to *17. Global Emergency Contact* or contact a doctor (at once).

The decision to induce or not to induce emesis in ingestion is often controversial, is not automatic, and must be carefully considered. Emesis may be indicated in substantial recent ingestions. Contraindications to emesis induction include signs of oral, pharyngeal, or oesophageal irritation; a depressed gag reflex; or central nervous system excitation or depression. If these are present or likely, EMESIS SHOULD NOT BE INDUCED.

Special treatment

Treat symptomatically.

First aid facilities

Eye wash facilities and safety shower should be available if electrolyte from this product is being handled.

Symptoms of Exposure

Electrolyte from this product is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Symptoms include spasm, inflammation, and oedema of the larynx; spasm, inflammation, and oedema of the bronchi; pneumonitis; pulmonary oedema; burning sensation; cough; wheezing; shortness of breath; headache; and nausea.

Potential health effects

Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through the skin. Causes skin burns. May cause bromide rash and/or skin blackening in the longer term.
Ingestion	Harmful if swallowed, causes burns.
Eyes	Causes eye burns.

5. FIRE FIGHTING MEASURES

Suitable extinguishing equipment

In a fire situation select extinguishing media based on the cause of the surrounding fire. Product will not react adversely with water, foam, or dry-agent based extinguishers. Prevent contamination of drains or waterways. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use water-fog to cool intact containers and nearby storage areas.

Special hazards

This product is considered to be non-flammable; however, if heated to decomposition this product may evolve fumes of bromine, hydrogen bromide, and carbon monoxide. Many organic compounds and some reactive metals may burn in a bromine atmosphere.

Advice for fire fighters

Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use water-fog to cool intact containers and nearby storage areas.

6. ACCIDENTAL RELEASE MEASURES

Spillage of electrolyte from this product

Contact emergency services where appropriate. Use personal protective equipment to prevent skin / eye contact. Clear area of all unprotected personnel. Ventilate area where possible. Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. Wash spill site with water.

7. STORAGE AND HANDLING

Store in secured, cool, dry, well-ventilated area in a tightly closed container. Store removed from combustible materials, heat or ignition sources, alkalis, acids, metals, and foodstuffs. Ensure containers are adequately labelled and protected from physical damage. Containers that are opened must be carefully resealed and kept upright to prevent leakage. When not stored in original battery packaging, electrolyte must be stored in a thick-walled polyethylene container. Handle and open container with care.

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Wash hands thoroughly after use.

Prohibit eating, drinking, and smoking in contaminated areas.

Prevent release into the environment.

8. EXPOSURE CONTROLS

Ingredient	Reference	TWA	STEL
Zinc chloride (fume)	SWA (AUS)	1 mg / m3	2 mg / m3
Zinc bromide (fume)	Data not available		
N-Ethyl-N-methylpyrrolidinium bromide (MEP)	Data not available		

This product should be handled in well-ventilated conditions. Do not create mists / sprays. As far as possible, use appropriate engineering controls to reduce exposure to splashes / mists / sprays.

PPE

Eye / Face	Wear goggles / full face mask where there is a risk of splashing.
Hands	Wear PVC or rubber gloves.
Body	Not required if suitable engineering controls are in place however chemical resistant suit should be considered if a risk assessment deems it necessary.
Respiratory	Type B respirator where risk of inhalation occurs.

9. PHYSICAL AND CHEMICAL PROPERTIES

	Electrolyte	Plastics
Appearance	YELLOW LIQUID (with possible dark brown oily component)	Translucent, white, or black
Solubility (water)	SOLUBLE	NOT RELEVANT
Odour	Bromine odour	NOT RELEVANT
Specific Gravity	1.5	NOT RELEVANT
pH	1 to 2	NOT RELEVANT
% Volatiles	N/A	NOT RELEVANT
Vapour Pressure	7 mBar	NOT RELEVANT
Flammability	NON-FLAMMABLE	NOT RELEVANT
Vapour Density	5.2 (Air = 1)	NOT RELEVANT
Flash Point	NOT RELEVANT	341°C
Boiling Point	128°C	NOT RELEVANT
Upper Explosion Limit	NOT RELEVANT	NOT RELEVANT
Melting Point	NOT AVAILABLE	129°C - 133°C
Lower Explosion Limit	NOT RELEVANT	NOT RELEVANT
Evaporation Rate	0.1 (Butyl acetate = 1)	NOT RELEVANT
Auto ignition Temperature	NOT RELEVANT	330°C - 410°C
Decomposition Temperature	NOT AVAILABLE	290°C
Partition Coefficient	NOT AVAILABLE	NOT RELEVANT
Viscosity	0.7 cSt	NOT RELEVANT

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended conditions of storage.

Conditions to avoid

Avoid heat (> 60°C), sparks, open flames, and other ignition sources.

Material to avoid

The electrolyte contained in this product will corrode most metals.

Hazardous

May evolve toxic gases (metal oxides, nitrogen oxides, carbon oxides) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

Health hazard

Corrosive. The electrolyte contained in this product has the potential to cause adverse health effects. Use safe work practices to avoid eye or skin contact and inhalation. Engineered solutions, such as using suitable pumps to transfer material rather than manually pouring, should be considered.

Summary

Product contains bromide. Some individuals may experience an allergic reaction with "bromide rash" and possible acne-like eruptions or boils. N-Ethyl-N-methylpyrrolidinium bromide (MEP) is classified as a human mutagen (Cat. 2). MEP has been documented to produce a positive mutagenic result in the in-vivo somatic cell mutagenicity assay, the bone marrow micronucleus test.

Eye

Corrosive—irritant. Contact with the electrolyte contained in this product may result in irritation, lacrimation, pain, redness, corneal burns, and possible permanent damage.

Inhalation

Corrosive—irritant. Over exposure to the electrolyte contained in this product may result in irritation of the nose and throat, coughing, nausea, dizziness, and headache. Aspiration into lungs may cause chemical pneumonitis and pulmonary oedema.

Skin

Corrosive. Contact with the electrolyte contained in this product may result in irritation, redness, pain, rash, dermatitis, and possible burns. May cause possible allergic reaction with bromoderma (bromide rashes) and possible acne-like eruptions or boils.

Ingestion

Corrosive. Ingestion of the electrolyte contained in this product may result in burns to the mouth and throat, nausea, vomiting, abdominal pain, and ulceration.

Toxicity Data

ZINC CHLORIDE (7646-85-7)

LCLo (Inhalation):	1960 mg/m³/10 minutes (rat)
LD50 (Ingestion):	200 mg/kg (guinea pig)
LDLo (Intraperitoneal):	30 g/kg (7-8 day pregnant rat)
TCLo (Inhalation):	4800 mg/m³/30 minutes (man)
TDLo (Ingestion):	15 mg/kg (chicken - tumours)

POTASSIUM CHLORIDE (7447-40-7)

LD50 (Ingestion):	1500 mg/kg (mouse)
LD50 (Intraperitoneal):	620 mg/kg (mouse)
LD50 (Intravenous):	117 mg/kg (mouse)
LDLo (Ingestion):	20 mg/kg (man)
LDLo (Intraperitoneal):	900 mg/kg (guinea pig)
LDLo (Intravenous):	77 mg/kg (guinea pig)
LDLo (Subcutaneous):	2120 mg/kg (frog)
TDLo (Ingestion):	60 mg/kg/days (woman)

12. ECOLOGICAL INFORMATION

The major constituents of this material are considered to be very harmful to aquatic life. No environmental toxicity data is available for N-Ethyl-N-methylpyrrolidinium bromide.

13. DISPOSAL CONSIDERATIONS

Waste disposal

Wearing protective equipment, absorb spills with non-organic absorbent (e.g. vermiculite or clay) and collect and place in suitable containers for disposal. For large quantities, contact the manufacturer for additional information. Prevent dispersal of product and product residues to waterways and the environment.

Legislation

Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS DANGEROUS GOODS BY THE AUSTRALIAN DANGEROUS GOODS CODE - Edition 7, and Regulation (EC) no. 1272/2008 of the European Union.

UN No. 2794
Shipping Name: BATTERIES, WET, FILLED WITH ACID (contains Zinc Bromide, polybromide oil)
Class 8 DG
Packaging Group NIL
Hazchem Code 2R

IATA
UN No. 2794
Shipping Name: BATTERIES, WET, FILLED WITH ACID (contains zinc bromide, polybromide oil)
Class 8 DG
Packaging Group NIL
Hazchem Code 2R

IMDG
UN No. 2794
Shipping Name: BATTERIES, WET, FILLED WITH ACID (contains zinc bromide, polybromide oil)
Class 8 DG
Packaging Group NIL
Hazchem code 2R
Mark: MARINE POLLUTANT

ADR/RID
UN No. 2794
Shipping Name: BATTERIES, WET, FILLED WITH ACID (contains zinc bromide, polybromide oil)
Class 8 DG
Packaging Group NIL
Hazchem code 2R
Marking: Environmentally hazardous substance

15. REGULATORY INFORMATION

AICS
All chemicals listed on the Australian Inventory of Chemical Substances (AICS) except for polybromide oil.

ESIS
All chemicals listed via the European chemical substances information system except for polybromide oil.

16. OTHER INFORMATION

This SDS has been prepared according to the guidelines published by Safe Work Australia. The information presented is believed to be correct to the best of our knowledge but does not claim to be all inclusive. The information in this document is based on our present knowledge and should be only considered as a guide. As with any chemical substance, an in-house risk assessment should always be carried out.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES

Exposure standards are established on the premise of an 8-hour work period of normal intensity, under normal climatic conditions and where a 16-hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

DEFINITIONS and ABBREVIATIONS

ADG	Australian Dangerous Goods.
CAS#	Chemical Abstract Service number - used to uniquely identify chemical compounds.
pH	Relates to hydrogen ion concentration using a scale of 0 (highly acidic) to 14 (highly alkaline).
STEL	Short Term Exposure Limit.
SWA	Safe Work Australia.
TWA	Time Weighted Average.

17. GLOBAL EMERGENCY CONTACT

PHONE NUMBERS FOR GLOBAL SERVICES WITH CLIENT ACCESS CODE							
Customer Support							
Americas		**Europe**		**Asia Pacific**		**Middle East/Africa**	
1.866.519.4752 (US, Canada, Mexico)		No Toll-Free Access		No Toll-Free Access		No Toll-Free Access	
(+)1 760 476 3962		(+)1 760 476 3961		(+)1 760 476 3960		(+)1 760 476 3959	
Countries*	**Languages**	**Countries***	**Languages**	**Countries***	**Languages**	**Countries***	**Languages**
Argentina	English	Belgium	English	Australia	English	Algeria	English
Brazil	Spanish	Denmark	Spanish	Hong Kong	Japanese	Egypt	Arabic
Canada	French CA	Finland	German	India	Korean	Israel	Persian
Costa Rica	Portuguese	France	French	Japan(KDD)	Chinese	Kuwait	Turkish
Mexico	Other	Germany	Italian	Malaysia	Thai	Morocco	French
Peru		Italy	Russian	New Zealand	Other	Oman	Other
USA		Netherlands	Other	S. Korea		Saudi Arabia	
		Poland		Singapore		South Africa	
		Portugal		Taiwan		Turkey	
		Russia		Thailand		United Arab Emirates	
		Spain					
		Switzerland					
		UK					

	Regulation	Country	Number	Languages
Country Specific * *	**Required**	Australia	(+)61 1 800 686 951	English
		China	(+)86 4001 2001 74	Chinese
	Recommended	New Zealand	(+)64 800 451719	English
	Optional	United Kingdom	(+)44 8 08 189 0979	English

End of Safety Data Sheet