



# Empower™

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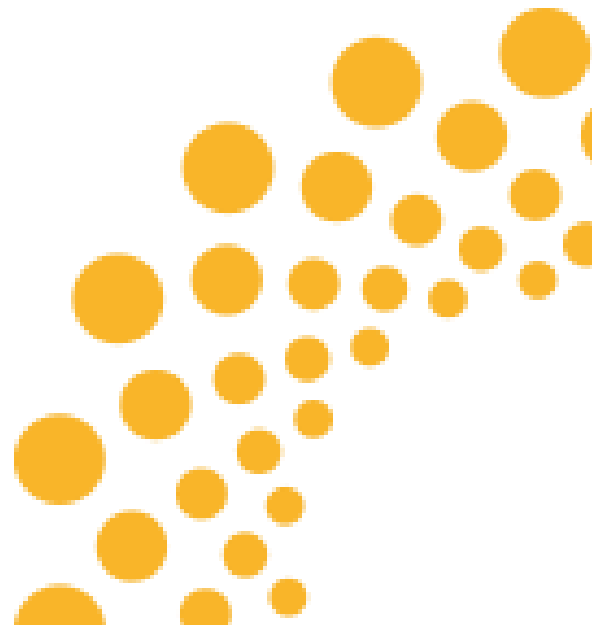
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## 1000394 Elektrobank14 Safety Data Sheet

Version {\_UIVersionString}

28/04/2021

Change Log					
Version	Change	Section	Reason	Date	By
1.0	Introduce document	NA	NA		JF
2.0	Changed EB14 UN No. to 3481 and changed module address to Empower, not ZN Tech	1	Equipment with Li batteries in.	28/04/21	JF



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# 1 Identification

This SDS describes two products, with one being installed into the other on site.

LBM025100A, which is a Lithium Iron Phosphate battery module imported from China. This product is often transported separately to the end product.

Elektrobank14 product is the end product and contains six LBM025100A modules and is often assembled on site.

<b>Product Identifier</b>	ElektroBank14	LBM025100A
Product Description	The end product is an Integrated Photovoltaic and Solar storage system. It includes 6 x LBM025100A modules connected in series.	Lithium Ion Battery Module (often transported separately to end product)
Product Uses	Residential Lithium Batteries for energy storage	Residential Lithium Batteries for energy storage
Battery Chemistry	Lithium Iron Phosphate (LFP, LiFEPO4)	Lithium Iron Phosphate (LFP, LiFEPO4)
UN No	UN3481 (do not transport via airfreight as complete unit – ship battery modules separately)	UN3480
Photo of product		
Supplier Address	Empower Energy Pty Ltd 10-18 Orchard Rd. Brookvale, NSW, 2100	
Telephone No.	+61 (02) 8040 6955	
<b>Emergency Response Service Telephone No.</b>	<b>1800 638 556</b>	
Capacity	100Ah	100Ah
Energy	15.4kWh	2.56kWh
Nominal Voltage	154V	25.6V
Approximate Weight	180kg	25kg
Equivalent Lithium Content	1.44kg	0.24kg

## 2 Hazard(s) Identification

### 2.1 Classification of the Substance or Mixture

CAS-No – Not applicable

INCI CTF A-Description: Lithium ion polymer rechargeable battery series

## 2.2 Label Elements

The product is classified and labeled according to Regulation (EC) No 1272/2008;

### Hazard pictograms:



GHS05 GHS07 GHS08

### Signal word: Danger

### Hazard statements:

**H314** Causes severe skin burns and eye damage.

**H317** May cause an allergic skin reaction.

**H351** Suspected of causing cancer

Precautionary statements

**P101** If medical advice is needed, have product container or label at hand.

**P102** Keep out of reach of children.

**P103** Read carefully and follow all instructions.

**P260** Do not breathe dust/fume/gas/mist/vapors/spray

**P303+P361+P353** If on skin (or hair), take off all contaminated immediately. Rinse skin with water/shower.

**P305+P351+P338** If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**P310** Immediately call a POISON CENTER/doctor.

**P402** Store in a dry place

**P405** Store in a locked up area.

**P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

## 2.3 Other Hazards

Results of PBT and vPvB assessment:

PBT: Not applicable

vPvB: Not applicable

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III,

sub-section 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

### 3 Composition and Information on Ingredients

**Important note:** The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

Material or Ingredient	PEL (OSHA)	TLV (ACGIH)	%/wt of each cell
Graphite CAS# 7782-42-5	5 mg/m <sup>3</sup> TWA (respirable fraction 15 mg/m <sup>3</sup> TWA (total dust)	2 mg/m <sup>3</sup> TWA (respirable fraction)	7-25
Lithium iron Phosphate CAS# 15365-14-7	None Established	None Established	15-40
Hexafluoropropylene-vinylidene fluoride Copolymer CAS# 9011-17-0	None Established	None Established	3-15
Lithium Hexafluorophosphate CAS# 21324-40-3	None Established	None Established	0-5
Acetylene Black CAS# 1333-86-4	3.5 mg/m <sup>3</sup> TWA (as carbon black)	3.5 mg/m <sup>3</sup> TWA(as carbon black)	0-2
Diethyl Carbonate CAS# 105-58-8	None Established	None Established	0-15
Dimethyl Carbonate CAS# 616-38-6	None Established	None Established	0-15
Ethyl Methyl Carbonate CAS# 623-53-0	None Established	None Established	0-15
Propylene Carbonate CAS# 108-32-7	None Established	None Established	0-15
Ethylene Carbonate CAS# 96-49-1	None Established	None Established	0-15

### 4 First Aid Measures

Under normal conditions of use, the battery is hermetically sealed.

- Ingestion:** Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

2. **Inhalation:** Contents of an open battery can cause respiratory irritation. Inhalation of vapors may cause irritation of the upper respiratory tract and lungs. Provide fresh air and seek medical attention.
3. **Skin Absorption:** Ethylene carbonate, diethyl carbonate and dimethyl carbonate may be absorbed through the skin causing localized inflammation.
4. **Skin Contact:** Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.
5. **Eye Contact:** Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Note: Acetylene black and cobalt compounds are listed as possible carcinogens by the International Agency for Research on Cancer (IARC).

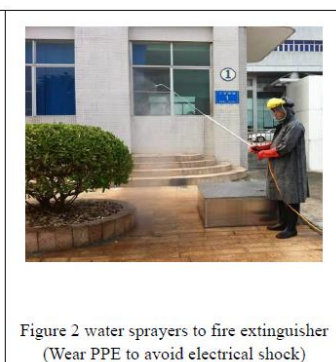
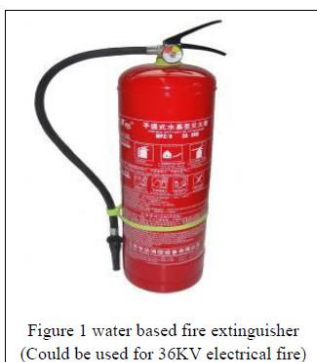
## 5 Firefighting Measures

### 5.1 Risk Analysis (electrical shock, fire, explode, population)

Modules were exposed to drop tests, crush tests, short circuiting and liquid immersion, which led to risks such as electrical shock and igniting.

### 5.2 Material Preparation & People Training

1. **Water based sprayer fire extinguish:** One 9L or two 6L water spray fire extinguishers are recommended per EB14 product or LBM025100A module. Portable electric water sprayer or hang type water spray fire extinguishers (Figures 1 and 2) are also appropriate.



2. **Water protection sets:** Raincoat, galoshes, and rubber gloves
3. **PPE:** Breathing mask, safety glass, face mask, gloves for high temperatures
4. **Smoke escape:** One fan per 20 m along wall or portable fans in rooms
5. **Gases explosion tools:** Open condition for devices and rooms. Some devices like high or low temperature ovens must be sealed. The wall should have one fan per 200 m  $\geq 5,000$  m<sup>3</sup> per hour for flow rate.
6. **Neutralizing material:** Prepare 10 kg Ca(OH)<sub>2</sub> powder per 500 kWh Li-ion battery pack or modules to neutralize electrolyte. 8% HF is created when electrolyte meets water.
7. **People training:** Turn on fans or portable fans for smoke escape; wear the water protection sets; use water spray fire extinguishers. Neutralized by released electrolyte with Ca(OH)<sub>2</sub> or NaOH. Use a multimeter to measure voltage.

## 5.3 Fire Extinguisher Flow Chart

1. Trigger Fire alarm if there is smoking or burning.
2. Vacate the building unless you are a trained fire fighter
3. Dial 000 and inform the fire service the fire is a lithium battery fire
4. If you are a trained fire fighter and are able to progress down this list then do so with care
5. Wear PPE. (Breath mask, face mask. If using water, PPE should include the raincoat, galoshes, and rubbergloves).
6. Turn Off power supply in devices or external power supply.
7. Use any fire extinguishers for solid material fire. The recommended sequence is water or mist water, sand, fire extinguisher blanket, CO<sub>2</sub>, powder.
8. Allow smoke to escape by turning on fans or allow fresh air into environment.
9. Dry and neutralize scene, if necessary. Dry by fans, neutralize by Ca(OH)<sub>2</sub> powder if water was used.

## 6 Accidental Release Measures

1. **On hand:** Place material into suitable containers and call local fire/police department.
2. **In water:** Low electrical shock risk when EV or battery/pack is in water. Hydrogen gas is released by electrolyzed water, so maintain air flow to avoid H<sub>2</sub> gas accumulation, which could potentially lead to an explosion. Call local fire/police department in event of explosion.

## 7 Handling and Storage

One of circuit of the major risks associated with the transport of batteries and battery-powered equipment is short-circuiting the battery as a result of the battery terminals coming into contact with other batteries, metal objects, or conductive surfaces. Packaged batteries or cells must be separated in a way to prevent short circuits and damage to terminals. They must be packed in a strong outer packaging or be contained in equipment.

1. **Handling:** Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided, but accidental short-circuiting for a few seconds will not seriously affect the battery. Prolonged short circuits will cause the battery to rapidly lose energy and possible generate enough heat to burn skin. Sources of short circuits include jumbled batteries in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of batteries in devices. To minimize risk of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery. Should an individual cell within a battery become ruptured, do not allow contact with water. When operators handle the battery which voltage more than 50v, they must wear insulating PPE.
2. **Storage:** The lithium ion battery should be between 25% and 75% of full charge when stored for a long period of time. Stored in a cool, dry, and well ventilated area. Elevated temperatures can result in loss of battery performance, leakage, or rust. Do not expose the battery to open flames.

## 8 Exposure Controls and Personal Protection

1. **Engineering Control:** Keep away from heat and open flame. Stored in a cool, dry place.
2. **Personal Protection:**
  - a. **Respiratory Protection:** Not necessary under normal conditions.
  - b. **Eye/Face Protection:** Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.
  - c. **Gloves:** Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.
  - d. **Foot Protection:** Steel toed shoes recommended for large container handling.

## 9 Physical and Chemical Properties

<b>Physical State</b>	Solid	<b>Solubility in Water</b>	N/A
<b>Color</b>	White	<b>Vapor Pressure</b>	N/A
<b>Odor</b>	No Odor	<b>Explosion Limit</b>	N/A
<b>Flash Point</b>	N/A	<b>Auto Flammability</b>	N/A
<b>Solubility in Ethanol</b>	N/A	<b>Melting Point</b>	N/A
<b>Boiling Point</b>	N/A	<b>Freezing Point</b>	N/A

## 10 Stability and Reactivity

1. **Stability:** Good stability at standard temperature.
2. **Reactivity:** None

Avoid contact with water and acids. Hazardous decomposition products: If Al package foil of battery is damaged, the battery should avoid contact with a strong oxidizer, acids and high temperatures, as the electrolyte could form HF.

## 11 Toxicological Information

### 11.1 Acute Toxicity

No specific acute toxicity data exists for this product.

1. **Skin:** Not classified as a skin irritant unless the battery ruptures. Contact with contents may cause irritation, redness, dermatitis and possible burns with prolonged contact.
2. **Eye:** Not classified as an eye irritant unless the battery ruptures. Contact with contents may cause irritation, redness and possible burns with prolonged contact.
3. **Sensitisation:** Not classified as causing skin or respiratory sensitisation.
4. **Reproductive:** No relevant or reliable studies were identified.
5. **Carcinogenicity:** No evidence of carcinogenic effects.
6. **Mutagenicity:** No evidence of mutagenic effects.



7. **STOT – single exposure:** Not classified as causing organ damage from single exposure. Due to the product form and nature of use, exposure to internal contents is not anticipated unless the battery ruptures. Exposure to contents may cause respiratory irritation.
8. **STOT – repeated exposure:** Not expected to cause organ effects from repeated exposure. Due to the product form and nature of use, exposure to internal contents is not anticipated unless the battery ruptures.
9. **Aspiration:** Not relevant.

## 12 Ecological Information

1. **Toxicity:** This product may be hazardous to the environment
2. **Persistence and Degradability:** This product is not readily biodegradable
3. **Bioaccumulative Potential:** Limited information was available at the time of this review
4. **Mobility in Soil:** This product has low mobility in soil





## 13 Disposal Considerations





Do not dispose of battery into environment or sewerage. It should be recycled and disposed in adherence to local legislation and regulations.

## 14 Transport Information

### 14.1 Air Transportation Requirements

The Li-ion battery should be transported in accordance with the International Air Transport Association (IATA DGR 59edition) requirements for transportation. The battery or cell should be packed and signed as specified by the following table. If the cell's power is less than 20 Wh or a battery's power is less than 100 Wh and the package is in accordance with PI-965 Section II, it is not classified as dangerous cargo.)

UN No.	Proper Shipping Name	Power	Package Requirements	Label Which Need to Paste
UN 3480	Lithium Ion Batteries	Cell > 20 Wh Battery > 100 Wh	PI965 Section IA Limit per package: Pax A/C = 5 kg CAO = 35 kg	Class 9 Hazard Label 
		Cell ≤ 20 Wh Battery ≤ 100 Wh	PI965 Section IB Note: Use "IB" if package exceeds Section II Limits Limit per package: Pax A/C = 10 kg Gross CAO = 10 kg Gross	Class 9 Hazard Label and Lithium Ion Battery Handling Label  
		Cell ≤ 20 Wh Battery ≤ 100 Wh	PI965 Section II Limit per package: Equal to or less than 2.7 Wh = 2.5kg; or Greater than 2.7 Wh but equal to or less than 20 Wh = 8 cells; or Greater than 2.7 Wh but equal to or less than 100 Wh = 2 batteries	Lithium Battery Handling Label 
UN3481	Lithium Ion Batteries	Cell > 20 Wh Battery > 100 Wh	Section I Limit per package: Pax A/C = 5 kg CAO = 35 kg	Class 9 Hazard Label

	Contained in Equipment			
		Cell ≤ 20 Wh Battery ≤ 100 Wh	PI967 Section Limit per package: Pax A/C = 5 kg CAO = 5 kg	Lithium Battery Handling Label 
UN3481	Lithium Ion Batteries Contained with Equipment	Cell > 20 Wh Battery > 100 Wh	PI966 Section I Limit per package: Pax A/C = 5 kg CAO = 35 kg	Class 9 Hazard Label 
		Cell ≤ 20 Wh Battery ≤ 100 Wh	PI966 Section II Limit per package: Pax A/C = 5 kg CAO = 5 kg	Lithium Battery Handling Label 

Cells and/or batteries at a state of charge of greater than 30% of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Packages prepared according to Section II of PI965 must be offered to the operator separately from other cargo and must not be loaded into a unit load device before being offered to the operator.

The lithium core and battery goods required by the packaging specification PI965 and PI968 II shall not be packed in the same outer package as other dangerous goods.

Do not pack Li-ion batteries (UN 3480, PI965 Section IA or IB) or lithium batteries (3090, UN PI968 Section IA or IB) with category 1 explosive materials such as flammable gas, flammable liquid, flammable solid, or antioxidants.

If a package is damaged, batteries must be quarantined, inspected, and repacked. Cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport. Waste Li-ion batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator.

The lithium battery should pass the UN38.3 test. If the battery can not pass the testing, it cannot be transported and should be re-designed. If an Li-ion battery passes the test, follow the UN3480 and the packing requirements for PI965. For the Li-ion batteries installed in equipment, follow the UN3481 and the packing requirements for PI967.

The Li-ion battery testing meets all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

No	Items	Result	Remarks
1	Altitude Simulation	Pass	

2	Thermal Test	Pass	Tests 1 to 5 must be conducted in sequence on the same cell or battery
3	Vibration	Pass	
4	Shock	Pass	
5	External Short Circuit	Pass	
6	Impact	Pass	
7	Forced Discharge	Pass	Only for cell

## 14.2 The Requirement for Ocean Shipping

According to International Maritime Dangerous Goods Code (IMDG 38th) and the requirements of UN NO. 3480/3481, the Li-ion modules require Class II packaging. Packaging must exhibit isolation and minimize risks of short circuits.

Clause 188 of IMDG states Li-ion cells less than 20 Wh are not dangerous cargo, and Li-ion batteries less than 100 Wh are also not classified as dangerous cargo but need to be marked with a WHR ratio label. Otherwise, the battery and module should be packed in a strong outer packaging or be contained in equipment. Clause 230 of IMDG 38th requires the Li-ion battery to meet all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

## 15 Regulatory Information

See ACGIH exposure limits information as noted in Section 3

1. **US:** This MSDS meets/exceeds OSHA requirements.
2. **International:** This MSDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documented in ANSI (American National Standards Institute) Standard Z400.1-1993.
3. **Air transportation:** This MSDS adheres to Civil aviation industry standard MH/T1020-2009 Lithium Battery Air Transport Standard and IATA DGR and ICAO. The international transport and commodity inspection uses this standard at the moment (IMDG CODE),
4. **Ocean shipping:** This MSDS conforms to International Maritime Dangerous Goods Code to transport and According to the requirements of UN NO 3480/3481 to management the goods.
5. **Land transportation:** This MSDS conforms to List of Dangerous Goods(GB12268).
6. **Avoid electrical shock:** This MSDS conforms to Standard for Electrical Safety in the Workplace, NFPA-70E.

## 16 Any Other Relevant Information

1. **Charging:** This battery is made to be charged many times using an approved battery charger. Never use a modified or damaged battery charger. A backup charge termination based on time is recommended to prevent overcharging. The charging temperature should be between 0° C and 45° C (32° F and 113° F). The battery pack will be warm during charging.
2. **Charging Voltages and Currents:** Charging voltages are prevented from exceeding the specified limits by an internal battery protection circuit. Never use a battery that shows signs of a damaged protection circuit or broken case. (Such damage to the protection circuit may

be indicated by voltages at the battery terminals outside of their specified ranges.) Adhere to all specified charging and discharging voltages and currents. Do not use battery if its voltage drops below the specified minimum voltage.

3. **Labeling:** If the CATL label or package warnings are not visible, it is important to provide a package and/or device label.

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