



Specification Approval Sheet(Battery)

产品规格确认书(电池)

Model 型号: EP70133146

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Ecity Power Co., Ltd. Product Specification

1. Preface 前言

The product specification covers the general performance, test method and quality requirements for the rechargeable LiFePO₄ lithium ion battery, EP70133146, manufactured and supplied by Ecity Power Co., Ltd.

本产品规格书描述了广州亿城数码科技有限公司生产的可充电磷酸铁锂电池 EP70133146 的总的性能指标、测试方法以及质量。

2. Model 型号: EP70133146

3. Specifications 产品规格

No.	Items	Specifications
1	Charging Voltage 充电电压	DC3.65V
2	Typical Voltage 标称电压	3.2V
3	Normal Capacity 标称容量	10000mAh@ 0.2C Discharge
4	Minimum Capacity 最小容量	9800mAh@ 0.2C Discharge
5	Charging method 充电方法	CC(Constant Current)/ CV(Constant Voltage) CC (恒流)/ CV (恒压)
6	Maximum charge current 最大充电电流	10 Ampere 10 安培
7	Maximum discharge current 最大放电电流	20 Ampere(Continuous), 60 Ampere(10 Second Pulse) 20 安培 (持续放电), 60 安培 (10 秒脉冲)
8	Lifecycle(Minimum) 循环寿命 (最小)	2000cycles, Capacity $\geq$ 7500mAh 2000 次, 剩余容量 $\geq$ 7500mAh
9	Discharge cut-off voltage 放电截止电压	2.40V
10	Operating temperature 工作温度	Charge Temperature Range: 0°C ~ 45°C 充电工作温度范围: 0°C ~ 45°C Discharge Temperature Range: -20°C ~ 60°C 放电工作温度范围: -20°C ~ 60°C
11	Storage temperature 储存温度	Short Period(1 month): -10°C ~ 45°C Long Period(6 months): 0°C ~ 35°C 短期存放(1 个月以下): -10°C ~ 45°C 长期存放(6 个月以下): 0°C ~ 35°C
12	Energy Density 能量密度	Gravimetric 能量重量密度: Volumetric 能量体积密度:
13	Power Density(100%SOC,18s peak) 功率密度	Gravimetric 功率重量密度: Volumetric 功率体积密度:
14	Battery Weight 电池重量	Approx. 280g $\pm$ 10g 约: 280g $\pm$ 10g
15	Battery Dimension(not including terminals) 电池尺寸(不包括极耳)	Thickness 厚度: 7mm Wide 宽: 133mm Length 长: 146mm
16	Initial Internal Impedance 初始内阻	<12m Ω

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4. Battery Performance Criteria 电池性能检查及测试

4.1 Reliability Test Procedure and Criteria 可靠性测试程序及标准

No.	Items	Test Method and Condition	Criteria
1	Appearance 外观	Visual 目测	No Defect and Leakage 无缺陷和漏液
2	Dimension 尺寸	Caliper 游标卡尺	As item 6 见第六项
3	Weight 重量	Scale 秤	As item 3.14 见 3.14
4	Fully Charged 充满电	CC/CV (Constant Current / Constant Voltage)	Constant Current: 1C Constant Voltage: 3.65 V
5	Battery Voltage 电池电压	As of shipment., Voltmeter 出货状态,伏特计	3250 -3350 mV
6	Internal Impedance 初始内阻	Impedance meter at 1kHz AC 1kHz 交流内阻仪	As item 3.16 见 3.16
7	Initial Capacity 初始容量	After fully charged, discharge at 0.2C current until the voltage reaches 2.1V. 充满电后, 0.2C 放电至 2.1V 截止电压	As item 3.4 见 3.4
8	Cycle Life 循环寿命	Charge: CC/CV, CC at 0.2C, CV at 3.65 V, Cut-off Current: 0.05C. Discharge: 0.2C to 2.1V.	As item 3.8 见 3.8
9	Self-discharge 自放电	After fully charged, store the Battery under the condition as No.4.4 for 30days, then measured the capacity with 0.2C till 2.1V 充满电后, 在 No.4.4 条件下贮存 30 天, 再以 0.2C 放电至 2.1V 所放出的容量。	Remaining capacity > 90% 剩余容量 > 90%
10	Operational Temperature Characteristics 不同温度工作特性	After fully charged, maintain the cell at different temperature for 60 minutes, and then perform 0.2C discharge until the voltage reaches 2.1 V. 充满电后, 在以不同温度放 60 分钟, 再以 0.2C 放电至 2.1V。	Remaining capacity 剩余容量 -20°C : >70% 0°C : >90% 40°C: 100% 75°C: 100%

4.2 Safety Test Procedure and Criteria 安全测试程序及标准

No.	Items	Test Method and Condition	Criteria
1	Short Circuit 短路测试	At room temperature, connecting the positive and negative terminals of the cell with a maximum resistance load of 0.1 ohm until it is completely discharged and the cell's temperature has returned to near ambient temp. 在室温下, 用大功率电阻将电芯正负极短路, 直到放完电并且电芯温度已经恢复到接近环境温度。	No fire or explosion. The temperature of the exterior cell shall below 150°C 不起火爆炸 电芯表面温度小于 150°C
2	Abnormal Charge	The cell is to be subjected to a 1C charging current and charged to 12.0V (CC/CV) for 7 hours at RT 用 1C 充电电流将电芯充到 12V (恒流/恒压)	No fire or explosion 不起火爆炸
3	Crush 挤压	Place the cell between 2 iron plates in parallel. Apply a force of 13 kN on the plate by a 32mm diameter piston. Both the wide and narrow sides are subjected to the crush. Separate samples are to be used for each test.	No fire or explosion 不起火爆炸
4	Impact 撞击、穿刺	Place the cell on a flat surface. Put a ϕ 15.8mm bar across the center of the sample. Drop a 9.1Kg weight from a height of 610 $\pm$ 25mm onto the sample. Both the wide and narrow sides are subjected to the impact. Separate samples are to be used for each test.	No fire or explosion 不起火爆炸
5	Vibration Test 振动测试	After standard charging, fixed the Battery to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the amplitude of the vibration is 1.6mm. The Battery shall be vibrated for 30 minutes towards per axis of XYZ axes. 将标准充电后的电池固定在振动台上, 沿 X、Y、Z 三个方向各振动 30 分钟, 振幅 1.6mm, 振动频率为 10Hz~55Hz, 每分钟变化 1Hz。	No leakage 无泄漏 No fire or explosion 不起火爆炸
6	Drop Test 跌落测试	The Battery is to be dropped from a height of 1 meter twice onto concrete ground. 将标准充电后的电池从 1 米高度跌落至混凝土地面 2 次	No explosion, no fire, no leakage. 无爆炸、起火、泄漏
7	Heating 加热	Put cell into oven. The temperature of the oven is to be raised at a rate of 5 $\pm$ 2°C/min to a temperature of 150 $\pm$ 2°C and remain for 10 minutes at the Temperature.	No fire or explosion 不起火爆炸



4.3 Appearance 外观检查

Appearance should be free from any remarkable scratch, flaw, rust, discoloration and electrolyte leakage, which may adversely affect commercial value of the battery.

不允许有任何影响电池性能的外观缺陷，诸如明显的划伤、裂纹、铁锈、污点以及电解液漏液等。

4.4 Standard environmental test condition 标准测试环境

Unless otherwise specified, all tests stated in this Product Specification are conducted at the condition below:

Temperature : $23 \pm 3^{\circ}\text{C}$

Humidity : $50 \pm 10\% \text{ RH}$

除非特别说明，本规格书中所有测试均在以下环境条件下进行：

温度： $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

湿度： $50 \pm 10\% \text{ RH}$

4.5 Test Device 测试设备

Charger and voltmeter: The charger and voltmeter should have an accuracy of $\pm 0.01\text{A}$ and $\pm 0.01 \text{ V}$

Slide Caliper: The slide caliper should have a scale of 0.05mm

Impedance meter: The impedance meter should be operated at AC 1kHz.

充电器和伏特计：充电器和伏特计精度必须 $\pm 0.01\text{A}$ 和 $\pm 0.01 \text{ V}$

游标卡尺：游标卡尺刻度 0.05mm

内阻仪：请使用 1kHz 的交流内阻仪

5. Storage for a long time 长时间贮存

1. If the battery will be stored for a long time (longer than 1 months), it is better to preserve the battery at the environment of low humidity and low temperature.

2. Use within 3 months (90days) after shipping

1、如果长时间贮存电池（超过 1 个月）最好置于干燥、凉爽处。

2、电池必须在 3 个月内使用。

6. Outline Dimension (all unit in mm, not in scale) 外形尺寸图 (单位: mm;未按比例)

Item	Description	Dimensions
T	Thickness	7mm max
W	Width	133mm max
L	Length	146 mm max

