# 锂离子电芯规格书

# Specification
# For
# Lithium-ion Rechargeable Cell

**电芯型号：IMR18500-1200mAh**

**Cell Type : IMR18500-1200mAh**

| | | | |
|---|---|---|---|
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## 1 Preface 前言

This specification describes the type and size, performance, technical characteristics, warning and caution of the lithium ion rechargeable cell. The specification only applies to IMR18500-1200mAh cell supplied by Henan Hengyi lithium energy technology Co., Ltd

本标准描述了圆柱型锂离子电芯的外型尺寸、特性、技术要求及注意事项。本标准适用于河南恒一锂能科技有限公司生产的圆柱型 IMR18500-1200mAh 锂离子电芯。

## 2 Definition 定义

### 2.1 Rated capacity:

**标称容量：**

Rated capacity: Cap=1200mAh.Under 25±2.5℃, It means the capacity value of being discharged by 5-hours rate to end voltage2.75V, which is signed Cap, the unit is mAh.

标称容量 Cap=1200mAh，指在 25±2.5℃环境下，以 5 小时率放电至终止电压 2.75V 时的容量，以 Cap 表示，单位为毫安培时(mAh)。

### 2.2 Standard charge method:

**标准充电方式：**

Under 25±2.5℃, it can be charged to 4.2V with constant current of 0.5C, and then, charged continuously with constant voltage of 4.2V until the charged current is 0.01C.

指在 25±2.5℃环境下，以 0.5C 的电流恒流充电至单体电芯电压 4.2 V 后，转为恒压 4.2 V 充电，至充电电流小于 0.01C 时，停止充电。

### 2.3 Standard discharge method:

**标准放电方式：**

Under 25±2.5℃, it can be discharged to the voltage of 2.75V with constant current of 0.5C.

指在 25±2.5℃环境下，以 0.5C 的电流恒流放电至单体电芯电压 2.75V。

## 3 Cell type and size 电芯型号及尺寸

### 3.1 Description and model 电芯说明及型号

**Description:** Cylindrical Li-ion rechargeable cell

**Model:** IMR18500-1200mAh

IMR18500-1200 型号的圆柱锂离子二次电芯

### 3.2 Cell bar code and explanation 电芯喷码及说明 (可根据客户要求喷码)

### 3.3 Cell size 电芯尺寸

Cell physical dimension listed in Figure 1(unit: mm).

电芯尺寸示意图如图 1 所示（单位：mm）。

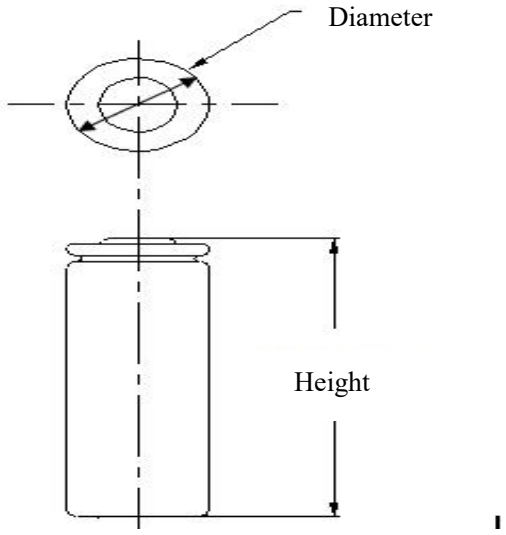



Figure 1/ 图 1

### 4 Cell specification 电芯特性

| ITEM<br>项目 | SPECIFICATION<br>特性 |
|---|---|
| Normal capacity<br>标称容量 | 1200 mAh@0.5C |
| Minimum capacity<br>最小容量 | 1200 mAh@0.5C<br>(Discharge the cell from 4.2V to 2.75V by 0.5C current)<br>(电芯以 0.5C 从 4.2V 放电至 2.75V) |
| Normal voltage<br>标称电压 | 3.7V |
| Charging voltage<br>充电电压 | 4.2 ±0.05 V |
| Discharge ending voltage<br>放电终止电压 | 2.75±0.05 V |
| Standard charging current<br>标准充电电流 | 0.5C |
| Standard discharge current<br>标准放电电流 | 0.5C |
| Max charge current<br>最大充电电流 | 1C |
| Max discharge current<br>最大放电电流 | 5C |

| | |
|---|---|
| Max discharge current<br>最大瞬间放电电流 | 8C |
| Max recommended charge and discharge cell body temperature<br>充放电过程中电芯表面的最大推荐温度 | Charge:0~ 45℃<br>Discharge:-20~ 60℃<br>充电时：0~45℃<br>放电时：-20~60℃ |
| Maximum short term allowable charge and discharge cell body temperature. Charging and discharging at these conditions will shorten cell cycle life.<br>充放电过程中电芯表面的短时间最大温度（在这些情况下充放电将会导致电池循环寿命很快衰减） | Charge: 50℃<br>Discharge: 60℃<br>充电时：50℃<br>放电时：60℃ |
| Humidity range<br>湿度范围 | 0～90％RH(non-condensing 不冷凝) |
| Internal resistance<br>内阻 | ≤30mΩ (AC Impedance, 1000 Hz) |
| Cell dimension<br>电芯尺寸（单位：mm） | Height ： 49.0±0.3（平）、51.2±0.3（尖）<br>Diameter ： 18.3±0.3 |
| Weight<br>重量 | 32±2 g |

## 5 Technical characteristics 技术要求

### 5.1 Cell usage conditions 电芯使用环境

Temperature of charge 充电温度： 0～45℃

Temperature of discharge 放电温度： -20～60℃

### 5.2 Cell testing conditions 电芯试验环境

Unless otherwise specified, all tests stated according to following:

除非有特殊说明，所有测试的环境条件要求如下：

Temperature 温度： 25±2.5℃

### 5.3 Requirement of the testing equipment 测量仪表要求

Voltage meter: The voltage tester internal resistance is ≥ 10 KΩ/V

电压仪表要求：测量电压的仪表内阻不小于 10KΩ/V

Temperature meter: The precision is ≤0.5℃

温度仪表要求：测量温度的仪表精度不低于 0.5℃

**5.4 Electronic performance 电性能**

| NO.<br>序号 | ITEM<br>测试项目 | CRITERION<br>性能标准 | Test Method<br>测试方法 |
|---|---|---|---|
| 5.4.1 | Discharge rate capability<br>倍率放电性能 | Cap(0.5C)/Cap(0.5C)≥100%<br>Cap(1.0C)/Cap(0.5C)≥96%<br>Cap(2.0C)/Cap(0.5C)≥95%<br>Cap(5.0C)/Cap(0.5C)≥90% | 在1标准大气压，环境温度25℃±2.5℃，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0.5C、1.0C、2.0C、5.0C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）。<br>Standard charged under the condition of normal atmospheric pressure and the environmental temperature of 25℃±2.5℃ and 45%～75%RH, then rest for 30min and discharge at0.5C、1.0C、2.0C、5.0Cto the discharge cut-off voltage respectively. Charge/discharge cycle can be conducted for 3 times before meeting the Standards（the same below） |
| 5.4.2 | Cycle life<br>循环寿命 | Cap(500th)/Cap(Avg10)≥80% | 在1标准大气压，环境温度25℃±2.5℃，相对湿度为45%～75%的条件下，电池标准充电后（搁置30min，分别以1.0C进行放电至终止电压放电至标称容量80%循环次数<br>Standard charged under the condition of normal atmospheric pressure and the environmental temperature of 25℃±2.5℃ and 45%～75%RH, then rest for 30min and discharge at 1.0C to the discharge cut-off voltage respectively. Nominal capacity get 80% cycle times. |
| 5.4.3 | High-Low temperature discharge performance<br>高低温放电性能 | Cap(-10℃)/Cap(25℃)≥70%<br>Cap(0℃)/Cap(25℃)≥85%<br>Cap(55℃)/Cap(25℃)≥95% | 电池标准充电后，在55±2.5℃条件下恒温搁置3h、以1C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1C放电至终止电压。<br>Standard charge. Then store for 3h at55±2.5 ℃ and discharge at 1C 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 1C measuring corresponding discharge capacity. |
| 5.4.4 | 常温荷电保持能力<br>Norm Storage | 容量保持率≥90%<br>容量恢复率≥95% | 电池标准充电后，开路放置28天，再以0.5C放电至终止电压。<br>Store for28 days after standard charged, then discharge at 0.5C to the discharge cut-off voltage. |

**5.5 Environmental characteristics 环境适应性能**

| NO.<br>序号 | ITEM<br>测试项目 | CRITERION<br>性能标准 | TESTING METHOD<br>测试条件与方法 |
|---|---|---|---|
| 5.5.1 | 热循环性能<br>Thermal Cycle | 电池不漏液、不冒烟、不起火、不爆炸<br>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 进行放电至终止电压。<br>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 to discharge cut-off voltage. |
| 5.5.2 | 恒定湿热性能<br>Static Humidity | 电池不起火、不爆炸<br>放电时间≥36min<br>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 放电至终止电压。<br>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 to discharge cut-off voltage, measuring final capacity. |
| 5.5.3 | 跌落性能<br>Drop | 不起火、不爆炸<br>放电时间≥51min<br>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 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<br>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 1Cto discharge cut-off voltage. Conduct 1 C/1 C cycle for 3 times. |
| 5.5.4 | 振动环境适应性能<br>Vibration | 电池外观无明显损伤、不漏液、不冒烟、不爆炸<br>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：<br>A)振动频率：10Hz～30Hz<br>位移幅值（单振幅）：0.38mm<br>B)振动频率：30Hz～55Hz<br>位移幅值（单振幅）：0.19mm。<br>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:<br>A)vibration frequency:10Hz～30Hz<br>Displacement breadth (single swing): 0.38mm<br>B) vibration frequency: 30Hz～55Hz<br>C) Displacemen tbreadth(single swing): 0.19mm。<br>Measure final status after sweeping and Observe the variation of the battery's appearance. |

**5.6 Safety characteristics 安全性能**

| NO.<br>序号 | ITEM<br>测试项目 | CRITERION<br>性能标准 | TESTING METHOD<br>测试条件与方法 |
|---|---|---|---|
| 5.6.1 | Overcharge test<br>过充测试 | No leakage、No flame、No fire、No explode<br>电芯不漏液、不冒烟、不起火、不爆炸 | The cell is discharged following the standard discharge method. Apply a 5V power supply and a 3C charge current for 1.5hrs.电芯按照标准放电方式放完电后，采用 3C 电流 5V 电压恒流恒压充电 1.5 小时。 |
| 5.6.2 | 130℃hot oven test<br>130℃热箱测试 | When the temperature of the cell is 130℃. Cell must not fire or explode in 60 minutes<br>电芯表面温度达到 130℃后的 60 分钟内，电芯不起火、不爆炸 | The cell is charged following the standard charge method. After charging the cell is put in the oven. And then the oven temperature will be ramped at 5℃ per minute to 130℃ and held at 130℃. When the temperature of the cell reach 130℃, the cell is maintained in the 130℃ oven for a maximum of 60 minutes or until a fire or explosion is obtained, whichever comes first. Record the time that the cell temperature reaches 130℃ and the time when a fire or explosion occurs.电芯按照标准充电方式充满电后，将电芯放进热箱里，然后将热箱按 5℃/min 升温到 130℃，当电芯的温度也达到 130℃时，电芯在热箱 130℃环境下保持 60 分钟或者电芯起火爆炸为止。记录电芯温度升至 130℃起直到电芯起火或爆炸的时间。 |
| 5.6.3 | Crush test<br>挤压测试 | No fire、No explode<br>电芯不起火、不爆炸 | After charging a cell following the standard charge method, the cell shall be crushed between two flat surfaces. The direction of the crushing force shall be vertical to axis of the cylinder. The crushing force is to be applied by a hydraulic ram with a 32mm diameter piston. Crushing force is approximately 13 KN. Once the maximum pressure has been obtained it is to be released.<br>电芯按照标准充电方式充满电后，放在两个平整的表面进行挤压测试，压力器必须施加一个与圆柱电芯轴向垂直的力，平压于电芯。采用 32 mm 直径的液压活塞，所用压力为 13 KN，一旦达到最大压力值，即释放压力。 |

| | | | |
|---|---|---|---|
| 5.6.4 | Short circuit test<br>短路测试 | No fire、No explode<br>电芯不起火、不爆炸 | Cell shall first be charged according to standard charge method, and then cell is to be short-circuited by connecting the positive and negative terminals of the cell with copper wire having a maximum resistance load of 50mΩ. This test is done at room temperature and at 60℃ (different cells). Monitor the cell temperature while testing. The cell is continuously discharged until the cell case temperature has returned to be 10℃ less then peak temperature.<br>电芯按照标准充电方式充满电后，在室温和 60℃进行短路实验，将接有热电偶的电芯置于通风橱中，用铜线短路其正负极(线路总电阻不大于 50 毫欧)，实验过程中监视电芯温度变化，当电芯温度下降到比峰值低 10℃时，结束实验。 |
| 5.6.5 | Impact test<br>重物冲击测试 | No flame、No fire、No explode<br>电芯不冒烟、不起火、不爆炸 | Cell shall first be charged according to standard charge method，then the battery cell was placed on a flat surface so that the longitudinal axis of the battery cell shall be parallel with it.<br>A 7.9mm diameter bar is to be placed across the center of the sample. A.9.1kg weight is to be dropped from a height of 61cm on the sample.<br>电芯按照标准充电方式充满电后，水平放置于一个与电芯纵轴平行的平板。将一直径Φ7.9mm 的棒放在样品中心，让重量 9.1kg 的重物从 610mm 的高度落到实验电芯上 |
| **Note<br>备注** | All above safety tests will be conducted at 25℃±2.5℃ except where specified differently. Use proper ventilation with protective equipment.<br>除特殊说明，以上所有安全测试均应在 25℃±2.5℃通风橱中，且附带有保护装置的条件下进行。 | | |

## 6 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露，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，保存不用时，应放置在阴凉干燥的环境中。
- Don’t use and leave the cell near a heat source such 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 necklaces, 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 sunlight or a vehicle in extremely hot conditions).
- 禁止在高温下（直热的阳光下或很热的汽车中）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.
- 如果电芯发生泄露，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, generates 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.
- 如果电芯发出异味，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中移开并停用。
- 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。

## 7 Contact information 联系方式

If you have any questions regarding the cell, please contact the following address:

如有疑问，请按以下地址联系：

厂址：河南省平顶山市新华区龙门大道产业园 河南恒一锂能科技有限公司

## 8 The restriction of the use of hazardous substances 有害物质控制要求

This model of lithium-ion cell is in accordance with our company's request of "environmental substances control standard".

本型号锂离子电芯符合本公司“环境物质控制标准”要求！