

Product Specification

产品规格承认书

Customer Code 客户代码: _____

Customer Product Model 客户产品型号: _____

Coincell Battery cell Model.科恩瑟尔电芯型号: **0640**

Coincell Battery Product Model. 科恩瑟尔电池型号: _____

Battery Capacity 产品容量: **3.85V 8mAh**

Battery Part Number 产品料号: _____

Document Number 文件号: _____

Prepared by 制作人	Checked by 审核人	Approved by 批准人
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Revision History
版本履历表

Revision 版本	Description 内容描述	Issued by 发行人	Approved by 审批人	Date 日期
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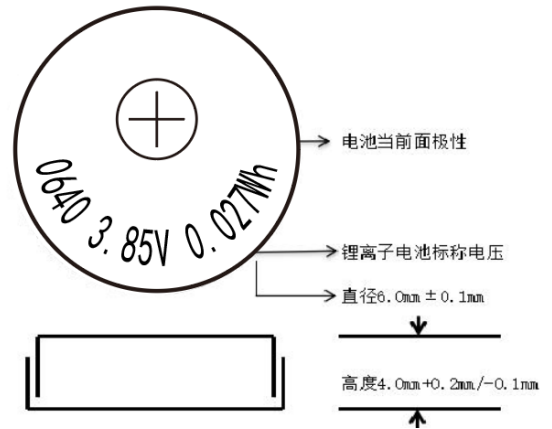
1. Scope 概述

This document describes the specification of rechargeable Li-ion battery pack which is provided by Shenzhen Coincell Battery Co., Ltd.

这文件描述由深圳市科恩瑟尔电池有限公司设计制造的可充电锂离子电池成品的规格。

2. Battery specification 电芯规格:

No.	Item 项目	Parameters 参数	
1	Battery cell model 电芯型号	0640	
2	Minimum capacity 最小容量 (0.2C discharge current 放电电流)	7 mAh	
3	Typical capacity 典型容量 (0.2C discharge current 放电电流)	8 mAh	
4	Nominal voltage 标称电压	3.85V	
5	Shipment voltage 出货电压	3.8-4.0V	
6	Shipment state of charge 出货容量状态	65%~85%	
7	Charge ending voltage 充电限制电压	4.35V	
8	Discharge ending voltage 放电终止电压	3.00V	
9	Maximum battery dimension 电芯最大尺寸	D: 6.1mm , H: 4.2mm	
10	Battery weight 电芯重量	Appr.: 0.6g	
11	Cell Impedance 内阻 (V=3.8-4.0V)	≤2000mΩ (备注: 出厂时间小于6个月, 循环次数小于30次) (Remark: shipment time < 6months, cycle time < 30cycles)	
12	Max charge current 最大充电电流	7mA, 1C	15°C ≤ T ≤ 45°C
		1.4mA, 0.2C	0°C ≤ T < 15°C
13	Max discharge current 最大放电电流	7mA, 1C	15°C ≤ T ≤ 60°C
		1.4mA, 0.2C	-20°C ≤ T < 15°C
14	Operating temperature 工作温度范围	Charge 充电: 0-45°C Discharge 放电: -20-60°C	
15	Cycle life 循环寿命 (RT) (2C charge 充电, 0.5C discharge 放电)	300次充放电后, 电池恢复80%的初始容量, 电芯膨胀率≤1%。 After 300 cycles charge/discharge, the battery can recover 80% of its initial capacity, the battery expansivity ≤1%.	
16	Storage method 储存方式	1 Month at -20 to 60 °C	Capacity recovery rate > 85%
		3 Month at -20 to 45 °C	Capacity recovery rate > 90%
		1 Year at -20 to 20 °C	Capacity recovery rate > 90%
17	Certification requirement 认证要求	UN38.3, IEC62133, UL1642, RoHS, REACH	



3. Cell drawing 电芯示意图:



4. Performance And Test Conditions (电池性能测试条件)**4.1 Standard environmental test condition (标准测试环境)**

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature: $23\pm 5^{\circ}\text{C}$ Humidity: $65\pm 10\%\text{RH}$.

除非特别说明, 本标准书中所有测试均在以下环境条件下进行: 温度: $23\pm 5^{\circ}\text{C}$ 湿度: $65\pm 10\%\text{RH}$

4.2 Measuring Instrument or Apparatus (测量器具及设备)**4.2.1 Dimension Measuring Instrument (尺寸测量器具)**

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

尺寸测量器具的精度等级应不小于 0.01 mm 。

4.2.2 Voltmeter (伏特计)

Standard class specified in the national standard or more sensitive class having inner impedance more than $10\text{k}\Omega/\text{V}$

按照国家标准指定规格等级或采用灵敏度更高的, 测量电压时内阻不应小于 $10\text{k}\Omega/\text{V}$ 。

4.2.3 Ammeter (安培计)

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω .

按照国家标准指定规格等级或采用灵敏度更高的, 包括电流表及电线在内的总外阻应小于 0.01Ω 。

4.2.4 Impedance Meter (电阻计)

Impedance shall be measured by a sinusoidal alternating current method (2kHz LCR meter).

内阻测试仪测量原理应为交流阻抗法 (2kHz LCR)。

4.3 Visual inspection (外观检查)

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell..

不允许有任何影响电池性能的外观缺陷, 诸如裂纹、裂缝、泄漏等。

5. Performance And Test Conditions (电池性能测试条件)**5.1 Battery Performance and Test Criteria 电池性能和测试标准**

序号 No.	检验项目 Test Item	试验方法 Test Method	标准 Standard
5.1.1	标准充电性能 (0.2C) Standard Charge	标准充电: 环境温度 $25\pm 2^{\circ}\text{C}$, 0.2C 恒流恒压充电至 4.35V; 充电电流到 $\leq 0.02\text{C}$ 截止 Battery pack is charged by 0.2C constant current at $25\pm 2^{\circ}\text{C}$ until 4.35V. Then, battery cell is charged by constant voltage until current drop to 0.02C.	充电容量应 \geq 标称容量 充电时间应小于 6h Capacity $\geq 7\text{mAh}$ Charging time $\leq 6\text{h}$
5.1.2	最大充电电流 (1C) Maximum	快速充电: 环境温度 $25\pm 2^{\circ}\text{C}$, 1C 恒流恒压充电至 4.35V; 充电电流直到 $\leq 0.02\text{C}$ 截止 Battery pack is charged by 1.0C constant current at	充电容量应 \geq 标称容量 充电时间应小于 2h Capacity $\geq 7\text{mAh}$

	charge current	25±2°C until 4.35V. Then, battery pack is charged by constant voltage at 4.35V until current drop to 0.02C.	Charging time ≤2h	
5.1.3	标准放电性能 (0.2C) Standard Discharge	标准放电:环境温度 25±2°C, 0.2C 恒流放电至 3.0V, 上述试验做 5 次, 如能放电容量达到标称容量 Battery pack is discharged by 0.2C continuous current at 25±2°C until the voltage drop to 3.0V. Repeat 5 times.	放电时间不小于 4.5h Discharge time ≥4.5h	
5.1.4	快速放电性能 (1C) Maximum discharge current	快速放电:环境温度 25±2°C, 1C 恒流放电至 3.0V. Battery pack is discharged by 1.0C continuous current at 25±2°C until the voltage drop to 3.0V.	放电时间不小于 51 分钟 Discharge time ≥51 minutes	
5.1.5	放电效率 Discharge at different Current	环境温度 25±2°C, 电池充满电以 0.2C 0.5C 1C 的电流放电截止 3.0v。 Discharge at 0.2C 0.5C 1C till 3.0V at 25±2°	0.2C 0.5C 1C	100% 99% 97.5%
5.1.6	高温性能 Discharge at high temperature	1.在环境温度 25±2°C 电池 0.2C 充电后符合标准。将电池放 (55±2)°C 高温搁置 2 小时; 然后把电池, 恒定 1C 电流放电直到电压达到 3.0V 2. 经过测试, 把电池搁置 2 小时, 常温 25±2°C 然后进行外观检查 1. After standard charging, keep the Cells 2h at 55±2°C, then discharging at 1C to voltage 3.0V, recording the discharging time. 2. After testing, keep cells 2h at 25±2°C, then do visual checking.	1. 电池 55±2°C 温度下, 1C 放电时间不应小于 51 分钟; 2. 电池外观应无变形爆炸 1. At 55±2°C, 1C discharge time ≥51 minutes; 2. Cells no disform, no explosion.	
5.1.7	低温性能 Discharge at Low temperature	1.环境温度 25±2°C 电池 0.2C 充电后, 符合标准, 电池在低温箱 (-10±2°C) 16~24 小时; 然后将电池 0.2C 恒流放电到电压 3.0V 2. 经过测试, 在 25±2°C, 把电池放置 2 小时, 然后进行外观检查 1. After standard charging, keep the Cells 16h at -10±2°C, then discharging at 0.2C to voltage 3.0V, recording the discharging time. 2. After testing, keep cells 2h at 25±2°C, then do visual checking.	1. 电池 -10±2°C 温度下, 0.2C 放电时间不应小于 180 分钟 2. 外观电池应无变形不漏液、不冒烟、不着火、不爆炸 1. At -10±2°C, 0.2C discharge time ≥180 minutes; 2. Cells no disform, no leakage, no smoke, no fire & no explosion.	
5.1.8	充电保持能力 Capability of keeping electricity	环境温度下 25±2°C, 电池 0.2C 充电符合标准, 在 25±2°C 放置 28 天。然后 0.2C 放电到 3.0V 截止 20±5°C, After standard charging, laying the battery 28days, discharging at 0.2C to voltage 3.0V, recording the discharging time.	电池 0.2C 放电不应小于 255 分钟 Discharge time ≥255min	
5.1.9	循环寿命测试 Cycle Life	环境温度 25±2°C, 电池 1C 充电后, 搁置 0.5h-1h, 然后 1C 放电, 搁置 0.5h~1h 再下一个充放电周期。电池应不断的充电和放电的 500 次 Constant current 1C charge to 4.35V, then constant voltage charge to current declines to 0.02C, stay	容量保持 ≥75% Capacity ≥75%	

		0.5-1h, then constant current 0.5C discharge to 3.0V, stay 0.5-1h. Repeat above steps till 500 times.	
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5.2 Safety Test 安全测试

No. 序号	Test item 检验项目	Test Method 试验方法	Criteria 标准
5.2.1	Constant Humidity and Temperature test 恒温恒湿测试	Battery cell is fully charged by standard charge process. Then, battery cell is put into chamber with constant humidity(90~95%) and temperature ($45 \pm 2^{\circ}\text{C}$) for 16hrs. Take out battery, keep it for 2~4hrs at $23 \pm 3^{\circ}\text{C}$ and discharge by 1C to 3.0V. 电池充电后在 $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 温度和相对湿度 90%~95% 环境中 16h 取出在室温搁置 2~4h, 目测外观; 再快速放电到截至电压 3.0V	No leakage, No Smoke, No fire, No explosion After test, battery cell can discharge \geq 36minutes 不漏液、不冒烟、不着火、不爆炸; 放电时间不低于 36min
5.2.2	High Temperature Test 高温测试	Charge battery cell to full power with fast charging, put it aside for 2h under the condition of $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$, and then discharge it to the cut-off voltage with fast discharging. The discharge capacity is the high-temperature discharge capacity. 电芯以标准放电至截止电压, 搁置 10min 后, 电芯做一个快速充放电循环, 该放电容量为初始容量; 以快速充电充电至满电, 在 $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下搁置 2h, 然后以快速放电至截止电压, 该放电容量为高温放电容量。	After test, battery cell no obvious damage, no leakage, no pressure release, no fire or explosion. Capacity $\geq 85\%$ Swelling rate $\leq 5\%$ 电芯外观无明显损伤, 膨胀尺寸变化不大于 5%、漏液、不泄压、不起火、不爆炸。高温放电容量不低于初始容量的 85%。
5.2.3	Low Temperature Test 低温测试	Charge the battery cell to full power with standard current, put it aside for 16 ~ 24h under the condition of $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, and then discharge to the cut-off voltage with standard current. The discharge capacity is the low-temperature discharge capacity. 将电芯以标准放电至截止电压, 搁置 10min, 然后将电芯以标准充电至满电, 以标准放电至截止电压, 该放电容量为初始容量; 再次将电芯以标准充电至满电, 在 $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下搁置 16~24h, 然后以标准放电至截止电压, 该放电容量为低温放电容量。	After test, battery cell no obvious damage, no swelling, no leakage, No pressure release, no fire or explosion. Capacity $\geq 70\%$ Discharge time $\geq 3.5\text{h}$ 电芯外观无明显损伤, 不膨胀、漏液、不泄压、不起火、不爆炸。低温放电容量不低于初始容量的 70%, 放电时间不低于 3.5h。

5.2.4	Vibration Test 振动测试	<p>At temperature 25 ± 2 °C, the battery cell is clamped and placed on the workbench. Within 90min, the single amplitude is 0.4mm in the range of 10 ~ 55 ~ 10Hz, and vibrates with a linear sweep frequency of 1Hz / min; Vibration test shall be conducted in three mutually perpendicular directions of the battery, and the vibration in each direction shall be 30min respectively.</p> <p>环境温度 25 ± 2 °C, 电芯用夹具夹好放在工作台上, 在 90min 内, 10~55~10Hz 范围内单振幅 0.4mm, 以 1Hz/min 的线性扫频振动; 在电池的互相垂直的三个方向都要进行振动测试, 各个方向振动分别为 30min</p>	<p>After test, battery cell no obvious damage, no leakage, no smoke or explosion. Voltage should $>3.6V$.</p> <p>试验后, 电芯外观应无明显损伤、漏液、冒烟或爆炸电压应大于 3.6V</p>
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5.3 Safety requirements for batteries 电池的安全要求

This test simulates improper battery use to avoid similar safety problems

这个测试是模拟电池运用不恰当，避免类似安全问题

The following tests shall be carried out in the device with forced ventilation conditions and explosion-proof measures. Before the test, all electric cells shall be quickly charged to the cut-off voltage and put aside for 24h before the following tests

下述测试应在有强制排风条件及防爆措施的装置内进行，在测试前所有的电芯都按快速充电至截止电压，并搁置 24h 后，再进行下述测试

NO. 产 品 序 号	Test Item 检 查 条 款	Test Method 试 验 法	Criteria 标 准
5.3.1	Heavy impact 重物冲击	Place the cell on the impact table and diameter 15.8mm steel column is placed in the center of the battery, and the longitudinal axis of the steel column is parallel to the table. Let the 9.1kg hammer fall freely from the height of 610mm to impact the cell, and the cell is allowed to deform 将电芯放在冲击台上，将一Φ15.8mm 的钢柱置放电池中心，钢柱的纵轴平行于平面，让重量 9.1kg 重锤自 610mm 高度自由落下，冲击电芯，电芯允许发生变形	No Fire or explosion 电芯应不起火，不爆炸
5.3.2	Crush test 挤压	Battery cell is fully charged by standard charge process. The battery cell is to be crushed with its longitudinal axis parallel to the surfaces of crushing apparatus. The surfaces are to be bought in contact with cell and the crushing is to be continued until an applied force of 13kN is reached. Keep 1 minute. 将电芯最大平面平行挤压设备的挤压平面，放置在挤压设备的两个挤压平面之间，逐渐加压到 13kN，保持压力 1min	No Fire or explosion 电芯不起火、不爆炸
5.3.3	Needling 针刺	Place the battery cell on the console and pierce the center of the maximum surface of the battery with a stainless steel needle with a diameter of 3mm at a speed of 20mm / S ~ 40mm / s for 1min 将电芯放置在操作台上，用直径 3mm 的无锈钢针以 20mm/s~40mm/s 的速度刺穿电池最大表面中心位置，保持 1min	No Fire or explosion 电芯不起火、不爆炸
5.3.4	Drop Test 自由跌落	Battery cell is fully charged by standard charge process. Battery cell is free fall from a height of 1m on the wood board (thickness 18-20mm) put on cement floor, from X-axis、Y-axis、Z-axis positive and negative direction. Each direction is free fall 1 time. After drop test, discharge battery at 1C, then charge 1C, doing this charge and discharge cycle till discharge time no less than 51 minutes.	No Fire or explosion 电芯不起火、不爆炸

		<p>Then end this cycle test, which no more than 3 times.</p> <p>将电芯样品由高度为 1m 的位置自由跌落到置于水泥地面上的 18-20mm 厚的木板上, 从 X、Y、Z 正负方向(六个方向)每个方向自由跌落 1 次。自由跌落结束后, 将电芯以 1C5A 电流放电至终止电压, 然后以 1C5A 的电流进行充放电循环, 直至放电时间不低于 51min, 即可终止充放电循环, 充放电循环次数应不多于 3 次</p>	
5.3.5	Thermal shock 热冲击 (130℃10min)	<p>Hang the battery cell in the temperature impact oven (far-infrared blast oven or vacuum oven) with insulating wire. The temperature of the impact oven rises to 130 °C ± 2 °C at the rate of 5 °C ± 2 °C / min for 10min, and observe the state of the battery cell.</p> <p>将电芯用绝缘线悬挂在温度冲击箱 (远红外鼓风烘箱或真空烤箱) 中, 冲击箱温度以 5℃±2℃/min 的速率上升到 130℃±2℃, 保持 10min, 观察电芯的状态</p>	No Fire or explosion 电芯不起火、不爆炸
5.3.6	Overcharge Test 过 充 (3C5A4.6V)	<p>Battery cell is fully charged by standard charge process. Then, the battery is charged by 3.0C rate constant current and voltage to 4.6V. When below situation occurred, terminate test. 1. Battery cell failure (such as fire, explosion), 2. Current less than 0.05C₅A, plus cell temperature decreased 10°C from max temperature.</p> <p>将电芯以标准放电至截止电压, 然后以 3C5A 恒流充电到指定电压 4.6V, 转为恒压充电, 当出现以下情况时终止测试, ①电芯失效(如起火、爆炸); ②电流低于 0.05C₅A, 并且电芯的温度比峰值温度下降 10°C;</p>	No Fire or explosion 电芯不起火、不爆炸
5.3.7	Over discharge Test 过放电	<p>At 23±3°C, battery cell is discharged by 1C for 90 minutes until 0V. Check whether cell will be on fire or explosion. Measure the IR after testing.</p> <p>将电芯以标准充电制式充电至截止电压, 然后以 1C5A 恒流放电 90min, 截止电压为 0V; 观察电芯是否着火或爆炸, 测试完后测试电压内阻</p>	No Fire or explosion 电芯不起火、不爆炸
5.3.8	Short Test 短路	<p>The battery is fully charged by standard charge process. Then, the battery anode and cathode connect to 80±20mΩ load. Terminate the test in case below conditions: 1. Last for 4h, 2. Open circuit Voltage less than 0.1V, 3. Cell outside center temperature is 10°C less than max temperature.</p> <p>在环境温度 25°C ± 2°C 的条件下, 在防爆箱内用电阻不大于 100mΩ 的导线将电芯正负极短接, 试验过程中关注</p>	No Fire or explosion Battery outside center temperature ≤150°C 电芯不起火、不爆炸、外壳中心最高温度 ≤150°C

		温度变化, 当符合下列任何一个条件, 试验结束。①4h; ②当电芯开路电压小于 0.1V 时; ③电芯外壳中心温度比 峰值温度低于 10°C	
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5.4 电池储存测试 Battery storage test

5.4.1	Battery storage 储存	Storage test, battery at $25 \pm 5 \text{ }^{\circ}\text{C}$ 0.5C ₅ A constant current. When the voltage at the power supply terminal reaches the limit voltage, it shall be stored within 3 months Storage within 12 months 存储测试, 电池在 $25 \pm 5^{\circ}\text{C}$ 0.5C ₅ A 恒定电流下。当在电源端电压达到极 限电压, 3 个月内存储 12 个月内存储	1 电池容量保持在 $\geq 90\%$ 2 电池容量保持在 $\geq 75\%$
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6 Transportation and storage 运输和存储

6.1 Transportation: the battery shall be transported under the state of charge (95% of the state of charge). During transportation, excessive vibration, impact or extrusion shall be prevented to prevent exposure to sunlight and rain water. It is suitable for land transportation. Electricity needs to be reduced to 50% by sea and air.

交通: 电池应在充电状态下运输的一般 (95% 的充电状态) 在运输过程中, 要防止过度的振动、冲击或挤压, 防止曝露在阳光和雨水中, 它适用于陆运。海运和空运需降电到 50%。

6.2 The battery shall be stored in a clean, dry and ventilated room with an temperature of 5 to 35 $^{\circ}\text{C}$. It shall be protected from contact with corrosive substances and away from fire and heat sources.

电池应存放在清洁、干燥通风的室内环境温度 5 至 35°C, 应防止与腐蚀性物质接触, 远离火源, 热源

7. Warranty 保质期

Shenzhen Coincell Battery Co., Ltd. guarantees the battery at good condition within 12months when battery is delivered from factory.

深圳市科恩瑟尔电池有限公司保证电池从出厂日起 12 个月内功能良好

8. Product liability statement 产品责任书

Shenzhen Coincell Battery Co., Ltd. **DO NOT** take responsibility if customer **DO NOT** follow the specification and below instruction using the battery.

您必须严格遵守深圳市科恩瑟尔电池有限公司规格书使用电芯。对于没有按照规格书进行操作所造成的任何意外事故，深圳市科恩瑟尔电池有限公司不承担任何责任。

9 Warning precautions 警告注意事项

9.1 Avoid charging more than 4.35v, prevent overcharging the battery cell, and prohibit reverse charging of the positive and negative electrodes; The cut-off voltage shall not be lower than 3.0V and the charging current shall not exceed 24mA;

充电避免充电超过 4.35V, 防止电芯导致过充电, 禁止正负极反充; 截止电压应不低于 3.0V, 充电电流不超过 24mA;

9.2 The cell shall be stored in a dry area below 35 °C with SOC about 50%.

电芯应为半充电状态并储存在 35 °C 以下干燥区域;

9.3 Do not heat or throw the cell into fire or water. Do not change or dissect the cell. Otherwise, it will lead to danger, such as fire, heating, leakage to explosion;

切勿将电芯加热或投入火中或水中。不要更改或解剖电芯。否则会导致危险, 如起火、发热、泄至爆炸;

9.4 Do not short-circuit the positive (+) and negative (-) of the cell. Keep the battery away from metals and other conductive materials. If it is not handled well, the direct contact between the positive (+) and negative (-) of the cell and the metal and other conductive materials will lead to the short circuit of the cell (for example, if the caliper measures the thickness, insulation treatment shall be done on the caliper or battery surface)

切勿短接电芯正极(+)和负极(-), 使电池远离金属和其他导电材料。处理不好电芯正极(+)和负极(-)以及金属和其他导电材料的直接接触会导致电芯短路(如卡尺测量厚度, 需在卡尺或者电池表面做绝缘处理);

9.5 Do not reverse connect the positive (+) and negative (-) of the cell; 切勿反接电芯正极(+)和负极(-);

9.6 When the battery cell is deflated, heated, discolored or other abnormal phenomena occur during use, charging or storage. It shall be removed from the fixture or charger immediately, and the battery cell shall be stopped from use.

当电芯在使用、充电及储存时发生放气、发热、变色或其他不正常现象, 立即从夹具或充电器卸除, 电芯停止使用。

9.7 Do not directly weld the battery cell. Excessive heat will cause deformation of the electric core components such as insulating parts, resulting in expansion, leakage, fire and explosion of the battery.

勿直接焊接电芯, 过多的热量会导致电芯组件如绝缘件变形, 进而导致电芯鼓胀、泄露、起火和爆炸。

9.8 Do not use cells damaged under transport pressure, drop, short circuit or other conditions and cells that release electrolyte odor

切勿使用在运输压力、跌落、短路或其他情况下损坏的电芯以及释放出电解液气味的电芯。

10 其他 Others

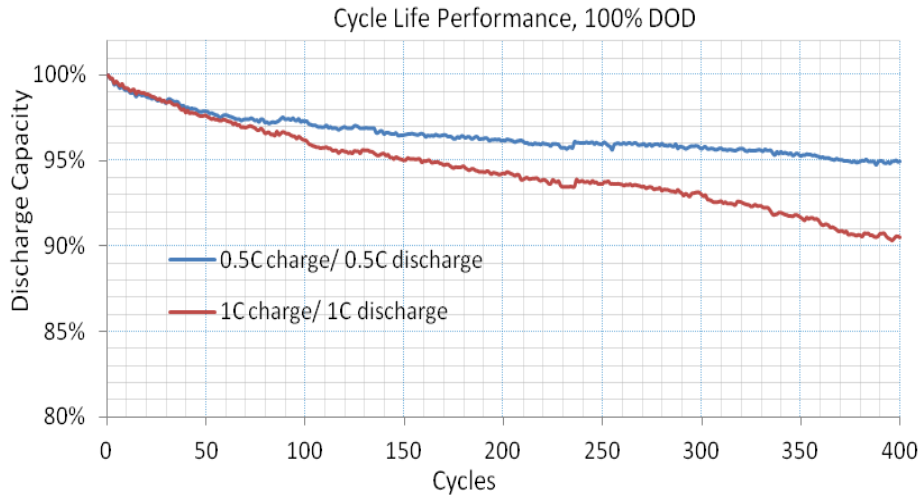
Inform customers in advance of changes in specifications, materials, production process and product control system and changes in quality and reliability data

在规格、材料、生产过程和产品控制系统的改变, 在与质量和可靠性数据变更的通知提前通知给客户。

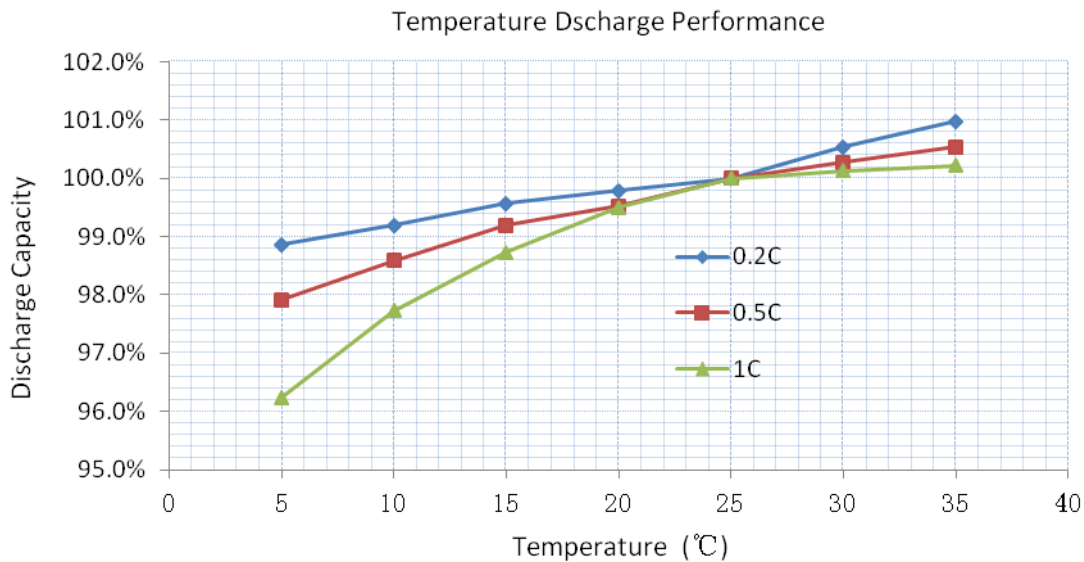
Any other items are not covered in the specification shall be agreed by both parties.

任何本规格书没有包括的事项, 需要双方协议确定。

1: Cycle life performance curve 循环寿命性能曲线图



2: High and low temperature discharge performance curve 高低温放电性能曲线图



3: Rate discharge performance diagram

倍率放电性能图

