



产品规格书 Product Specification

To: 客户 : _____
 Customer: _____

承认书

SPECIFICATION FOR APPROVAL

客户品名/料号 Customername /material number		
产品名称 Product Name:	<u>锂离子电池</u> <u>Lithium-ion Battery</u>	
型号 Model :	<u>LDA78200</u>	
规格 Specification :	<u>3.6V 140mAh</u>	
制造商 Manufacturer:	<u>广东利得安新能源有限公司</u> <u>GUANGDONG LDA POWER CO., LTD.</u>	
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编制 Editor	审核 Checked by	批准 Approver

客户签署 Customer Approval:

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广东利得安新能源有限公司
 GUANGDONG LDA POWER CO., LTD
 东莞市电的电子有限公司
 DONGGUAN LIDEA ELECTRONICS CO., LTD

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文件修订履历表

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A0	初版发行 New version	2023-8-16		

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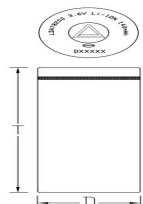
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1 范围 SCOPE

规格书适用于本公司生产的 3.6V 锂离子电池 LDA78200，需严格按照本规格书指定的方法进行测试。如对测试项目或测试方法有异议，请与广东利得安新能源有限公司协调解决。

The purpose of this product specification is to provide technical information for the rechargeable Lithium-ion battery LDA78200. The test shall be conducted in strict accordance with the method specified in this specification. If you have any objection to the test items or test methods, please contact guangdong LDA power co., LTD.

2 电芯规格 CELL SPECIFICATION

品名 Description	Rechargeable lithium-ion button battery	外形尺寸 Dimension 
型号 Model	LDA78200	
直径 Diameter	7.8 \pm _{0.1} ^{0.1} mm	
厚度 Thickness	20.0 \pm _{0.1} ^{0.1} mm	
重量 Weight	3.5 \pm 0.2 g	
标识 Mark	负极面标注：品名、品牌、型号、标称电压、负极符号等 Positive surface label: lname, brand, model, voltage, +,	

3 技术参数 PERFORMANCES DATA

项目 ITEM	参数值 PARAMETER	备注 REMARK
典型容量 Nominal capacity	140 mAh	以 0.2CmA 放电至 3.0V Discharging by 0.2CmA Cut-off voltage 3.0V
最小容量 Minimum capacity	135 mAh	
标称电压 Nominal voltage	3.6V	
出货电压 Delivery voltage	3.85~4.0V	
电芯内阻 Cell Internal impedance	≤450 mΩ	满充状态下 At full charge
标准放电电流 Standard discharging current	0.2C mA	放电温度 -20℃—60℃
最大放电电流 Max discharging current	1C mA	放电温度 15℃—60℃
放电截止电压 Cut-off discharge voltage	3.0V	
标准充电电流 Charging current	0.2C mA	充电温度 0℃≤T<45℃
常规充电电流 Normal charging current	1CmA	充电温度 10℃≤T<45℃
标准充电电压 Nominal charging voltage	4.2V	
最大充电电压 Max charging voltage	4.25V	
充电时间 Charging time	标准充电约 5 小时	Standard charging About 5.0hours
最快充电时间 Fast charging time	1CmA 充电约 1.5 小时	Charging with 1CmA About 1.5 hours
工作温度 Working temperature	充电 charging	0~+45℃
	放电 discharging	-20~+60℃
储存温度 Storage temperature	20±5℃	3 个月内 3 month
循环寿命 Cycle life	≥500 次	参照 4.5.3 Refer to 4.5.3
自放电率 Self-discharge rate	每月 <5% Less than 5% per month	20±5℃

4 性能测试 PERFORMANCE TEST



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4.1 标准测试条件 Standard Test condition

测试电池必须是本公司出厂时间不超过一个月的新电池，且电池未进行过五次以上充放电循环。除非其它特殊要求，本产品规格书规定的测试条件为：温度 $25 \pm 2^\circ\text{C}$ ，相对湿度 45%~85%。

The samples for test are fresh batteries (within one month ex-factory, cycles less than 5 times.)

Unless otherwise stated, the test should be conducted under temperature $25 \pm 2^\circ\text{C}$, humidity 45%~85%.

4.2 测试设备 Testing equipment

仪器 Instrument	标准要求 Standard Requirements
测试尺寸仪器 Instrument to measure dimension	精度: $\geq 0.02\text{mm}$ Precision: $\geq 0.02\text{mm}$
万用表 multimeter 伏特计 Voltmeter	精度: ≥ 0.5 级 内阻: $< 10\text{k}\Omega/\text{V}$ Precision: ≥ 0.5 grade Internal impedance: $< 10\text{k}\Omega/\text{V}$
安培计 Ammeter	安培计和电线内阻 $< 0.01\Omega$ Impedance of ammeter and wires $< 0.01\Omega$
内阻测试仪 Internal resistance meter	Impedance is measured by sinusoidal 1kHz AC current 内阻测试用 1kHz 正弦交流电流
温度计 Thermometer	精度: $\geq \pm 0.5^\circ\text{C}$ Precision: $\geq \pm 0.5^\circ\text{C}$

4.3 标准充放电 Standard charging /discharging

标准充电：在环境温度为 $25 \pm 2^\circ\text{C}$ 条件下以 0.2CmA 电流恒流充电到 4.2V，然后转恒压充电，直到充电电流小于或等于 0.02CmA，停止充电。

Under temperature $25 \pm 2^\circ\text{C}$,Charging with constant current 0.2C mA to 4.2V,then charging with constant voltage 4.2V until the charging current drops to 0.02CmA.

标准放电：在温度为 $25 \pm 2^\circ\text{C}$ 条件下以 0.2CmA 电流放电至 3.0V。

Under temperature $25 \pm 2^\circ\text{C}$,discharge with constant current 0.2CmA to cut-off voltage 3.0V.

充电和放电之间均需间隔 10 分钟。

10 minutes between charging and discharging

4.4 初始性能测试 Initial performance test

项目 item	测试方法 Testing method	标准 Standard
开路电压 OCV	标准充电后，24 小时内测量电池开路电压。 After standard charging, measure the OCV within 24hours	$\geq 4.10\text{V}$
内阻 Impedance	标准充电后，采用内阻测试仪测量内阻.After standard charging, measure the impedance with Internal resistance tester	$\leq 450\text{m}\Omega$
容量 Capacity	标准充电后，采用 0.2CmA 放电至 3.0V 的容量。After standard charging, measure the capacity by discharging (with 0.2C mA) the battery to 3.0V	$C \geq 135\text{mAh}$

4.5 电性能测试 Electronical Proformance Test

4.5.1 放电温度特性 Discharge temperature characteristics

电池在 $25 \pm 2^\circ\text{C}$ 标准充电，然后在 30 分钟内冷却或加热到测试温度。放电前电池在此温度下保持 1 小时，

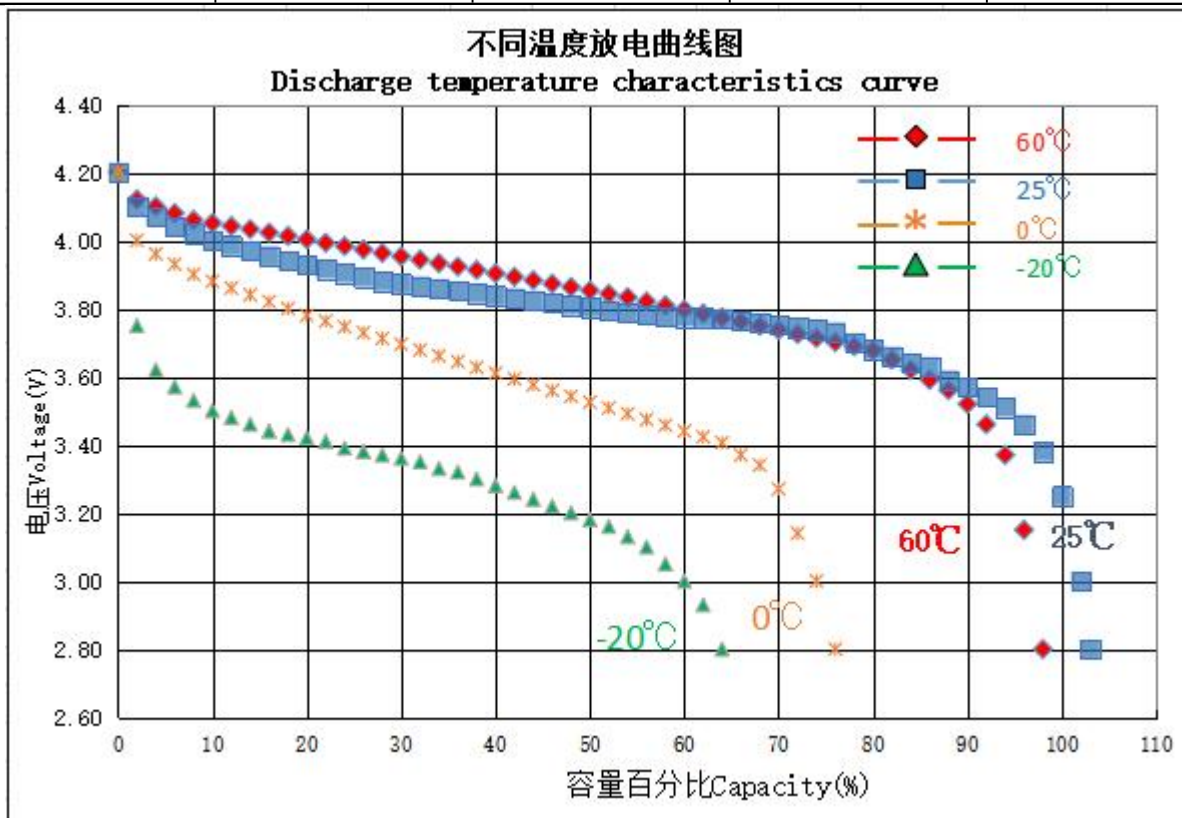


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恒流放电到截止电压 3.0V, 放电电流为 0.2CmA, 做完一个温度实验后, 电池在室温下放置 2h 然后进行充电 ($25\pm 2^\circ\text{C}$), 要求如下:

After standard charging, heat or cool the battery to the set temperature below within 30 minutes, keep the battery under the set temperature by one hour, then discharge the battery with constant 0.2CmA to 3.0V. Standing time 2hours should be kept before standard charging, and then next test can be conducted, As follows:

放电温度 Temperature	-20°C(0.2CmA)	0°C(0.2CmA)	25°C(0.2CmA)	60°C(0.2CmA)
放电容量 capacity	>60%	>70%	100%	>95%



4.5.2 倍率放电性能 Rate Discharge Characteristics

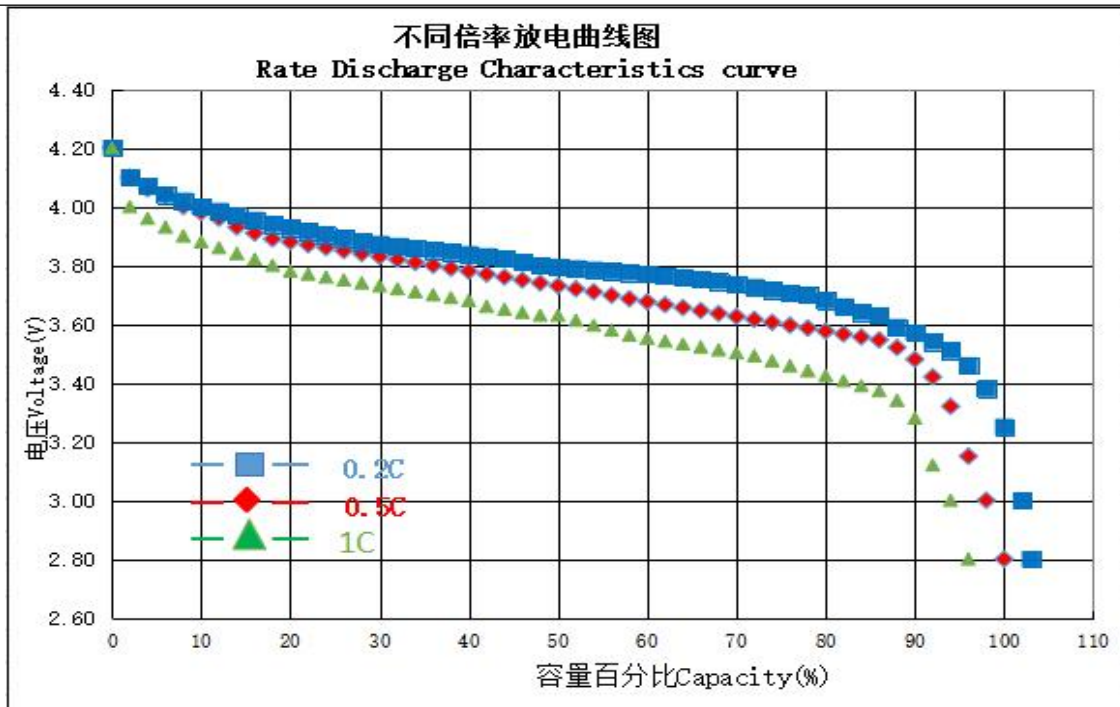
电池在 $25\pm 2^\circ\text{C}$ 标准充电后, 搁置 10min, 分别以 0.2CmA、0.5CmA、1.0CmA 放电至 3.0V, 搁置 10min, 测试电池的容量。

After standard charging and 10minutes standing by, discharge the battery with constant 0.2C mA、0.5C mA、1.0CmA to cut-off 3.0 V. Then 10minutes standing by, Test battery capacity:

放电倍率 Discharge Rate	0.2C	0.5C	1.0C
容量比例 Capacity	100%	95%	>90%



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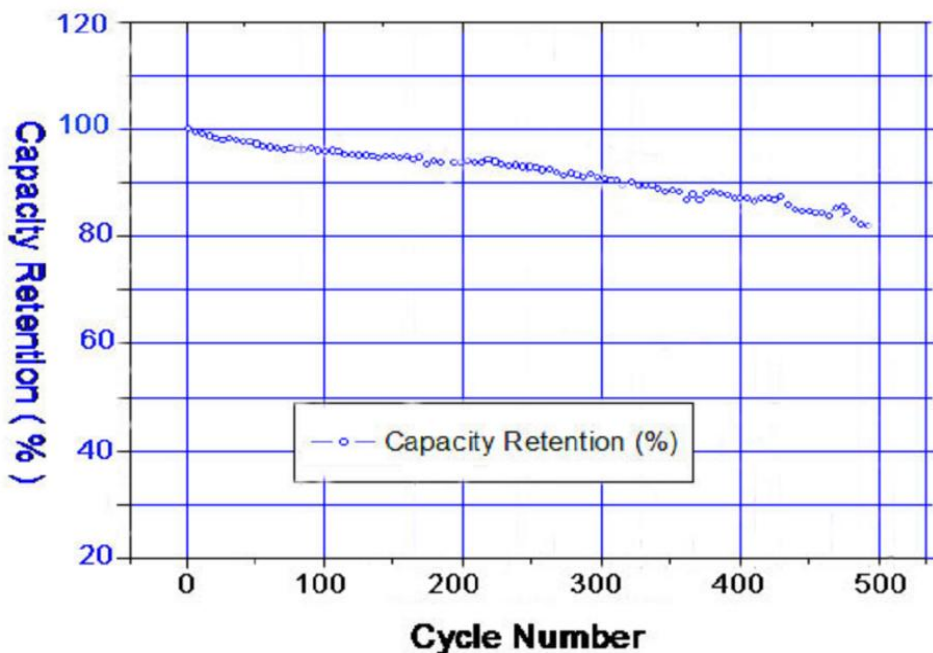
4.5.3 循环寿命 Cycle life

标准充电后，搁置 10min，0.2CmA 放电至 3.0V，搁置 10min，重复上述步骤进行循环，直至电池放电容量连续 3 次 ≤ 80% 第 3 周的放电容量，测试温度 25±2℃（影响电池循环性能的重要参数），要求如下：

循环次数 ≥ 500 次

After standard charging and 10minutes standing by, discharge the battery with constant 0.2C mA to cut-off 3.0V and then another 10minutes standing by. Repeat above cycle until continuous 3times discharged capacity lower than 80% of nominal capacity, counter the cycles (*the test should be conducted under temperature 25±2℃, humidity 45%~85%.)

LIFE CYCLES ≥ 500



4.5.4 储存性能 Storage Characteristics



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项目 ITEM	测试方法 TESTING METHOD	要求 STANDARD
常温储存 STORAGE CHARACTERISTICS AT ROOM TEMP	1 标准充电后, 电池在 25±2℃ 的环境中贮存 30 天, 测试 0.2CmA 放电容量 (保持容量) Test the remained capacity discharging with 0.2C mA after standard charging and 30days storage(Standard environment).	剩余容量 Remained capacity≥95%
	2 在上述放电之后, 标准充电, 0.2CmA 恒流放电循环 3 次, 测试恢复容量 (3 周循环的最大放电容量) After above test, repeat with standard charging /discharging 3times, take the highest discharged capacity value as restored capacity.	恢复容量 Restored capacity≥98%
高温储存 STORAGE CHARACTERISTICS AT HIGH TEMP	1 标准充电后电池在 60±2℃ 的环境中贮存 7 天, 测试 0.2CmA 放电容量 (保持容量) Test the remained capacity with 0.2C mA after standard charging and 7days' storage at 60±2℃ environment.	剩余容量 Remained capacity≥80%
	2 在上述放电之后, 标准充电, 0.2CmA 恒流放电循环 3 次, 测试恢复容量 (3 周循环的最大放电容量) After above test, repeat with standard charging /discharging 3times, take the highest discharged capacity value as restored capacity.	恢复容量 Restored capacity≥97%

4.6 安全性能 SAFTY CHARACTERISTICS

项目 ITEM	测试方法 TEST METHOD	要求 STANDARD
短路 External Short Circuit	标准充电后, 将接有热电偶的电池置于通风橱中, 短路其正负极 (线路总电阻不大于 80mΩ), 试验过程中监视电池温度变化, 当电池温度下降到比峰值低约 10℃ 时, 结束试验。 After standard charging, put the battery samples (connected with thermopair) into ventilating cabinet, short-circuit the samples with wire (less than 100mΩ), when the temperature drops by 10℃ from the peak, conclude the test.	电池不起火、不爆炸, 外部温度不得高于 150℃ (极耳熔断属正常现象) No fire, No explosion, External temperature no exceed 150℃
热冲击 Thermal	标准充电, 搁置 24h, 然后将电池放于热箱中, 热箱温度以 (5±2℃) /min 的速率升至 100±2℃ 并保温 30min After standard charging and 24hours standing by, put the samples into temperature circulation oven, set the oven temperature raised (by rate 5±2℃/min) to 100±2℃, then remain 30minutes.	电池不起火、不爆炸 No fire, no explosion
过充电 Force charge	标准充电后, 将接有热电偶的电池置于通风橱中, 连接恒流恒压源, 电压调节为 4.6V, 电流为 3CmA, 然后对电池以 3CmA 充电, 试验过程中监视电池温度变化, 当电池温度下降到比峰值低约 10℃ 时, 结束实验。测试过程中并不要求电流一直保持 3CmA。 After standard charging, put the battery samples (connected with thermopair) into ventilating cabinet, connect the battery with 4.6V/3CmA power supply, monitor the temperature change, when the temperature drop 10℃ from the peak, conclude the test .	电池不起火、不爆炸 No fire, no explosion



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<p>自由跌落 Drop</p>	<p>电池标准充电后，按下列条件进行自由跌落试验： 跌落高度：1.2m； 承接物：18~20mm 厚硬木板； 跌落方向：沿 X、Y、Z 三个方向各跌落 3 次。 After standard charging, drop the battery samples from height: 1.2m; floor: 18~20mm thickness solid wood board; Drops : X、Y、Z axes each 3times</p>	<p>不起火、不爆炸 No fire, no explosion</p>
<p>高温高湿 High temperature, high humidity</p>	<p>标准充电后，将电池置于温度为 60℃和湿度为 90%的恒温恒湿箱中，搁置 7 天。 After standard charging, keep the battery samples in oven with ambient temperature 60℃,humidity90% for 7days</p>	<p>电池无泄漏 No leakage</p>

5 认证证书 CERTIFICATES

序号 ITEM	证书名 CERTIFICATES NAME	备注 REMARK
1	UN38.3	
2	IEC62133 报告	
3	ROHS	
4	REACH	
5	电池指令	
6	CCC	
7		
8		
9		
10		

6 电池使用指南 HANDLING PRECAUTIONS AND GUIDELINES

认真阅读下面的注意事项，确保正确使用锂离子电池。本公司对违反下述注意事项而产生的任何问题不予负责。

Carefully read the following handling precautions and guidelines before the usage of battery. LDA take no responsibility for any accidents when the battery is used under other conditions than those described in this documents.

1. 勿将电池投入火中或给电池加热；在高温或有热源（如发热器或热季的车内等）环境使用或贮存电池有



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可能导致电池起火或爆炸；

Do not drop the battery into fire or heat the battery. Do not put the battery under extremely high temperature, such as near heater or in the car at summer. Or else. The battery may get fire or explosion.

2. 禁止将电池投入水中或将其弄湿；在潮湿环境下长期存放或使用电池会严重影响电池的使用性能；

Do not drop the battery into water, keep the battery surface dry. Storage or use of batteries in humid environment will seriously affect the battery performance.

3. 禁止撞击、挤压、坠落电池或者使电池受到机械震动； Do not shock ,crush,drop,vibrate the battery;

4. 禁止用钉子或其它尖锐物体刺穿电池壳体； Do not puncture the battery ;

5. 禁止以任何方式分解电池； Do not disassemble the battery;

6. 禁止用导线或其它金属物体将电池正负极短路，禁止将电池与项链、发夹或其它金属物体一起运输或贮存；

Do not short circuit the battery with wires or other metal materials. Do not store or transport the battery together with necklace, key, or other metal materials. Or else. The battery may get fire or explosion.

7. 勿将电池正负极接反； Do not reverse the battery positive and negative terminals.

8. 禁止直接在电池表面焊接端子、引线等； Do not solder directly onto battery surface;

9. 禁止与不同容量、型号、品种电池组合使用；

Do not to be combined use batteries of different capacities, models and varieties together.

10. 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用； Stop using the battery if the battery Out peculiar smell, get hot, deformed or other abnormal situation occurs. And remove immediately from electrical appliances

11. 电池应放在小孩接触不到的地方，如果小孩不小心吞咽电池，应立即寻求医疗救助；

Keep the battery away from children .if swallow, see doctor immediately

12. 如果电池漏液后电解液接触皮肤或进入眼睛，不要擦，应用清水冲洗，并立即寻求医疗救助。如不及时处理，眼睛将会受到伤害。

If the skin or eyes get contact with the electrolyte, wash with sufficient water and see doctor immediately.。

13. 如果设备长期不用，将电池取出并放置在凉爽、干燥的地方，否则，电池可能生锈或性能变差。

Remove the battery from applications if the application is not in use for long time.

7 储存及质保 ATORAGE AND QUALITY ASSURANCE

7.1 电池长期存放环境：温度 $20\pm 5^{\circ}\text{C}$ ，相对湿度 45%~85%。

Long term storage environment of battery: temperature $20 \pm 5^{\circ}\text{C}$, relative humidity 45% ~ 85%

7.2 如果长期不使用，电池每 3 个月按标准充电流程充电一次，保持电压在 3.55~3.95V 之间。

If not used for a long time , Require to charge battery every 3months using standard charge process. Keep the voltage between 3.55 and 3.95V.

7.3 本公司承诺出厂电池工艺性能良好，保质期为出厂后 12 个月。

LDA warrants the battery to be free of defectives in material and workmanship. The warranty time is 12 months from the date of delivery from LIDEA factory.

8 规格书的修订及其他 REVSING OF THE SPEC SHEET AND OTHER

8.1 任何本规格书没有包括的事项，需经双方协商确定。

Any other items are not covered in the specification shall be agreed by both parties.

8.2 本公司有权对本产品规格书进行修订，不再另行通知客户。

LDA remains the right to revising the spec sheet. No further notice will be given to the customer.

8.3 LDA 保留最终解释权。请严格按照规范使用电池。LDA 不对任何不当操作负责。

LDA reserves the right of final interpretation. Please use the battery in strict accordance with the specifications. LDA will not be responsible for any improper operation.