

# MATERIAL SAFETY DATA SHEET

Date : Jan/16/2018  
File No.: PH-W5-878

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## 1. Identification of the substance/preparation and of the company/undertaking

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### Identification of the product

Product name : Lithium Ion Cell  
Chemical System: LiFePO<sub>4</sub>/C 26650 battery pack.  
Model: Cylindrical and Prismatic Type Cells\_  
Designated for RECHARGE?  Yes  No

### Manufacturer/supplier identification

Company : SHENZHEN RAMWAY BATTERY CO LIMITED  
Contact for information : No, 9 xingyu rd, Wuzhou industry park guangxi  
Emergency telephone No. : 0086-755-23025177

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## 2. Composition/information on ingredients

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Ingredient	Percent	CAS Index No./EC No.	Molar mass	Molecular formula	Symbol
Lithium iron phosphate	23%	N/A		LiFePO <sub>4</sub>	
Graphite	11.5%	7782-42-5		C	
Organic Electrolyte	13.2%	N/A			
Polypropylene	2%	N/A			
Steel	38.1%	7439-89-6		Fe	
Copper	6.7%	7440-50-8		Cu	
Aluminum	5.5%	7429-90-5		Al	

Weight of metallic lithium per cell: 0g. There is no metallic lithium in the lithium polymer battery.  
The lithium polymer battery is with a Watt-hour rating  $\leq 20$  Wh/Cell (cell),  $\leq 100$  Wh (battery pack).

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## 3. Hazards identification

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### Health Hazards (Acute and Chronic):

For the battery cell, chemical materials are stored in a hermetically sealed can, 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, or added electric stress by misuse the cell case will be breached and hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

### Carcinogenicity:

NTP: None IARC Monograph: None OSHA Regulated: None

### Medical Conditions Generally Aggravated by Exposure:

An acute exposure will not generally aggravate any medical condition.

Human health effects:

Inhalation: The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact: The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and the stimulation on the skin.

Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and the stimulation on the eye. Inflammation of the eyes may occur.

Environmental effects:

Since a battery cell remains in the environment, do not throw out it into the environment.

Specific hazards:

If the electrolyte contacts with water, it may generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, do not bring close to fire.

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#### **4. First aid measures**

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After inhalation contact:	Make the victim blow his/her nose, gargle. Seek medical attention if necessary.
After skin contact:	Remove contaminated clothes and shoes immediately. Immediately wash extraneous matter or contact region with soap and plenty of water.
After eye contact:	Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.
After ingestion contact:	Make the victim vomit. Immediately seek medical attention.

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#### **5. Fire-fighting measures**

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Extinguishing Media:	Plenty of water, CO <sub>2</sub> gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.
Specific methods of fire-fighting:	When the battery burns with other combustibles simultaneously, take fire extinguishing method which corresponds to the combustibles. Extinguish a fire from the windward as much as possible.
Flammable Limits:	Not available

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#### **6. Accidental release measures**

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The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

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#### **7. Handling and storage**

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Avoid mechanical or electrical abuse. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

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#### **8. Exposure controls/personal protection**

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Specific control parameter :

Personal protective equipment :

Respiratory protection (Specify Type) :	Not necessary under conditions of normal use.
Ventilation:	Not necessary under conditions of normal use.
Protective Gloves:	Not necessary under conditions of normal use.
Eye protection:	Not necessary under conditions of normal use.
Other Protective (Clothing or Equipment):	Not necessary under conditions of normal use.

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## 9. Physical and chemical properties

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Appearance	
Physical state:	Solid
Form:	Cylindrical
Color:	Metallic color
Odor:	No odor
PH	N/A
Specific temperatures	Temperature ranges changes in physical state occur.
Flash point	N/A
Explosion properties	N/A
Density	N/A
Solubility	with indication of the solvent(s): Insoluble in water

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## 10. Stability and reactivity

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Stability:	Stable
Conditions to Avoid:	When cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will cause heat generation and ignition. Avoid direct sunlight and high humidity.
Hazardous Decomposition or By-products:	Acrid or harmful gas is emitted during fire.
Materials to avoid:	Conductive materials, water, seawater, strong oxidizers and strong acids.

Hazardous polymerization will not occur.

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## 11. Toxicological information

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Acute toxicity :	
Copper	60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg
Organic electrolyte	LD50, oral - Rat 2,000mg/kg or more
Further toxicological information :	
Aluminum	By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).
Graphite	Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.

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## 12. Ecological information

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Ecotoxic effects : N/A  
Further ecological data : N/A

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### 13. Disposal considerations

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RY encourages battery recycling. Our Li-ion batteries are recyclable through the Rechargeable Battery Recycling Corporation's (RBRC) *Charge Up to Recycle! Program*. For information call 1-800-8-BATTERY or see their website at [www.rbrc.org](http://www.rbrc.org). Li-ion batteries must be handled in accordance with all applicable state and federal laws and regulations.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212° F. Such treatment can vaporize the liquid electrolyte causing cell rupture. Do not use in combination with fresh and used lithium batteries neither with other type of battery.

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### 14. Transport information

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International transport regulations :  
UN-No.:  
IATA Packaging Instruction

1. International Air Transport Association (IATA) pursuant to Packing Instruction 965-967, Section II
2. International Maritime Dangerous Goods Code (IMDG) pursuant to Special Provisions A188 and A230.
4. U.S. hazardous materials regulations pursuant to 49 CFR 173.185 and Special Provision A188.

3480 and 3481  
Packing List 965-967 Section II

RY Li-ion cells pass the tests defined in UN model regulation section 38.3. Cells and batteries are packed according to the requirement of 55<sup>th</sup> Edition of the IATA Dangerous Goods Regulations (DGR).

RY Battery packs packed in strong outer packages constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.

RY battery packs are properly protected to prevent short circuits. the equipment is secured against movement within the outer packaging and is equipped with an effective means of preventing accidental activation.

RY battery packs meet the defined tests requirements contained in the UN Model Regulations, Manual of Test and Criteria. Part III, subsection 38.3.

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### 15. Regulatory information

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N/A

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### 16. Other information

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**Make people :** Professional post : R&D Engineer                      Name(sign) : James Lee  
**Make unit :** Name : R&D Department                              Phone : 0086-755-23025177  
Address : R&D Dept., Panyu Plant.,  
**Date of issue :** 2018/01/16

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