

Section 1. PRODUCT IDENTIFICATION

Product Name	Rechargeable Lithium-ion Battery
Other Names	Lithium-ion batteries (including lithium-ion polymer batteries)
Recommended Use of the Chemical and Restrictions on Use	Lithium batteries for Industrial application. Traction application, Ground Support Equipment(GSE), Automatic Guided Vehicle(AGV). Not suitable for automotive application as the battery requires special chargers
Details of Manufacturer or Importer	Distributed in Australia by: Century Yuasa Batteries 37-65 Cobalt Street Carole Park. QLD. 4300.
Emergency Telephone Number	07 3361 6161
Poisons information Centre	Australia 131126

Section 2. HAZARD(S) IDENTIFICATION

HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the Model WHS Regulations and the ADG Code.

GHS Classification: Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Dermal) Category 3, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 1A, Corrosive to Metals Category 1, Carcinogenicity Category 2, Flammable liquids Category 3. Hazardous to the Aquatic Environment Long-Term Hazard Category 2

GHS Label Elements



Signal Word

DANGER

IN THE EVENT OF INTERNAL CONTENTS EXPOSED

Hazard Statement(s)	H311	Toxic in contact with skin
	H302	Harmful if swallowed
	H314	Causes severe skin burns and eye damage
	H290	May be corrosive to metals
	H351	Suspected of causing cancer
	H335	May cause respiratory irritation
	H373	Causes damage to organs through prolonged or repeated exposure
	H226	Flammable liquid and vapour

IN THE EVENT OF INTERNAL CONTENTS EXPOSED

Precautionary Statement(s)	P101	If medical advice is needed, have product container or label at hand
General	P102	Keep out of reach of children
	P103	Read carefully and follow all instructions
Precautionary Statement(s)	P210	Keep away from heat/sparks/open flames/hot services. No Smoking.
Prevention	P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment
	P242	Use non-sparking tools.
	P260	Do not breath dust/fume
	P270	Do not eat, drink or smoke when using this product
	P271	Use only outdoors or with adequate ventilation.
	P280	Wear protective gloves/protective clothing/eye protection/face protection
Precautionary Statement(s)	P301 + P330 + P331+P316	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Get emergency medical help immediately, Call Poison Centre
Response	P303 + P361 + P353+ P363	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
	P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
	P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue Rinsing.
		Absorb spillage to prevent material damage
	P390	
Precautionary Statement(s)	P403 + P235	Store in a well-ventilated place. Keep cool.
Storage	P405	Store locked up
Precautionary Statement(s)	P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation
Disposal		

Section 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	Identification	Content % weight
Lithium iron phosphate (LiFePO ₄)	15365-14-7	25 - 35 %
Graphite/Carbon (C)	7440-44-0	10 - 30 %
Electrolyte, Lithium hexafluorophosphate (LiPF ₆)	21324-40-3	10 - 20 %
Electrolyte, Ethylene carbonate (C ₃ H ₄ O ₃)	96-49-1	
Electrolyte, Ethyl methyl carbonate (C ₄ H ₈ O ₃)	623-53-0	
Aluminium (Al)	7429-90-5	10 - 30 %
Copper (Cu)	7440-50-8	< 15 %
Polyvinylidene fluoride	24937-79-9	< 10 %
Polyethylene	9002-88-4	< 5 %
Mercury (Hg)	7439-97-6	<0.1%
Cadmium (Cd)	7440-43-9	<0.01%
Lead (Pb)	7439-92-1	<0.1%

Section 4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery and cell casing.

Undamaged, closed batteries do not represent a danger to the health.

Eye Contact	<ul style="list-style-type: none"> Wash out immediately with water for at least 15 minutes. Seek medical attention. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel
Skin Contact	<ul style="list-style-type: none"> Wash off immediately with plenty of water Seek medical attention.
Inhalation	<ul style="list-style-type: none"> If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. Keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. Transport to hospital, or doctor.
Ingestion	<ul style="list-style-type: none"> Rinse the mouth with water and spit out Drink water and if possible, eat calcium gluconate tablets Do not induce vomiting Contact a Poisons Information Centre or a Physician
After High Voltage Exposure	Valid for voltage above 75DC. <ul style="list-style-type: none"> Call for medical help immediately Start CPR if needed Always consult a physician
Symptoms Caused by Exposure	Burns, blood coagulation, myocardial effects.
Medical Attention and Special Treatment	Treat symptomatically.

Section 5. FIRE FIGHTING MEASURES








Suitable Extinguishing Equipment	Water	CO ₂	Dry Chemical Powder	Foam	BCF/ Where regulations permit
	✗	✓	✓	✗	✓
	Use a large amount of water to cool down battery for an extended period, it may take e.g. 24 hours. The run-off water can be contaminated with hydrofluoric acid and toxic and appropriate protective means should be applied.				
Specific Hazards Arising from the Chemical	May form hydrofluoric acid if electrolyte gets into contact with water. In case of venting or fire, emissions of toxic gases can occur, e.g. highly toxic hydrogen fluoride (HF) gas, carbon monoxide and carbon dioxide.				
Special Protective Equipment and Precautions for Firefighters	Self-contained breathing apparatus and protective suit. In event of gassing or fire, only move the battery if it is necessary and if it can be done in a safe way. If the battery has heated, above about 85 °C, cell(s) inside the battery can vent. The vented gases can be both flammable and toxic.				
Hazchem Code	1YE				

Section 6. ACCIDENTAL RELEASE MEASURES

This information is relevant only if the battery is broken and the contents are released.

Personal Precautions, Protective Equipment and Emergency Procedures	Avoid contact with skin and eyes. Wear self-contained breathing apparatus and protective suit.
Environmental Precautions	Do not discharge into the drains/surface waters/groundwater.
Methods and Materials for Containment and Cleaning Up	Sand or soil should be used to absorb any exuded material, send for disposal (in accordance with local regulations).

Section 7. HANDLING AND STORAGE

Precautions for Safe Handling	<ul style="list-style-type: none">• Avoid short circuit• Avoid mechanical damage.• Do not open the battery.• Keep fire extinguisher in relevant distance• Keep away from open flames, hot surfaces, and sources of ignition.
Conditions for Safe Storage	<ul style="list-style-type: none">• Store in-house between -20 °C and + 35 °C.• Avoid short circuit.• Place on a pallet for easy removal in case of danger.• Keep distance from flammable materials.
Storage Incompatibility	<div>✓ = May be stored together</div> <div>① = May be stored together with specific preventions</div> <div>✗ = Must not be stored together</div> <div><div> ✗</div><div> ✗</div><div> ✓</div><div> ✗</div><div> ✓</div><div> ✓</div><div> ①</div></div>

Section 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Control Measures - This product presents no health hazards to the user when used according to label directions for its intended purposes

Ingredient	SafeWork Australia WES TWA _{8hr}	WorkSafe New Zealand TWA _{8hr}	Other Exposure Standard
Lithium iron phosphate (LiFePO ₄)	-	-	
Lithium hexafluorophosphate (LiPF ₆)	-	-	ACGIH TLV TWA 2.5mg/m ³ F
Ethylene carbonate (C ₃ H ₄ O ₃)	-	-	-
Ethyl methyl carbonate (C ₄ H ₈ O ₃)	-	-	-

Aluminium (Al)	10mg/m ³	10mg/m ³	-
Copper (Cu)	0.01mg/m ³	0.01mg/m ³ (r)	-
Polyvinylidene fluoride	-	-	-
Polyethylene	-	-	-
Mercury (Hg)	0.025mg/m ³	0.025mg/m ³	-
Cadmium (Cd)	0.01mg/m ³	0.004mg/m ³ (r)	-
Lead (Pb)	0.05 mg/m ³	0.05 mg/m ³	-

Biological Monitoring Not required

Engineering Controls

- Keep away from heat and open flame.
- Prevent mechanical damage.
- Store in recommended temperature.
- Keep distance from flammable materials.
- In the event of gas emissions or fire appropriate ventilation is needed.

Personal Protection



Respirator Type

- Not normally required with normal use.
- In case of battery venting see firefighting measures



Eye Protection

- Not normally required with normal use.
- **If** the battery is open, safety glasses is needed if above 75 VDC. In the event of gas emissions or a fire, see chapter firefighting measures.



Clothing

- During repair of the battery no rings, clocks or other metal objects shall be present. Isolated tools shall be used. If the battery is open and high voltage exposed an electrical safety hook is recommended.



Glove Type

- Not normally required with normal use.
- If the battery is opened high voltage levels can be exposed and electrical safety gloves is needed
- Chemical gloves if battery cells are burnt or ruptured



Foot wear

- Steel toed shoes recommended during handling

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Solid		
Odour	Not applicable	Lower explosive limits	Not Applicable
Odour threshold	Not applicable	Vapour pressure (kPa)	Not Applicable
pH	Not Applicable	Vapour density (Air = 1)	Not Available
Melting point/ freezing point (°C)	Not Available	Relative density (Water = 1)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Solubility in water (g,L)	Not Applicable
Flash point	Not Applicable	Partition coefficient: n-octanol/water	Not Available
Evaporation rate	Not Available	Auto-ignition temperature	Not Applicable
Flammability	Not Available	Decomposition temperature (°C)	Not Available
Upper explosive limits	Not Available	Viscosity	Not Available

Section 10. STABILITY AND REACTIVITY

Reactivity	Not Available	Chemical stability	Product is considered stable
Possibility of hazardous reactions	May form hydrofluoric acid if electrolyte gets into contact with water	Conditions to avoid	Keep away from open flames, hot surfaces, and sources of ignition. Never impact, pierce, or crush the battery
Incompatible materials	Water, salted water, other solvents with water inside the battery can damage the battery and start a short circuit reaction.	Hazardous decomposition products	In case of venting or fire, emissions of toxic gases can occur, e.g. highly toxic hydrogen fluoride (HF) gas and carbon monoxide.

Section 11. TOXICOLOGICAL INFORMATION ACUTE EFFECTS

If appropriately handled and if in accordance with the general hygienic rules, no damages to health have become known.

Symptoms or effects that may arise in the event of a fire:-

May form hydrofluoric acid if electrolyte gets into contact with water. In case of venting or fire, emissions of toxic gases can occur, e.g. highly toxic hydrogen fluoride (HF) gas, carbon monoxide and carbon dioxide.

Inhaled	<p><i>Hydrogen fluoride gas</i> At high levels or in combination with skin contact can cause death from an irregular heartbeat or from fluid build-up in the lungs.</p> <p><i>Carbon monoxide</i> Flu-like symptoms (headaches, dizziness, disorientation, nausea and fatigue). Chest pain in people with coronary heart disease At higher concentration: impaired vision and coordination, dizziness and confusion</p>
Ingestion	Abdominal pain, nausea and vomiting
Skin contact	Electrolyte is composed of corrosive substances, serious burns may result, poorly healing wounds
Eye	Electrolyte is composed of corrosive substances, serious burns may result, risk of blindness

Chronic effects No information available

Acute Toxicity	Skin Irritation / Corrosion	Serious Eye Damage / Irritation	Respiratory Or Skin Sensitisation	Mutagenicity	Carcinogenicity	Reproductivity	Stot - Single Exposure	Stot - Repeated Exposure	Aspiration Hazard
✓	✓	✓	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ

✓ = Data required to make classification available ✗ = Data available but does not fill the criteria for classification

ⓘ = Data Not Available to make classification

Section 12. ECOLOGICAL INFORMATION

Ecological injuries are not known or expected under normal use.

Degradability	No information available
Bio-accumulative Potential	No information available
Mobility in Soil	No information available
Other Adverse Effects	In the event of a fire or accidental release: Do not discharge into the drains/surface waters/groundwater. Sand or soil should be used to absorb any exuded material, send for disposal.

Section 13. DISPOSAL CONSIDERATIONS

Safe Handling & Disposal	Recycle in accordance with local regulations
Environmental Regulations	Refer to section 15

Section 14. TRANSPORT INFORMATION

REGULATED FOR TRANSPORT OF DANGEROUS GOODS ADG, IATA and IMDG

Labels Required



Marine Pollutant Hazchem Code

Land and Sea Transport
No
1YE

Air Transport

Land Transport

UN Number 3480
Proper Shipping Name Lithium-ion batteries (including lithium-ion polymer batteries)
Transport Hazard Class Class 9
Sub-risk Not Applicable
Packing Group Not Applicable
Environmental Hazards for Transport Purposes
Special Precautions for User Special Provisions 230, 348, 376, 377, 384
Packing Instructions P903, P908, P909, P911, LP903, LP904, LP906

Air Transport

UN Number 3480
Proper Shipping Name Lithium-ion batteries (including lithium-ion polymer batteries)
Transport Hazard Class Class 9
Sub-risk Not Applicable
Packing Group Not Applicable
Environmental Hazards for Transport Purposes
Special Precautions for User Forbidden on passenger aircraft.
Must be shipped at a state of charge not exceeding 30% of the rated capacity
Complies with the requirements of Section 1A of Packing Instructions 965 of 61st DGR Manual of IATA (2020 Edition).

Sea Transport

UN Number 3480
Proper Shipping Name Lithium-ion batteries (including lithium-ion polymer batteries)
Transport Hazard Class Class 9
Sub-risk Not Applicable
Packing Group Not Applicable
Environmental Hazards for Transport Purposes
Special Precautions for User EMS Number F-A,S-I
Special Provisions 230, 348, 376, 377, 384
Packing Instructions P903, P908, P909, P911, LP903, LP904, LP906
Stowage and Handling Category A, SW19
IMDG Code (Amdt. 39-18) (2018) Edition – including passing of the UN38.3 test.

Section 15. REGULATORY INFORMATION

SUSMP Not applicable
Classifications Globally Harmonised System (GHS) of Classification and Labelling of Chemicals
HSNO (NZ) Act Batteries are considered to be a manufactured article and there not covered by the HSNO Act.

The regulations applicable to lithium-ion batteries are evolving and as such users should confirm local regulatory requirements with the storage, handling and use of this product.

Section 16. ANY OTHER RELEVANT INFORMATION

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
DSEN	Dermal Sensitiser
STOT	Specific Target Organ Toxicity
TLV	Threshold Limit Value
TWA _{8hr}	Time Weighted Average (8 hour)
WES	Workplace Exposure Standard

References

IATA Lithium Battery Guidance Document (2021)
 IMDG Code (incorporating amendment 39-18)
 SafeWork Australia Workplace Exposure Standards for Airborne Contaminants (19 December 2019)
 WorkSafe New Zealand Workplace exposure standards and biological exposure indices Ed 12-1 (November 2020)
 ACGIH Threshold Limit Values <https://www.osha.gov/annotated-pels/note> (accessed May 2021)

Revision Information

	Number	Comment	Date
Christopher Noble	02	Updated ingredients and format to ETQ	23/11/23
Christopher Noble	03	Updated to GHS10e	2/8/2024

The information given above is provided in good faith based on existing knowledge and does not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance, or disposal of the product. If there are any queries, the supplier should be consulted.