

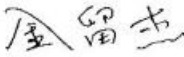
Approval Sheet
USB 充电 AA 锂离子电池规格承认书

型号 Model: USB-50AA 样品数量 NO.OF SAMPLES:

功率 Energy: 2200mWh

送样日期 DATE OF SENDING SAMPLE:

版本 REV : A0 客户代码 CUSTOMER CODE:

电芯制定人 Cell Prepared by	包装制定人 Pack Prepared by	审核人 Checked by	批准人 Approved by
			

客户名 CUSTOMER NAME :

业务员 THE SALESMAN :

客户确认 CUSTOMER APPROVAL	签章 STAMP

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Product Modified Record List

产品变更履历表

Revision 版本	Date 日期	Mark 标记	Modified content 变更内容	Approved by 批准
A0	2025-3-31		首版发行	彭建普

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1 适用范围 Scope

仅适用于江西省倍特力新能源有限责任公司生产的可充电锂离子电池或电池组, 包括锂离子电池电芯和保护组件。This document describes the product specification of lithium ion polymer battery or module which includes cell and protection devices supplied by Jiangxi BetterPower new energy limited liability company.

2 电池组成 Battery Constitution

序号 No.	名称 Name	型号 Model	备注 Remark
1	1 支锂离子电芯 One piece of cell	倍特力聚合物电池 PL 13430-700mAh	
2	1 个功能保护板 One piece of protection board	IC: LC9203DB-3.7V	

3 产品技术参数 Product Specification

序号 NO.	项目 Items	标准 Criteria	备注 Remarks
1	电芯规格 Cell Specification	700mAh/3.7V	0.2C 充放电至终止电压 0.2C charge and discharge for cut-off voltage
2	内阻 Internal Impedance	Cell $\leq$ 110m Ω	标准充电后 AC 1KHz 测试 AC 1KHz after standard charge
3	标称容量 Nominal Capacity	1480mAh/1.5V	0.2C 充放电至终止电压 0.2C charge and discharge for cut-off voltage
4	最小容量 Minimum Capacity	1400mAh/1.5V	
5	标称能量 Nominal Energy	2200mWh	
6	最小能量 Minimum Energy	2100mWh	
7	开路电压 Open voltage	1.50 $\pm$ 0.05V	
8	工作电压 Working voltage	1.50 $\pm$ 0.05V	
9	电池重量 Battery weight	16.5 $\pm$ 0.5g	
10	充电电流 charge current	350mA	输入 DC5V/>0.5A Input DC5V/>0.5A
11	充电电压 charge voltage	DC5.0V	输入 DC/5V $\pm$ 0.3 Input DC5V $\pm$ 0.3
12	标准充电时间 Standard charging time	160min	指示灯状态: 充电中指示灯 G-LED 闪烁, 充满电 G-LED 指示长亮。 Indicator Light Status: During charging, the green LED (G-LED) blinks. When fully charged, the G-LED stays on constantly.
13	标准放电电流 Standard discharge current	200mA	

14	最大放电电流 Max discharging current	1500mA	
15	放电截止电压	$0.8 \pm 0.1V$	
16	循环寿命 Cycle life	≥ 300 cycles	0.5C 标准充放电使用 恢复初始容量 $\geq 70\%$ (指电芯的标准充放电) Use under 0.5C standard charge - discharge conditions. Recovery of the initial capacity $\geq 70\%$ (refers to the standard charge - discharge of the battery cell).
17	年自放电率 Annual self - discharge rate	15-25%	
18	工作温度 Operating Temperature	$0^{\circ}C \sim +15^{\circ}C$	充电 Charging
		$15^{\circ}C \sim +45^{\circ}C$	充电 Charging
		$-20^{\circ}C \sim +60^{\circ}C$	放电 Discharging
19	贮存温度 Storage Temperature	$-20^{\circ}C / +45^{\circ}C$	小于 1 星期 Less than 1 week
		$-20^{\circ}C / +35^{\circ}C$	小于 1 个月 Less than 1 month
		$-20^{\circ}C / +30^{\circ}C$	小于 1 年 Less than 1 year
20	储存湿度 Storage Humidity	$60\% \pm 20\%RH$	相对湿度 Relative Humidity
21	静态电流 quiescent current	$\leq 10\mu A$	
22	插拔测试 insertion and extraction test	≥ 1000 times	插入力 $\geq 1kg$, 拔出 $\leq 3.5kg$ 插拔速度 12.7mm/min。 Insertion force ≥ 1 kg, withdrawal force ≤ 3.5 kg, and insertion/extraction speed of 12.7 mm/min.

4 电芯性能 Cell Performance

4.1 常规性能 Product General Performance

序号 No.	项目 Items	测试条件 Test Method and Condition	标准 Criteria
1	标准充电模式 Standard Charge	0.2C 恒流充电至 4.2V, 然后恒压充电至 0.02C。 Charge to 4.2V at constant current 0.2C, then constant voltage charge to taper current 0.02C.	总充电时间不超过 6.5 小时, 其中在 $25 \pm 2^{\circ}C$ 环境下充电。 The total charging time shall not exceed 6.5 hours, including charging in an environment of $25 \pm 2^{\circ}C$.

2	0.2ItA 放电性能 0.2ItA discharging Performance	将电池或电池组按标准充电模式充好电后，搁置 0.5~1h，再以标准放电模式进行放电。 The cell or battery charged with standard charge mode, deposit 0.5~1h, then discharged with standard discharge mode.	放电时间应 $\geq 5h$ 。上述测试可以重复循环 5 次，当有一次符合要求即为合格。 The discharge time is required $\geq 5h$. The above test cycle can be repeated five times, Once is qualified to meet the requirements.
3	荷电保持能力 Charged Storage Characteristics	将电池或电池组按标准充电模式充电后，开路放置在 $20\pm 5^{\circ}\text{C}$ 环境温度下 28 天后。 The cell or battery charged with standard charge mode, Open circuit stored in $20\pm 5^{\circ}\text{C}$ for 28 days. Discharged with standard discharge mode.	以标准放电模式进行放电，放电时间应不低于 4.25 小时，再次以标准充电模式充电后以标准放电模式放电，放电时间应不低于 4.5 小时。 Discharge time should not be less than 4.25h. Then charged with Standard Charge mode, Discharged with standard discharge mode again. Discharge time should not be less than 4.5h.

4.2 安全性能测试 Safety Performance Testing

序号 No.	项目 Items	测试条件 Testing condition	标准 Criteria
1	过充电测试 Overcharge testing	充满电的电池外接 3C/4.6V 的电源给电池持续加载 2 小时。 3C/4.6V DC power supply charge 2hrs after fully charge	不起火，不爆炸 No fire, no explode
2	强制放电测试 Forced Discharging Test	以 0.2C 放电至 3.0V 以后，以 1.0C 电流反向充电 90min After 0.2C discharge to 3.0V, then 1.0C reverse charge 90min	不起火，不爆炸 No fire, no explode

3	挤压测试 Crush Test	电芯标准充电后，将电芯放在两个平面间承受挤压，挤压的压力由一个直径为 32mm 活塞的液压油缸提供，挤压将一直持续到液压油缸的压强读数达到 17.2MPa，此时的压力为 13 kN，一旦这个最大压力达到，马上卸压；圆柱型或方型电芯受挤压时其长轴应平行于挤压装置的平面，每个电芯只在一个方向上承受挤压，每次挤压使用不同的电芯。 After standard charge, A cell is to be crushed between two flat surfaces, the force for the crushing is to be applied by a hydraulic ram with a 32 mm diameter piston, the crushing is to be continued until a pressure reading of 17.2 MPa is reached on the hydraulic ram, applied force of 13 kN, once the maximum pressure has been obtained it is to be released, A cylindrical or prismatic cell is to be crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus, each cell is to be subjected to a crushing force in only one direction, separate cells are to be used for each test.	不起火、不爆炸 No fire, and no explosion.
4	跌落测试 Drop Test	电池完全充电后从 1200mm 高度由 X, Y, Z 正负 6 个方向自由跌落到置于水泥地面上 18mm-20mm 的厚木板上，每个方向跌落 1 次，最后用 0.5C 进行充放循环 3 次。 Battery is dropped from a height of 1.2 meters 6 times at six angles (X, Y, Z plus positive, negative) to concrete ground, then cycle three times at 0.5C current.	不起火，不爆炸，不冒烟 No fire, no explode, no smoke
5	振动测试 Vibration Test	充满电电池按 X、Y、Z 三个方向，每个方向上从 10Hz~55Hz 的频率循环扫描振动 90min 振动频率 10Hz~50Hz 位移幅值（单振幅 0.8mm）。 After standard charging, fixed the capacitor 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 capacitor shall be vibrated for 30 minutes per axis of XYZ axes.	不起火，不爆炸，不冒烟 No fire, no explode, no smoke
6	恒定湿热 Constant Humidity and Temperature Characteristics	将电池放入 40℃±2℃ 及相对湿度为 90%~95%RH 的恒温恒湿箱中 48 小时后，再以 1.0C 电流放电至 3.0V。 After put the battery in the constant humid and hot box of 40℃± 2℃and relative humidity of 90%~95%RH for 48 hours, and with discharging current 1.0C till 3.0V cut off voltage.	无冒烟、爆炸、腐蚀，放电容量不低于初始容量 60% No smoke, no explosion, no corrosion, the residual capacity is not less than 60% of the initial capacity

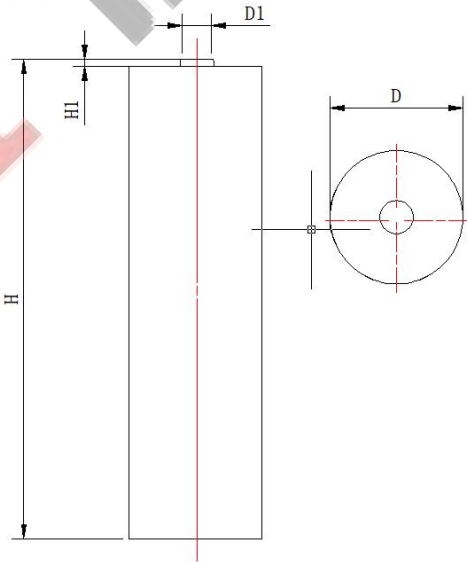
4.3 环境性能测试 Environment Performance Testing

序号 No.	项目 Items	测试条件 Testing condition	标准 Criteria
1	电池温度性能 Temperature Performance of Battery	充电过程：标准充电模式。 放电过程：分别在-10℃， 0℃和 55℃温度下以 0.2C 恒流放电至 3.0V。 Charge: Standard charge model Discharge: Discharge to 3.0V at 0.2C constant current at -10℃, 0℃ and 55℃respectively	-10℃下，容量≥60% 0℃下，容量≥80% 55℃下，容量≥95% -10℃, capacity ≥60% 0℃, capacity ≥ 80% 55℃, Capacity ≥95%

5. 电池尺寸 Battery Drawing

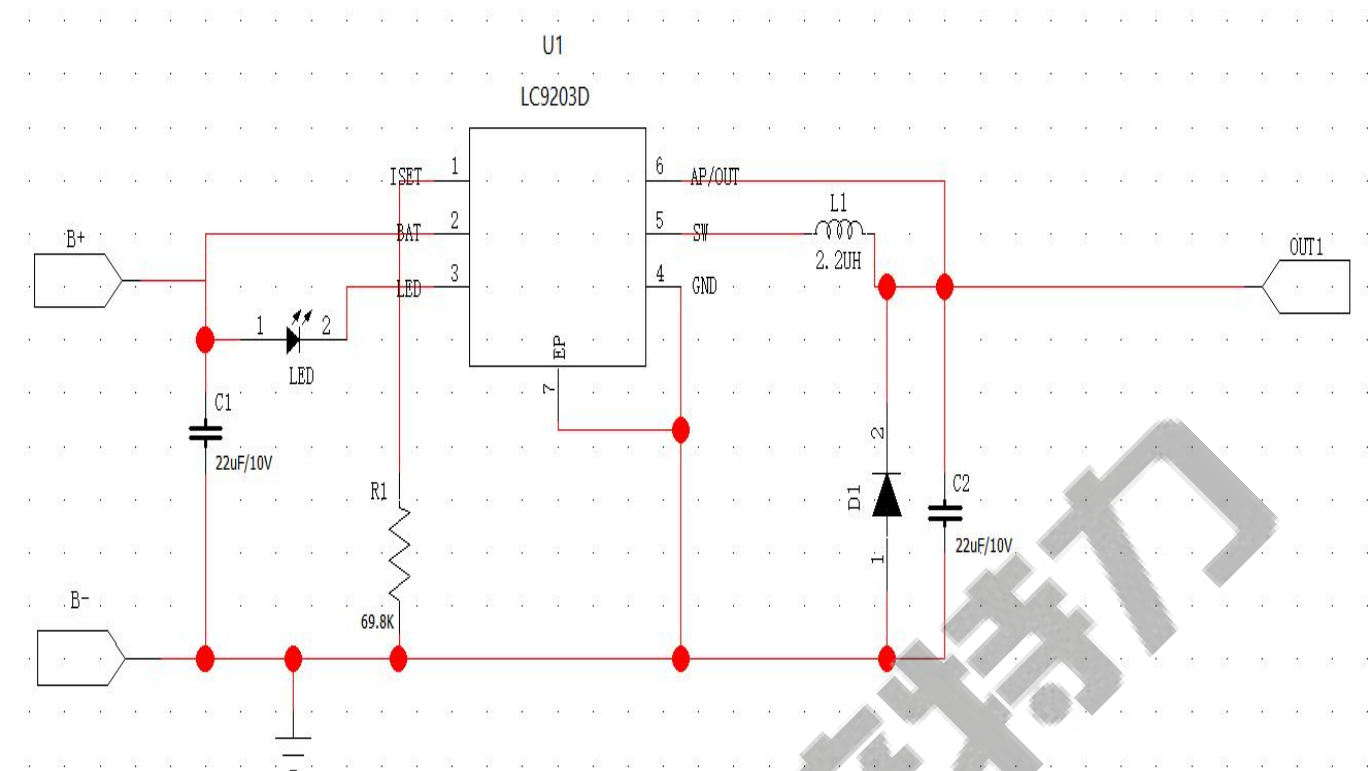
如图所示/ To see the drawing:

项目 Items	标准 Criteria
H	≤50.5mm
H1	1.8±0.3mm
D	≤14.5mm
D1	4.8±0.3mm



6. 保护板规格书 PCM specification

6.1 保护板原理图 Protection board principle diagram



6.2 保护板电气性能 Protection board electrical properties

Protection Parameters /保护参数					
Over-Charge Voltage Protection (OVP) 适配器输入电压	4700	5200	5300		mV
Over-Charge Voltage Protection Release 恒压浮充电压	4150	4200	4250	3.7V, 充电电流降为 ICHG/10Vcv时	mV
Over-Charge Voltage Protection Delay Time 充电电流	/	350	400	R1=100K	mA
Over-Discharge Voltage Protection (UVP) 充电过温保护阈值		130			°C
Over-Discharge Voltage Protection Release 输出电压	1450	1500	1550		mV
Over-Discharge Voltage Protection Delay Time 开关频率	/	1.5	/	500mA 负载	MHz
Over-Current Charge Protection Detection Voltage 静态工作电流	/	6	10		uA
Over-Current Charge Protection (OCC) 欠压保护	2650	2750	2850		mV
Over-Current Charge Protection Delay Time 带载能力		1	1.5		A
Over-Current Discharge Protection Detection Voltage 低电量提示输出电压(BUCK 模式)	1.0	1.1	1.15		V
Over-Current Discharge Protection (OCD) 过温保护阈值	/	150			°C
Battery low voltage indicates the voltage 电池低电量提示电压	3100	3150	3200		mV
Single LED Current LED 电流	4	5	6		mA
Equiped with LED indicator LED指示灯	充电时, LED闪烁; 充满电时, LED常亮; 放电时, LED不亮, (绿灯)				

6.3 保护板元器件 Protection board component

Symbol 位号	Material name 物料名称	Specification model 规格型号	PCB footprint 封装形式	Qty 数量	Vender 品牌
U1	IC	LC9203DB-3.7V	QFN2*2-6L	1	力驰微
L1	贴片电感	IMTF252010S2R2MCTBU0,2.2UH	252010	1	巨晟
R1	贴片电阻	69.8K,±1%,1/10W	0402	1	国巨
R2, R3	贴片电阻	5.1K,±5%,1/10W	0402	2	国巨
LED	贴片LED	绿灯	0603	1	明大
B+	总正极	UL3239-26#-16mm 带 2*6*0.1 镍带	/	1	信达
OUT1	总输出	6.3*4.5*2 镀镍（盖帽式）	/	1	铭创盛
C1, C2	贴片电容	22uF,±10%,X7R,25V，无卤素	0603	2	三星
D1	二极管	B2020WS	SOD-323	1	
PCB	底板	BPI-002-LC9203D-TYPE-C-A1，白油，黑字，喷锡，ROHS,FR4,尺寸:13*13*0.8mm，铜厚1盎司，ROHS		1	博亿达

7. 贮存及其它事项 Storage and Others

7.1 长期贮存 Long Time Storage

长期贮存的电池（超过 3 个月）需对电池进行充放电一次，置于干燥、凉爽处。贮存电池电量为 60%。储存温度（-10-30℃）和湿度（60±20%RH）。

If stored for a long time(exceed three months), Need charge and discharge battery one time, the cell should be stored in drying and cooling place.The cell's storage Battery level is 60% .Storage temperature （-10-30℃）and moisture （60±20%RH）.

7.2 其它事项 Others

任何本说明书中未提及的事项，须经双方协商确定。

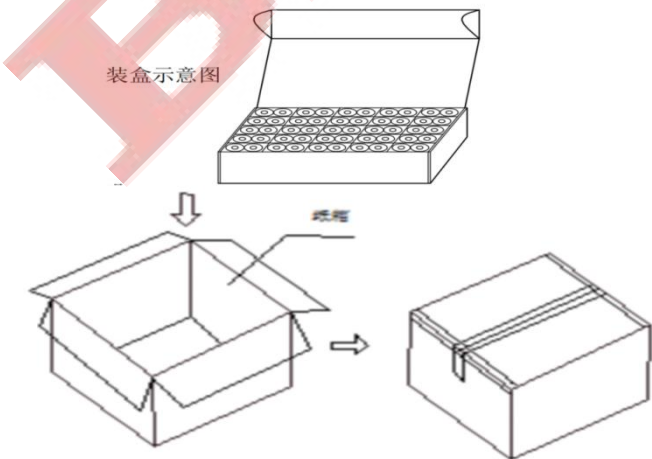
Any matters that this specification does not cover should be conferred between the customer and BPI.

7.3 保质期限 Shelf life

保质期是从出厂日期(喷码)开始起十二个月。

Shelf life starts from the manufacture date (printing) within Twelve months.

8. 包装示意图 Packaging schematic diagram



序号 No	项目 Item	描述 Description	备注 Remark
1	包装方式 Packing style	外箱+吸塑盒 Carton& Plastic tray	
2	包装箱外尺寸 Outside size of the box	\	
3	重量 Weight	\	
4	封箱方式 Carton Sealing method	透明封箱胶带 Transparent adhesive tape	

附录 Appendix
聚合物锂离子充电电池操作指示及注意事项
Handling Precautions and Guideline
For LIP (Lithium-Ion Polymer) Rechargeable Batteries
前言 Preface

本档“聚合物锂离子充电电池操作指示及注意事项”仅适用于江西省倍特力新能源有限责任公司的电池。

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries' shall be applied to the battery cells manufactured by Jiangxi Better Power new energy limited liability company.

声明 Note

以上所有测试的产品需为出货后 7 天内未使用过的全新电池；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 $60\pm 20\%\text{RH}$ 。

Testing product should be fresh unused within 7 days after shipment; Unless otherwise defined, test and the measurement shall be done under temperature of $25\pm 2^{\circ}\text{C}$ and relative humidity of $60\pm 20\%\text{RH}$.

本产品为江西省倍特力新能源有限责任公司为贵司专项定制开发。双方签订购销合同后，贵司承诺按照合同约定履行付款和提货义务。如违反合同约定拒绝按时付款和提货，贵司承担本产品所有开发费用及相关违约责任。

This product is specially customized and developed by Jiangxi Better Power new energy limited liability company for your company. After both parties sign the purchase and sales contract, your company promises to fulfill the payment and delivery obligations as stipulated in the contract. If you refuse to make payment and pick up the goods on time in violation of the contract, your company shall bear all development costs and related breach of contract responsibilities for this product.

1 充电 Charging

1.1 充电电压 Charging voltage

充电电压不得超过本规格书刊号中规定的额定电压。充电器的设计应满足此条件。电池电压高于额定电压值时，将可能引起电池的充放电性能、机械性能和安全性能的问题，可能会导致发热或泄漏。

Charging shall be done by voltage less than that specified in the Product Specification . which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition. It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the battery electrical, mechanical safety performance and could lead to heat generation or leakage.

1.2 充电温度 Charging temperature

电池必须在 $0^{\circ}\text{C}\sim 45^{\circ}\text{C}$ 的环境温度范围内进行充电。

The cell shall be charged within $0^{\circ}\text{C}\sim 45^{\circ}\text{C}$ range in the Product Specification.

2 放电 Discharging

2.1 放电电流 Discharging current

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

2.2 放电温度 Discharging temperature

电池必须在 -20°C~60 °C 的环境温度范围内进行放电。

The cell shall be discharged within -20°C~60 °C range specified in the Product Specification.

2.3 过放电 Over-discharging

需要注意的是，在电池长期未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电量维持 60% 左右。

It should be noted that during a long period of unused battery, it may be in a certain state of overdischarge with its self-discharge characteristics. In order to prevent the occurrence of overdischarge, the battery should be regularly charged to maintain its power level of about 60%.

过放电会导致电芯性能、电池功能的丧失。

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

3 保护电路模块 Protection Circuit Module

电芯/电池包装应配有 PCM 以正确保护电芯/电池。PCM 应具有以下功能以保证安全并防止损坏电池性能：(1) 过充保护功能；(2) 过放保护功能；(3) 短路保护

The Cell/battery packaging should be equipped with PCM to properly protect cell/battery. PCM should have the following functions to ensure safety and prevent damage to battery performance: (1) overcharge protection function; (2) over-discharge protection function; (3) Short circuit protection

4 电池的注意事项 Handling Instructions

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

Read and observe the following warnings and precautions to ensure correct and safe use of Li-ion battery.

危险!

Danger!

安全警示及使用说明 Caution and Guideline

使用前应先阅读产品规格书以及安全警示，确保正确使用电池并确保电池使用过程中的安全。

Before using battery, please read specification and safety caution, insure proper application and safety.

安全警示 Caution

下面的操作可能导致电池泄漏，发热甚至燃烧：

Failing in following items can cause leakage, heat even fire:

禁止反向充电！

Prohibition of reverse charge of battery.

禁止过充电！

Prohibition of overcharge of battery.

禁止过放电！

Prohibition of over-discharge of battery.

禁止短路！

Prohibition of short circuit of positive and negative of battery.

请使用指定的充电器充电！

Please charge by specified charger.

请不要撞击，敲打，钉刺或拆卸电池！

Don't knock, beat, nail or disassemble battery.

请保持电芯远离热源，禁止将电芯扔入火中！

Please keep away from fire or other heating sources and prohibition of dumping of battery into fire.

电池浸水后禁止使用！

Don't use after the battery is soaked!

使用说明 Guideline

如果电解液接触到皮肤或眼睛,请立刻用清水冲洗接触的区域并寻求医生的建议！

If electrolyte comes into contact with the skin or eyes where shall flush the electrolyte immediately with fresh water and physicians' advice is to be sought.

请不要在规定的范围外使用或储存电池，否则将削弱电池的性能，缩短电池的寿命，甚至导致电池发热，起火或爆炸！

Don't use or storage battery under the circumstance beyond specified, unless will weaken battery performance and shorten battery life-span, even will cause heating, fire or explosion.

使用前请确保电池在质量保证期内。

Please insure battery in quality guarantee duration before using.

请不要使电池的封口边缘与金属直接接触。

Please don't make the battery side edge of direct contact with the metal.

将小电池和电池放在儿童接触不到的地方

Keep small cells and batteries which are considered swallowable out of the reach of children.

吞咽可能导致烧伤、软组织穿孔和死亡。在摄入 2 小时内可能发生严重烧伤

Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion.

如误食电池或电池，应立即求医。

In case of ingestion of a cell or battery, seek medical assistance promptly.