

# Safety Data Sheet

LBATN12100

Date Prepared: 12 February 2025

This Safety Data Sheet (SDS) provides relevant battery information to retailers, consumers, OEMs and other users requesting a GHS-compliant Safety Data Sheet (SDS). Articles, such as batteries, are exempt from GHS SDS classification criteria. The GHS criteria is not designed or intended to be used to classify the physical, health and environmental hazards of an article. Branded consumer batteries are defined as electro-technical devices.

## SECTION 1 – IDENTIFICATION

### 1.1 PRODUCT IDENTIFIER

Description:	12V 100Ah LiFePO <sub>4</sub> Core Battery
Synonyms:	Secondary (rechargeable) Lithium Iron Phosphate (LiFePO <sub>4</sub> ) Traction / Energy battery
Specification:	1.28 kWh, 100Ah, 12.8V
Use:	Traction Battery
Part Number:	LBATN12100

### 1.2 SUPPLIER

Manufacturer:	REDARC Electronics Pty Ltd.
Address:	23 Brodie Road North, Lonsdale, South Australia, Australia, 5160
Contact Phone Number:	+61 8 8322 4848
Emergency Phone Number:	Poisons Information Centre Australia: 13 11 26 Poisons Information Centre New Zealand: 0800 764 766

## SECTION 2 – HAZARD IDENTIFICATION

### 2.1 CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

**Hazardous chemical. Dangerous Goods** (According to the Model WHS Regulations and the ADG code).

**GHS Signal word:** DANGER

**GHS Classification:** Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 1A, Flammable liquids Category 3. Specific Target Organ Toxicity – Repeat Exposure 1 Specific Target Organ Toxicity – Single Exposure 2 Hazardous to the Aquatic Environment Long-Term Hazard Category 2

**GHS label elements:**  
(Internal contents)



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**EMERGENCY OVERVIEW:** The rechargeable LiFePO<sub>4</sub> battery cells described in this Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer. The product should not be disassembled. Do not short circuit, puncture, incinerate, crush, immerse in water, or expose to temperatures outside of the manufacturer declared temperature range of the product. If this occurs, electrolyte leakage, or battery vent/explosion/fire may follow depending on the circumstances.

**ROUTES OF ENTRY:** Risk of exposure will only occur if the battery cell is mechanically, thermally, or electrically abused and the enclosure is compromised. If this occurs, exposure to electrolyte solutions contained within the battery cell may occur by inhalation, eye contact, skin contact and ingestion.

## **IN THE EVENT THAT INTERNAL CONTENTS ARE EXPOSED**

Hazard Statement(s)	H302	Harmful if Swallowed
	H314	Causes severe skin burns and eye damage
	H335	May cause respiratory irritation
	H372	Causes damage to organs through prolonged or repeated exposure (teeth, bone, kidney)
	H226	Flammable liquid and vapour

## **IN THE EVENT THAT INTERNAL CONTENTS ARE 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 vapours/fume/mist.
	P264	Wash hands thoroughly after handling
	P270	Do not eat, drink or smoke when using this product
	P271	Use only outdoors or in a well-ventilated area
	P280	Wear protective gloves/protective clothing/eye protection/face protection
Precautionary Statement(s)	P301+P330+ P331+P310	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Get emergency medical help immediately, Call POISON CENTER.
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 P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/Doctor if you feel unwell.
	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.
	P314	Get medical advice / attention if you feel unwell.
	P370+P378	In case of fire use CO <sub>2</sub> or Dry Chemical Powder to extinguish.
Precautionary Statement(s)	P403+P235+ P405	Store in a well-ventilated place. Keep cool. 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. See Section 13 of this SDS

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## SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Under normal use, this battery is not expected to expose the user to hazardous ingredients. Each battery consists of a plastic container containing several sealed Lithium Iron Phosphate cells and materials of construction of which the following could potentially be hazardous upon release.

Chemical Composition	Chemical Formula	CAS Number	Weight %	Hazard Class / Code
Lithium iron phosphate	LiFePO <sub>4</sub>	15365-14-7	35% ~ 50%	Aquatic Chronic 4 (H413)
Graphite	C	7782-42-5	10% ~ 25%	Eye Irrit. 2 (H319) STOT SE 3 (H335 Lungs and respiratory tract),
Monofluoroethylene Carbonate	C <sub>3</sub> H <sub>3</sub> FO <sub>3</sub>	114435-02-8	0% - 5%	Acute Tox 4 (H302) Skin Irrit. 2 (H315) Skin Sens. 1 (H317) Eye Irrit. 2 (H319) STOT RE 1 (H372 – Other - Teeth)
Lithium Hexafluorophosphate	LiPF <sub>6</sub>	21324-40-3	0% - 5%	Acute Tox 3 (H301) Skin Corr. 1A (H314) Eye Dam. 1 (H318) STOT RE 1 (H372 – Tooth, Bone)
Diethyl Carbonate (DEC)	C <sub>5</sub> H <sub>10</sub> O <sub>3</sub>	105-58-8	0% – 20%	Flam. Liq. 3 (H226)
Ethyl Methyl Carbonate	C <sub>4</sub> H <sub>8</sub> O <sub>3</sub>	623-53-0	0% – 20%	Flam. Liq. 2 (H225)
Ethylene Carbonate	C <sub>3</sub> H <sub>4</sub> O <sub>3</sub>	96-49-1	0% – 20%	Acute Tox 4 (H302) Eye Irrit. 2 (H319) STOT RE 2 (H373 – Kidney)
Carbon	C	7440-44-0	0% - 5%	Eye Irrit. 2 (H319) STOT SE 3 (H335 - not specified)

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non-hazardous ingredients are also possible.

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## SECTION 4 – First Aid Measures

In the event of an electrolyte leak, battery rupture, vent, or explosion that causes direct contact with the ingredients, please evacuate all persons from the contaminated area and make sure there is adequate ventilation to disperse smoke, corrosive gas, and offensive odours. If this occurs, following first aid measures must be taken:

- **Eye contact:** Contact between the battery cell and the eye will not cause any harm. Eye contact with the contents of an open battery cell (electrolyte) can cause severe irritation or burns to the eye. Wear eye protection.

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 CENTER or doctor/physician.

- **Skin contact:** Contact between the sealed cell and the skin will not cause any harm. Skin contact with the contents of an open battery cell (electrolyte) can cause severe irritation or burns to the skin. Wear protective gloves, protective clothing and eye protection. Wash skin thoroughly after handling.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water (or shower). Wash contaminated clothing before reuse.

- **Ingestion:** Ingestion of a sealed battery cell is not an expected route of exposure. The ingestion of the battery contents (electrolyte) can cause serious chemical burns to the mouth, oesophagus, and gastrointestinal tract.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious.

- **Inhalation:** Inhalation of materials from a sealed cell is not an expected route of exposure. Vapours or fumes from a ruptured, cracked or damaged battery cell may cause respiratory irritation. Do not breathe vapours or fumes.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Use oxygen if available. Immediately call a POISON CENTER or doctor/physician. ADVICE TO DOCTOR: Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery. May form hydrofluoric acid if electrolyte comes into contact with water.

## SECTION 5 – FIREFIGHTING MEASURES

### Extinguishing Media:

Dry chemical type extinguishers are the most effective means to extinguish a battery fire. A CO<sub>2</sub> extinguisher will also work effectively. 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 Chemicals:

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.

### Fire Fighting Procedures:

Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire. Full protective clothing is necessary. During water application, caution is advised as burning pieces of flammable particles may be ejected from the fire.

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## Unusual Fire and Explosion Hazards:

Exposing battery cell(s) to excessive heat, fire, puncture, crushing, short circuit or over voltage condition may cause an explosion, fire or leakage of hazardous vapours and hazardous decomposition products. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapours.

## Hazardous Combustion Products:

Fire, excessive heat, or over voltage conditions may produce hazardous decomposition products. Damaged batteries can result in rapid heating and the release of flammable vapours. In case of fire, the formation of the following is possible: Hydrogen fluoride (HF), Carbon monoxide, carbon dioxide, phosphorous oxides and Lithium oxide fumes. LiPF<sub>6</sub> salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.

## SECTION 6 – ACCIDENTAL RELEASE MEASURES

The ingredients contained within the battery cells would only be released under abusive conditions. In the event of battery rupture and leakage, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe up spill with a cloth and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapours to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapours, wearing appropriate PPE. Remove spilled liquid with absorbent.

Place in an approved container and dispose in accordance with Section 13.

## SECTION 7 – HANDLING AND STORAGE

### 7.1 HANDLING:

- Do not expose the battery to high temperatures or fire.
- Do not immerse or wet a battery in water.
- Do not open, disassemble, modify, short circuit, puncture, incinerate or crush the battery. If a battery is damaged to the extent that it leaks electrolyte, rubber gloves must be used to handle all battery components. Refer to Section 8.2.
- Avoid reversing the battery polarity, which can cause the battery to be damaged or flame.
- Do not mix batteries of different types and brands. Do not mix new and used batteries.
- Avoid deep discharge of the battery.
- Follow manufacturers recommendations regarding maximum recommended currents and operating temperature range.
- Keep appropriate fire extinguisher within a suitable distance.

In the event of skin or eye exposure to the electrolyte, refer to Section 4, First Aid Measures.

### 7.2 STORAGE:

- Keep batteries in original package until use.
- Batteries should be separated from other materials and stored in a non-combustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks.
- Store in a dry, well-ventilated area away from moisture, sources of heat and open flames. Avoid direct sunlight. Elevated temperatures can result in reduced battery life.
- Insulate positive and negative terminals to avoid short circuit.
- Batteries should be stored between -20°C and 35°C. Battery exposure to temperatures in excess of 70°C may result in the battery venting flammable liquid and gases.

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Temperature Range [°C]	Effect on Batteries
0 to 25	Recommended - Ideal for battery chemistry
-20 to 35	Appropriate - Safe storage
35 to 70	Temporary reduction in capacity, will return once battery is below 35°C.
70+	Accelerated loss of charge capacity. Safety risk increases with time exposure and temperature increases above 70°C

## 7.3 OTHER:

Follow manufacturer's instructions for use, installation and storage as described in the user manual that is supplied with the battery.

## SECTION 8 – EXPOSURE CONTROLS and PERSONAL PROTECTION

This product presents no health hazards to the user when used according to label directions for its intended purposes.

Ingredient (CAS)	SafeWork Australia exposure limit TWA <sub>8hr</sub>	WorkSafe New Zealand TWA <sub>8hr</sub>	Other Exposure Standard
Lithium iron phosphate (15365-14-7)	-	-	-
Graphite (7782-42-5)	3 mg/m <sup>3</sup>	3 mg/m <sup>3</sup>	ACGIH TLV-TVA 2 mg/m <sup>3</sup>
Monofluoroethylene Carbonate (114435-02-8)	-	-	-
Lithium Hexafluorophosphate (21324-40-3)	-	-	-
Diethyl Carbonate (DEC) (105-58-8)	-	-	-
Ethyl Methyl Carbonate (623-53-0)	-	-	-
Ethylene Carbonate (96-49-1)	-	-	-
Carbon (7440-44-0)	-	-	-

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## 8.1 ENGINEERING CONTROLS:

- Prevent mechanical damage
- Store in recommended temperatures
- In case of abuse, use adequate mechanical ventilation (local exhaust) for the battery that has vented gas or fumes.
- Keep away from heat and open flame.

## 8.2 PERSONAL PROTECTIVE MEASURES:

- **Respiratory protection:** Not necessary under normal use. In case of battery venting, see Section 5 Firefighting measures.
- **Eye protection:** Not necessary under normal use. In case of battery venting or fire, see Section 5 Firefighting measures.
- **Hand protection:** Not necessary under normal use. Wear Viton rubber gloves if handling a ruptured or leaking battery cell. During repair of the battery, no rings, watches or jewellery. Insulated tools shall be used.
- **Skin Protection:** Not necessary under normal use. Wear rubber apron and Viton rubber gloves if handling a ruptured or leaking battery cell.
- **Other:** Use good chemical hygiene practice. Wash hands thoroughly after managing a spill / leakage from a damaged battery. No eating, drinking, or smoking in battery storage area.

## SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State;</b>	Solid
<b>Appearance:</b>	Battery, (approximate cuboid)
<b>pH:</b>	Not Applicable
<b>Relative Density:</b>	Not Applicable
<b>Boiling Point:</b>	Not Applicable
<b>Melting Point:</b>	Not Applicable
<b>Viscosity:</b>	Not Applicable
<b>Oxidizing Properties:</b>	Not Applicable
<b>Flash Point and Method (°C)</b>	Not Applicable
<b>Odour Type:</b>	Typically odourless but if leaking, smells of medical ether.
<b>Odour Threshold:</b>	Not Applicable
<b>Evaporative Rate: (n-Butyl Acetate = 1)</b>	Not Applicable
<b>Auto Ignition temperature (°C)</b>	Not Applicable
<b>Flammability Limits (%)</b>	Not Applicable
<b>Vapor Density: (Air = 1)</b>	Not Applicable
<b>Solubility in water</b>	Insoluble

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## SECTION 10 – STABILITY AND REACTIVITY

**REACTIVITY:** The battery is stable under condition as described in Section 7.

**POSSIBILITY OF HAZARDOUS REACTIONS:** May form hydrofluoric acid if electrolyte comes into contact with water.

**CONDITIONS TO AVOID:** Avoid exposing of the battery to high temperatures (>70°C) or fire. Do not disassemble, short circuit, over charge, puncture, incinerate or crush the battery. Avoid deep discharge of the battery. Do not immerse in water. Do not expose over a long period to humid conditions.

**MATERIAL TO AVOID:** Oxidising agents, alkalis, water. Never impact or pierce the battery. If battery has leaked, do not allow contact with strong oxidisers, mineral acids, strong alkalis or halogenated hydrocarbons.

**HAZARDOUS DECOMPOSITION PRODUCTS:** The battery may release toxic gas once the electrolyte leakage. In case of fire, the formation of the following gases cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide and Lithium oxide fumes. May form peroxides.

**HAZARDOUS POLYMERISATION:** Will not occur.

## SECTION 11 – TOXICOLOGICAL INFORMATION

**IRRITATION:** The battery does not elicit toxicological properties during routine handling and use. Risk of irritation only occurs if battery cells are mechanically, thermally or electrically abused, which results in leakage or venting of the battery cells. Internal components of cell may cause irritation or corrosion.

- Eye contact:**

Short Term Exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. **In case of leakage or damage**, the battery electrolyte is corrosive to the eyes. Serious burns may result, risk of blindness.

Long Term Exposure: No data for health effects associated with long term eye exposure.

- Skin contact:**

Short Term Exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. **In case of leakage or damage**, the battery electrolyte is corrosive to the skin. Serious burns may result.

Long Term Exposure: No data for health effects associated with long term skin exposure.

- Inhalation:**

Short Term Exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. **In case of leakage or damage**, the battery electrolyte may generate Hydrogen Fluoride gas. At high levels or in combination with skin contact can cause death from an irregular heartbeat or from fluid build-up in the lungs.

Long Term Exposure: No data for health effects associated with long term inhalation.

- Ingestion:**

Short Term Exposure: Significant oral exposure is considered to be unlikely. **In case of leakage or damage**, the electrolyte (if ingested), contents may cause abdominal pain, nausea and vomiting. May result in poisoning if cell contents are swallowed.

Long Term Exposure: No data for health effects associated with long term ingestion.

- Medical conditions generally aggravated by exposure:**

In the event of exposure to internal contents, skin / eye corrosion may occur. From repeated exposure, Target organ toxicity – bone, teeth and kidneys.

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**CARCINOGENICITY:** No information is available.

**SENSITIZATION:** No information is available.

**TERATOGENICITY:** No information is available.

**REPRODUCTIVE TOXICITY:** No information is available.

**MUTAGENICITY:** No information is available.

## SECTION 12 – ECOLOGICAL INFORMATION

**BIOACCUMULATION POTENTIAL:** Slowly biodegradable.

**MAMMALIAN EFFECTS:** None known at present.

**ECOTOXICITY:** None known at present.

**ENVIRONMENTAL FATE:** No known environmental hazards at present.

Do not let internal components enter marine environment. Avoid releasing to water ways, wastewater, or ground water.

## SECTION 13 – DISPOSAL CONSIDERATIONS

**WASTE DISPOSAL METHODS:** Dispose of the Li-ion battery in accordance with local, state and federal laws and regulations. Always discharge the battery before disposal. Batteries which have not been fully discharged are considered a reactive hazardous waste product due to the unconsumed lithium remaining in the battery.

Use electrical tape or other approved covering over the battery connection points to prevent short circuits.

Recycling of batteries should be undertaken where possible. Disposal by untrained personnel may cause a dangerous incident. Contact specialist local waste management contractors for local recycling options. Alternatively, recycle / dispose of in accordance with applicable local regulations.

- The battery packs internal cell contents should not be released into the environment; Do not dump into any sewers, on the ground or into any body of water.
- Do not dispose of battery packs in fire.
- Do not subject cells to temperatures in excess of 70°C.
- Used battery packs should be stored in their original packaging where possible.
- Ensure battery packs are stored in a manner to prevent short circuit of the cells.
- Battery pack should be fully discharged before recycling.
- Do not break battery pack open before disposal.

**USA:** Dispose of in accordance with local, state and federal laws and regulations.

**Canada:** Dispose of in accordance with local, state and federal laws and regulations.

**EC:** Dispose of in accordance with relevant EC Directives.

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## SECTION 14 – TRANSPORT INFORMATION

### 14.1 TRANSPORT CLASSIFICATION

Transport of Lithium-Ion batteries shall occur with a maximum State of Charge (SOC) of 30% (according to IATA Packaging instruction PI965 Section IA) and shall not be transported on passenger aircraft (Cargo Only).

The transport of rechargeable lithium-ion batteries regulated by the United Nations as detailed in the “Model Regulations on the transport of Dangerous Goods Ref. ST/SG/ AC.10/1 Revision 20 2017”.

Lithium-ion batteries are classified as a **Dangerous Goods** according to the criteria of the Australian Dangerous Goods (ADG) Code.

Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of LITHIUM-ION BATTERIES. Refer to relevant transportation documents for full set of requirements.

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG)	AIR TRANSPORT (IATA)
<b>UN Number</b>	UN3480	UN3480	UN3480
<b>Proper Shipping Name</b>	LITHIUM-ION BATTERIES	LITHIUM-ION BATTERIES	LITHIUM-ION BATTERIES
<b>Hazard Class</b>	9	9	9
<b>Packing Group</b>	Not Applicable	Not Applicable	Not Applicable
<b>Packing Instruction</b>	PI 903	PI 903	PI 965
<b>Label statement</b>	See Section 14.2		

### 14.2 TRANSPORT CLASSIFICATION



Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of Lithium-ion batteries which are assigned Class 9. Refer to relevant transportation documents. Lithium and Lithium-ion cells and batteries are regulated in the U.S. in accordance with Part 49 of the Code of Federal Regulations, (49 CFR Sections 105-180) of the U.S. Hazardous Materials Regulations.

## SECTION 15 – REGULATORY INFORMATION

The transport of rechargeable lithium-ion batteries regulated by the United Nations as detailed in the ‘Model Regulations on the transport of Dangerous Goods Ref. ST/SG/AC.10/1 Revision 20 2017’.

Defined by UN in the “Recommendations on the transport of Dangerous Goods Chapter 38.3 Manual Tests and Criteria Ref. ST/SG/AC.10/11 Rev.6/Amend.1 2017”. The Lithium-Ion Cells and the Battery Packs may or may not be assigned to the UN No. 3480 Class 9 that is restricted for transport.

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## SECTION 16 – OTHER INFORMATION

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Prevent the Li-ion battery from being abused mechanically or electrically. Follow the directions in the user handbook to install and operate the battery.

**DISCLAIMER:** The data and suggestions presented are true as of the preparation date and are presented in good faith. REDARC disclaims all liability for using this information and its recommendations, and it makes no express or implied warranties about it.

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