



广西焱能新能源有限公司
文件/表单发行、修订、废止申请单

文件名称		GZNF18650HP-1800mAh锂离子电池规格书 (不带PTC)									
文件编号		GYN-SP-YF-001		申请部门		电芯开发部			版次	A1	
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申请人/日期: 张明		审核/日期:			批准/日期: 王明						
会签部门		会签	发放对象及份数								
事业部	<input type="checkbox"/> 生产部		配料份数 ()	涂布份数 ()	整片份数 ()	卷绕份数 ()	组装份数 ()	主管一份数 ()	主管二份数 ()	主管三份数 ()	经理份数 ()
			注液份数 ()	化成/分容份数 ()	一次配组份数 ()	包装份数 ()					
	<input checked="" type="checkbox"/> 品控部	王明	IPQC配料/涂布份数 ()	IPQC整片份数 ()	IPQC卷绕/组装份数 ()	IPQC注液份数 ()	IPQC化成/分容份数 ()	来料计量主管份数 ()	前段主管份数 ()	后段主管份数 ()	经理份数 ()
	<input type="checkbox"/> 物控部		PC计划份数 ()	MC物控份数 ()			统计份数 ()		仓储份数 ()		主管份数 ()
	<input checked="" type="checkbox"/> 技术部	张明	技术前段份数 ()	技术后段份数 ()							经理份数 ()
	<input type="checkbox"/> 设备部		设备前段份数 ()	设备中段份数 ()			设备后段份数 ()				经理份数 ()
	<input type="checkbox"/> 事业部	王明									事业部份数 ()
会签部门		会签	发放对象及份数		会签部门			会签	发放对象及份数		
人资行政中心	<input type="checkbox"/> 行政部		部门份数 ()			<input checked="" type="checkbox"/> 营销一部	王明	部门份数 ()			
	<input type="checkbox"/> 招聘部		部门份数 ()			<input type="checkbox"/> 营销二部		部门份数 ()			
	<input type="checkbox"/> 人力资源管理部		部门份数 ()			<input type="checkbox"/> 营销三部		部门份数 ()			
	<input checked="" type="checkbox"/> 人资行政中心		中心份数 ()			<input checked="" type="checkbox"/> 营销中心		中心份数 ()			
研究院	<input checked="" type="checkbox"/> 电芯开发部		部门份数 ()		<input type="checkbox"/> 采购中心		中心份数 ()				
	<input checked="" type="checkbox"/> 质量管理部	王明	部门份数 ()		<input type="checkbox"/> 项目中心		中心份数 ()				
	<input type="checkbox"/> 新材料开发部		部门份数 ()		<input checked="" type="checkbox"/> 客服中心	王明	中心份数 ()				
	<input type="checkbox"/> 应用开发部		部门份数 ()		<input type="checkbox"/> 财务中心		中心份数 ()				
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锂离子电芯规格书

Specification For Lithium-ion Rechargeable Cell

电芯型号: GZNF18650HP-1800mAh

Cell Type: GZNF18650HP-1800mAh

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1 Preface 前言

This specification describes performance、technical characteristic, warning and caution of the lithium ion rechargeable cell. The specification only applies to GZNF18650HP-1800 mAh(without PTC)cell supplied by Guang xi Yi'ng New Energy Co., Ltd.

本标准描述了圆柱型锂离子电芯的特性、技术要求及注意事项。本标准适用于广西焱能新能源有限公司生产的圆柱型 GZNF18650HP-1800mAh（不带 PTC）锂离子电芯。

2 Description 产品类别

2.1 Product 产品: Lithium-ion Rechargeable Cell 锂离子可充性电芯

2.2 Model 电芯型号: GZNF18650HP-1800mAh (without PTC)

3 Characteristic 性能

3.1 Cell Specification 电芯特性

ITEM (项目)	SPECIFICATION (规格)	REMARK (备注)
Nominal capacity 标称容量	1800mAh	Std.charge/discharge 标准充放电
Minimum capacity 最小容量	1750mAh	Std.charge/discharge 标准充放电
Nominal Voltage 额定电压	3.20V	Average 平均值
Shipment Voltage 出货电压	2.90-3.40V	Interval value 区间值
Standard Charge (Refer to 4.1) 标准充电 (参照 4.1)	0.5C (900mA) 3.65V 18mA	Constant current 恒流 Constant voltage 恒压 End current 截止电流
Fast charge(refer to 4.3) 快速充电 (参照 4.3)	1C (1800mA) 3.65V 18mA	Constant current 恒流 Constant voltage 恒压 End current 截止电流
Max. Charge Voltage 最大充电电压	3.65V	/
Max.charge current 最大充电电流	1C (1800mA)	/
Standard Discharge (Refer to 4.2) 标准放电 (参照 4.2)	0.5C (900mA) 2.00V	Constant current 恒流 End Voltage 终止电压
Fast Discharge (refer to 4.3) 快速放电 (参照 4.3)	1.0C (1800mA) 2.00V	Constant current 恒流 End Voltage 终止电压
Max. Continuous discharge current 最大持续放电电流	5C (9000mA)	/



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Max. Instantaneous discharge current 最大瞬间放电电流	10C (18000mA)	/
charge current for cycle tested (refer to 4.1) 循环测试充电 (参照 4.1)	0.5C (900mA) 3.65V 18mA	Constant current 恒流 Constant voltage 恒压 End current 截止电流
discharge current for cycle tested (refer to 4.3) 循环测试放电 (参照 4.3)	1.0C (1800mA) 2.00V	Constant current 恒流 End Voltage 终止电压
MAX Weight 最大重量	42±3 g	/
Internal resistance 内阻	≤35mΩ	AC Impedance, 1000Hz
Diameter 直径	Max.18.60 mm ≤18.60 mm	/
Height 高度	Max. 65.30 mm ≤65.30 mm	/
Operating Temperature 操作温度	Charge 充电	0~45℃
	Discharge 放电	-10~50℃
Storage Condition 储存条件	1 month	-10~50℃ (环境湿度≤45%RH)
	3 month	-10~45℃ (环境湿度≤45%RH)
	1 year	-10~20℃ (环境湿度≤45%RH)

电芯示意图	产品尺寸图 (Dimensions)



4 Definition 定义

4.1 Standard charge method 标准充电方式

“Standard charge” shall consist of charging at constant current of 0.5C (900 mA).The cell shall then be charged at constant voltage of 3.65V while tapering the charge current ,charging shall be terminated when the charging current has tapered to 18 mA.For test purpose ,charging shall be performed at 25℃ ± 2 ℃

指在 25℃ ± 2 ℃ 环境下，0.5C（900mA）恒定的电流充电至 3.65V，再以 3.65V 恒压充电至电流 18 mA。

4.2 Standard discharge method 标准放电方式

“Standard Discharge” shall consist of discharging at a constant current of 0.5C (900mA) to 2.00V. Discharging is to be performed at 25 ℃ ± 2 ℃ unless otherwise noted (such as capacity versus temperature)

指在 25℃ ± 2 ℃ 环境下，0.5C（900mA）恒流放电至 2.0V。

4.3 Fast charge/discharge method 快速充放电方式

Tested at 25℃ ± 2 ℃ Cell shall be charged at constant current of 1.0C (1800 mA) to 3.65V with end current of 90 mA. Cells shall be discharge at constant current of 1.0C (1800 mA)/3C(5400mA) to 2.00V. Cells are to rest 30 minutes after charge and 30 minutes after discharge.

在 25℃ ± 2 ℃，1.0C(1800 mA)恒流恒压充电到 3.65V，截止电流为 90 mA，搁置 30min，然后 1.0C(1800 mA)/3.0C(5400mA)放电到 2.00V，搁置 30min。

5 Technical characteristic 技术要求

5.1 Electrical characteristic 电性能

ITEM 测试项目	CRITERION 性能标准	Specification(标准)
Discharge performance 放电性能	Charge according to 4.1,then discharge within 1 hour with constant current of 0.5C(900 mA) to the end voltage is 2.00V 电池按 4.1 充满电后 1 小时内以 0.5C（900 mA）恒流放电到 2.00V	≥1750mAh.
Cycle life 循环寿命	Cells shall be charged per 4.1 and discharged per 4.3, 1000 cycles by 1.0C(1800mA),300 cycles by 3.0C(5400mA). A cycle is defined as one charge and one discharge . 电池按 4.1 的测试方法进行充电，按 4.3 的测试方法进行放电。1.0C(1800mA)放电 1000 周，3.0C(5400mA)放电 300 周，其中 1 周包含 1 个充电和放电。	Capacity remaining rate ≥ 80% 容量保持率 ≥ 80%



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High-Low temperature discharge performance 高低温放电性能	Cells shall be charged per 4.1 at 25°C ± 2 °C and discharge at a constant current of 0.5C to 2.00V at the following temperatures. 在 25°C ± 2°C 按照 4.1 方式充满电，在如下的温度下按 0.5C 恒流放电到 2.00V。		
	Charge 充电	Discharge (放电)	Capacity 容量
	25°C	-10°C -5°C 25°C 55°C	≥50% ≥75% ≥100% ≥95%
Storage characteristic 储存性能	Cells shall be charged per 4.1 and storage in a temperature-controlled environment at 25°C ± 2 °C for 28 days. After storage, cells shall be discharged per 4.2 to obtain the capacity remaining . 按照 4.1 方式充满电后，在 25°C ± 2 °C 环境下，搁置 28 天，储存结束后，按照 4.2 的方式获得残余容量。		Capacity remaining rate ≥90% 容量保持率 ≥90% Capacity recovery rate ≥90% 容量恢复率 ≥90%
High temperature storage test 高温储存性能	Cells shall be charged per 4.1 and storage in a temperature-controlled environment at 60 °C for 1 week . After storage, cells shall be discharged per 4.2 and cycled per 4.2 for 3 cycles to obtain recovered capacity. 按照 4.1 方式充满电后，在 60 °C 下存放 1 周，1 周后，按照 4.2 放电，并循环 3 周获得恢复容量。		Capacity remaining rate ≥90% 容量保持率 ≥90% Capacity recovery rate ≥90% 容量恢复率 ≥90%

5.2 Environment characteristic 环境性能

ITEM 测试项目	CRITERION 性能标准	Specification(标准)
Constant Temperature and High Humidity 恒定湿热性能	Cells are charged per 4.1 and stored at ambient temperature of 40°C ± 5 °C (95%RH) for 48H, then placed in room temperature for 2H, after that, check its appearance prior to being discharged cut -off voltage at a constant current of 0.2C. 按 4.1 方式充满电后，将电芯放入 40°C ± 5 °C (95%RH) 的恒温恒湿箱中搁置 48H，在室温下搁置 2H 后，目测电芯外观，再以 0.2C 放电至终止电压。	no distortion, no rust, no fume, no explosion; The discharging time is not less than 180min 1. 电芯外观应无变形，锈蚀，冒烟或爆炸 2. 放电时间应不低于 180min。
Drop test 自由跌落	Cells charge per 4.1 are dropped onto wooden floor from 1.0 meter height, 1 drops from each cell terminal and 2 drop from the side of cell can (Total number of drops=4). 按照 4.1 充满电后，将电芯从 1.0m 的高度上跌落到电木板上，从头部、尾部两方向各跌落 1 次，侧面跌落 2 次。	No fume, No explosion 电芯不冒烟，不爆炸



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Vibration Test 振动试验	<p>After Standard charge,cells are fixed on vibration table and subjected to vibration cycling at the rate of 1Hz per minute between 10HZ and 55Hz。The excursion of the vibration is 1.52mm.The test has to be carried out for 90 min±5minutes at x,y and z axes individually.</p> <p>将充满电的电池以振幅 0.76mm（双振幅为 1.52mm）的正弦振动，振动频率范围为 10Hz-55Hz，频率变化速率 1HZ/min。沿 X、Y、Z 三个方向振动，每个方向振动 90min ±5min。</p>	No leakage No fire No explosion 不漏液，不起火，不爆炸
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5.3 Safety Test 安全测试

All below tests are carried out on the equipment with forced ventilation and explosion-proof device.Before test all cells are charged in accordance with 4.1,and stored 24 prior to testing.

下述试验应在有强制排风条件及防爆措施的装置内进行，在试验前所有的电芯都按 4.1 规定充电，并搁置 24H 后，再进行以下试验。

ITEM 测试项目	CRITERION 性能标准	Specification(标准)
Crush Test 挤压测试	<p>A cell is to be placed on the crush flat,the axis is parallel to the crush flat,it is to be crushed between two flat surfaces.Crushing force is approximately 13KN and hold for 1 min.</p> <p>电池按照 4.1 方式充满电后，电芯放在挤压设备的两个挤压表面之间，圆柱电芯轴平行于挤压平面，逐渐增加压力至 13KN，保持压力 1min。</p>	No fire No explosion 不起火，不爆炸
Heating Test 热冲击	<p>Cells are charged per 4.1 and heated in a circulation air oven at a rate of (5 ± 2) ° C per minute to (130 ± 2) ° C .At 130 ° C oven is to remain for 30 minutes before test is discontinued ..</p> <p>电池按照 4.1 方式充满电后，将电芯放在电热鼓风干燥箱中，温度以 (5 ± 2) ° C / min 的速率由室温升至 (130 ± 2) ° C ，并保持 30min。</p>	No fire No explosion 不起火，不爆炸
Overcharge Test 过充电	<p>A cell is discharged to cut-off voltage at CC of 0.2C ,then it is to be subjected to CC /CV power by connecting its positive & negative terminal,then set the current 3 times of the max.set the voltage as 5V,after that ,charge the cell up to 5V at 3 times current at the max,until that last 7H at the voltage of 5V or the voltage in no more increased.</p> <p>先将电池 0.2C 放电至终止电压，然后将电芯正负极连接于恒压电源，调整电流至 3 倍电流中的最大值，电压为 5V，然后对电芯以 3 倍电流中的最大值，直到输出的电压不低于 5V，持续充电 7H 或者电压不再增加。</p>	No fire, No explosion 电芯不起火，不爆炸



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<p style="text-align: center;">Short-circuit test 短路测试</p>	<p>Cell are charged per 4.1, and the positive and negative terminal is connected by a $(80 \pm 20)\text{m}\Omega$-wire. Monitor its temperature while testing, the cell is to be discharged until the cell case temperature has returned to be 20% less than peak temperature.</p> <p>按照 4.1 的方式充满电后，将正负极用 $(80\pm 20)\text{m}\Omega$ 的导线连接起来，实验过程监控电芯温度变化，当电芯温度下降到比峰值低约 20%，结束实验。</p>	<p>No fire ,No explosion Max.temp.<150℃ 电芯不起火，不爆炸 最高温度<150℃</p>
<p style="text-align: center;">Combustion injection test 燃烧喷射</p>	<p>Cell are charged per 4.1, and placed on the steel wire of the test tooling. If the cell slips during the test, it can be fixed on the wire mesh by a single wire. if this does not happen,the cell can not be bundled.Heat the cell by flame and stop heating when the following three conditions occur :</p> <p>a) explosion; b) complete combustion; c) keep heating for 30 minutes, but the cell does not fire or explode.</p> <p>将电池按照 4.1 方式充满电后，再将电池放置在试验工装的钢丝网上。如果试验过程中会出现电池滑落的情况时，可用单根金属丝把电池样品固定在钢丝网上；若无此类情况发生，则不可以捆绑电池。用火焰加热电池，当出现以下三种情况时停止加热：</p> <p>a) 电池爆炸； b) 电池完全燃烧； c) 持续加热 30min，但电池未起火、未爆炸。</p>	<p>Components that make up cell (except for dust products) or the whole cell are not allowed to penetrate steel wire 组成电池的部件（粉尘状产物除外）或电池整体不得穿透钢网</p>
<p style="text-align: center;">Acupuncture test 针刺测试</p>	<p>Cell are charged per 4.1, and placed on the support and connected with the thermoelectric Europe .Then the cell is pierced by a nail with a diameter of 5 mm. Observe the phenomenon and temperature change of the cell.</p> <p>将电池按照 4.1 方式充满电后，放在支座上，并与热电偶相连，然后用直径为 5mm 的铁钉刺穿电芯，观察电芯现象及温度变化。</p>	<p>no fire ,no explosion Max.temp.<150℃ 电芯不起火，不爆炸 最高温度<150℃</p>



6 Warranty 质量保证

The quality guarantee period is 12months from the time leaving factory,even though the problem occurs within this period,we will not replace a new cell for free as long as the problem is not due to the failure of Yi neng manufacturing process or is due to customer's abuse or misuse.

保质期从出厂开始 12 个月，但是，在此期限内，如果非焱能公司的制程原因而是客户的误用造成的电芯质量问题，焱能公司不承诺免费更换。

- Yi neng will not be responsible for trouble occurred by handling outside of the precautions in instructions .

焱能公司对违反安全守则操作所产生的问题不承担任何责任。

- Yi neng will not be responsible for the trouble occurred by matching electric circuit,cell pack and charger .

焱能公司对于电路、电池组、充电器搭配使用产生的问题不承担任何责任。

- Yi neng will be exempt from warrantee any defect cells during assembling after acceptance.

出货后客户在电芯组装过程中产生的不良电芯不在焱能公司质量保证的范围之列。

- Yi neng have the right to modify this specification with notifying the clients

焱能公司有修改规格书的权力并且会及时通知客户。

- Details not be involved in this specification can be discussed between the manufacture and the clients

本规格书未尽事宜由供求双方共同协商解决。

7 Storage 储存

- The cell should be used within a rang of temperatures specified in the product specification . Otherwise ,it may cause loss of characteristics,leakage and/or rust.

电芯要在产品规格书规定的温度范围内使用，否则，可能会损失某些性能、漏液或者是生锈。

- The cell should be used within a short period after charging because long-term storage may cause of capacity by self-discharging .If long-term storage is necessary ,the cell should be stored at lower voltage within a range specified in the product specification,because storage at higher voltage voltage may cause loss of characteristics.

电芯充完电后，要在短时间内使用，因为长期储存可能因自放电引起容量损失。如果是长期储存，电芯应该在产品规格书内的低电压储存，高电压储存会损失某些性能。

8 Warning and cautions in handling the lithium-ion cell

电芯使用时警告事项及注意事项

To prevent the possibility of the cell from leaking,heating,explosion,please observe the following precautions:

为防止电芯可能发生泄漏，发热，爆炸，请注意以下预防措施：

- Don't immerse the cell in water

严禁将电芯浸入水中

- Don't use and leave the cell near a heat source as fire or heater

禁止将电芯在热高温源旁，如火，加热器等旁边使用和留置。



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- When charging, use a cell charger specifically for that purpose
充电时请选用锂离子电芯专用充电器。
- Don't reverse the positive and negative terminals.
严禁颠倒正负极后使用电芯。
- Don't connect the cell to an electrical outlet directly.
严禁将电芯直接插入电源插座。
- Don't discard the cell in fire or heater.
禁止将电芯丢入火或加热器中。
- Don't connect the positive and negative terminal directly with metal objects.
禁止用金属直接连接电芯正负极，造成短路。
- Don't transport and store the cell together with metal objects such as necklace, hairpins.
禁止将电芯与金属，如发卡、项链等一起运输或存储。
- Don't strike, throw or trample the cell.
禁止敲击，抛掷或踩踏电芯等。
- Don't directly solder the cell.
禁止直接焊接电芯。
- Don't pierce the cell with a nail or other sharp object.
禁止用钉子或其它利器刺穿电芯。

Caution 小心

- Don't use or leave the cell at very high temperature conditions (for example, strong direct sunshine or a vehicle in extremely hot conditions).
禁止在高温下（直接的阳光或很热的汽车中）使用或放置电芯，否则可能会引起电芯过热，起火或功能失效，寿命减短。
- If the cell leaks and the electrolyte get into your eyes, don't wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention. Otherwise, eyes injury can result.
如果电芯发生泄漏，电解液进入眼睛，请不要搓揉，应用清水冲洗眼睛，必要时请立即前往医院接受治疗，否则会伤害眼睛。
- If the cell gives off an odor, generate heat, becomes discolored or deformed, or in any way appear abnormal during usage, recharging or storage, immediately remove it from the device or cell charger and stop using it.
如果电芯发生异味，发热，变色，变形或使用、存储、充电过程中出现任何异常现象，立即将电芯从装置或充电器移开并停用。
- In case the cell terminals get dirty, clean the terminals with a dry cloth before use.
如果电芯弄脏，使用前应用干布抹净。
- Don't leave, charge or use the cell in a car or similar place where inside of temperature may be over 60°C
不要在车中或者是相似的地方放置、充电或使用电芯，这些地方的温度可能超过 60 度。



9 Caution for the battery and pack 电池组注意事项

- Used dedicated charger.
使用规定充电器
- Don't charge the reversely.
不要正负极接反。
- Use or charge the battery only in the dedicated application
电池组使用或者充电时，只在规定的充电器上。
- Don't throw the battery into the fire.
不要把电池组扔到火中。
- Don't leave, charge or use the battery in a car or similar place where inside of temperature may be over 60°C
不要在车中或者是相似的地方放置、充电或使用电池组，这些地方的温度可能超过 60 度。
- Charging method is Constant Current-Constant Voltage(CC/CV).Charging should be operating under stand charge current and maximum charge voltage which specified in the product specification.
充电方式是恒流恒压充电，充电应在规格书要求下，以标准充电电流和最大的充电电压下进行。
- Discharging method is Constant Current.Discharging should be operating under fast discharge current which is specified in the product specification.
放电方式是恒流放电，放电应在规格书的要求下，快速放电的方式放电。