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河南恒一锂能科技有限公司

Henan Hengyi lithium energy technology Co., Ltd

圆柱形锂离子可充电电池

产品规格书

SPECIFICATIONS

CYLINDRICAL LITHIUM-ION RECHARGEABLE BATTERY

型　号 MODEL：　IMR18650-1500mAh

客户名称 CUSTOMER:

客户确认 CONFIRMATION:

日　期 DATE ：

制定 PRERARED	审核 CHECKED	批准 APPROVED
胡晓转 Huxiaozhuan	胡晓转 Huxiaozhuan	张新恒 Zhangxinheng

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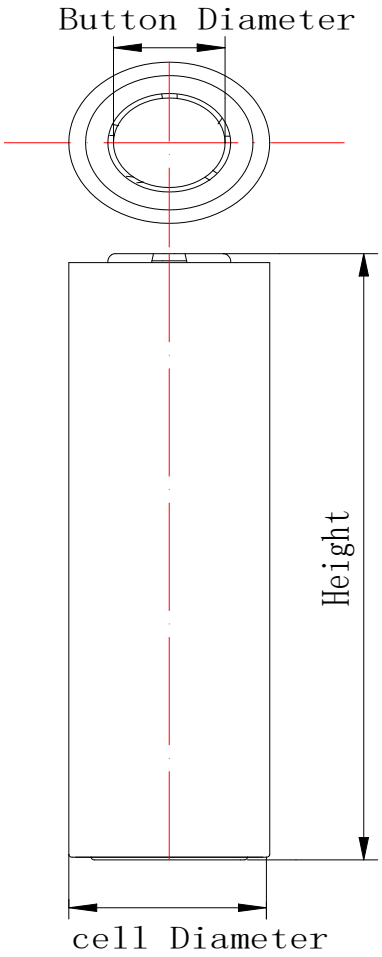
1.适用范围 Scope

本产品规格书描述了河南恒一锂能科技有限公司（以下简称恒一公司）生产的圆柱锂离子电池的产品性能指标。

The document describes the product specification of the cylindrical lithium-ion rechargeable battery cell supplied by Henan Hengyi lithium energy technology Co., Ltd（Hereinafter referred to as Hengyi company）

2.型号 Model：IMR18650-1500mAh

3.尺寸：



Cell diameter(电池直径) mm	Cell Height(电池高度) mm	Button diameter(盖帽直径) mm
18.15±0.3	65.0±0.5	7.5±0.3

4.规格

序NO.	项目 Item	规格 Specification
1.	标称容量 Nominal capacity	1500mAh@ 0.2C（300mA）放电discharge
2.	最小容量 Minimal capacity	1500mAh@ 0.2C(300mA)放电 discharge
3.	标称电压 Nominal voltage	3.7V
4.	内阻 Impedance	≤60mΩ（充电态）
5.	充电截止电压 Charge cut-off voltage	4.2 V
6.	充电电流 Charge current	标准充电：0.2C_5A　　Standard charge：0.2C_5A 快速充电：0.5C_5A　　Rapid charge：　0.5C_5A
7.	标准充电方法 Standard Charging method	0.2C_5A 恒流（CC）充电至 4.2V，再恒压 4.2V（CV）充电直至充电电流≤0.02C_5A 0.2C_5A constant current（CC）charge to 4.2V，then consrant voltage 4.2V（CV）charge till charge current decline to≤0.02C_5A
8.	充电时间 Charging time	标准充电：7.5 h（参考值）Standard charge：7.5 h（reference） 快速充电：3.5 h（参考值）Rapid charge：3.5 h（reference）
9.	最大充电电流 Max.charge current	750mA
10.	最大持续放电流 Max. Continous discharge current	750mA
11.	放电截至电压 Discharge cut-off voltage	3.0 V
12.	工作温度 Operating temperature	充电Charge：0°C～45°C 放电Discharge：-20°C～60°C
13.	储存温度 Storage temperature	-10°C～45°C
14.	储存湿度 Storage humidity	≤85%RH
15.	电池重量 Cell Weight	约Approx：40g

5.电池性能 Battery Performance

5.1 电性能 Electrical characteristics

序号 NO.	项目 Item	标准 Requirements	测试方法 Test Method
1	常温放电性能 Discharge Characteristics	A）0.2C_5A ≥5h B）0.5C_5A ≥116min C）1C_5A ≥54min	在 1 标准大气压，环境温度 20℃±5℃，相对湿度为 45%～75%的条件下，电池标准充电后（以下若没有特别说明，均在此条件下放置，皆按此充电方式），搁置 30min，分别以 0.2C_5A、1C_5A、进行放电至终止电压，循环三次，当有一次达到标准，即达到标准要求（下同）。 Standard charged under the condition of normal atmospheric pressure and the environmental temperature of 20℃±5℃ and 45%～75%RH, then rest for 30min and discharge at0.2C_5A、1C_5A to the discharge cut-off voltage respectively. Charge/discharge cycle can be conducted for 3 times before meeting the Standards（the same below）
2	常温荷电保持能力 Norm Storage	放电时间≥4.25h Discharge Time≥ 4.25h	电池标准充电后，开路放置 28 天，再以 0.2C_5A 放电至终止电压。 Store for 28 days after standard charged, then discharge at 0.2C_5A to the discharge cut-off voltage.
3	循环寿命 Cycle Life	Cdischarge ≥ 150 times	在 1 标准大气压，环境温度 20℃±5℃，相对湿度为 45%～75%的条件下，电池标准充电后（搁置 30min，分别以 0.5C_5A 进行放电至终止电压放电至标称容量 80%循环次数 Standard charged under the condition of normal atmospheric pressure and the environmental temperature of 20℃±5℃ and 45%～75%RH, then rest for 30min and discharge at0.5C_5A to the discharge cut-off voltage respectively. Nominal capacity get 80% cycle times.
4	出货电压 Cell Voltage	出货状态 As of shipment	3.8V-4.05V

5.2 环境适应性能 **Adaptation to Environment Characteristic**

序NO.	项目 Item	标准 Standard	测试方法 Test Method
1	热循环性能 Thermal Cycle	电池不漏液、不冒烟、不起火、不爆炸 No smoking 、No fire No explosion、No leakge	电池标准充电后，在环境温度为 75±2℃的条件下开路放置 48h，在-20 ℃条件下开路放置 6h，然后在室温条件下开路放置 24h， 1C$_5$A 进行放电至终止电压。 Standard charge the battery, then store it at 75±2℃ for 48h, then -20℃ for 6h and room temperature for 24h.Then discharge at 1C$_5$A to discharge cut-off voltage.
2	恒定湿热性能 Static Humidity	电池不起火、不爆炸 放电时间≥36min Discharge Time ≥36min No explosion No fire	电池标准充电后，置于温度为 40℃±2℃，相对湿度为 90％的恒温恒湿箱中，搁置 48h 后，取出电池 20±5℃环境下搁置 2h。观察电池外观变化。然后以 1C$_5$A 放电至终止电压。 Standard charge. Put the battery into a 40℃±2℃ and 90％ RH chamber for 48h, then get it out and store it for 2h at room temperature. Observe the variation of the battery's appearance and then discharge at 1C$_5$A to discharge cut-off voltage, measuring final capacity.
3	跌落性能 Drop	不起火、不爆炸 放电时间≥51min No fire、No explosion Discharge time ≥ 51min	标准充电后，将电池样品由高度(最低点高度)为 1m 的位置自由跌落到 18～20mm 的硬木板上，要求各面各跌落一次。然后将电池以 1C$_5$A 放电至终止电压，做 1C/1C 循环达到要求停止，充放电循环次数不高于 3 次 Standard charge. Then let it self fall off from a height of 1.0m(the lowest height) to a smooth wooden surface. The self fall off should be conducted from every positive and negative direction. then discharge at 1C$_5$A to discharge cut-off voltage. Conduct 1 C$_5$A /1 C$_5$A cycle for 3 times.
4	不同温度下的放电性能 High-low Temperature Discharge	电池不爆炸、不起火。 No fire\explosion A)55 ℃≥90% B)0 ℃≥80%; C)-10 ℃≥70%	电池标准充电后，在 55±2℃条件下恒温搁置 3h、以 0.2C$_5$A 放电至终止电压，然后在室温条件下标准充电， 依次按照 0±2 ℃/-20±2 ℃的顺序在相应的恒温条件下搁置 20h，以 0.2C$_5$A 放电至终止电压。 Standard charge. Then store for 3h at 60±2℃ and discharge at 0.2C$_5$A to discharge cut-off voltage.

			then standard charge at room temperature and store for 20h according to the order of 0±2 ℃/-10±2 ℃ and discharge at 0.2C_5A measuring corresponding discharge capacity.
5	振动环境 适应性能 Vibration	电池外观无明显损伤、不漏液、不冒烟、不爆炸 No remarkable damage、No smoking No explosion No leakge	电池标准充电后，安装在振动台面上，按下面的振动频率和对应的振幅调整好试验设备,X、Y、Z 三个方向每个方向上从 10Hz～55Hz 循环扫频振动 30min，扫频速率为 1oct/min： A)振动频率：10Hz～30Hz 位移幅值（单振幅）：0.38mm B)振动频率：30Hz～55Hz 位移幅值（单振幅）：0.19mm。 Standard charge. Measure initial status. 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: A)vibration frequency:10Hz～30Hz Displacement breadth (single swing): 0.38mm B) vibration frequency: 30Hz～55Hz Displacemen tbreadth(single swing): 0.19mm。 Measure final status after sweeping and Observe the variation of the battery's appearance.

5.3 安全性能 Safety Performance

序号 NO.	项目 Item	标准 Requirements	测试方法 Test Method
1	过充性能 Overcharge	不爆炸、不起火 No fire、No explosion	电池标准充电后，以 1C_5A 电流充电至 5V,然后转恒压充电至截至电流 0.01C_5A 时终止。 Standard charge. Charge at 1 C_5A to 5V, then change to charge with constant voltage till the current less than or equal to 0.01 C_5A.

2	过放性能 Over Discharge	不起火、不爆炸 No fire、No explosion	电池标准充电后，以 1C$_5$A 进行放电至终止电压，然后用 10Ω的电阻将电池正负极相连，搁置 14 天。 Standard charged. Discharge at 1C$_5$A to discharge cut-off voltage and then connect the positive and negative terminals with a resistor of 10Ω for 14 days.
3	常温短路性能 Short Circuit at Room Temperature	不爆炸、不起火 最高温度<150℃ No fire、No explosion Max. temperature< 150℃	电池标准充电后，置于防爆玻璃罩中直接短路其正负极（线路总电阻<0.1Ω），当电池温度下降到比峰值约低 10 ℃时试验结束。观察电池的温度及外观变化。 Standard charged. Keep the battery into a ventilation cabinet and short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to <0.1Ω). Stop the test when the temperature falls to value 10 ℃ lower than the peak value.
4	高温短路性能 Short Circuit at High Temperature	不冒烟、不爆炸 不起火 最高温度<150℃ No fire、No explosion Max.temperature<150℃	电池标准充电后，置于 60±2℃防爆箱中，放置 3h 后直接短路其正负极（线路总电阻<0.1Ω），试验过程监视电池温度变化，当电池温度下降到比峰值约低 10 ℃时结束试验。观察电池的温度及外观变化。 Standard charged, Keep the battery into a ventilation cabinet of 60±2 ℃ and store for 3h. Short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to <0.1Ω) at this temperature. Supervise the variation of the battery's temperature in the process of the test, stop the test when the temperature falls to value 10 ℃ lower than the peak value.

备注：以上标准中的一些术语的定义：

Commets：The definitions of some nomenclatures of this specification.

（1）标准充电：在环境温度 20℃±5℃的条件下，以 0.5C$_5$A 充电，当电池端电压达到充电限制电压 4.2V 时，改为恒压充电，直到充电电流小于或等于 0.01C$_5$A 后停止充电
standard charge： Charge with current 0.5C$_5$A to limit charge voltage 4.2V under the condition of 20℃±5℃ surrounding temperature, then change to charge with constant voltage till the current less than or equal to 0.01 C$_5$A.

（2） 剩余容量：电池经过特定的检测程序后的首次放电容量。
Residual Capacity: The first discharge capacity after being tested by the specific procedure.

（3） 标准循环：电池 0.5C 标准充电后，搁置 10min，以 0.5C$_5$A 放电至 3.0V
Standard Cycle：After standard charge at 0.5C, rest for 10min, then discharge at 0.5C$_5$A to 3.0V.

（4） 恢复容量：电池经过特定的检测程序后，通过反复充放电使状态恢复后的放电容量。
Recovery Capacity: The discharge capacity by implementing charge-discharge cycle repeatedly after being tested by the specific procedure.

（5） 用于上述测试的电池必须是交货一个月内的电池，除非另有规定。
Test should be conducted with new batteries within one month after shipment from our factory，Unless otherwise defined.

6.外观检查 Visual Inspection

不允许有任何影响电池性能的外观缺陷，如裂纹、裂缝、泄漏等。
There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

7.标准测试环境 Standard environmental test condition

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：
Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:
温 度：20±5℃ Temperature: 20±5℃
湿 度：25-85％RH Humidity: 25-85％RH
大气压：86KPa～106 kPa Atmosphere: 86KPa～106 kPa

8.储存及其它事项 Storage and Others

8.1 长期储存 Long Time Storage
长期储存的电池（超过3个月）须置于干燥、凉爽处。每6个月对电池进行一次充放电，储存电压为3.6～3.9V且储存环境要求如7。
If the cell is stored for a long time(exceed three months)，the cell should be stored in drying and cooling place. The cell should be charged and discharged every six month. The cell's storage voltage should be 3.6~3.9V and the cell is to be stored in a condition as NO.7.

8.2 其它事项 Others
任何本规格书中未提及的事项，须经双方协商确定。
Any matters that this specification does not cover should be consulted between the customer and HUANYU.

9. 保质期及产品责任 Warranty Period& Product Liability

保质期是从出厂日期（喷码）开始起 12 个月
Warranty period of this product is 12 months from manufacturing code.
恒一公司对因没有按本规格书规定操作而导致的意外不负责任，当本规格书有一些变动时，恒一公司会通知购买方。
HENGYI company is not responsible for the troubles caused by mishandling of the battery which is clearly against the instructions in this specification. When HENGYIcompany find any new facts which require modification of this document, we will inform the buyer.

10. 电池使用时警告事项及注意事项 Warnings and Cautions in using the battery

为防止电池可能发生泄漏,发热、爆炸,请注意以下预防措施：
To prevent the possibility of the battery from leaking, heating or explosion please observe the following precautions:

警 告 ！ WARNINGS!

- 使用规定的充电器
- Use the battery charger specifically for that purpose when recharging
- 不要将电池投入火中或加热
- Do not discard the battery in fire or a heater.
- 不要将电池分解拆散
- Do not dismantle the battery
- 严禁将电池浸入海水或水中,保存不用时,应放置于阴凉干燥的环境中.
- Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.
- 禁止将电池在热高温源旁,如火、加热器等使用和留置.
- Do not use or leave the battery near a heat source as fire or heater.
- 充电时请选用锂离子电池专用充电器.
- Please choose lithium-ion battery charger when charging.
- 严禁颠倒正负极使用电池.
- Do not reverse the position and negative terminals.
- 严禁将电池直接插入电源插座.
- Do not connect the battery to an electrical outlet.
- 禁止用金属直接连接电池正负极短路.
- Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.
- 禁止将电池与金属,如发夹、项链等一起运输或贮存.
- Do not transport or store the battery together with metal objects such as hairpins, necklaces, etc.
- 禁止敲击或抛掷、踩踏电池等.
- Do not strike, trample or throw the battery.
- 禁止直接焊接电池和用钉子或其它利器刺穿电池.
- Do not directly solder the battery and pierce the battery with a nail or other sharp objects.

小　　心 ！CAUTIONS!

- 禁止在高温下（炙热的阳光下或很热的汽车中）使用或放置电池,否则可能会引起电池过热、起火或功能失效、寿命减短.

  Do not use or leave the battery at high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- 禁止在强静电和强磁场的地方使用,否则易破坏电池安全保护装置,带来不安全的隐患.

  Do not use the battery in a location where static electricity and magnetic field is great, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- 如果电池发生泄露,电解液进入眼睛,请不要揉擦,应用清水冲洗眼睛,并立即送医治疗,否则会伤害眼睛.

  If the battery leaks, and the electrolyte get into the eyes, do not rub the eyes, instead, rinse the eyes with clean water, and immediately seek medical attention. Otherwise, it may injure eyes.

  如果电池发出异味,发热、变色、变形或使用、贮存、充电过程中出现任何异常,立即将电池从装置或充电器中移离并停用.

  If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.

  如果电极弄脏,使用前应用干布抹净,否则可能会导致接触不良功能失效

  In case the battery terminals are dirty, clean the terminals with a dry cloth before use. Otherwise performance may occur due to the poor connection with the instrument.
- 废弃之电池应用绝缘纸包住电极,以防起火、爆炸。

  Be aware discarded batteries may cause fire or explosion, tape the battery terminals to insulate them.