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	INR18650HP-2500mAh（不带PTC） 锂离子电芯规格书	版 次：A/2
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广西卓能新能源科技有限公司
Guangxi zhuo' neng New Energy Technology Co.,Ltd

锂离子电芯规格书

Specification
For
Lithium-ion Rechargeable Cell

电芯型号：INR18650HP-2500mAh（不带 PTC）

Cell Type：INR18650HP-2500mAh（without PTC）

地址：广西钦州市钦北区皇马工业园 1 区
Address: Area 1 Huangma Industrial Zone, Qinbei District, Qinzhou City Guangxi Zhuang Autonomous Region

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黄光炜	江利金		

Contents 目录

1 Preface 前言

This specification describes performance、technical characteristic，warning and caution of the lithium ion rechargeable cell. The specification only applies to 18650HP-2500mAh(without PTC) cell supplied by Guangxi zhuo' neng New Energy Technology 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。本标准使用与广西卓能新能源科技有限公司生产的圆柱型 18650HP-2500mAh(不带 PTC)锂离子电芯。

2 Description

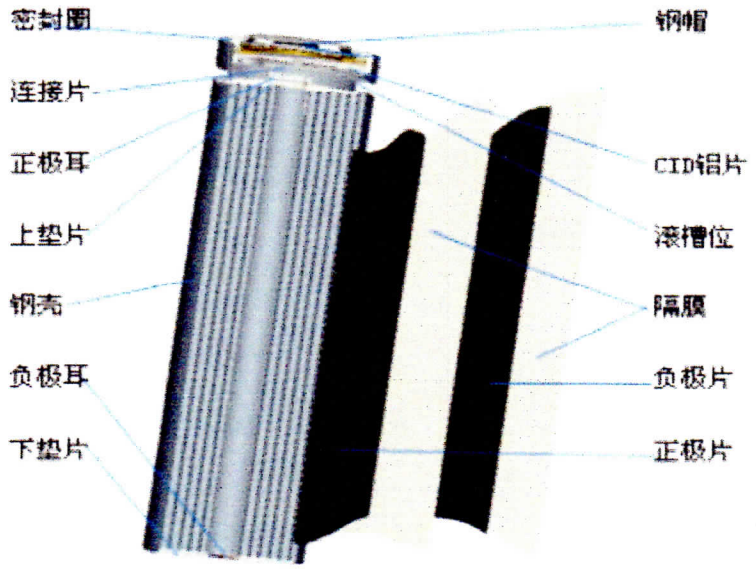
2.1 product 产品：Lithium-ion Rechargeable cell 锂离子可充性电芯

2.2 Model 电芯型号：INR18650HP-2500mAh（without PTC）

3 Specification 标准

ITEM（项目）	SPECIFICATION（规格）	REMARK（备注）
Nominal capacity 标称容量	2500mAh	Standard.charge/discharge 标准充放电
Minimum capacity 最小容量	2450mAh	Standard.charge/discharge 标准充放电
Nominal Voltage 额定电压	3.6V	Average 平均值
Shipment voltage 出货电压	3.55-3.75V	interval value 区间值
Standard Charge (Refer to 4.1) 标准充电（参照 4.1）	0.5C（1250mA） 4.2V 50mA	Constant current 恒流 Constant voltage 恒压 End current 截止电流
Fast charge 快速充电	1C（2500mA） 4.2V 50mA	Constant current 恒流 Constant voltage 恒压 End current 截止电流
Max. Charge Voltage 最大充电电压	4.2±0. 05V	/
Max.charge current 最大充电电流	1C（2500mA）	/
Standard Discharge （Refer to 4.2） 标准放电	0.2C（500mA） 2.50V	Constant current 恒流 End Voltage 终止电压
Continuous maximum discharge current 持续最大放电电流	8C（20000mA） 2.50V	Constant current 恒流 End Voltage 终止电压
Instantaneous maximum discharge current 瞬间最大放电电流	10C（25000mA）	≤10S
Internal resistance 内阻	≤20mΩ（without PTC）	AC Impedance，1250Hz

Diameter 直径	Max. 18.60mm ≤18.60	/
Height 高度	Max. 65.30 ≤65.30	/
Operating Temperature 操作温度	Charge 充电	0～45℃
	Discharge 放电	-20～60℃
Storage Temperature 储存温度	1 month	-20～50℃
	3 month	-20～45℃
	1 year	-20～20℃



4 Definition

4.1 Standard charge method

标准充电方式：

"Standard charge" shall consist of charging at constant current of 0.5C （1250mA）.The cell shall then be charged at constant voltage of 4.2V while tapering the charge current ,charging shall be terminated when the charging current has tapered to 50mA.For test purpose ,charging shall be performed at 25℃±2 ℃

指在 25℃±2 ℃环境下，0.5C（1250mA）恒定的电流充电至 4.2V，再以 4.2V 恒压充电至电流 50mA。

4.2 Standard discharge method

标准放电方式：

"Standard Discharge" shall consist of discharging at a constant current of 0.2C (500mA) to 2.50V. Discharging is to be performed at 25 ℃ ± 2 ℃ unless otherwise noted (such as capacity versus temperature)

指在 25℃±2 ℃环境下，0.2C（500mA）恒流放电至 2.50V。

4.3 Charge/discharge method

充放电方式

Tested at 25℃±2 ℃ Cell shall be charged at constant current of 0.5C(1250mA) to 4.2Vwith end current of 50mA. Cells shall be discharge at constant current of 8C(20000mA) to 2.50V. Cells are to rest 20 minutes after charge and 20minutes after discharge.

指在 25℃±2 ℃，0.5C(1250mA)恒流恒压充电到 4.2V，截止电流为 50mA，搁置 20min，然后 8C(20000mA)放电到 2.50V，搁置 30min。

5 Technical characteristic 技术要求

5.1 Electrical characteristic 电性能

<table>
<tr><th>ITEM 测试项目</th><th colspan="2">CRITERION 性能标准</th><th>Specification(标准)</th></tr>
<tr><td>Discharge performance
放电性能</td><td colspan="2">Charge according to 4.1,then discharge within 0.5 hour with constant current of 0.2C(500mA)to the end voltage is 2.50V.
电池按 4.1 充电后 0.5 小时内以 0.2C(500mA)恒流放电到 2.50V。</td><td>0.2C,≧300min</td></tr>
<tr><td>Cycle life
循环寿命</td><td colspan="2">Cells shall be charged and discharged per4.3, 300cycles.A cycle is defined as one charge and one discharge.Cells are to rest 20 minutes after charge and30minutes after discharge.
电池 按 4.3 的测试方法进行充放电 300 周，其中 1 周包含 1 个充电和放电。充电后搁置 20 分钟，放电后搁置 30 分钟。</td><td>≥60%</td></tr>
<tr><td rowspan="4">High-Low temperature discharge performance
高低温放电性能</td><td colspan="2">Cells shall be charged per 4.1 at 25℃±2 ℃ and discharge per 4.2 at the following temperatures.
在 25℃±2℃ 按照 4.1 放式充满电，在如下的温度下按 4.2 放式放电。</td><td></td></tr>
<tr><td>Charge 充电</td><td>Discharge（放电）</td><td>Capacity 容量</td></tr>
<tr><td rowspan="2">25℃</td><td>-15℃
-10℃
0℃
25℃
50℃</td><td>≥60%
≥80%
≥90%
≥100%
≥100%</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Storage characteristic
储存性能</td><td colspan="2">Cells shall be charged per 4.1 and storage in a temperature-controlled environment at 25 ℃ ± 2 ℃ for 30 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℃±2 ℃环境下，搁置 30 天，储存结束后，按照 4.2 的方式获得残余容量。</td><td>Capacity remaining rate ≥90%
容量保持率≥90%
Capacity recovery rate ≥95%
容量恢复率≥95%</td></tr>
</table>

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℃ for 1 week.After storage,cells shall be discharged per 4.2 and cycled per4.2 for 3 cycles to obtain recovered capacity. 按照 4.1 方式充满电后，在 60 ℃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 ≥95% 容量恢复率≥95%

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℃±5 ℃(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℃±5 ℃(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。	1.nodistortion, no rust,no fume, no explosion; 2.The discharging time is not less than 180min 1、电芯外观应无变形，无锈蚀，无冒烟或无爆炸。 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 for 1cycle,2 drops from each cell terminal and 1drop from the side of cell can (Total number of drops=3). 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、侧面）三个方向跌落 3 次。	No leakage,no fume,no explosion 电芯应不漏液，无冒烟或无爆炸
Vibration Test 振动试验	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 minutes at x,y and z axes individually. 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。	No leakage，fire or explosion 不漏液，不起火，不爆炸

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 24h 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	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. 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。	No fire,no explosion 电芯不起火，不爆炸
Impact Test 重物冲击	Cells charge per 4.1 are impacted with their longitudinal axis parallel to the flat surface to the flat surface and perpendicular to the longitudinal axis of the 15.8±0. 2mm diameter bar.A 9.1±0. 1 Kg weight is to be dropped from a height of 610±25mm onto the cell . 将电池充满电后，将电池置于平台表面，使其纵轴向与重物表面平行，将直径为 15.8±0.2 的金属棒横置在电池的几何中心上表面，将重量为 9.1±0.1Kg 的重物从 610±25mm 高处自由落体状态撞击在电池表面。	no fume,no explosion 电芯不冒烟或不爆炸
Heating Test 加热	Cells are charged per 4.1 and heated in a circulation air oven at a rate of (5 ± 2) ℃ per minute to (130 ± 2) ℃ .At 130 ℃ oven is to remain for 30 minutes before test is discontinued . 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) ℃/min 的速率由室温升至 (130± 2) ℃，并保持 30min。	No fire or explosion 不起火，不爆炸
Overcharge Test 过充电	A cell is discharged to cut-off voltage at CC of 0.5C ,then it is to be subjected to CC /CV power by connecting its positive & negative terminal,then set the current of 3 times the max.set the voltage as 10V,after that ,charge the cell up to 10V at 3 times current at the max,until that last 7h at the voltage of 10V or the voltage in no more increased. 先将电池 0.5C 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 10V，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 10V，持续充电 7H 或者电压不再增加。	No fire,no explosion 电芯不起火，不爆炸
Short-circuit test 短路测试	Cell are charged per 4.1, and the positive and negative terminal is connected by a (80 ± 20)mΩ-wire. Monitor its temperature while testing, the cell is to be discharged until the cell case temperature has returned to be 20% less then peak temperature . 按照 4.1 的方式充满电后，将正负极用（80±20）mΩ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。	no fire ,no explosion Max.temp.<150℃ 电芯不起火，不爆炸 最高温度<150℃

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 Zhuo neng manufacturing process or is due to customer's abuse or misuse.

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

- Zhuo neng will not be responsible for trouble occurred by handling outside of the precautions in instructions .
  卓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。
- Zhuo neng will not be responsible for the trouble occurred by matching electric circuit,cell pack and charger .
  卓能公司对于电路、电池组、充电器搭配使用产生的问题不承担任何责任。
- Zhuo 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卓能公司质量保证的范围之列。
- Zhuo neng have the right to modify this specification with notifying the clients
  卓能公司有权利修改规格书的权利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
  本规格书为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范温度围内使用，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，请注意一下预防措施：

- 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。

- 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 15minutes,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，请不要搓柔，应用清水充洗眼睛，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想象，立即将电芯从装置或充电器张移开并停用。
- 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℃
  不要离开正在充电或者是使用的电芯在车中或者是相似的地方，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℃
  在温度可能超过 60℃的地方充电或者使用车中的电池组时，请不要离开。
- 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 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。