锂电池 UN38.3 测试报告
Lithium Battery UN38.3 Test Report

委托单位: **Applicant:**	深圳市云球贸易科技有限公司 SHENZHEN YUNQIU TRADE TECHNOLOGY CO., LTD
货物名称: **Name Of Goods:**	锂离子电芯 BD-PROXT XT35-18650 3.7V 3500mAh 13Wh Lithium-ion cell BD-PROXT XT35-18650 3.7V 3500mAh 13Wh
测试机构: **Testing By:**	深圳市元素检测有限公司 Shenzhen Element Testing Co., Ltd.
测试机构地址: **Testing Institution Address:**	深圳市龙岗区坪地街道坪西社区龙岭北路76号2号厂房401、4号厂房101 邮编518117 101 of Plant 4, & 401 of Plant 2, No.76, Longling North Road, Pingxi, Pingdi Subdistrict, Longgang District, Shenzhen, Guangdong, China/518117
签发日期: **Issue Date:**	2025-02-21

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Approved By: Lu Min/Technical Director

深圳市元素检测有限公司
Shenzhen Element Testing Co., Ltd.
(盖章stamp)

样品名称 Sample name	锂离子电芯 BD-PROXT Lithium-ion cell BD-PROXT		型号 Model	XT35-18650	
商标 Brand	N/A		检测类别 Test Classification	委托测试 COMMISSION TEST	
报告编号 Report no.	ELE2501B00380				
委托单位 Applicant	深圳市云球贸易科技有限公司 SHENZHEN YUNQIU TRADE TECHNOLOGY CO., LTD				
	中国深圳市宝安区沙井镇沙井街道博港社区中亚硅谷岗头路 20-2 号楼 3 号 No.20-2, Gangtou Road, No.3 Building, Central Asia Silicon Valley, Pokgang Community, Shajing Street, Shajing Town, Bao'an District, Shenzhen, China				
制造单位 Manufacturer	力钜新能源(中山)有限公司 Blackcell New Energy (Zhongshan) Co., Ltd				
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测试日期 Tested Date	2025-02-06~2025-02-20				
试验依据 Test Method	联合国《试验和标准手册》（第八修订版 ）38.3 节 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.8/Subsection 38.3				

测试结论 Test Conclusion：

该电池样品通过所有项目检测，符合该条款的性能要求。

The samples have passed all test items.

深圳市元素检测有限公司
Shenzhen Element Testing Co., Ltd.
（盖章 stamp）

检测日期： Tested Date:	2025-02-06	审核日期： Checked Date:	2025-02-20	批准日期： Approved Date:	2025-02-20

I、样品描述 Sample Description			
型号 Model	XT35-18650	标称电压 Nominal Voltage	3.7V
额定容量 Rated capacity	3500mAh	额定能量 Rated Energy	13Wh
标准充电电流 Standard Charge Current	700mA	标准放电电流 Standard Discharge Current	700mA
最大充电电流 Max. Charge Current	3500mA	最大放电电流 Max. Discharge Current	20A
充电限制电压 Max. Charging Voltage	4.2V	充电截止电流 End Charge Current	70mA
放电截止电压 Cut-off Voltage	2.5V	外观形状 Appearance	白色圆柱体 White Cylinder
电池尺寸 Battery Dimension (D×H)	(18.5×65.5)mm	电池质量 Battery Mass	48.6g

II、测试程序 Test Procedure

1. 每一种类型的电池均应进行 T.1 至 T.8 项试验。电池必须按顺序在相同的一组电池上进行试验 T.1 至 T.5。试验 T.6 和 T.8 应使用未另外试验过的电池。试验 T.7 可以使用先前在试验 T.1 至 T.5 中使用过的未损坏电池进行，以便测试进行在循环过的电池上。

Each battery type is subjected to tests T.1 to T.8. Tests T.1 to T.5 are conducted in sequence on the same battery. Tests 6 and 8 are conducted using not otherwise tested batteries. Test T.7 may be conducted using undamaged batteries previously used in Tests T.1 to T.5 for purposes of testing on cycled batteries.

2. 为了量化质量损失，可用以下公式计算：质量损失(%)=(M1-M2)/M1×100

In order to quantify the mass loss, the following procedure is provided: Mass loss(%)=(M1-M2)/M1×100

式中：M1是试验前的质量，M2是试验后的质量。如果质量损失不超过下表所列的数值，应视为“无质量损失”。

Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the values in Table below, it is considered as "no mass loss".

电芯或电池的质量 Mass M of cell or battery	质量损失限值 Mass loss limit
M＜1g	0.5%
1g ≤ M ≤ 75g	0.2%
M＞75g	0.1%

3. 在测试 T.1 至 T.4 中，电池须满足无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的90%。

In test T.1 to T.4, batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test battery after testing is not less than 90% of its voltage immediately prior to this procedure.

III、一般说明 General description

本报告出现的试验结果仅与试验样品有关。

The test results presented in this report relate only to the object tested.

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可能的试验情况判定 / Possible test case verdicts:	
一试验情况不适用本试验产品 — Test case does not apply to the test object	不适用N/A（Not applicable）
一试验样品满足要求 — Test object does meet the requirement	通过P (Passed)
一试验样品不满足要求 — Test object does not meet the requirement	失败F (Fail)

IV、测试项目及样品编号描述
Test items description and number of the sample:

测试项目 Test items	样品编号 Sample Number
T.1: 高度模拟/Altitude simulation	电池/cells: C01~C10
T.2: 温度测试/ Thermal test	
T.3: 振动/ Vibration	
T.4: 冲击/ Shock	
T.5: 外短路/External short circuit	
T.6: □挤压 Crush ☒撞击 Impact	电池/cells: C11~C20
T.7 过度充电/ Overcharge	不适用 N/A
T.8: 强制放电/ Forced discharge	电池/cells: C21~C40

V、样品预处理状态描述说明
Pre-treatment status description and illustration of sample:

测试项目 Test item	样品编号 Sample No.	预处理状态 Pre-treatment state	备注 Remark
T.1~T.5	C01~C05	在第一次循环完全充电状态。 At first cycle, in fully charged states.	---
	C06~C10	在25次循环结束后完全充电状态。 After 25 cycles ending in fully charged states.	---
T.6	C11~C15	在第一次循环50%额定容量的荷电状态。 At first cycle at 50% of the design rated capacity.	---
	C16~C20	在25次循环结束后50%额定容量的荷电状态。 After 25 cycles ending at 50% of the design rated capacity.	---
T.7	不适用N/A	在第一次循环完全充电状态。 At first cycle, in fully charged states.	---
	不适用N/A	在25次循环结束后完全充电状态。 After 25 cycles ending in fully charged states.	---
T.8	C21~C30	在第一次循环完全放电状态。 At first cycle, in fully discharged states.	---
	C31~C40	在25次循环结束后完全放电状态。 After 25 cycles ending in fully discharged states.	---

备注：送检样品符合《联合国试验和标准手册》(ST/SG/AC.10/11/Rev.8), 38.3章的要求。
Remark: The samples submitted for inspection meet the requirements of the UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.8/Subsection 38.3.

VI、测试方法 Test methods			
ST/SG/AC.10/11/Rev.8/Subsection 38.3.			
条款/Clause	标准要求/ Requirement + Test	测试结果 / Result	判定/ Verdict
38.3.4.1	Test T.1: 高度模拟 Altitude simulation		P
	试验电池和电池组应在压力等于或低于 11.6千帕和环境温度(20±5℃)下存放至少 6小时。 Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 ± 5 °C).		P
	要求电池和电池组无渗漏、无排气、无解体、无破裂和无起火,并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试,验前电压的90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90 % of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	无质量损失、无漏液、无泄气、无分解、无破裂、 无着火，且测试后开路电压大于测试前开路电压的90%。 测试数据见表格T.1 No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, also open circuit voltage after testing is more than 90% of its initial voltage. Test data see table T.1	P
38.3.4.2	Test T.2: 温度试验 Thermal test		P
	首先将样品放在72±2°C的环境中放置至少6个小时，然后放在–40±2°C的环境中放置至少6个小时。温度转换的最大间隔时间为30分钟。如此循环10次，最后将样品放在20±5°C的环境中静置24小时。Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ±2 °C, followed by storage for at least six hours at a test temperature equal to - 40 ± 2 °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5 °C).		P
	对于大型电池和电池组,暴露于极端试验温度的时间至少应为12小时。 For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.		N/A

	要求电池和电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。Cells and batteries meet this requirement if there is no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	无质量损失、无漏液、无泄气、无分解、无破裂、 无着火，且测试后开路电压大于测试前开路电压的90%。 测试数据见表格T.2 No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, also open circuit voltage after testing is more than 90% of its initial voltage. Test data see table T.2	P
38.3.4.3	Test T.3: 振动 Vibration		P
	电池和电池组紧固于振动机平台,但不得造成电池变形,并能准确可靠地传播振动。振动应是正弦波形，对数扫描频率在 7 赫兹和 200·赫兹之间,再回到7赫兹，跨度为15分钟。这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行12次,总共为时3小时。其中一个振动方向必须与端面垂直。Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.		P
	作对数式频率扫描，对总质量不足 12 千克的电池和电池组（电池・和小型电池组) ,和对12千克及更大的电池组(大型电池组)有所不同。The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).		P

	对电池和小型电池组:从7 赫兹开始,保持1gn的最大加速度,直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米（总偏移 1.6 毫米),并增加频率直到最大加速度达到8gn(频率约为50赫兹)。将最大加速度保持在 8gn 直到频率增加到 200 赫兹。For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.		P
	对大型电池组:从7赫兹开始,保持1gn的最大加速度,直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米（总偏移 1.6 毫米），并增加频率直到最大加速度达到 2gn（频率约为 25 赫兹）。将最大加速度保持在2gn直到频率增加到200赫兹。For large batteries: from 7 Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200Hz.		N/A
	要求电池和电池组试验中和试验后无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在第三个垂直安装方位上的•试验后立即测得的开路电压不小于在进行这一试验前电压的90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	无质量损失、无漏液、无泄气、无分解、无破裂、 无着火，且测试后开路电压大于测试前开路电压的90%。 测试数据见表格T.3 No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, also open circuit voltage after testing is more than 90% of its initial voltage. Test data see table T.3	P

<table>
<tr><td>38.3.4.4</td><td>Test T.4: 冲击 Shock</td><td></td><td>P</td></tr>
<tr><td></td><td>试验电池和电池组用坚硬支架紧固在试验装置上,支架支撑着每个试验电池组的所有安装面。每个电池需经受最大加速度150gn和脉冲持续时间6毫秒的半正弦波冲击。针对大型电池需经受最大加速度50gn和脉冲持续时间11毫秒的半正弦波冲击。Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell shall be subjected to a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50g, and pulse duration of 11 milliseconds.</td><td></td><td>P</td></tr>
<tr><td></td><td>每个电池组应根据电池组的质量而受到峰值加速度的半正弦波冲•击。对于小型电池组的脉冲持续时间应6毫秒,对于大型电池组的脉冲持续时间应为11毫秒，下面的公式用于计算适当的最小峰值加速度。
Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.
<table>
<tr><th>电池
Battery</th><th>最小峰值加速度
Minimum peak acceleration</th><th>脉冲持续时间
Pulse duration</th></tr>
<tr><td>小型电池
Small batteries</td><td>$150g_n$ 或公式结果中的较小值
$150g_n$ or result of formula
Acceleration $(g_n)=\sqrt{\left(\frac{100850}{mass^*}\right)}$
whichever is smaller</td><td>6毫秒
6ms</td></tr>
<tr><td>大型电池
Large batteries</td><td>$50g_n$ 或公式结果中的较小值
$50g_n$ or result of formula
Acceleration $(g_n)=\sqrt{\left(\frac{3000}{mass^*}\right)}$
whichever is smaller</td><td>11毫秒
11ms</td></tr>
<tr><td colspan="3">* 质量单位用千克计算 Mass is expressed in kilograms.</td></tr>
</table></td><td></td><td>P</td></tr>
<tr><td></td><td>每个电池或电池组需在三个互相垂直的安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受18次冲击。 Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.</td><td></td><td>P</td></tr>
</table>

	要求电池和电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的90%。有关电压的要求不适用于完全放电状态的试验电池和电池组。Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90 % of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	无质量损失、无漏液、无泄气、无分解、无破裂、 无着火，且测试后开路电压大于测试前开路电压90%。 测试数据见表格T.4. No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, also open circuit voltage after testing is more than 90% of its initial voltage. Test data see table T.4	P
38.3.4.5	Test T.5: 外部短路 External short circuit		P
	待测试的电池或电池组应加热一段时间，以使其外表面温度达到均匀稳定的57±4℃的温度。加热时间取决于电池或电池组的大小和设计,并应进行评估和记录。如果这种评估是不可行的,对于小型电池和小型电池组至少在57±4℃的环境下存放 6 小时，对于大型电池和大型电池组至少在57±4℃的环境下存放12小时。然后电池或电池组在57±4℃的环境中，应接受一个外部总阻值小于 0.1 欧姆的短路条件。The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57 ±4 °C, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at 57 ±4 °C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.		P
	这一短路条件应在电池或电池组的外壳温度回到 57±4℃后继续短路 1 小时，或对于大型电池组其外壳温度已下降了一半的最大升温，并保持低于该值。短路和冷却过程至少在环境温度中进行。This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57 ± 4 °C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.		P

	要求电池和电池组外壳温度不超过170℃,并且在试验过程中及试验后6小时内无解体,无破裂,无起火。Cells and batteries meet this requirement if their external temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.	外表温度小于170°C，在测试中及之后6小时内, 无发生分解、破裂和着火。 测试数据见表格T.5 External temperature is less than 170°C, also no disassembly, no rupture and no fire during the test and within six hours after the test. Test data see table T.5	P
38.3.4.6	Test T.6: ☒撞击 Impact ☐挤压 Crush		P
	撞击(适合于直径大于或等于18mm的圆柱形电池)Test procedure – Impact (applicable to cylindrical cells greater than or equal to 18 mm in diameter)		P
	将样品放在一个平坦的光滑平面上。将一直径为15.8 mm±0.1mm，长度不小于6cm的316不锈钢棒横过样品中部放置后，将一质量为9.1 kg±0.1 kg的重物从61±2.5 cm的高度落向样品。The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm±0.1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9.1 kg±0.1 kg mass is to be dropped from a height of 61±2.5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.		P
	接受撞击的样品，纵轴应与平坦的表面平行并与横放在样品中心的直径15.8 mm±0.1mm弯曲表面的纵轴垂直。每一个样品只接受一次撞击。The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm±0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.		P
	挤压(适用于棱柱形、袋状、硬币/纽扣电池和直径不超过18mm的圆柱形电池)。Test Procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 mm in diameter).		N/A

	将电池或元件电池放在两个平面之间挤压，挤压力度逐渐加大，在·第一个接触点上的速度大约为1.5厘米/秒。挤压持续进行,直到出现以下三种情况之一：A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached:		N/A
	(a) 施加力达到13kN±0.78kN。The applied force reaches 13kN±0.78kN ;		N/A
	(b) 电池的电压下降至少100mV。The voltage of the cell drops by at least 100 mV;		N/A
	(c) 电池变形达原始厚度的50%或以上。The cell is deformed by 50% or more of its original thickness.		N/A
	棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币形电池应从其平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.		P
	每个试样电池或元件电池只做一次挤压试验。试样应继续观察6小时。试验应使用之前未做过其他试验的电池或元件电池进行。Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.		N/A
	要求电池和原件电池外壳温度不超过 170℃，并且在试验过程中及试验后6小时内无解体,无起火。Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassembly and no fire during the test and within six hours after this test.	电池外表温度小于170°C, 在测试中及之后6小时内无发生分解和着火。 测试数据见表格T.6 External temperature of cells is less than 170°C, also no disassembly and no fire during the test and within six hours after the test. Test data see table T.6	P

38.3.4.7	Test T.7: 过度充电 Overcharge		N/A
	在室温下，以2倍的制造商宣称的最大持续充电电流对样品充电，测试时间为24小时。测试的最小电压如下：The charge current shall be twice the manufacturer's recommended maximum continuous charge current. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The minimum voltage of the test shall be as follows:		N/A
	(a) 如果制造商宣称的充电电压不超过18V，本测试的最小充电电压应是制造商宣称的最大充电电压的两倍或者是22V之中的较小者。When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.		N/A
	(b) 如果制造商宣称的充电电压超过18V，本测试的最小充电电压应该是制造商宣称的最大充电电压的1.2倍。When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.		N/A
	要求充电电池组在试验过程中和试验后7天内无解体,无起火。There is no disassembly and no fire during the test and within seven days after the test.	在测试中和测试完成后7天内无发生分解和着火。 测试数据见表格T.7 No disassembly and no fire during the test and within seven days after the test Test data see table T.7	N/A
38.3.4.8	Test T.8: 强制放电 Forced discharge		P
	每个电池应在环境温度下与12V直流电源上进行强制放电,此直流电源串联在起始电流等于制造商给定的最大放电电流条件下强制放电。Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. 将适当大小和额定值的电阻负荷与试验电池串联，计算得出给定的•放电电流。对每个电池进行强制放电,放电时间(小时)应等于其额定容量除以初始试验电流（安培）。The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).		P

	要求原电池或充电电池在试验过程中和试验后7天内无解体,无起火。There is no disassembly and no fire during the test and within seven days after the test.	电池在测试中和测试完成后7天内无发生分解和着火。 测试数据见表格T.8 Cells have no disassembly and no fire during the test and within seven days after the test. Test data see table T.8	P

VI、测试数据 Test Data

T.1. 高度模拟 Altitude simulation

样品状态 The state of samples	编号 No.	试验前Pre-test		试验后After test		质量损失 Mass loss (%)	电压比(%) Voltage ratio	测试结果 Test result
		质量 Mass (g)	电压 Voltage (V)	质量 Mass (g)	电压 Voltage (V)			
在第一次循环完全充电状态 At first cycle, in fully charged states	C01	48.111	4.175	48.111	4.175	0.000	100.000	P
	C02	47.854	4.174	47.854	4.174	0.000	100.000	P
	C03	47.923	4.176	47.923	4.176	0.000	100.000	P
	C04	48.496	4.175	48.496	4.175	0.000	100.000	P
	C05	48.572	4.174	48.572	4.174	0.000	100.000	P
在25次循环结束后完全充电状态 After 25 cycles ending in fully charged states	C06	48.198	4.173	48.198	4.173	0.000	100.000	P
	C07	47.869	4.174	47.869	4.174	0.000	100.000	P
	C08	47.774	4.172	47.774	4.172	0.000	100.000	P
	C09	48.159	4.173	48.159	4.173	0.000	100.000	P
	C10	48.296	4.175	48.296	4.175	0.000	100.000	P

注释 Notes :
测试后，样品无渗漏、无排气、无解体、无破裂和无起火，电压比不小于 90%。After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And voltage ratio is not less than 90%.

T.2. 温度试验 Thermal test

样品状态 The state of samples	编号 No.	试验前Pre-test		试验后After test		质量损失 Mass loss (%)	电压比(%) Voltage ratio	测试结果 Test result
		质量 Mass (g)	电压 Voltage (V)	质量 Mass (g)	电压 Voltage (V)			
在第一次循环完全充电状态 At first cycle, in fully charged states	C01	48.111	4.175	48.110	4.171	0.002	99.904	P
	C02	47.854	4.174	47.853	4.170	0.002	99.904	P
	C03	47.923	4.176	47.921	4.172	0.004	99.904	P
	C04	48.496	4.175	48.495	4.171	0.002	99.904	P
	C05	48.572	4.174	48.571	4.170	0.002	99.904	P
在25次循环结束后完全充电状态 After 25 cycles ending in fully charged states	C06	48.198	4.173	48.197	4.169	0.002	99.904	P
	C07	47.869	4.174	47.867	4.170	0.004	99.904	P
	C08	47.774	4.172	47.772	4.168	0.004	99.904	P
	C09	48.159	4.173	48.158	4.169	0.002	99.904	P
	C10	48.296	4.175	48.294	4.171	0.004	99.904	P

注释 Notes :
测试后，样品无渗漏、无排气、无解体、无破裂和无起火，电压比不小于 90%。After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And voltage ratio is not less than 90%.

T.3. 振动 Vibration

样品状态 The state of samples	编号 No.	试验前Pre-test		试验后After test		质量损失 Mass loss (%)	电压比(%) Voltage ratio	测试结果 Test result
		质量 Mass (g)	电压 Voltage (V)	质量 Mass (g)	电压 Voltage (V)			
在第一次循环完全充电状态 At first cycle, in fully charged states	C01	48.110	4.171	48.110	4.171	0.000	100.000	P
	C02	47.853	4.170	47.853	4.170	0.000	100.000	P
	C03	47.921	4.172	47.921	4.172	0.000	100.000	P
	C04	48.495	4.171	48.495	4.171	0.000	100.000	P
	C05	48.571	4.170	48.571	4.170	0.000	100.000	P
在25次循环结束后完全充电状态 After 25 cycles ending in fully charged states	C06	48.197	4.169	48.197	4.169	0.000	100.000	P
	C07	47.867	4.170	47.867	4.170	0.000	100.000	P
	C08	47.772	4.168	47.772	4.168	0.000	100.000	P
	C09	48.158	4.169	48.158	4.169	0.000	100.000	P
	C10	48.294	4.171	48.294	4.171	0.000	100.000	P

注释 Notes：

测试后，样品无渗漏、无排气、无解体、无破裂和无起火，电压比不小于 90%。After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And voltage ratio is not less than 90%.

T.4. 冲击 Shock

样品状态 The state of samples	编号 No.	试验前Pre-test		试验后After test		质量损失 Mass loss (%)	电压比(%) Voltage ratio	测试结果 Test result
		质量 Mass (g)	电压 Voltage (V)	质量 Mass (g)	电压 Voltage (V)			
在第一次循环完全充电状态 At first cycle, in fully charged states	C01	48.110	4.171	48.110	4.171	0.000	100.000	P
	C02	47.853	4.170	47.853	4.170	0.000	100.000	P
	C03	47.921	4.172	47.921	4.172	0.000	100.000	P
	C04	48.495	4.171	48.495	4.171	0.000	100.000	P
	C05	48.571	4.170	48.571	4.170	0.000	100.000	P
在25次循环结束后完全充电状态 After 25 cycles ending in fully charged states	C06	48.197	4.169	48.197	4.169	0.000	100.000	P
	C07	47.867	4.170	47.867	4.170	0.000	100.000	P
	C08	47.772	4.168	47.772	4.168	0.000	100.000	P
	C09	48.158	4.169	48.158	4.169	0.000	100.000	P
	C10	48.294	4.171	48.294	4.171	0.000	100.000	P

注释 Notes：

测试后，样品无渗漏、无排气、无解体、无破裂和无起火，电压比不小于 90%。After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And voltage ratio is not less than 90%.

T.5. 外部短路 External short circuit

样品状态 The state of samples	编号 No.	样品表面最高温度(℃) Max. External Temperature(℃)	测试结果 Test result
在第一次循环完全充电状态 At first cycle, in fully charged states	C01	108.5	P
	C02	110.7	P
	C03	109.1	P
	C04	109.8	P
	C05	108.9	P
在25次循环结束后完全充电状态 After 25 cycles ending in fully charged states	C06	110.1	P
	C07	110.5	P
	C08	109.5	P
	C09	108.9	P
	C10	107.9	P

注释 Notes :
测试样品表面温度不超过 170 °C，测试中与测试后 6 小时内无解体、无破裂、无起火。Test sample external temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

T.6. ☒撞击 Impact ☐挤压 Crush

样品状态 The state of samples	编号 No.	样品表面最高温度(℃) Max. External Temperature(℃)	测试结果 Test result
在第一次循环50%额定容量的荷电状态 At first cycle at 50% of the design rated capacity	C11	110.4	P
	C12	108.5	P
	C13	109.7	P
	C14	108.9	P
	C15	108.1	P
在25次循环结束后50%额定容量的荷电状态 After 25 cycles ending at 50% of the design rated capacity	C16	108.2	P
	C17	107.8	P
	C18	109.2	P
	C19	109.3	P
	C20	109.9	P

Notes 注释:
测试样品表面温度不超过 170 °C，测试中与测试后 6 小时内无解体、无破裂、无起火。Test sample external temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

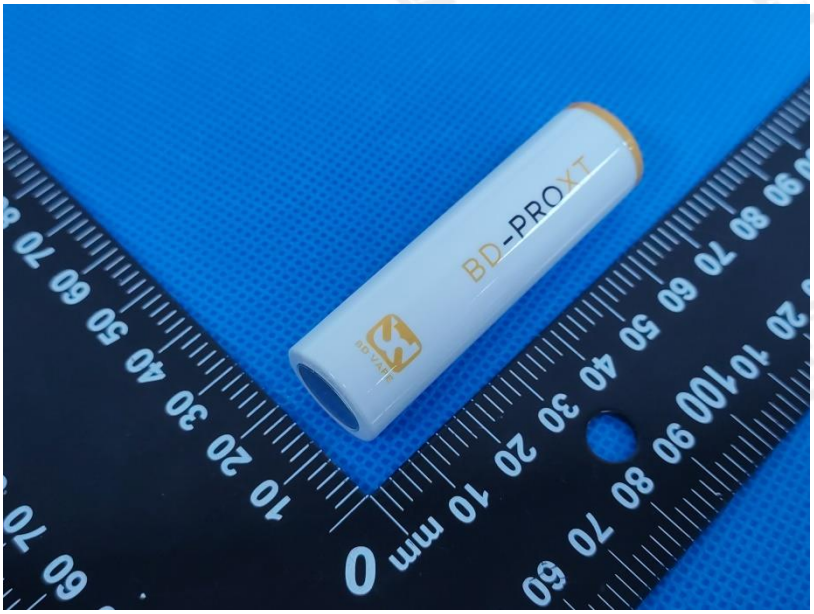
T.7. 过度充电 Overcharge

样品状态 The state of samples	编号 No.	测试结果 Test result
--	--	不适用 N/A
Notes 注释: 样品在测试中和测试后 7 天内无解体、无起火。There is no disassembly and no fire during the test and within seven days after the test.		

T.8. 强制放电 Forced discharge

样品状态 The state of samples	编号 No.	测试结果 Test result
At first cycle, in fully discharged states 在第一次循环完全放电状态	C21	P
	C22	P
	C23	P
	C24	P
	C25	P
	C26	P
	C27	P
	C28	P
	C29	P
	C30	P
After 25 cycles ending in fully discharged states 在25次循环结束后完全放电状态	C31	P
	C32	P
	C33	P
	C34	P
	C35	P
	C36	P
	C37	P
	C38	P
	C39	P
	C40	P
Notes 注释: 样品在测试中和测试后 7 天内无解体、无起火。There is no disassembly and no fire during the test and within seven days after the test.		

VII、样品图片Sample Picture

电芯 Cell
  

VIII、试验仪器设备清单 Test Equipment List

序号 No.	设备编号 Device No.	设备名称 Equipment name	设备型号 Equipment Model	有效期至 Calibration validity	本次使用 Used(√)
1	EP-B-001-01	电池低压高空模拟试验机	GX-3020-ZC50	2025-04-08	√
2	EP-B-004-01	电池重物冲击试验机	GX-5066-A	2025-04-08	√
3	EP-B-003-01	电池挤压试验机	GX-5067-CSM	2025-04-08	
4	EP-B-007-01	电池短路试验机	GX-6055-NT5	2025-04-08	√
5	EP-B-014-01	振动试验系统	JQA-031-150	2025-04-08	√
6	EP-B-015-01	高加速冲击试验机	JQIS-25	2025-04-08	√
7	EP-B-016-02	电池充放电测试仪	CT-4008Tn-5V12A-S1	2025-04-08	√
8	EP-B-022-01	精密烤箱	GX-6055-NT5	2025-04-08	√
9	EP-S-033-01	万用表	FLUKE 15B+	2025-04-08	√
10	EP-S-042-01	直流电子负载测试仪	IT8510	2025-04-08	√
11	EP-B-020-01	可程控直流电源	62012P-80-60	2025-04-08	√
12	EP-S-065-01	电子天平	PTX-JA510	2025-04-08	√
13	EP-S-073-01	恒温恒湿箱	XB-OTS-408H-C5	2025-04-08	√
14	EP-B-023-01	TP700多路数据采集仪	TP700	2025-04-08	√
15	EP-S-052-01	温湿度计	JR900	2025-04-09	√
16	EP-S-041-01	数显游标卡尺	MNT-150T	2025-04-11	√

声 明
Statement

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Objections to the test report must be submitted to Shenzhen Element Testing Co., Ltd. within 15 days.

4、本报告仅对本次客户所送测试样品有效。

This report is only valid for the test samples delivered by this customer.

5、未经深圳元素检测有限公司书面同意，不得部分地复制本报告

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--测试报告结束--

--End of test report--