



Test Report

UN38.3

HUNAN HUAXING LITHIUM BATTERY NEW ENERGY CO., LTD.

湖南华兴锂电新能源有限责任公司

Lithium LiFePO4 Cell

磷酸铁锂电芯

32700 6.0AH

Client Name : HUNAN HUAXING LITHIUM BATTERY NEW ENERGY CO., LTD.

委托单位: 湖南华兴锂电新能源有限责任公司

Address : No.399 Jinshui West Road, Ningxiang High-tech Industrial Park,

地址: Changsha, Hunan, 410600 China
湖南省长沙市宁乡市金水西路399号

Prepared By : World Standardization Certification & Testing Group (Shenzhen) Co., Ltd.

编制: 深圳世标检测认证股份有限公司

Address : Building A-B, Baoshi Road, Baoshi Science & Technology Park, Bao' an District, Shenzhen, Guangdong, China

地址: 深圳市宝安区宝石路宝石科技园A-B栋

TEL: 86-755-26996192; FAX: 86-755-86376605

Date of Test 测试日期: 15 May 2023 to 25 June 2023

Date of Issue 签发日期: 29 June 2023

Report number 报告号: WSCT-CNAS-BATT-230600093A-UN

Note: This report shall not be reproduced except in full, without the written approval of World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. This document may be altered or revised by World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.





Test Report

Tested by (+ signature)..... 测试工程师(签名)	孙文辉	
Checked by (+ signature)..... 技术审核(签名)	任宇疆	
Approved by (+ signature)..... 技术总监批准(签名)	柳海棚	
Date of issue 签发日期	29 June 2023 2023年06月29日	
Applicant 申请商	HUNAN HUAXING LITHIUM BATTERY NEW ENERGY CO., LTD.	
Contact (联系方式)	Phone:0731-88310888 website: --	Email:530792915@qq.com
Address 地址	No.399 Jinshui West Road,Ningxiang High-tech Industrial Park, Changsha,Hunan,410600 China	
Manufacturer..... 制造商	HUNAN HUAXING LITHIUM BATTERY NEW ENERGY CO., LTD. 湖南华兴锂电新能源有限责任公司	
Contact (联系方式)	Phone:0731-88310888 website:--	Email:530792915@qq.com
Address 地址	No.399 Jinshui West Road,Ningxiang High-tech Industrial Park, Changsha,Hunan,410600 China 湖南省长沙市宁乡市金水西路399号	
Standard..... 标准	UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend1/Subsection 38.3 联合国《试验和标准手册》(第7版修订1) 38.3节	

Test conclusion 检验结论:

The Lithium LiFePO4 Cell submitted by HUNAN HUAXING LITHIUM BATTERY NEW ENERGY CO., LTD. are tested according to Section 38.3 of Seventh edition of Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.7/Amend1/Subsection 38.3).

由 湖南华兴锂电新能源有限责任公司 送检的磷酸铁锂电芯, 依据联合国《试验和标准手册》(第7版修订1) 38.3节进行检测。

Test result: Pass

检验结果: 通过





Basic information description:	
基本信息描述:	
Name of sample.....	Lithium LiFePO4 Cell
样品名称	磷酸铁锂电芯
Model.....	32700 6.0AH
型号	
Ratings	3.2V 6.0AH 19.2Wh
额定值	
Trade mark.....	/
商标	
Maximum charge voltage.....	3.65V
最大充电电压	
Discharge cut-off voltage.....	2.0V
放电截止电压	
Max. continuous charge current.....	电芯: 6000mA 标充: 6000mA 截止: 300mA
最大连续充电电流	
Max. continuous discharge current...	电芯: 18000mA 标放: 6000mA
最大连续放电电流	
Dimension	电芯高: 70.5mm 直径32.2mm
尺寸	
Mass	电芯: 141.08g
质量	
Shapen of battery/cell	Cylinder
电池/芯形状	圆柱体
Possible test case verdicts:	
报告中可能用到的结论标识:	
Test case does not apply to the test object.....	N/A 不适用
测试项目不适用于该产品	
Test item does meet the requirement.	P(ass) 合格
测试项目符合标准的要求	
Test item does not meet the requirement.....	F(ail) 不合格
测试项目不符合标准的要求	




I、CONCLUSION 结论

ITEM项目	SAMPLE NUMBER样品号	STANDARD标准	CONCLUSION结论
Altitude simulation 高空模拟	C1-C10	UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend1/ Subsection 38.3. 联合国《试验和标准手册》（第7 版修订1）38.3节	P
Thermal test 热测试			P
Vibration 振动			P
Shock 冲击			P
External short circuit 外部短路			P
Impact / Crush 撞击/挤压	C11-C20		P
Overcharge 过度充电	N/A		N/A
Forced discharge 强制放电	C21-C40		P

Notes备注:

ITEM项目	SAMPLE NUMBER样品号	STATE状态
T.1-T.5	C1-C5	at first cycle, in fully charged state 第一个交替充电放电周期完全充电状态
	C6-C10	after 25 cycles ending in fully charged state 第二十五个交替充电放电周期完全充电状态
T.6	C11-C15	at first cycle at 50% of the design rated capacity 第一个交替充电放电周期充电到设计额定容量的50%
	C16-C20	after 25 cycles at 50% of the design rated capacity 第二十五个交替充电放电周期充电到设计额定容量的50%
T.7	N/A	N/A
	N/A	N/A
T.8	C21-C30	at first cycle, in fully discharged state 第一个交替充电放电周期完全放电状态
	C31-C40	after 25 cycles ending in fully discharged state 第二十五个交替充电放电周期完全放电状态





For Question,
Please Contact with WSCT
www.wsct-cert.com

Report No.:WSCT-CNAS-BATT-230600093A-UN

Page 5 of 17

II、THE PHOTO OF SAMPLE 样品图片

Cell 电芯





III、MAIN TEST EQUIPMENT 主要测试设备

NO.编号	Instrument Name 仪器名称
WSCT/BATT-016 WSCT/BATT-026 WSCT/BATT-027	Charge and discharge tester 充放电测试仪
WSCT/BATT-009	CTS 20V10A Charge and discharge tester CTS 20V10A 充放电测试仪
WSCT/BATT-010	CDS 120V100A Charge and discharge tester CDS 120V100A 充放电测试仪
WSCT/BATT-006	Altitude simulation low pressure testing chamber 模拟高空低压试验箱
WSCT/BATT-004	Temperature cycling testing chamber 温度循环试验箱
WSCT/BATT-008	Electrical vibration testing system 电动振动试验系统
WSCT/BATT-017	Drop style shock testing machine 跌落式冲击台
WSCT/BATT-003	Temperature control type battery short circuit testing machine 温控型电池短路试验机
WSCT/BATT-111	Power battery crush testing machine 动力电池挤压试验机
WSCT/BATT-005	Battery heavy impact testing machine 电池重物撞击试验机
WSCT/BATT-015	Programmable DC power supply 可编程直流电源
WSCT/BATT-029	Scales 天平
WSCT/BATT-021	Steel ruler 钢直尺
WSCT/BATT-022	Digital caliper 数显卡尺
WSCT/BATT-020 WSCT/BATT-023 WSCT/BATT-024	Indoor digital temperature and humidity meter 室内数字温湿度计
WSCT/BATT-100 WSCT/BATT-014	Digital multimeter 数字多用表
WSCT/BATT-117	Thermocouple 热电偶





IV、TEST METHOD AND RESULT 测试方法和结果

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.

小型电芯或电池必须按顺序进行试验T1至T5。试验T6至T8应使用未另外试验过的电芯或电池。试验T7可以使用原先在试验T1至T5中使用过的未损坏的电池进行，以便测试交替充电放电的电池。

In order to quantify the mass loss, the following procedure is provided.

$$\text{Mass loss}(\%) = (M_1 - M_2) / M_1 \times 100$$

Where M_1 is the mass before the test and M_2 is the mass after the test, When mass loss does not exceed the values in Table blow, it shall be considered as “no mass loss”.

质量损失量化数值可用下式计算：

$$\text{质量损失}(\%) = (M_1 - M_2) / M_1 \times 100$$

式中 M_1 是试验前的质量， M_2 是试验后的质量。如质量损失不超过下表所列数值，即视为“无质量损失”。

Mass M of cell or battery 电芯或电池质量M	Mass lost limite 质量损失限值
M < 1g	0.5%
1g ≤ M ≤ 75g	0.2%
M > 75g	0.1%

When testing a battery assembly in which the aggregate lithium content of all anodes, when fully charged, is not more than 500 g, or in the case of a lithium ion battery, with a Watt-hour rating of not more than 6200 Wh, that is assembled from batteries that have passed all applicable tests, one assembled battery in a fully charged state shall be tested under tests T.3, T.4 and T.5, and, in addition, test T.7 in the case of a rechargeable battery.

当已通过所有适用试验的电池组用导线连接组成的电池组件在完全充电时所有阳极的合计锂含量小于500 克，或者以锂离子电池而言，电池的瓦特小时额定值低于6200Wh时。已通过所有适用测试的在满电状态下组装的电池应按照T.3、T.4和T.5下进行测试，此外，可充电电电池还应按照T.7进行测试。

When batteries that have passed all applicable tests are electrically connected to form a battery in which the aggregate lithium content of all anodes, when fully charged, is more than 500 g, or in the case of a lithium ion battery, with a Watt-hour rating of more than 6200 Wh, the assembled battery does not need to be tested if the assembled battery is of a type that has been verified as preventing:

1. Overcharge;
2. Short circuits; and
3. Over discharge between the batteries.

当已通过所有适用试验的电池组用导线连接组成的电池组件在完全充电时所有阳极的合计锂含量大于500 克，或者以锂离子电池而言，电池的瓦特小时额定值超过6200Wh时。该电池组件如已证实装有防止其过量充电、短路、或电池组件内之间过量放电的系统，即不需要进行试验。

Test T.1: Altitude simulation 高空模拟

Test procedure 试验程序:

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).

试验电芯和电池在压力不大于11.6kPa和环境温度（20℃±5℃）下存放至少6小时。

Requirement 要求:

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.

如果无漏液、无排气、无解体、无破裂和无着火，且每个试验电芯或电池在试验后的开路电压不低于其在进行这项试验前开路电压的90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放完电状态的试验电芯和电池。

Result 结果:

The samples C1-C10: No leakage, no venting, no disassembly, no rupture and no fire. The data see table 1.
编号为C1-C10的样品：无漏液、无排气、无解体、无破裂和无着火现象，数据见表1。

Test T.2: Thermal test 热测试

Test procedure 测试程序:

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). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

试验电芯和电池在试验温度等于 $72^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 下存放至少6小时，接着在试验温度等于 $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$

下存放至少6小时。两个极端温度之间的最大时间间隔为30分钟。这一过程须重复10次，接着将所有电池在环境温度 $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 下存放24小时。对于大型电芯和电池，暴露于极端试验温度的时间至少应为12小时。

Requirement 要求:

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.

如果无漏液、无排气、无解体、无破裂和无着火，且每个试验电芯或电池在试验后的开路电压不低于其在进行这项试验前开路电压的90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放完电状态的试验电芯和电池。

Result 结果:

The samples C1-C10: No leakage, no venting, no disassembly, no rupture and no fire. The data see table 2.
编号为C1-C10的样品：无漏液、无排气、无解体、无破裂和无着火现象，数据见表2。

Test T.3: Vibration 振动

Test procedure 测试程序:

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 12Kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of $1 g_n$ 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 $8 g_n$ occurs (approximately 50 Hz). A peak acceleration of $8 g_n$ is then maintained until the frequency



is increased to 200 Hz.

For large batteries: from 7 Hz a peak acceleration of 1 g_n 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 g_n occurs (approximately 25 Hz). A peak acceleration of 2 g_n is then maintained until the frequency is increased to 200 Hz.

电芯和电池紧固于振动机平台，但不得造成电芯变形，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个方向重复进行12次，总共为时3小时。

做对数频率扫描，对总质量不足12千克的电芯和电池（电芯和小型电池），和对12千克及更大的电池（大型电池）有所不同。

对电芯和小型电池：从7赫兹开始，保持1g_n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8g_n（频率约为50赫兹）。将最大加速度保持在8g_n直到频率增加到200赫兹。

对大型电池：从7赫兹开始，保持1g_n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2g_n（频率约为25赫兹）。将最大加速度保持在2g_n直到频率增加到200赫兹。

Requirement 要求:

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.

如果试验中和试验后无渗漏、无排气、无解体、无破裂和无着火，并且每个试验电芯或电池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%，电芯和电池即符合本项要求。有关电压的要求不适用与完全放电状态的试验电芯和电池。

Result 结果:

The samples C1-C10: No leakage, no venting, no disassembly, no rupture and no fire. The data see table 3.
编号为C1-C10的样品：无漏液、无排气、无解体、无破裂和无着火现象，数据见表3。

Test T.4: Shock 冲击

Test procedure 测试程序:

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.

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g _n or result of formula	6ms





	$\text{Acceleration}(g_n) = \sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller	
Large batteries	50 g _n or result of formula $\text{Acceleration}(g_n) = \sqrt{\left(\frac{30000}{\text{mass}^*}\right)}$ whichever is smaller	11ms

* Mass is expressed in kilograms

Each cell or battery is 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.

试验电芯和电池用坚硬支架紧固在试验装置上，支架支撑着每个试验电池的所有安装面。

每个电芯须经受峰值加速度150g_n和脉冲持续时间6毫秒的半正弦波冲击。另外，大型电芯须经受峰值加速度50g_n和脉冲持续时间11毫秒的半正弦波冲击。

每个电池需经受半正弦波冲击的峰值加速度取决于电池的质量。小型电池的脉冲持续时间为6毫秒，大型电池为11毫秒。下面提供的公式用来计算适当的最小峰值加速度。

电池	最小峰值加速度	脉冲持续时间
小型电池	150 g _n 或公式的结果，取其较小值 $\text{加速度}(g_n) = \sqrt{\left(\frac{100850}{\text{质量}^*}\right)}$	6毫秒
大型电池	50 g _n 或公式的结果，取其较小值 $\text{加速度}(g_n) = \sqrt{\left(\frac{30000}{\text{质量}^*}\right)}$	11毫秒

* 质量以公斤为单位表示

每个电芯或电池须在三个互相垂直的电芯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。

Requirement 要求:

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.

如果无漏液、无排气、无解体、无破裂和无着火，且每个试验电芯或电池在试验后的开路电压不低于其在进行这项试验前开路电压的90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放完电状态的试验电芯和电池。

Result 结果:

The samples C1-C10: No leakage, no venting, no disassembly, no rupture and no fire. The data see table 4.

编号为C1-C10的样品：无漏液、无排气、无解体、无破裂和无着火现象，数据见表4。



**Test T.5: External short circuit 外部短路****Test procedure 测试程序:**

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57 ± 4 °C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 57 ± 4 °C. 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.

试验电芯和电池在 57 ± 4 °C的环境温度下, 经受外电阻小于0.1欧姆的短路试验, 短路时间持续到电芯或电池壳温度恢复到 57 ± 4 °C后继续至少1小时。

Requirement 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 during the test and within six hours after the test.

如果电芯和电池外表面温度不超过170 °C, 6小时内无解体、无破裂和无着火, 那么电芯和电池适合这要求。

Result 结果:

The samples C1-C10: No disassembly, no rupture and no fire. The data see table 5.

编号为C1-C10的样品: 无解体、无破裂和无着火现象, 数据见表5。

Test T.6: Impact/Crush 撞击/挤压**Test procedure 测试程序:****Impact (applicable to cylindrical cells not less than 18mm in diameter)**

Note: Diameter here refers to the design parameter (for example the diameter of 18650 cells is 18.0mm)

This test sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm diameter bar is to be placed across the center of the sample. A 9.1 kg mass is to be dropped from a height of 61 ± 2.5 cm onto the sample.

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 \pm 0.1 mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

撞击 (适用于直径不小于18毫米的圆柱形电池)

注: 此处直径指设计参数 (例如: 18650电芯的直径为18毫米)

将试验样品用的电芯或元件电芯放在一个平坦光滑的平面上, 将一直径为15.8毫米的横木横过电池中部放置后, 将一质量为9.1千克的物体从 61 ± 2.5 厘米的高度落向样品。

接受撞击的试样, 纵轴应与平坦的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。每一个试样只经受一次撞击。

Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18 mm in diameter)

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 $13 \text{ kN} \pm 0.78 \text{ kN}$;

Example: The force shall be applied by a hydraulic ram with a 32 mm diameter piston until a pressure of 17MPa 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.

挤压（适用于棱柱形、袋装、硬币/纽扣电芯和直径小于18毫米的圆柱形电芯）

将电芯或元件电芯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)施加的力量达到13千牛±0.78千牛；

例如：用一个活塞直径32mm的液压顶施力，直到液压顶的压力达到17兆帕。

(b)电芯的电压下降至少100毫伏；

(c)电芯变形达原始厚度的50%或以上。

一旦达到最大压力、电压下降100毫伏或更多，或电芯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/硬币形电芯应从其平坦表面施压，圆柱形电芯应从与纵轴垂直的方向施压。

每个试样电芯或元件电芯只做一次挤压试验。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芯或元件电芯进行。

Requirement 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.

如果电芯或元件电芯外部最高温度应不过170°C，并且在试验过程中及试验结束后6个小时之内无解体和无着火，电芯和元件电芯即符合本项要求。

Result 结果:

The samples C11-C20: No disassembly and no fire. The data see table 6.

编号为C11-C20的样品：无解体和无着火现象，数据见表6。

Test T.7: Overcharge 过度充电

Test procedure 测试程序:

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.

以2倍制造厂推荐的最大持续充电电流对样品充电，本测试最小电压为：

(a)如果厂家推荐的充电电压不超过18V，本测试的最小充电电压应该是2倍的厂家标定最大充电电压或者22V两者中的较小者

(b)如果厂家推荐的充电电压超过18V，本测试的最小充电电压应该1.2倍的厂家标定最大充电电压
20±5°C的环境温度下，试验持续24小时。

**Requirement 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.

试验样品在试验中和试验后7天内，应无解体和无着火现象发生。

Result 结果: N/A**Test T.8: Forced discharge 强制放电****Test procedure 测试程序:**

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.

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).

在环境温度下，将电芯连接在12V的直流电源上进行强制放电，此直流电源提供给每个电芯初始电流为制造厂指定的最大放电电流。

指定的放电电流通过串联在测试电芯上的合适大小和功率的负载来获得，每个电芯的强制放电时间（小时）为额定容量除以初始电流（安培）。

Requirement 要求:

Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

试验样品在试验中和试验后7天内，应无解体和无着火现象发生。

Result 结果:

The samples C21-C40: No disassembly and no fire. The data see table 8.

编号为C21-C40的样品：无解体和无着火现象，数据见表8。



V、TEST DATA 测试数据

Table 1: Altitude simulation / 表1: 高空模拟

No. 编号	Pre-test 测试前		After test 测试后		Mass loss 质量损失 (%)	Voltage loss 电压 损失(%)	Verdict 判定
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
C1	140.719	3.35	140.715	3.35	0.003	0.00	P
C2	140.422	3.36	140.420	3.36	0.001	0.00	P
C3	140.841	3.35	140.839	3.35	0.001	0.00	P
C4	140.286	3.38	140.284	3.37	0.001	0.30	P
C5	140.625	3.35	140.625	3.35	0.000	0.00	P
C6	140.120	3.38	140.117	3.37	0.002	0.30	P
C7	140.533	3.38	140.530	3.37	0.002	0.30	P
C8	139.641	3.36	139.640	3.36	0.001	0.00	P
C9	140.043	3.38	140.040	3.37	0.002	0.30	P
C10	141.070	3.37	141.069	3.36	0.001	0.30	P

Table 2: Thermal test / 表2: 热测试

No. 编号	Pre-test 测试前		After test 测试后		Mass loss 质量损失 (%)	Voltage loss 电压 损失(%)	Verdict 判定
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
C1	140.715	3.35	140.711	3.34	0.003	0.30	P
C2	140.420	3.36	140.419	3.34	0.001	0.60	P
C3	140.839	3.35	140.836	3.34	0.002	0.30	P
C4	140.284	3.37	140.280	3.35	0.003	0.59	P
C5	140.625	3.35	140.623	3.33	0.001	0.60	P
C6	140.117	3.37	140.116	3.33	0.001	1.19	P
C7	140.530	3.37	140.527	3.34	0.002	0.89	P
C8	139.640	3.36	139.637	3.33	0.002	0.89	P
C9	140.040	3.37	140.036	3.34	0.003	0.89	P
C10	141.069	3.36	141.066	3.34	0.002	0.60	P




Table 3: Vibration / 表3: 振动

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压 损失(%)	Verdict 判定
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
C1	140.711	3.34	140.710	3.34	0.001	0.00	P
C2	140.419	3.34	140.415	3.33	0.003	0.30	P
C3	140.836	3.34	140.833	3.34	0.002	0.00	P
C4	140.280	3.35	140.275	3.35	0.004	0.00	P
C5	140.623	3.33	140.622	3.33	0.001	0.00	P
C6	140.116	3.33	140.111	3.33	0.004	0.00	P
C7	140.527	3.34	140.524	3.34	0.002	0.00	P
C8	139.637	3.33	139.635	3.33	0.001	0.00	P
C9	140.036	3.34	140.035	3.34	0.001	0.00	P
C10	141.066	3.34	141.065	3.34	0.001	0.00	P

Table 4: Shock / 表4: 冲击

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压 损失(%)	Verdict 判定
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
C1	140.710	3.34	140.709	3.33	0.001	0.30	P
C2	140.415	3.33	140.413	3.33	0.001	0.00	P
C3	140.833	3.34	140.829	3.34	0.003	0.00	P
C4	140.275	3.35	140.273	3.34	0.001	0.30	P
C5	140.622	3.33	140.622	3.33	0.000	0.00	P
C6	140.111	3.33	140.110	3.33	0.001	0.00	P
C7	140.524	3.34	140.520	3.34	0.003	0.00	P
C8	139.635	3.33	139.631	3.33	0.003	0.00	P
C9	140.035	3.34	140.033	3.34	0.001	0.00	P
C10	141.065	3.34	141.062	3.33	0.002	0.30	P




Table 5: External short circuit / 表5: 外部短路

No.编号	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Peak temperature 最高温度(°C)	85.9	92.1	91.3	91.2	95.9	90.1	87.9	96.2	94.3	97.7
Verdict 判定	P	P	P	P	P	P	P	P	P	P

Table 6: Crush / 表6: 撞击

No.编号	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
Peak temperature 最高温度(°C)	23.6	23.8	24.6	24.1	24.3	24.9	25.2	24.8	24.6	24.8
Verdict 判定	P	P	P	P	P	P	P	P	P	P

Table 7: Overcharge / 表7: 过度充电

No.编号	B11	B12	B13	B14	B15	B16	B17	B18
Verdict 判定	N/A							

Table 8: Forced discharge / 表8: 强制放电

No.编号	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30
Verdict 判定	P	P	P	P	P	P	P	P	P	P
No.编号	C31	C32	C33	C34	C35	C36	C37	C38	C39	C40
Verdict 判定	P	P	P	P	P	P	P	P	P	P





Attachment附件:

38.3.5 Lithium cell and battery test summary 锂电池芯和锂电池试验概要

The following test summary shall be made available: 需提供以下试验概要

The following information shall be provided in this test summary: 本试验概要需提供以下信息	Summary 概要	Remarks 备注
(a) Name of cell, battery, or product manufacturer, as applicable; 锂电池芯, 锂电池或生产厂商名称 (如适用)	Lithium cell or battery test summary in accordance with sub-section 38.3 of Manual of Tests and Criteria 按照《试验和标准手册》第38.3小节对锂电池或电池组进行试验的情况概要	见第1、2页
(b) Cell, battery, or product manufacturer's contact information to include address, phone number, email address and website for more information; 锂电池芯, 锂电池或生产厂商联系信息应包括地址、电话号码、电子邮箱地址和网址, 以便了解更多信息		见第2页
(c) Name of the test laboratory to include address, phone number, email address and website for more information; 进行试验的实验室名称, 应包括地址、电话号码、电子邮箱地址和网址, 以便了解更多信息		见第1页
(d) A unique test report identification number; 唯一的试验报告识别号码		见页眉
(e) Date of test report; 试验报告的日期		见第1、2页
(f) Description of cell or battery to include at a minimum: 锂电池芯或锂电池说明, 至少包括: 1) Lithium ion or lithium metal cell or battery; 锂离子或锂金属电池芯或电池 2) Mass; 质量 3) Watt-hour rating, or lithium content; 额定瓦时或锂含量 4) Physical description of the cell/battery; and 锂电池芯/电池的物理形状说明: 和 5) Model numbers. 型号		见第3页
(g) List of tests conducted and results (i.e., pass/fail); 所进行的试验及其结果 (即: 通过/未通过) 一览表		见第4页
(h) Reference to assembled battery testing requirements, if applicable (i.e. 38.3.3 (f) and 38.3.3 (g)) ; 关于集成锂电池试验要求 (如适用) 的参考信息 (即38.3.3 (f) 和38.3.3 (g))		见第9页
(i) Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any; and 关于所用《试验和标准手册》修订版本及对该版本的任何修改的参考信息。		见第2页
(j) Signature with name and title of signatory as an indication of the validity of information provided. 签字, 并附签字者姓名和职衔, 以证明所提供信息属实		见第2页

*** End of report***

