可充电锂离子电池

Lithium-ion Rechargeable Cell

产品规格书

Product Specification

型号(Model): YFH-INR21700/4000mAh-5C

制作	审核	批准

江西省允福亨新能源有限责任公司

Jiangxi Yunfuheng New Energy Technology Co.,Ltd.

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目录 Contents

1. 范围 Scope

本产品规格书描述的是江西省允福亨新能源有限责任公司的可充电锂离子电池，包括产品规格信息、各种性能测试条件、产品责任及注意事项。

This product specification defines the requirements of the rechargeable lithium ion battery to be supplied to the customer by **Jiangxi Yunfuheng New Energy Technology Co.,Ltd.** Including product specification、testing method、product liability and notice。

如果客户需要任何其它的附加信息, 请事先与江西省允福亨新能源有限责任公司联系。

Should there be any additional information required by the customer, customers are advised to contact **Jiangxi Yunfuheng New Energy Technology Co.,Ltd.** before selecting a solution.

2. 产品描述与型号 Description and Model

2.1 产品描述: 电芯(可充电锂离子电池)

2.1 Description: Cell (Rechargeable Lithium-ion Battery)

2.2 型号 Model: YFH-INR21700/4000mAh-5C

3. 定义 Definition

3.1 标准模式充电　Standard Charge

标准模式充电的定义:在环境温度25±3℃下, 将电芯以2000mA电流恒流充电到4.2V, 然后转为在4.2V下恒压充电至截止电流80mA。

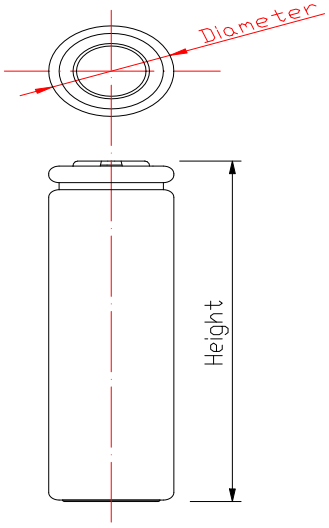
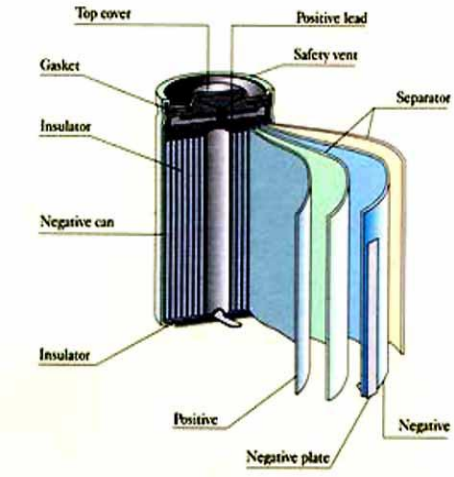
This "Standard Charge" means charging the cell at constant current of 2000mA to 4.2V, then at constant voltage of 4.2V with 80mA cut-off, at temperature 25±3℃.

3.2 标准模式放电　Standard Discharge

标准模式放电的定义: 在环境温度25±3℃下, 将满电状态电芯以2000mA电流恒流放电到2.50V。

This "Standard Discharge" means discharging the fully charged cell at constant current of 2000mA to 2.50V, at temperature 25±3℃.

4. 产品规格 Product Specifications

项目 Item		规格 Specification	电芯外形结构示意图 Schematic diagram of the structure of the electric core
1.标称容量 Nominal Capacity (0.5C 放电容量， 4.20~ 2.50V)		4000mAh	1、外形尺寸图 Outline dimension drawing 
2.最小容量 Minimum Capacity (0.5C 放电容量， 4.20~ 2.50V)		3900mAh	
3.标称电压 Nominal Voltage		3.7 V	
4.放电终止电压(最小)Discharge Cut-off Voltage		2.50V	
5.充电限制电压(最大) Max Charge Voltage		4.2±0.05V	
6.充电电流(标准)Standard Charging Current		2000mA	
7.最大充电电流 Max. Charge Current		6000mA	
8.最大持续放电电流 Max. Discharge Current		40A(80℃温度截止)	
9.瞬间放电电流 Instantaneous Discharge Current		50A(2s pulse)	
10.交流内阻 Internal AC Impedance		≤12mΩ (不含 PTC) ≤12mΩ (Without PTC)	
11. 电芯重量 Cell Weight		70.0±2.0g	2、结构图 Structure 
12 电芯尺寸 Cell Dimension	直径 Diameter	Φ21.40±0.20mm	
	高度 height	70.50±0.2mm	
13.能量密度 Energy Density	重量 Weight	211Wh/kg	
	体积 Volume	584Wh/L	
14. 使用时电芯表面温度 Operating temperature(surface temperature)	充电 Charging	0～50℃	
	放电 Discharging	-20～80℃	
15. 储存温度 Storage Temperature	1 个月 1 month	-20～60℃	
	3 个月 3 months	-20～45℃	
	6 个月 6 months	-20～30℃	
16.出货电压范围 Delivery voltage range		3.65V～3.70V	

5. 外观 Appearance

应没有如深度划痕、裂缝、生锈、斑点或漏液等影响电芯商业价值的外观瑕疵。

There shall be no such defects as deep scratch, crack, rust, discoloration or leakage, which may adversely affect the commercial value of the cell.

6. 性能规格 Performance Specifications

6.1 标准测试条件 Standard Test Conditions

6.1.1 环境条件 Environmental Conditions

除非另有说明,本规格书中的所有测试应在25±3℃,相对湿度50±20%的环境下进行。

Unless otherwise specified, all tests stated in this specification are conducted at temperature 25±3℃ and humidity 50±20%.

6.1.2 测量设备 Measuring Equipment

(1) 电流表和电压表 Ammeter and Voltmeter

电流表和电压表必须达到0.5级或以上。

The ammeter and voltmeter should have an accuracy of the grade 0.5 or higher.

(2) 游标卡尺 Slide caliper

游标卡尺的最小刻度必须达到0.01mm。

The slide caliper should have 0.01 mm scale.

(3) 内阻测试仪 Impedance meter

须使用1kHz的交流内阻测试仪。

The impedance meter with AC 1kHz should be used.

6.2 电性能 Electrical Characteristics

项目 Item	测试方法 Test Method	标准 Standard
1.初始容量 Initial Capacity	标准充满电后,搁置5分钟,然后用2000mA电流连续放电至2.50V终止电压,上述步骤循环2次,取第2次放电容量. At fter the Battery being standard charged, set it aside for 5 minutes, and then discharge continuously with 2000mA current to 2.50V termination voltage. Repeat the above steps for two times and record the second time of discharge capacity .	初始容量≥3900mAh Initial Capacity≥3900mAh
2.1循环寿命 Cycle Life	在25±3℃温度下，以2A恒流充电至4.2V，再恒压4.2V充电直至充电电流80mA，搁置5分钟，再用4A恒流放电至2.50V，又搁置10分钟，重复以上步骤，直到放电容量是初始容量的80%。 At 25±3 ℃, charge to 4.2V with 2A constant current, then charge at 4.2V constant voltage until charging current is 80mA. Shelve for 5 minutes, then discharge to 2.50V with 4A constant current, and shelve for 10 minutes. Repeat the above steps until the discharge capacity is 80% of the initial capacity.	放电容量(500次循环) ≥80% Discharge capacity (500th cycle)≥80%

2.2循环寿命 Cycle Life	在25±3℃温度下，以2A恒流充电至4.2V，再恒压4.2V充电直至充电电流80mA，搁置5分钟，再用20A恒流放电至2.50V，又搁置60分钟，重复以上步骤，直到放电容量是初始容量的80%。 At 25±3 ℃, charge to 4.2V with 2A constant current, then charge at 4.2V constant voltage until charging current is 80mA. Shelve for 5 minutes, then discharge to 2.50V with 20A constant current, and shelve for 60 minutes. Repeat the above steps until the discharge capacity is 80% of the initial capacity.	放电容量(300次循环) ≥80% Discharge capacity (300th cycle)≥80%
3.倍率放电性能 Discharge Rate Capabilities	电芯以标准模式充满电后，按以下不同电流放电至2.50V来测试放电容量 Discharge capacity is measured with various currents as below to 2.50V after the standard charge. Relative capacity at each current shall meet the following table.	1C/0.5C≥98% 3C/0.5C≥95% 5C/0.5C≥93%
4.不同温度下的放电能力 Temperature Dependence of Discharge Capacity	标准充电后，在以下温度下静置6h，然后用0.2C放电至2.50V,所记录放电容量。 At fter the Battery being standard charged, Let stand for 6 h at the following temperature, then discharge with 0.2C current to voltage 2.50V. Record the discharging capacity.	-20℃/25℃≥60% -10℃/25℃≥70% 0℃/25℃≥80% 60℃/25℃≥90%
5.荷电保持能力 Normal Storage	在 20±5℃状态下,标准充饱电后,电芯搁置 28 天,然后用 0.2C 放电至 2.50V,所记录放电时间. At 20±5℃, rest the battery for 28 days after it being standard charged. Then discharge its voltage to 2.50V with 0.2Ccurrent. Record the discharging time.	≥255 分钟 ≥255 minutes.

6.3 环境适应性能 Environmental Characteristics.

1.振动 Vibration	充电后电池在相互垂直的 X、Y、Z 三个方向上从 10Hz～55Hz 循环扫频振动 30min，扫频频率 10-55Hz，扫频速率为 1oct/min。 Equip it to the vibration platform, adjust and prepare the test equipment according to following vibration frequency and relevant swing, doing frequency sweeping from X, Y, Z three directions, each from 10Hz to 55Hz for 30 minutes of recycling, rating of which is 1oct/min:	不冒烟、不爆炸 No smoking 、No explosion
2.自由跌落 Drop	将电池从 1 米高位置自由跌落到 20mm 厚的硬木板上，从 X、Y、Z 正负方向（六个方向）每个方面自由跌落 1 次。 The battery from the 1 meter high free fall to the 20mm thick hard board, from X, Y, Z positive and negative direction (in the direction of each aspect of the free fall 1 times).	不冒烟、不爆炸 No smoking 、No explosion
3.高温高湿测试 High Temperature and High Humidity Test	电芯以标准模式充满电，在温度为60±2ºC，相对湿度为95%的环境下储存168小时。储存后按标准模式放电并按标准模式充电和标准模式放电循环3次获得恢复容量(第3次循环的放电容量)。 Cells are fully charged per Standard Charge and stored at 60±2ºC (95%RH) for 168 hours. After test, cells are discharged per Standard Charge and Standard Discharge cycled per & Standard Discharge for 3 cycles to obtain recovered capacity (3rd discharge capacity).	不漏液，不破裂，不生锈，容量恢复率≥80% No leakage, No rupture, No rust, Capacity recovery rate≥80%

6.4 安全性能 Safety Performance.

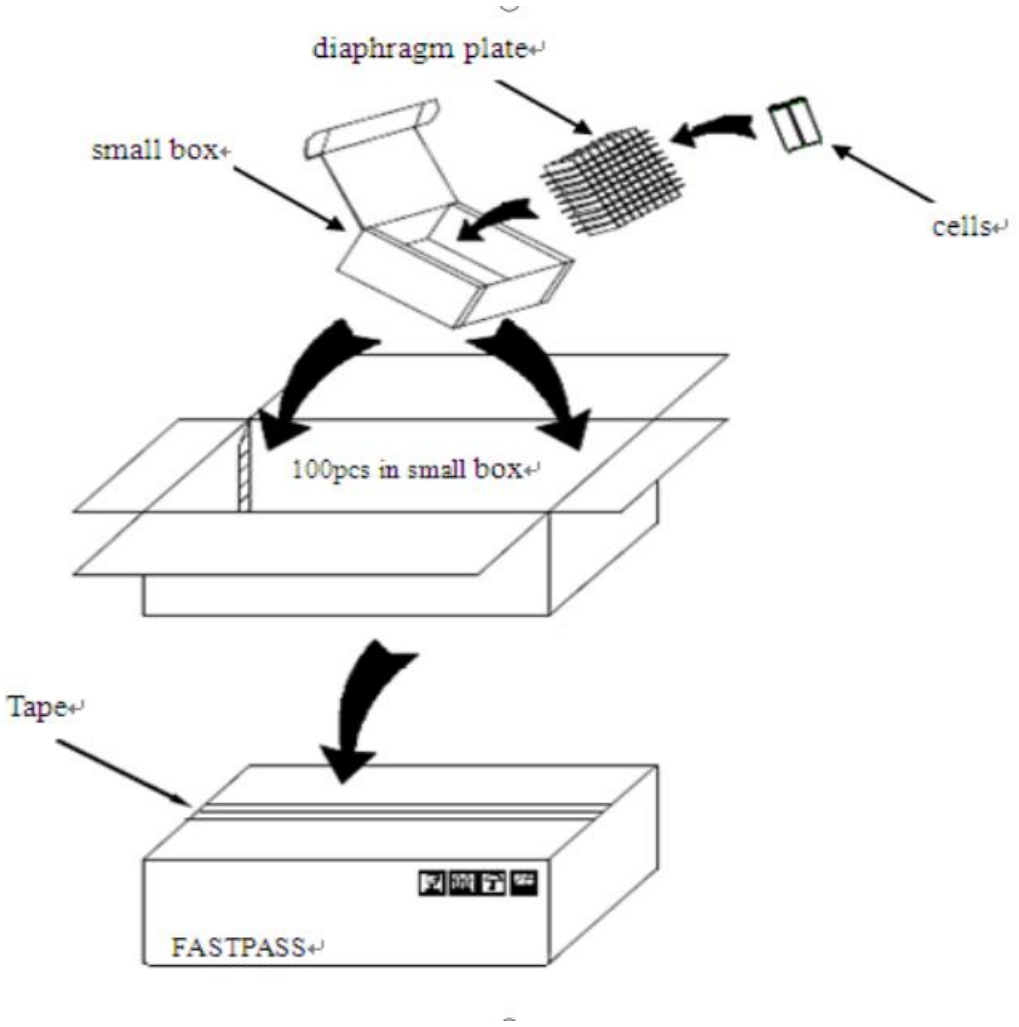
1.常温短路性能 Short Circuit at Room Temperature	电池标准充电后，将接有热电偶的电芯置于环境温度 20±5℃的防爆箱中，短路其正负极，短路导线电阻 80±20mΩ，试验过程中监视电芯温度变化，当电芯温度下降到比峰值低约 10℃时，或短接时间达到 24h 后结束试验 After the Battery being standard charged,keep the battery connected with a thermocouple in a explosive -proof box at 20 ± 5 ℃. Short circuit the positive and negative terminals, and the conductor resistance to 80 ±20 m Ω. Monitor change of the cell's temperature during the process of test. Stop the test when the temperature falls to the value that about 10℃ lower than the peak value ,or if the short circuited time is up to 24 hours.	不爆炸、不起火,最高温度<150℃ No fire,No explosion , Max.temperature<150℃
2. 过放电 Over Discharge	电池以 0.2C_5A 放电至 2.50V，然后在正负极之间接上 30Ω电阻，放置 24h，观察电芯外观。 After being standard charged, discharge the battery to 2.50V with 0.2C_5A, and then use a 30 resistor to connect the battery positive and negative terminals for 24 hours. Observe the appearance of the electric core	不起火、不爆炸 No fire, No explosion
3. 过充电 Overcharge	电池标准充电后，将电池置于防爆箱内，连接电芯正负极于恒流恒压电源，调节电流至 3C，电压上限为 10V，然后对电芯进行充电，直到电芯电压达到最大输出电压后，再持续充电 7h 或电池温度下降到比峰值低 20%，测验结束 The Battery being standard charged, put the battery in an explosion-proof box and connect the positive and negative electrode of the battery with a power supply that provides steady current and voltage.Then adjust current to 3C, and set the voltage's upper limit to 10V. Keep charging until the maximum output voltage is reached. The test can be finished after continuing to charge for 7 hours or when the temperature of the battery drops to 20% below the peak value.	不起火、不冒烟 No smoke or fire

4. 重物冲击 Impact Test	电池标准充电后，电芯放置于冲击台上，并将一个Φ15.8±0.2mm 的钢柱置于电池中心，让 9.1±0.1kg 重锤自 61cm 高度自由落到电池中心上方的钢柱上，测试后观察 6h The Battery being standard charged,put the battery on the impact table and place a steel column (Φ15.8± 0.2 mm) is placed on the center of the battery. Let a hammer (9.1 ± 0.1 kg) fall off to the steel column above the battery center from the height of 61cm. After that,observe the battery for 6 hours.	不起火、不爆炸 No fire, No explosion
5. 挤压 Crush	电池标准充电后，将电芯放置在两个平面内，垂直于极板方向进行挤压，两平板间施加 13.0kN±0.78kN 的挤压力。一旦压力达到最大值即可停止挤压试验，试验过程中电池不能发生外部短路 The Battery being standard charged, put the cell between two planes and press it perpendicular to the direction of the plate. continue crushing until the force reaches 13.0kn ± 0.78kn. Once the pressure reaches the maximum, the extrusion test can be stopped. No external short circuit should occur during the test.	不起火、不爆炸 No fire, No explosion
6. 热冲击 Hot Oven	电池标准充电后，,将电池放入防爆高温箱内，以 5±2℃/min 的温升速率进行升温，当箱内温度达到 130±2℃后恒温，并持续 30min The Battery being standard charged,put the battery in high temperature explosion-proof box, with 5 ±2 ℃ / min temperature rising rate of temperature. When the temperature reaches 130 ± 2 ℃ in the cabinet, keep that temperature for another 30 min.	不起火、不爆炸 No fire, No explosion

7.包装 Packing

电池在包装时需处于半充满状态，包装箱外应标明产品名称、型号、标称电压、数量、出产日期及相应等级的内阻、容量。

Battery in the package should be in half charged state, the packing box should be marked with product name, model, rated voltage, number, production date and the corresponding level of internal resistance, Capacity.



8.运输 Transport

电池应包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压、防止日晒雨淋、可使用汽车、火车、轮船、飞机等交通工具运输。

Battery should be packed in case to deliver. During delivery, it should be protected from violent vibration, shock, extrusion and sun-scorched and rain-drenched. Automobile, train, ship or plane are available as media of transportation.

9.贮存 storage

*电池贮藏在通风干燥的环境中，不建议长期贮藏，贮藏时间超过3个月时建议每隔3个月做一次完整的充放电循环

Store the battery in a ventilated and dry environment.Long-term storage is not recommended. When the storage time exceeds 3 months, it is recommended to do a complete charge-discharge cycle every 3 months.

10.使用警告 Warnings and cautions

为了使电池安全的使用及处理请在使用前认真的阅读操作说明

To ensure proper use of the battery please read the manual carefully before using it. Handling

*不能把电池曝晒或丢在火中

Do not expose the battery to the sun or discard the battery in fire.

*电池充电时不能把正负极性装反

Do not reverse the positive and negative terminals when charging.

*避免短路电池

Avoid shorting the battery

*避免过分的物理震动和冲击电池

Avoid excessive physical shock or vibration.

*不能拆解或使电池变形

Do not disassemble or deform the battery.

*不能将电池浸入水中

Do not immerse the battery in water.

*不能将其它不同厂家，类型，型号的电池混合使用

Do not use the battery mixed with other batteries of different manufacturers,types and models.

*禁止小孩接触电池

Keep the battery out of the reach of children.

*电池必须在合适的条件下充电

The battery must be charged under appropriate conditions only.

*决不能用故障的充电器给电池充电

Never use a modified or damaged charger.

*电池持续充电不能超过 24H

Do not leave the battery in charger for over 24 hours.

处理 disposal

*不同国家法规的不同，处理时根据当地的法规

Regulations vary from different countries.　Dispose of the battery in accordance with local regulations.