

# Material Safety Data Sheet

## for Li-Ion (LiFePO<sub>4</sub>) Battery (UN3480)

### 1. PRODUCT IDENTIFICATION

**Product name:** RPower LiFePO<sub>4</sub> - Lithium Iron Phosphate Battery

**Manufacturer:** RP-Technik GmbH  
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**Electrochemical system**

Electrodes:	Negative Electrode	C
	Positive Electrode	LiFePO <sub>4</sub>
Electrolyte	LiPF <sub>6</sub>	

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Principal Hazardous Component(s) (chemical and common name)	Chemical Symbol	Weight (%)	Melting Point °C	CAS No.
Lithium iron phosphate	LiFePO <sub>4</sub>	23~33	> 1000°C	15365-14-7
Carbon	C	12~17	> 1000°C	7440-44-0
Organic solvents	EC	3	EC: 38°C	
	PC		PC: -49°C	
	DEC		DEC: -43°C	
	LiPF <sub>6</sub>		N/A	21324-40-3
ABS	Acrylonitrile butadiene-styrene resin	5	175°C	

Common name (used on label): RPower LiFePO<sub>4</sub> - Lithium Iron Phosphate Battery

### 3. HAZARD DATA

#### 3.1 Physical:

The Li-ion batteries described in this Material Safety Data Sheet are sealed which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact, risk of exposure only in case of abuse, e.g. mechanical, thermal, electrical which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage, electrode materials reaction with moisture/water of battery vent/explosion/fire may follow depending upon circumstances.

### 3.2 Chemical:

Classification of dangerous substances contained into the product as per directive.

Substance	Chemical Symbol	Indication of Danger	Special Risk	Safety Advice
Lithium iron phosphate	LiFePO <sub>4</sub>		R22 R43	S2 S22 S24 S26 S36 S37 S45
Carbon	C			
Organic solvents	EC PC DEC	Flammable	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
	LiPF <sub>6</sub>	Irritant Corrosive	R14	S2 S8 S22 S24 S26 S36

Slight variations depending from all type!!!

#### 1. Name of Special Risks:

R14/15	Reacts with water and yields flammable gases
R21	Harmful in contact with skin
R22	Harmful us swallowed
R35	Causes severe burns
R41	Risk of serious damage to the eye
R42/43	May cause sensitization by inhalation and skin contact
R43	May cause sensitization by skin contact

#### 2. Safety Advices:

S2	Keep out of reach from children
S8	Keep away from moisture
S22	Do not breathe dust
S24	Avoid contact with skin
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical attention
S36	Wear suitable protective clothing
S37	Wear suitable gloves
S45	In case of incident, seek medical attention

#### 4. FIRST-AID MEASURES

In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out corrosive fumes/gases and pungent odors.

In all case, seek immediate medical attention.

Eye contact:	Flush with plenty of water (eyelids-held open) for at least 15 minutes.
Skin contact:	Remove all contaminated clothing and flush affected areas with plenty of water and stop for at least 15 minutes.
Ingestion:	Dilute by giving plenty of water and get immediate medical attention. Assure that the victim does not aspirate vomited material by use of positional drainage. Assure that mucus does not obstruct the airway. Do not give anything by mouth to an unconscious person.
Inhalation:	Remove to fresh air and ventilate the contaminated area. Give oxygen or artificial respiration if needed.

## 5. FIRE-FIGHTING MEASURES

### Fire and explosion hazard:

The batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 90°C resulting from inappropriate use or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire. LiPF<sub>6</sub> salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.

### Extinguishing media:

Suitable: CO<sub>2</sub>  
Dry chemical or foam extinguishers.  
Not to be used: Type D extinguishers

### Special exposure hazards:

Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.

Eye contact: The electrolyte solution contained in the battery is irritant to ocular tissues.  
Skin contact: The electrolyte solution contained in the battery causes skin irritation.  
Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract.  
Inhalation: Contents of a leaking or ruptured battery can cause respiratory tract, mucus, membrane irritation and edema.

### Special protective equipment:

Use self-contained breathing apparatus to avoid breathing irritant fumes.  
Wear protective clothing and equipment to prevent body contact with electrolyte solution.

## 6. ACCIDENTAL RELEASE MEASURES

The material contained within the batteries would only be expelled under abusive conditions. Using shovel or broom, cover battery or spilled substances with dry sand or vermiculite, place in approved container (after cooling if necessary) and dispose in accordance with local regulations.

## 7. HANDLING AND STORAGE

The batteries should not be opened destroyed or incinerated since they may leak or rupture and release in the environment the ingredients they contain.

### Handling:

Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods.  
Do not directly heat or solder.  
Do not throw into fire.  
Do not mix batteries of different types and brands.  
Do not mix new and used batteries.  
Keep batteries in non-conductive (i.e. plastic) trays.

### Storage:

Store in a cool (preferably below 30°C) and ventilated area away from moisture, sources of heat, open flames, food and drink.  
Keep adequate clearance between walls and batteries.  
Temperature above 90°C may result in battery leakage and rupture.  
Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.

### Other:

Manufacturer recommendations regarding maximum recommended currents and operating temperature range.  
Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Respiratory protection:

Not necessary under normal use.

In case of battery rupture, use self-contained full-face respiratory equipment. Equipment with type ABEK filter.

### Hand protection:

Not necessary under normal use.

Use rubber gloves if handling a leaking or ruptured battery.

### Eye protection:

Not necessary under normal use.

Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.

### Skin protection:

Not necessary under normal use.

Use rubber apron and protective working in case of handling of a ruptured battery.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Cells are not single chemical material. There are no specific physical and chemical properties such as melting point and boiling point.

Main purpose of lithium ion cells: used in notebook computers.

## 10. STABILITY AND REACTIVITY

Conditions to avoid: Heat above 90°C or incinerate. Deform, mutilate, crush, pierce, and disassemble.

Materials to avoid: N/A

Hazardous decomposition products:

Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of lithium (LiPF<sub>6</sub>) with water.

Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire.

## 11. TOXICOLOGICAL INFORMATION

The Li-Ion batteries do not contain toxic materials.

## 12. ECOLOGICAL INFORMATION

When properly used or disposed, the Li-Ion batteries do not present environmental hazard.

## 13. DISPOSAL CONSIDERATION

Dispose in accordance with applicable regulations which vary from country to country.

(In more countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through not-for-profit organizations, mandated by local governments or organized on a voluntary basis by professionals).

Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in plastic bags prior to disposal.

Incineration: Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

## 14. TRANSPORT INFORMATION

The consignment complies with the current edition-55th, 2015 of the IATA DGR.

Description: Lithium ion battery (UN3480)

- 1) This consignment is complying with THE Section II of PI965 of IATA DGR 55th Ed.
- 2) UN manual of tests and criteria, part III, sub-section 38.3 (withstanding a 1.2m drop test)

The consignment can be shipped as “Not Restricted” in accordance with the current edition of 55th , 2015 of the IATA DGR (UN3480).

- A) This consignment packed in a clean, good and strong outer packaging.
- B) This consignment does not contain any recalled and/or defective batteries.
- C) This consignment have been packed in comply with the Section II of PI965.
- D) Handle with care, flammability hazard exists if the package is damaged.
- E) In any event of the package is found damaged, please follow the special procedures.  
If package is damaged, batteries must be protected so as to prevent short circuit.  
Batteries are completely enclosed by inner packaging (so) as to prevent from short circuit.
- F) For any additional information, please contact +49(0)6106-66028-0.

No.	ITEMS	RESULT	REMARKS
1	Altitude simulation	Pass	Test 1 to 5 must be conducted in sequence on the same cell or battery.
2	Thermal test	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External short circuit	Pass	
6	Impact	Pass	
7	Overcharge	Pass	Only battery do need this test item
8	Forced Discharge	Pass	

The product is not classified as dangerous under the current edition of the 55th , 2015 of the IATA DGR dangerous goods regulations and according the Section II of PI965 all applicable carriers.

The product is safe for air transportation and not regulated by IATA DGR.

Products had been passed UN38.3 test & declare that the lithium battery are not restricted & complied to Section II of PI965 - PI970.

## 15. REGULATORY INFORMATION

These is no regulation on Lithium batteries management.

## 16. OTHER INFORMATION/DISCLAIMER

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled.

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