



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址: 深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21

Cylindrical Li-ion Battery

Specification

电芯规格书

MODEL/型号: CKH 14500-800mAh 3.7V

| Prepared By/Date 编制/日期 | Checked By/Date 审核/日期 | Approved By/Date 批准/日期 |
|---------------------------|--------------------------|---------------------------|
| 陆秋霞 2020/12/21 | 王子灏 2020/12/21 | 刘荣 2020/12/21 |

| | Signature 确认 | Date 日期 |
|------------------|-------------------------|------------|
| Customer | | |
| Approval 客户批准 | Company Name: 公司名称: | |
| | Company Stamp: 客户印章: | |

- 保密文件 ---



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21

Amendment Records

(修正记录)

| Edition (版本) | Description (记述) | Prepared by (编制) | Approved by (批准) | Date (日期) |
|-----------------|---------------------|---------------------|---------------------|--------------|
| A0 | First Publish | 陆秋霞 | 刘荣 | 2020/12/21 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



深圳市达立科技有限公司

Shenzhen Dali Technology Co.,Ltd

VER: A0

地址: 深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609

DATE:

TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

2020/12/21

1 Scope (适用范围)

This specification is applied to the reference battery in this Specification that manufactured by Shenzhen Dali Technology Co.,Ltd.

本说明书适用于本书中所提及的深圳市达立科技有限公司制造的电池。

2 Cell Specification (电池规格)

Table 1 (表 1)

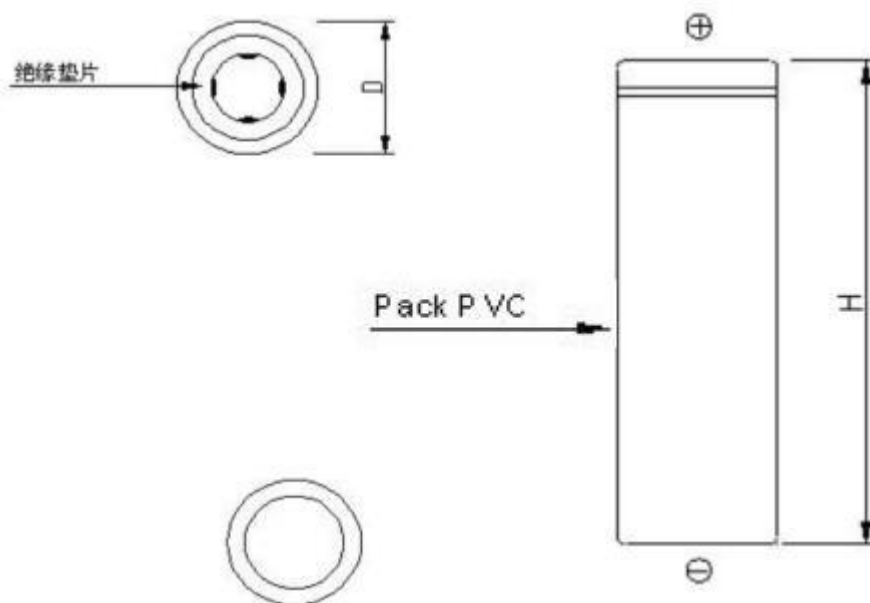
| No. (序号) | Item (项目) | General Parameter (常规参数) | | Remark (备注) |
|-------------|--|-----------------------------|--------|--|
| 1 | Typical Capacity (标称容量) | 800mAh | | 0.2C Standard discharge 0.2C 标准放电 |
| | Minimum Capacity (最小容量) | 760mAh | | |
| 2 | Nominal Voltage (标称电压) | 3.7V | | Mean Operation Voltage (即工作电压) |
| 3 | Charging limit voltage (充电限制电压) | 4.2V | | Under standard charge method 标准充电方式 |
| 4 | Discharge cut-off voltage (放电截止电压) | 3.0V | | Standard discharge mode 标准放电方式 |
| 5 | Delivery Voltage (交货电压) | $\geq 3.85V$ | | Within 10days after delivery 出厂 10 天内 |
| 6 | Standard charging current (标准充电电流) | 0.2C | 160mA | Standard charge about 6h(Ref) 标准充电, 时间约 6h (供参考) |
| | Quick charge current (快速充电电流) | 0.5C | 400mA | Rapid charge about 3h(Ref) 快速充电, 时间约 3h (供参考) |
| | Maximum Continuous Charge Current (最大充电持续电流) | 1.0C | 800mA | Under constant charging mod 连续充电模式 |
| 7 | Standard discharge current 标准放电电流 | 0.2C | 160mA | Under constant discharging mod 连续放电模式 |
| | Maximum Continuous Discharge Current (最大放电持续电流) | 3.0C | 2400mA | For continuous discharge mod,Initial discharge capacity in the standard of charge capacity of more than 90% 连续放电模式 (放电容量在标准放电容量的 90%以上) |
| 8 | Internal Impedance (内阻) | $< 80m\Omega$ | | Measure internal resistance at AC 1KHz after 50% charge 半电态下用交流法测量内阻 |

| | | |
|--|--|------------------|
|  | 深圳市达立科技有限公司 Shenzhen Dali Technology Co.,Ltd | VER: A0 |
| | 地址: 深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609 TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266 | DATE: 2020/12/21 |

Continuous the table 1 (续表 1)

| No. (序号) | Item (项目) | General Parameter (常规参数) | | Remark (备注) |
|----------|---|--------------------------|------------------------|--|
| 9 | Operation Temperature & humidity Range (工作温度和湿度范围) | Charge (充电): | 0~40°C 60±25%R.H. | Charge at a very low temperature such as below 0°C, battery life will be influenced 低温充电效率会下降, 会影响电池使用寿命。 |
| | | Discharge (放电) | -10~40°C 60±25%R.H. | |
| 10 | Storage Temperature Range for a long time (长时间储存温度范围) | ≤6 个月 (≤six months) | | 25°C ± 5°C 60±25%R.H. |
| | | ≤3 个月 (≤three months) | | 25°C ± 5°C 60±25%R.H. |
| | | ≤1 个月 (≤one months) | | 25°C ± 5°C 60±25%R.H. |

3 Cell Dimensions(电芯初始尺寸)



D: 14.2 ± 0.3mm

H: 49.5 ± 0.5mm



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE: 2020/12/21

4 Battery/Cell performance test Criteria 电池性能标准**4.1 Appearance inspection by visual 外观目测**

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery. 电池外观应没有划伤、破裂、污渍、生锈、漏液等影响市场价值的缺陷存在。

4.2 Environment test conditions 外界测试条件

Unless otherwise specified, test and measurement shall be done under temperature of 20-25°C and relative humidity of 60%±25%. 除非特别说明，否则测试会在温度 20-25°C，相对湿度 60%±25%的条件下进行。

4.3 Cell Electrical characteristics 电气特性

| No. (序号) | Item (项目) | Criteria (标准) | Test Conditions (测试条件) |
|-------------|------------------------------|----------------------|--|
| 1 | Cycle Life (循环寿命) | ≥ 500 times (次) | <p>Constant current 0.2C charge to 4.2V, then constant voltage charge to current declines to 0.01C, rest 0.5h~1h, constant current 0.2C discharge to 3.0V, rest 0.5h~1h. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells.</p> <p>先用 0.2 C 恒流充电至 4.2V, 再恒压 4.2V 充电直至充电电流 $\leq 0.01C$, 搁置 0.5h~1h, 再用 0.2C 电流放电至 3.0V; 又搁置 0.5h~1h, 重复以上步骤, 直到放电容量是初始容量的 80%。</p> |
| 3 | Capacity retention (容量保持) | $\geq 85\%$ | <p>Standard charge battery under temperature 20C° ± 5C°, then store battery at 20C° ± 5C° condition for 28 days. After 28 days, the battery shall be discharged to the termination voltage at 20C° ± 5C° for at least 4.25h.</p> <p>将电池在 20C° ± 5C° 环境中标准充电后储存在 20C° ± 5C° 的环境中 28 天。28 天后, 测试电池在 20C° ± 5C° 环境下 0.2C 放电到</p> |



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21

| No. (序号) | Item (项目) | Criteria (标准) | Test Conditions (测试条件) |
|-------------|--|---|---|
| 3 | Temperature Dependence of discharge capacity (放电温度特性) | Capacity after discharge should be not less than following Table3's requirement. 放电容量应不小于表 3 的要求 | Cells shall be charged per 3.3.1 and discharged @0.2 C5A to 3.0 volts. Except to be discharged at temperatures per Table 3. Cells shall be stored for 3 hours at the test temperature prior to discharging and then shall be discharged at the test temperature. The capacity of a cell at each temperature shall be compared to the capacity achieved at 23 °C and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3. 电池按 3.3.1 规定充电。按表 3 的温度中放 电，电池必须先在该试验温度中放置 3 个小 时。在每一个温度中的放电容量应不小于表3 的要求。 |

Table 3 (表 3)

4.4 Cell Electrical characteristics 电气特性

| | | | | | |
|---|------|------|------|-------|------|
| Discharge Temperature (放电温度) | -20℃ | -10℃ | 0℃ | 25℃ | 60℃ |
| Discharge Capacity(0.2C5A) (放电容量/0.2C5A) | >50% | >60% | >85% | >100% | >60% |

| No. (序号) | Items (项目) | Test Method and Condition (测试方法及条件) | Criteria (标准) |
|-------------|--------------------------|--|--|
| 1 | Vibration Test (振动测试) | After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 将标准充电后的电芯固定在振动台上, 沿 X、Y、Z 三个方向各振动 30 分钟, 振幅 1.6mm, 振动频率为 10Hz~55Hz, 每分钟变化 1Hz。 | No leakage 无泄漏 No fire 不起火 No explosion 不爆炸 |
| 2 | Drop Test 跌落测试 | The cell is to be dropped from a height of 1 meter twice onto concrete ground. 将标准充电后的电芯从 1 米高度跌落至混凝土地面 2 | No explosion, No fire, no leakage. 不爆炸、不起火、不泄漏 |



深圳市达立科技有限公司

Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609

TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:

2020/12/21

4.5 safety performance (安全性能)

| Item (项目) | Test Method (测试方法) | Requirements (要求) |
|--|--|--|
| Short Circuit tet (短路试验 25±5℃) | In the environment of 20℃ ± 5℃, place the battery connected with thermocouple (the contact of thermocouple is fixed at the center of the large surface of the battery) in the fume hood, short-circuit its positive and negative poles, short-circuit wire resistance 80m Ω ± 20 m Ω, when one of the following two situations occurs, the test is terminated: (a) the battery temperature drops to 20% lower than the peak value; (b) the short-circuit time reaches 24h. 在20℃ ± 5℃环境中，将接有热电偶的电池(热电偶的触点固定在电池大表面的中心部位)置于通风橱中，短路其正负极，短路导线电阻 80m Ω ± 20 m Ω，当出现以下两种情形之一时，试验终止：(a)电池温度下降到比峰值低 20%；(b)短接时间达到 24h。 | No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃ (无起火无爆炸电池表面温度应低于 150℃) |
| Short Circuit test (短路试验 55±5℃) | In the environment of 55℃ ± 5℃, place the battery connected with thermocouple (the contact of thermocouple is fixed at the center of the large surface of the battery) in the fume hood, short-circuit its positive and negative poles, short-circuit wire resistance 80m Ω ± 20 m Ω, when one of the following two situations occurs, the test is terminated: (a) the battery temperature drops to 20% lower than the peak value; (b) the short-circuit time reaches 24h. 在55℃ ± 5℃环境中，将接有热电偶的电池(热电偶的触点固定在电池大表面的中心部位)置于通风橱中，短路其正负极，短路导线电阻 80m Ω ± 20 m Ω，当出现以下两种情形之一时，试验终止：(a)电池温度下降到比峰值低 20%；(b)短接时间达到 24h。 | No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃ (无起火无爆炸, 电池表面温度应低于 150℃) |
| Thermal exposure test (热冲击试验) | stabilized at room temperature, is placed in a circulating air-convection oven. The oven temperature is raised at a rate of 5℃/min ± 2℃/min to a temperature of 130℃, the cell remains at this temperature for 30 min before the test is discontinued. 电池放置于循环空气烘箱里，温度以(5℃ ± 2℃)/分的速率升温至 130℃ ± 2℃并保温 30 分钟，试验结束。 | No explosion, No fire (无起火无爆炸) |



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609

DATE:

TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

2020/12/21

| | | |
|---|---|---|
| <p>Forced Discharge test (过放试验)</p> | <p>In the environment of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the battery is discharged to the termination voltage with a current of 0.2C, and then the battery is charged in reverse with a current of 1C. The charging time is required to be no less than 60 minutes. 在$20^{\circ}\text{C} \pm 5^{\circ}\text{C}$环境中, 电池以 0.2C 的电流进行放电到终止电压, 然后以 1C 的电流对电池进行反向充电, 要求充电时间不低于 60 分钟。</p> | <p>No explosion, No fire (无起火无爆炸)</p> |
| <p>Forced charge test (过充试验)</p> | <p>The battery is discharged at 0.2C to the termination voltage, then the battery is placed in the fume hood, the positive and negative poles of the battery are connected with the power supply, the current is adjusted to 3C, and the charging voltage is not less than 4.6V, until the battery voltage reaches the maximum value, any of the following two conditions can be met, namely: (a) the battery continues to charge for 7h; and (b) the battery temperature drops to 20% lower than the peak value. 电池以 0.2C 进行放电至终止电压, 然后将电池置于通风橱中, 连接电池正负极与电源, 调节电流至 3C, 充电电压不低于 4.6V, 直至电池电压达到最大值后, 满足以下两种情况任何一种即可停止: (a) 电池持续充电时间达到 7h; (b) 电池温度下降到峰值低 20%。</p> | <p>No explosion, No fire (无起火无爆炸)</p> |
| <p>Discharge at high temperature 高温放电</p> | <p>After standard charging of the battery, put the battery into a high-temperature box of $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 2 hours at a constant temperature, and then discharge it to the termination voltage with a current of 0.2C. The discharge time shall not be less than 5 hours. 电池标准充电后, 将电池放入 $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的高温箱中恒温 2h, 然后以 0.2C 电流放电至终止电压, 放电时间应不低于 5h。</p> | <p>$\geq 300\text{min}$</p> |
| <p>Discharge at low temperature 低温放电</p> | <p>After standard charging of the battery, put the battery into a low-temperature box at $-10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 4 hours at constant temperature, and discharge it to the termination voltage with a current of 0.2C. The discharge time shall not be less than 3 hours. 电池标准充电后, 将电池放入 $-10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的低温箱中恒温 4h 后, 以 0.2C 电流放电至终止电压, 放电时间应不低于 3h。</p> | <p>$\geq 180\text{min}$</p> |



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21**5 CAUTIONS IN USE(谨慎使用)**

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

(为确保正确使用电池，使用前请仔细阅读本细则)

5.1 Handling (电池操作)

- Do not expose to, dispose of the battery in fire. (不要靠近和放置电池于火中)
- Do not put the battery in a charger or equipment with wrong terminals connected.
(在充电器或设备仪器中不要把电池接错电极)
- Avoid shorting the battery (避免电池短路)
- Avoid excessive physical shock or vibration. (避免电池过多的物理撞击和震动)
- Do not disassemble or deform the battery. (不要解剖和使电池变形)
- Do not immerse in water. (不要把电池浸泡在水中)
- Do not use the battery mixed with other different make, type, or model batteries.
(不要和其它不同类型的电池混和使用)
- Keep out of the reach of children. (放置电池于儿童不易接触的地方)

5.2 charge and discharge (充电和放电)

- Battery must be charged in appropriate charger only.
(电池必须用适当的充电器充电)
- Never use a modified or damaged charger. (不要使用改装或损坏的充电器)
- Do not leave battery in charger over 24 hours.
(不要把电池放置于充电器超过 24h)

5.3 storage(储存)

- Store the battery in a cool, dry and well-ventilated area.
(应把电池置于凉爽、干燥及通风良好的区域)

5.4 disposal (电池处理)

- Regulations vary for different countries. Dispose of in accordance with local regulations. (电池处理要符合当地的规定)

5.5 Battery operation instruction (电池工作指南)**5.5.1 Charging (充电)**

Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.
(充电电流：不能超过规格书上规定的最大充电电流)

Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

(充电电压：不能超过规格书上规定的最大充电电压)

Charge temperature : The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

(充电温度：电池充电必须在规格书规定环境温度范围内)

Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery. (使用持续电流和电压方式进行充电，禁止反向充电，否则会损害电池)



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21**5.5.2 Discharging current (放电电流)**

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat. (不要超过本规格书上规定的最大放电电流，太大的电流放电会导致容量变小及使电池发热)

5.5.3 Electric discharge temperature (放电温度)

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated. (电池放电必须在本规格书规定的环境温度范围)

5.5.4 Over-discharges (过放电)

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

(在短时间过放电后立即充电不会影响电池的使用，但如果是长时间过放电会导致电池性能及电池功能丧失。电池长时间不使用，可能会有因它本身自动产生的电弧特性而必然的过放电情形，为防止电池过放电，电池应该保持一定的电量)

5.5.5 Storing the Batteries (储存电池)

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery. (电池应该储存在本产品规格书中规定温度范围。如果储存时间超过六个月，建议对电池进行额外充电。)

6 Period of Warranty (保质期)

The period of warranty is a year from the date of shipment. CKH guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customers abuse and misuse.

(保质期从出货之日起一年。如果是制造过程的缺陷而不是用户错用滥用造成的，本公司确保更换)

7 Storage of the Batteries (电池的存放)

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity of capacity. We recommend that batteries be charged about once per half a year to prevent over discharge.

(电池当在室温下存放，应充电到 30%至 50%的电量。如长时间储存，建议每半年需充一次电以防止过放电)

8 Other The Chemical Reaction (其它的化学反应)

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

(电池是利用化学反应产生电量，电池性能会随时间变差，即使电池长时间储存而不使用。另外，各种各样的使用方法，



深圳市达立科技有限公司
Shenzhen Dali Technology Co.,Ltd

VER: A0

地址：深圳市宝安区西乡大道宝源华丰总部经济大厦A座1608-1609
 TEL: 86 (0) 0755-23022966 FAX: 86 (0) 0755-85253266

DATE:
2020/12/21

像充电、放电及环境温度，等等不能在本规格书规定的范围时的情形，会减小电池的期望寿命，或者会使仪器设备由于电 池漏液而损坏。即使充电正确，电池长时间不能再充电，那就要更换电池了。)

9 Note: Any other items which are not covered in this specification shall be agreed by both parties.

(注意：任何本产品规格书未包含的其它条款，应由双方协议确定。)