中国认可
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检测
TESTING
CNAS L19396

UN38.3 检测报告
UN38.3 Test Report

样品名称： **Sample Name:**	可充电锂离子电芯 Rechargeable Li-ion Cell
样品型号： **Sample Model :**	GSP27148101
申请单位： **Applicant:**	广州鹏辉储能科技有限公司 Guangzhou Great Power Energy Storage Technology Co., Ltd.
地址： **Address:**	广州市南沙区东涌镇庆沙路 419 号 003 室 Room 003, 419 Qingsha Road, Dongchong town, Nansha, Guangzhou City, Guangdong Province, P.R. China
商标： **Trademark:**	/
测试标准： **Test Standard:**	ST/SG/AC.10/11/Rev.7/Amend.1 Section 38.3
测试日期： **Date of Test：**	2024.06.13-2024.07.18
签发日期： **Date of Issue:**	2024.08.09

广东威能检测技术有限公司
Guangdong WEINENG Testing Technology Co., Ltd

主检/Tested by: 陈信翔　　**审核/Checked by:** 李忠翔　　**批准/Approved by:** 朱华

广东威能检测技术有限公司
检 测 报 告

样品名称/ Sample Name.	可充电锂离子电芯 Rechargeable Li-ion Cell
型号/ Model	GSP27148101
额定参数/ Ratings	3.65V, 50Ah, 182.5Wh
到样日期/Sample Arrival Date	2024.05.30
申请单位 Applicant	广州鹏辉储能科技有限公司 Guangzhou Great Power Energy Storage Technology Co., Ltd.
申请单位地址 Applicant Address	广州市南沙区东涌镇庆沙路 419 号 003 室 Room 003, 419 Qingsha Road, Dongchong town, Nansha, Guangzhou City, Guangdong Province, P.R. China
制造商 Manufacture	河南省鹏辉电源有限公司 HENAN GREAT POWER ENERGY CO.,LTD.
制造商地址 Manufacture Address	河南省驻马店市中原大道与淮河大道交叉口西北角 Northwest corner of the intersection of zhongyuan avenue and huaihe avenue, zhumadian city, henan province
生产厂 Factory	河南省鹏辉电源有限公司 HENAN GREAT POWER ENERGY CO.,LTD.
生产厂地址 Factory Address	河南省驻马店市中原大道与淮河大道交叉口西北角 Northwest corner of the intersection of zhongyuan avenue and huaihe avenue, zhumadian city, henan province
测试实验室 Testing Laboratory	广东威能检测技术有限公司 Guangdong WEINENG Testing Technology Co., Ltd
测试地点 Testing Location	广东省东莞市松山湖园区新城路 9 号 6 栋负 101 室 Room Minus 101, Building 6, No.9 Xincheng Road, Songshan Lake Park, Dongguan, Guangdong, China
结论 Conclusion	经测试，该样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1 Section 38.3 标准要求。 The sample has passed the test items of UNITED NATIONS “Recommendations of the TRANSPORT OF DANGEROUS GOODS” Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1 Section 38.3
备注 Remark	/

样品参数/Sample specification			
电池类型 Battery type	锂离子电芯 Lithium ion cell	样品质量(kg) Mass	0.91
样品外观 Appearance	蓝色/棱柱形 Blue/prismatic	样品尺寸(mm) Dimension	148±0.5×27±0.5× 101.1±0.5
额定容量 Rated Capacity (Ah)	50	标称电压 Nominal Voltage (V)	3.65
标准充电电流 Standard Charge Current (A)	25	标准放电电流 Standard Discharge Current (A)	50
最大充电电流 Maximum Charge Current (A)	35	最大放电电流 Maximum Discharge Current (A)	75
充电限制电压 Limited Charge Voltage (V)	4.2	放电截止电压 Discharge Cut-off Voltage (V)	2.8
充电截止电流 Charging Cut-off Current (A)	1		

样品预处理/Sample Pretreatment	
样品编号/ Sample No.	预处理方式/ Preprocessing Method
C01#～C05#	一次循环的满电状态 at first cycle, in fully charged state
C06#～C10#	二十五次循环后完全满电状态 after twenty five cycles ending in fully charged state
C11#～C15#	一次循环 50%满电状态 at first cycle at 50% of the design rated capacity
C16#～C20#	二十五次循环 50%满电状态 after twenty five cycles ending at 50% of the design rated capacity
C21#～C30#	一次循环后完全放电状态 at first cycle, in fully discharged state
C31#～C40#	二十五次循环后完全放电状态 after twenty five cycles ending in fully discharged state

测试项目列表/ Test List			
条款/ Clause	测试描述/ Test description	样品编号/ Sample No.	结论/ Verdict
38.3.4.1	T.1 高度模拟/ T.1 Altitude simulation	C01#～C10#	P
38.3.4.2	T.2 温度试验/ T.2 Thermal test		P
38.3.4.3	T.3 振动/ T.3 Vibration		P
38.3.4.4	T.4 机械冲击/ T.4 Shock		P
38.3.4.5	T.5 外部短路/ T.5 External short circuit		P
38.3.4.6	T.6 撞击/挤压/ T.6 Impact/ Crush	C11#～C20#	P
38.3.4.7	T.7 过充电/ T.7 Overcharge	--	N/A
38.3.4.8	T.8 强制放电/ T.8 Forced discharge	C21#～C40#	P

测试顺序/ Test order:

- T.1→T.2→T.3→T.4→T.5→结束/ End
- T.6→结束/ End
- T.7→结束/ End
- T.8→结束/ End

可能的试验情况判定： Possible test case verdicts:	
试验样品不适用该条款.....: - Test case does not apply to the test object.....:	N/A
试验情况不做判定.....: - Test condition does not make a judgment.....:	--
试验样品满足要求.....: - Test object does meet the requirement.....:	P (Pass)
试验样品不满足要求.....: - Test object does not meet the requirement.....:	F (Fail)

ST/SG/AC.10/11/Rev.7/Amend.1 Section 38.3		
章节 Clause	**测试步骤 / Procedure**	**判定 Verdict**
38.3.4	小型电池或电池组应按顺序进行试验T.1至T.5。试验T.6和T.8应使用未另外试验过的电池或电池组。试验T.7可以使用原先在试验T.1至T.5中使用过的未损坏电池组进行，以便测试经过充放电的电池组。 Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall be conducted using not otherwise tested cells or 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.	
	T.1：高度模拟 / Altitude simulation	**P**
	测试步骤 / Test procedure: 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.	
38.3.4.1	标准要求 / Requirement 如果无渗漏、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%，电池和电池组即符合这一要求。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.	测试结果符合要求，见表1。 The test results meet the requirements. See table 1.

38.3.4.2	**T.2: 温度试验 / Thermal test**	**P**
	测试步骤 / Test procedure: 试验电池和电池组应先在试验温度等于（72 ± 2）℃的条件下存放至少6小时，接着再在试验温度等于（-40 ± 2）℃的条件下存放至少6小时。两个极端试验温度之间的最大时间间隔为30分钟。此程序重复进行，共完成10次，接着将所有试验电池和电池组在环境温度(20 ± 5) ℃下存放24小时。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。 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 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5)°C. For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.	
	标准要求 / Requirement: 如果无渗漏、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%，电池和电池组即符合这一要求。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.	测试结果符合要求，见表1。 The test results meet the requirements. See table 1.

	T.3: 振动 / Vibration	**P**
38.3.4.3	测试步骤 / Test procedure: 电池和电池组紧固于振动机平台，但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形，对数频率扫描从 7 赫兹到 200 赫兹，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。 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)应有所不同。 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。 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。 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. 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). 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. For large batteries: from 7 Hz to a peak acceleration of $1g_n$ is maintained unti18 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 $2g_n$ occurs (approximately 25 Hz). A peak acceleration of $2g_n$ is then maintained until the frequency is increased to 200 Hz.	
	标准要求 / Requirement: 如果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%，电池和电池组即符合本项要求。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	测试结果符合要求，见表1。 The test results meet the requirements. See table 1.

	procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	

	T.4: 冲击 / Shock	**P**

测试步骤 / Test procedure:

试验电池和电池组用坚固支架紧固在试验机上，支架支撑着每个试验电池组的所有安装面。

每个电池须经受最大加速度 150gn 和脉冲持续时间 6 毫秒的半正弦波冲击。不过，大型电池须经受最大加速度 50gn 和脉冲持续时间 11 毫秒的半正弦波冲击。

每个电池须经受的正弦波冲击的最大加速度取决于电池组的质量。小型电池组的脉冲持续时间 6 毫秒，大型电池组的脉冲持续时间 11 毫秒。

每个电池或电池组须在三个互相垂直的电池或电池组安装方位的正极方向经受三次冲击，接着在负极方向经受三次冲击，总共经受 18 次冲击。

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g_n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ whichever is smaller	6 ms
Large batteries	50 g_n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass^*}\right)}$ whichever is smaller	11 ms

* Mass is expressed in kilograms.

38.3.4.4

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 150 g_n and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 g_n and pulse duration of 11 milliseconds.

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.

Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

标准要求 / Requirement: 如果无渗漏、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%，电池和电池组即符合这一要求。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	测试结果符合要求，见表1。 The test results meet the requirements. See table 1.

	immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.	

<table>
<tr><td rowspan="3">38.3.4.5</td><td colspan="2">T.5: 外部短路 / External short circuit:</td><td>P</td></tr>
<tr><td colspan="3">测试步骤 / Test procedure:
对于待测电池或电池组，应加温一段必要的时间，使从外壳测量的温度达到均匀的稳定温度(57 ± 4) ℃。这段时间的长短取决于电池或电池组的大小和设计，对于这个持续时间应加以评估和记录。如无法进行这种评估，则小型电池和小型电池组的暴露时间应至少 6 小时，大型电池和小型电池组的暴露时间应至少 12 小时。然后，电池或电池组应在(57 ± 4) ℃条件下经受总外电阻小于 0.1 欧姆的短路条件。
这一短路条件应在电池或电池组外壳温度回到(57 ± 4) ℃后继续至少 1 小时，或在大型电池组的情况下外壳温度降幅达到试验中所观察的的最高温升幅的二分之一并保持低于该数值。
短路和降温阶段的温度应至少相当于环境温度。
The cell or battery to be tested shall be 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.
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.
The short circuit and cooling down phases shall be conducted at least at ambient temperature.</td></tr>
<tr><td>标准要求 / Requirement:
如果外壳温度不超过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，电池和电池组即符合本项要求。
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 within six hours after this test.</td><td>测试结果符合要求，见表1。
The test results meet the requirements. See table 1.</td></tr>
</table>

	T.6: 撞击 / 挤压 / Impact / Crush	**P**
38.3.4.6	测试步骤 / Test procedure: **撞击**(适用于直径不小于 18.0 毫米的圆柱形电池) 备注：这里的直径指的是设计参数（如 18650 电芯的直径是 18.0mm）。 试样电池或元件电池放在平坦光滑的表面上。一根 316 型不锈钢棒横放在试样中心，钢棒直径(15.8 ± 0.1)毫米，长度至少 6 厘米，或电池最长端的尺寸，取二者之长者。将一块(9.1 ± 0.1)千克的重锤从(61 ± 2.5)厘米高处跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿与水平支撑表面呈 90 度落下。 接受撞击的试样，纵轴应与平坦表面平行并与横放在试样中心的直径(15.8 ± 0.1)毫米弯曲表面的纵轴垂直。每一试样只经受一次撞击。 **Impact** (applicable to cylindrical cells not less than 18.0 mm in diameter) NOTE: Diameter here refers to the design parameter (for example the diameter of 18650 cells is 18.0 mm). The sample cell or component cell is to be placed on a flat smooth surface. A (15.8 ± 0.1) mm 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 ± 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. 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 ± 0.1) mm diameter curved surface lying across the center of the test sample. Each sample is to be subjected to only a single impact.	
	测试步骤 / Test procedure: **挤压**(适用于棱柱形、袋装、硬币/纽扣电池和直径小于 18.0 毫米的圆柱形电池) 备注：这里的直径指的是设计参数（如 18650 电芯的直径是 18.0mm）。 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) 施加到电芯上的压力达到 (13 ± 0.78) kN； (b) 电芯电压下降至少100mV；或 (c) 电芯形变与原电芯相比变化50%或以上。 一旦达到最大压力、电压下降 100 毫伏或更多，或电池变形至少达原厚度的 50%，即可解除压力。 棱柱形或袋装电芯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。 每个样品只经受一次挤压 。试验后样品应再观察 6 个小时，试验应使用之前未做过其他试验的电池或元件电池进行。 **Crush** (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter) NOTE: Diameter here refers to the design parameter (for example the diameter of 18650 cells is 18.0 mm).	

	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. (a) The applied force reaches (13 ± 0.78) kN; Example: The force shall be applied by a hydraulic ram with a 32 mm diameter piston until a pressure of 17 MPa is reached on the hydraulic ram. (b) The voltage of the cell drops by at least 100 mV; or (c) The cell is deformed by 50% or more of its original thickness. Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released. 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. 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.	
	标准要求 / Requirement: 如果外壳温度不超过 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，电池和电池组即符合本项要求。 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.	测试结果符合要求，见表2。 The test results meet the requirements. See table 2. ☑挤压 **Crush** ☐撞击 **Impact**

38.3.4.7	**T.7: 过充电 / Overcharge:**	**N/A**
	测试步骤 / Test procedure: 充电电流应是制造商建议的最大连续充电电流的两倍。最小试验电压应满足如下所述： (a) 制造商建议的充电电压不大于18V时，最小试验电压应是电池最大充电电压的2倍或22V两者中的较小值。 (b) 制造商建议的充电电压大于18伏特时，最小试验电压应是最大充电电压的1.2倍。 试验应在环境温度下进行。进行试验的时间应为 24 小时。 The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows: (a) 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. (b) 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. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.	
	标准要求 / Requirement: 充电电池组如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。 Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	/

38.3.4.8	**T.8: 强制放电 / Forced discharge:**	**P**
	测试步骤 / Test procedure: 每个电池应在环境温度下与 12 伏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的条件下强制放电。 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)。 Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. 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).	
	标准要求 / Requirement: 原电池或充电电池如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。 Primary or rechargeable cells meet this requirement if there is no disassembly and no fire within seven days of the test.	测试结果符合要求，见表4。 The test results meet the requirements. See table 4.

检测结果 / Testing Results

表 1：试验 1-试验 5 / Table1: T.1-T.5											P
样品编号 Sample No.	试验前质量 Mass prior to test (g)	试验前电压 OCV prior to test (V)	测试 1：高度模拟 Test 1: Altitude simulation		测试 2：温度试验 Test 2: Thermal test		测试 3：振动 Test 3: Vibration		测试 4：冲击 Test 4: Shock		测试 5：外部短路 Test 5: External Short Circuit
			质量损失 Mass loss (%)	电压比 Change ratio (%)	质量损失 Mass loss (%)	电压比 Change ratio (%)	质量损失 Mass loss (%)	电压比 Change ratio (%)	质量损失 Mass loss (%)	电压比 Change ratio (%)	最高温度 Max. Temp. (°C)
C01#	910.338	4.137	0.001	100.00	0.016	99.95	0.000	100.00	0.000	100.00	66.0
C02#	909.654	4.141	0.000	99.98	0.019	99.11	0.000	100.00	0.001	99.78	65.6
C03#	910.459	4.139	0.000	100.00	0.008	99.28	0.018	100.00	0.000	99.83	66.1
C04#	910.458	4.137	0.005	99.95	0.012	98.98	0.000	99.85	0.000	100.00	64.3
C05#	909.562	4.137	0.005	100.00	0.016	99.06	0.000	100.00	0.000	100.00	66.8
C06#	909.560	4.141	0.000	100.00	0.013	99.08	0.000	100.00	0.001	100.00	65.2
C07#	910.237	4.137	0.001	100.00	0.009	99.08	0.000	100.00	0.000	100.00	67.2
C08#	909.662	4.133	0.000	99.98	0.009	99.98	0.009	99.85	0.001	100.00	66.0
C09#	909.752	4.138	0.006	100.00	0.035	99.28	0.000	100.00	0.005	99.90	63.8
C10#	909.982	4.136	0.000	100.00	0.032	98.91	0.011	100.00	0.000	100.00	65.7

备注 / Remark:
测试 1-测试 4：测试样品无漏液、无排气、无解体、无破裂以及无着火现象，质量损失小于 0.1%。
Test 1-Test 4: Test sample no leakage, no venting, no disassembly, no rupture and no fire, Mass loss ＜0.1%.
测试 5：测试样品外壳温度不超过 170°C，在试验过程中及试验后 6 小时内无解体、无破裂，无起火。
Test 5:Test sample shell temperature does not exceed 170°C and there is no disassembly, no rupture and no fire within six hours after this test.

检测结果 / Testing Results

表 2：试验 6 / Table2: T.6			**P**
□撞击 / Impact　　☑挤压 / Crush			
样品编号 Sample No.	试验前电压 OCV Prior to test (V)	表面最高温度(°C) Surface Peak temperature(°C)	结果 Results
C11#	3.744	24.1	P
C12#	3.741	25.5	P
C13#	3.749	24.2	P
C14#	3.744	24.9	P
C15#	3.746	24.2	P
C16#	3.748	25.3	P
C17#	3.734	24.4	P
C18#	3.742	24.4	P
C19#	3.746	25.1	P
C20#	3.739	25.2	P
备注 / Remark: 测试样品外壳温度不超过 170°C，在试验过程中及试验后 6 小时内无解体、无破裂，无起火。 Test sample shell temperature does not exceed 170°C and there is no disassembly, no rupture and no fire within six hours after this test.			

检测结果 / Testing Results

表 3：测试 7 过充电 / Table3: T.7 Overcharge				N/A
充电电压 Charge voltage (V)		--	充电电流 Charge current (A)	--
样品编号 Sample No.	试验前电压 OCV Prior to test (V)	现象 Phenomenon		结果 Results
--	--	--		--
--	--	--		--
--	--	--		--
--	--	--		--

检测结果 / Testing Results

表 4：测试 8 强制放电 / Table4: T.8 Forced discharge					P
样品编号 Sample No.	试验前电压 OCV Prior to test (V)	结果 Results	样品编号 Sample No.	试验前电压 OCV Prior to test (V)	结果 Results
C21#	3.043	P	C31#	3.046	P
C22#	3.046	P	C32#	3.064	P
C23#	3.047	P	C33#	3.021	P
C24#	3.021	P	C34#	3.012	P
C25#	3.039	P	C35#	3.037	P
C26#	3.081	P	C36#	3.053	P
C27#	3.053	P	C37#	3.038	P
C28#	3.051	P	C38#	3.027	P
C29#	3.052	P	C39#	3.027	P
C30#	3.063	P	C40#	3.092	P
备注 / Remark: 测试样品在试验过程中和试验后 7 天内无解体，无起火。 Test sample did no disassembly and no fire during the test and within 7 days after the test.					

样品图片/ Sample Photos

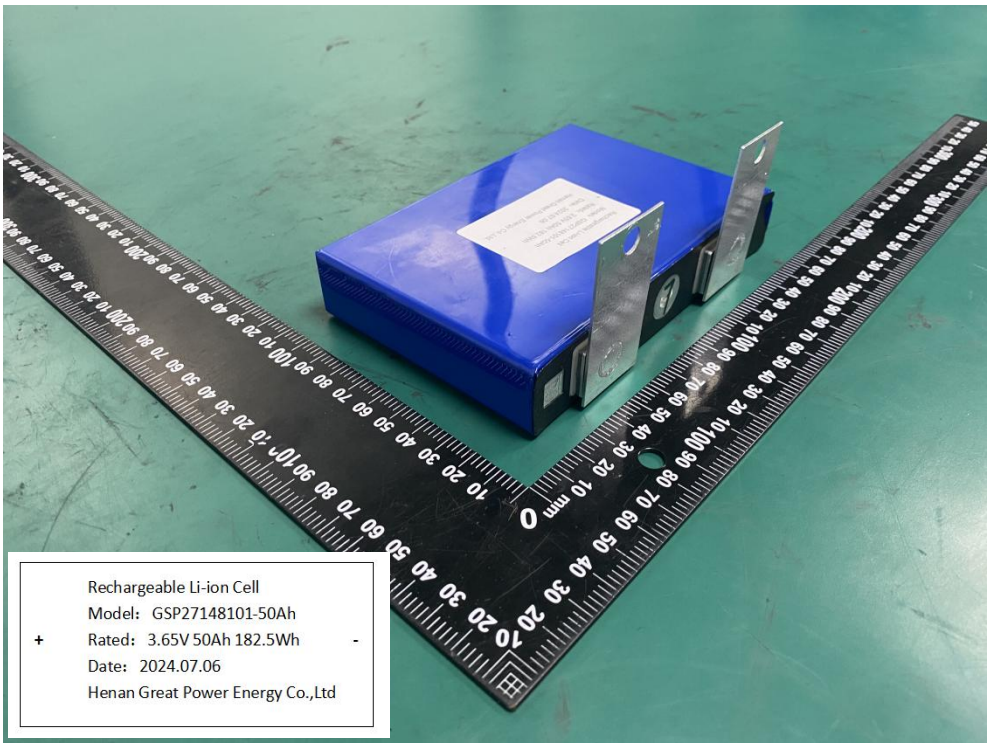


图 1 锂离子电芯正面 Picture 1 Front view of Li-ion Cell

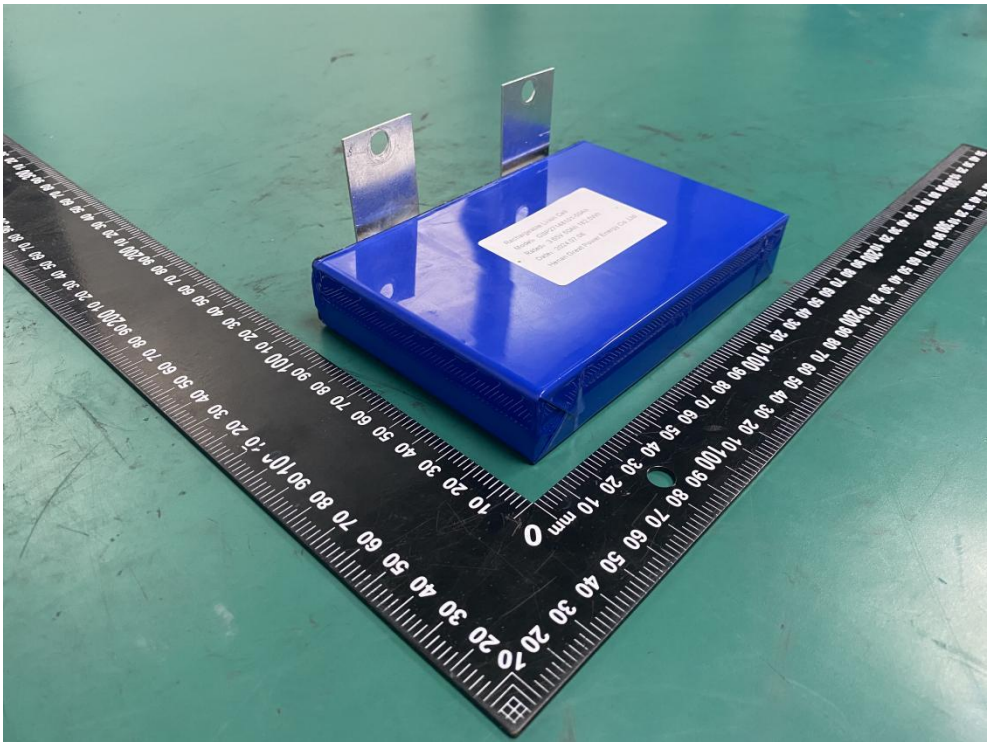


图 2 锂离子电芯侧面 Picture 2 Side view of Li-ion Cell

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