NCT Technology

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检测
TESTING
CNAS L8251

UN38.3 检测报告

UN38.3 Test Report

Client 委托方	Shenzhen Huanyuyuan Technology Co., Ltd 深圳市环宇源科技有限公司
Add. of Client 委托方地址	Block 72C, Dongyuan Industrial Park, No.28 Beihuan Road West, Longteng Area, Shiyan town, Bao' an District, Shenzhen, P.R. China 深圳市宝安区石岩街道龙腾社区北环路西 28 号东原厂厂房 72 栋 C
Samples Description 样品名称	Li-ion Battery 锂离子电池
Model/Type 型号规格	18650 7.4V 2000mAh
Testing Laboratory 测试机构	Shenzhen NCT Testing Technology Co., Ltd. 深圳诺测检测技术有限公司 1 / F, No. B Building, Mianshang Younger Pioneer Park, Hangcheng Road, Gushu Xixiang Street, Baoan District, Shenzhen, Guangdong, China 中国广东省深圳市宝安区西乡街道固戍航城大道绵商青年创业园 B 栋第 1 层
Report No. 报告编号	NCT19016211XB1-1
Issued Date 发行日期	Apr. 25, 2019
Test Conclusion 测试结论: **Shown in the Conclusion of test report. 见检测报告结论页.**	

Tested by 主检人: Vide Fan.

Approved by 批准人:

Inspected by 审核人: Hely Wang

Seal of NCT 报告单位（签章）:

Date of Issue 签发日期: 2019. 04. 25

Ⅰ、Sample Description 样品描述

Product Name 产品名称	Li-ion Battery 锂离子电池		**Sample Model** 样品型号	18650 7.4V 2000mAh	
Manufacturer 制造商	Shenzhen Huanyuyuan Technology Co., Ltd 深圳市环宇源科技有限公司				
Address 地址	Block 72C, Dongyuan Industrial Park, No.28 Beihuan Road West, Longteng Area, Shiyan town, Bao' an District, Shenzhen, P.R. China 深圳市宝安区石岩街道龙腾社区北环路西 28 号东原厂厂房 72 栋 C				
Factory 工厂	Shenzhen Huanyuyuan Technology Co., Ltd 深圳市环宇源科技有限公司				
Address 地址	Block 72C, Dongyuan Industrial Park, No.28 Beihuan Road West, Longteng Area, Shiyan town, Bao' an District, Shenzhen, P.R. China 深圳市宝安区石岩街道龙腾社区北环路西 28 号东原厂厂房 72 栋 C				
Manufacturer's contact information 制造商联系信息	**Phone number** 电话号码		**Email address** 电子邮箱地址	**Website** 网址	
	+86-755-29686393		----	----	
Trade Mark 商标	----	**Cell Shape** 电芯形状	Cylindrical 圆柱形	**Battery Size** 电池尺寸 (L×W×T)Max	(67.0×38.0×21.0)mm
Nominal Voltage 标称电压	7.4V	**Rated Capacity** 额定容量	2000mAh 14.8Wh	**Limited Charge Voltage** 充电限制电压	8.4V
Standard Charge Current 标准充电电流	400mA	**Maximum Continuous Charge Current** 最大持续充电电流	2000mA	**End Charge Current** 结束充电电流	100mA
Cut-off Voltage 放电截止电压	6.0V	**Standard Discharge Current** 标准放电电流	400mA	**Maximum Discharge Current** 最大放电电流	2000mA
Cells Number 组成电芯数量	2PCS		**Cell Model** 电芯型号	SZNS18650-2000	
Sample Mass 样品重量	90.0g		**Sample Physical description** 样品物理形态	Blue, Prismatic 蓝色,棱柱形	
Receiving Date 接收日期	Apr. 08, 2019		**Completing Date** 完成日期	Apr. 24, 2019	

Ⅱ、Standard 标准

UNITED NATIONS "Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria" (ST/SG/AC.10/11/Rev.6/Amend.1 Section 38.3)

联合国《关于危险货物运输的建议书 实验和标准手册》第六修订版修正 1 第 38.3 节。

Ⅲ、Test Item 测试项目

T.1.	☒Altitude simulation 高度模拟	T.5.	☒External short circuit 外部短路
T.2.	☒Thermal test 温度试验	T.6.	☒Impact / ☐Crush 撞击/挤压
T.3.	☒Vibration 振动	T.7.	☒Overcharge 过充电
T.4.	☒Shock 冲击	T.8.	☒Forced discharge 强制放电

Ⅳ、Test Method and Requirement 测试方法和要求

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. 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.

用相同的电芯或电池按照顺序进行试验 T.1 至 T.5。试验 T.6 至 T.8 用没有进行其他试验的电芯。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。

Batteries of B1#~B4# 、B9#~B12# are full charged after one cycle;

Batteries of B5#~B8# 、B13#~B16# are full charged after twenty-five cycles;

Component cells of C1#~C5# are 50% charged after one cycle;

Component cells of C6#~C10# are 50% charged after twenty-five cycles;

Component cells of C11#~C20# are full discharged after one cycle;

Component cells of C21#~C30# are full discharged after twenty-five cycles;

Test environment condition: ambient temperature: 15-25℃, ambient humidity: 40-70%

电池 B1#~B4# , B9#~B12#为 1 次循环满电状态；

电池 B5#~B8#, B13#~B16#为 25 次循环满电状态；

组成电芯 C1#~C5#为 1 次循环后 50%充电状态；

组成电芯 C6#~C10#为 25 次循环后 50%充电状态；

组成电芯 C11#~C20#为 1 次循环完全放电状态；

组成电芯 C21#~C30#为 25 次循环完全放电状态；

试验环境条件：环境温度：15-25℃，环境湿度：40-70%

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

$$\text{Mass loss (\%)} = (M1-M2)/M1 \times 100$$

质量损失的量化值，可用以下公式计算：

$$\text{质量损失(\%)} = (M1-M2)/M1 \times 100$$

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 shall be considered as "no mass loss".

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"。

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

Leakage means the visible escape of electrolyte or other material from a cell or battery or the loss of material (except battery casing, handling devices or labels) from a cell or battery such that the loss of mass exceeds the values in Table above.

渗漏系指可以看到的电解液或者其他物质从电芯或者电池中漏出，或电芯或电池中的物质损失（不包括电池外壳、搬运装置、或标签），失去的质量超过上表所列的数值。

In test T.1 to T.4, 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.

在测试 T.1 至 T.4 中，电芯和电池须满足无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或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%。

T.1. Altitude simulation 高度模拟

Test method 测试方法

Test cells and batteries are stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20±5℃).

试验电芯和电池被放置在压力等于或低于 11.6 kPa 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.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或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%。

T.2. Thermal test 温度试验

Test method 测试方法

Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2℃, followed by storage for at least six hours at a test temperature equal to -40±2℃. 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℃). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

试验电芯和电池放置在试验温度等于 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 次循环，接着将所有试验电芯和电池在环境温度(20±5℃)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.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或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%。

T.3. Vibration 振动

Test method 测试方法

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.

电芯和电池紧固于振动台台面，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 Hz 和 200 Hz 之间，再回到 7 Hz，跨度为 15 分钟。这一振动过程须对三个互相垂直的电芯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。

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).

作对数式频率扫描，对电芯和总质量不超过 12 千克的电池（电芯和小型电池），和对质量超过 12 千克的电池（大型电池）有所不同。

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.

对电芯和小型电池：从 7 Hz 开始，保持 1 gn 的最大加速度，直到频率达到 18 Hz。然后将振幅保持在 0.8mm（总位移 1.6mm），并增加频率直到峰值加速度达到 8 gn（频率约为 50 Hz）。将峰值加速度保持在 8 gn 直到频率增加到 200 Hz。

For large 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 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200 Hz.

对大型电池：从 7 Hz 开始，保持 1 gn 的最大加速度，直到频率达到 18 Hz。然后将振幅保持在 0.8mm（总位移 1.6mm），并增加频率直到峰值加速度达到 2 gn（频率约为 25Hz）。将峰值加速度保持在 2 gn 直到频率增加到 200 Hz。

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.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或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%。

T.4. Shock 冲击

Test method 测试方法

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.

试验电芯和电池用刚性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。

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

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

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.

每个电池须经受半正弦波冲击，峰值加速度需要根据电池的重量来决定。小型电池的脉冲持续时间为 6 ms，大型电池的脉冲持续时间为 11ms。下面的公式是用来计算合适的最小峰值加速度。

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.

电池	最小峰值加速度	脉冲持续时间
小型电池	150 gn 或计算结果中取最小的值 加速度（gn）= $\sqrt{(\frac{100850}{mass})}$	6ms
大型电池	50 gn 或计算结果中取最小的值 加速度（gn）= $\sqrt{(\frac{30000}{mass})}$	11 ms

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.

每个电芯或电池须在三个互相垂直的电芯或电池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.

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或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%。

T.5. External short circuit 外部短路

Test method 测试方法

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℃, 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℃ shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.

试验电芯或电池需要加热一段时间，以使其外壳温度均匀稳定地达到 57±4℃。加热时间的长短是由电芯或电池的尺寸和设计来决定的，这个加热时间需要评估并记录。如果这个加热时间不好评估的话，对于小电芯和小电池需要在此温度下放置至少 6 个小时，对于大电芯和大电池至少放置 12 个小时。然后使电芯或电池在 57±4℃下经受总外电阻小于 0.1Ω 的短路条件。

This short circuit condition is continued for at least one hour after the cell or battery external case

temperature has returned to 57±4℃, 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.

短路测试持续到电芯或电池外壳温度回到 57±4℃后至少持续 1 小时，针对大电池，外壳温度需要下降到测试过程中监控到的最大温度的一半以下。

The short circuit and cooling down phases shall be conducted at least at ambient temperature.

短路测试和冷却阶段至少应该在环境温度下进行。

Requirement 要求

Cells and batteries meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly, no rupture and no fire during the test and within six hours after test.

电芯和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、无破裂，无起火。

T.6. Impact / Crush 撞击/挤压

Test procedure – Impact (applicable to cylindrical cells not less than 18.0 mm in diameter)

测试步骤 – 撞击（适用于直径大于等于 18.0 毫米以上的圆柱形电芯）

The test 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.

试样电芯或电芯组件放在平坦光滑表面上，一根 316 型不锈钢棒横放在试样中心，钢棒直径 15.8 毫米±0.1 毫米，长度至少 6 厘米，或电芯最长端的尺度，取二者之长者。将一块 9.1 千克±0.1 千克的重锤从 61±2.5 厘米高度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。

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.

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。

Test procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter)

测试步骤– 挤压（适用于棱柱形，袋状，硬币/纽扣电芯和圆柱形电芯直径小于 18.0 毫米）

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.

将电芯或电芯组件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 cm/s。挤压持续进行，直到出现以下三种情况之一：

(a) The applied force reaches 13 kN ± 0.78 kN;

(b) The voltage of the cell drops by at least 100 mV;

(c) The cell is deformed by 50% or more of its original thickness.

(a)施加的力达到 13 kN ± 0.78 kN；

(b)电芯的电压下降至少 100mV；

(c)电芯形变达到原始厚度的 50%或更多。

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.

一旦达到最大压力、电压下降 100mV 或更多，或电芯形变至少达到原始厚度的 50%，即可解除压力。

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.

棱柱形或袋装电芯须从最宽的面施压。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。

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.

每个试样电芯或电芯组件只做一次挤压试验。试样须继续观察 6 小时。试验须使用之前未做过其他试验的试样电芯或电芯组件进行。

Requirement 要求

Cell and component cells meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly and no fire during the test and within six hours after test.

电芯和电芯组件外壳温度不超过 170℃，并且在试验过程中及试验后 6 小时内无解体，无起火。

T.7. Overcharge 过充电

Test method 测试方法

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

充电电流为制造商推荐的最大持续充电电流的两倍。试验的最小电压如下：

(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.

(a) 制造商推荐的充电电压不大于 18 伏时，试验的最小电压应是电池最大充电电压的两倍或 22 伏两者中的较小者。

(b) 制造商推荐的充电电压大于 18 伏时，试验的最小电压应是电池最大充电电压的 1.2 倍。

Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

试验应在环境温度下进行。进行试验的时间应为 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.

充电电池应在试验过程中和试验后 7 天内无解体，无起火。

T.8. Forced discharge 强制放电

Test method 测试方法

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.

每个电芯在环境温度下与 12V 直流电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。

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 is forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

试样电芯与一个适当大小的电阻负载串联以调节到规定大小的放电电流。每个电芯的放电时间（单位为 h）等于电芯的额定容量除以试验初始放电电流（单位 A）。

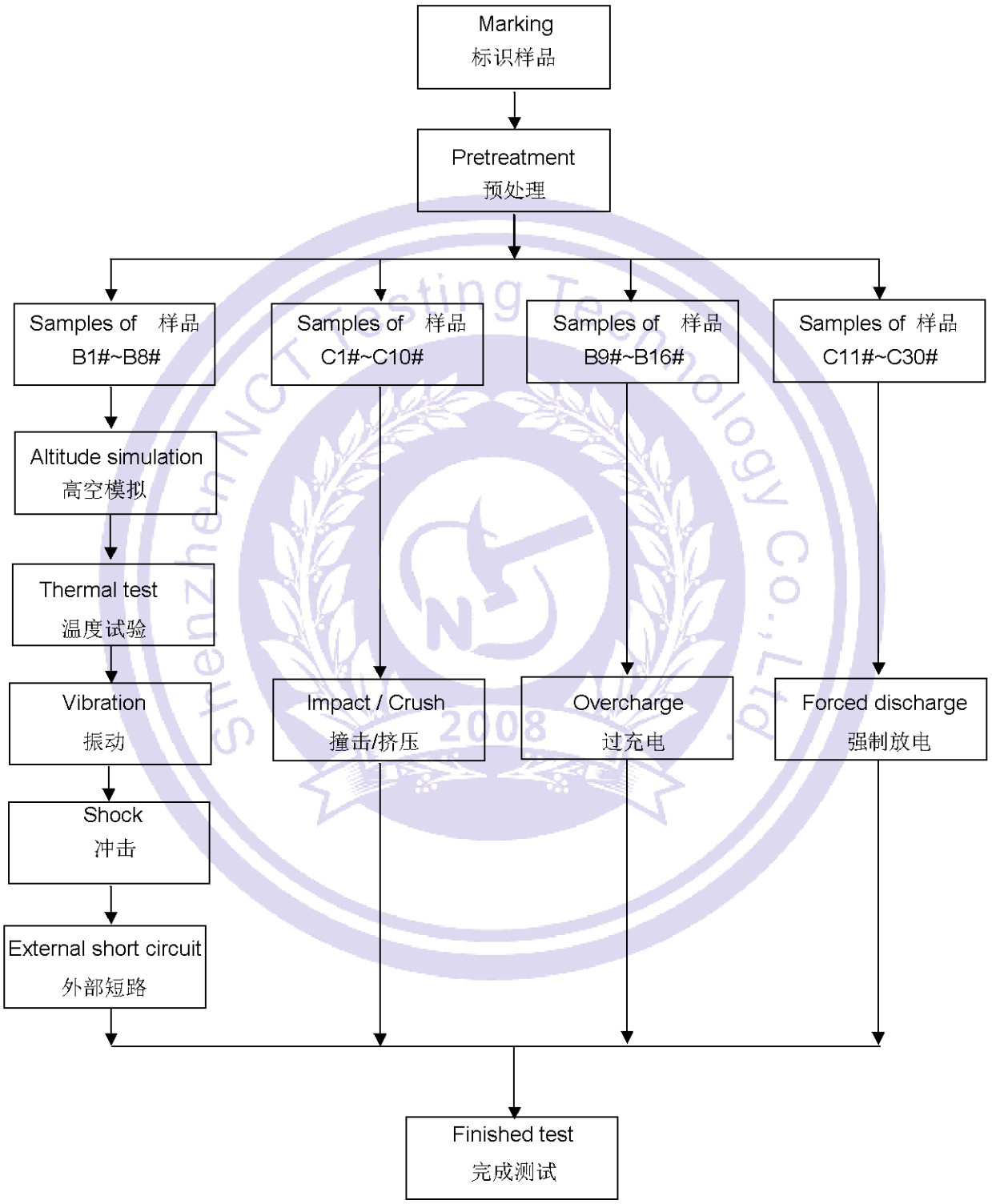
Requirement 要求

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.

原电芯或充电电芯应在试验过程中和试验后 7 天内无解体，无起火。

Ⅴ、Test Procedure 测试流程



Ⅵ、Main Test Apparatus 主要测试仪器

Serial No. 设备编号	Name of Equipment 设备名称	Model 型号	Calibration Date /Due Date 校准日期/到期日
NCT-011	Charge and discharge testing system 充放电测试系统	R2D6-20V-10A	2019. 01. 11 2020. 01. 10
NCT-012	Low-pressure high-altitude simulation test chamber 低压高空模拟试验箱	GX-3020-Z	2019. 01. 11 2020. 01. 10
NCT-017	Constant temperature and humidity test chamber 恒温恒湿试验箱	GX-3000-150LT	2019. 01. 11 2020. 01. 10
NCT-021	Vibration test instrument 振动测试仪器	ES-3-150	2019. 01. 11 2020. 01. 10
NCT-022	Shock test instrument 冲击测试仪器	SY10-2	2018. 08. 20 2019. 08. 19
NCT-018	Battery short circuit test instrument 电池短路测试仪器	BE-1000W	2019. 01. 11 2020. 01. 10
NCT-019	Impact test instrument 撞击测试仪器	BE-5066	2019. 01. 11 2020. 01. 10
NCT-020	Crush test instrument 挤压测试仪器	BE-6045T	2018. 07. 02 2019. 07. 01
NCT-033	DC regulated power supply 直流稳压电源	PS1540	2019. 01. 11 2020. 01. 10
NCT-016	Battery anti-explosion chamber 电池防爆箱	GX-FB-200	-- --
NCT-003	Electronic Scale 电子秤	JC-223S	2019. 01. 11 2020. 01. 10
NCT-053	Electronic Scale 电子秤	JA-4100	2018. 08. 04 2019. 08. 03
NCT-001	Digital Multimeter 数字万用表	17B+	2019. 01. 11 2020. 01. 10
NCT-029	Temperature recorder 温度记录仪	34970A	2019. 01. 11 2020. 01. 10

Ⅶ、Test Data 测试数据

T.1. Altitude simulation 高度模拟

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 1 次循环后满电状态	B1#	89.886	8.385	89.879	8.373	0.008	99.857	Pass 合格
	B2#	89.887	8.378	89.879	8.366	0.009	99.857	Pass 合格
	B3#	90.113	8.383	90.107	8.372	0.007	99.869	Pass 合格
	B4#	89.732	8.385	89.724	8.371	0.009	99.833	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B5#	89.830	8.378	89.824	8.367	0.007	99.869	Pass 合格
	B6#	89.643	8.381	89.635	8.368	0.009	99.845	Pass 合格
	B7#	90.053	8.382	90.046	8.371	0.008	99.869	Pass 合格
	B8#	90.007	8.387	89.999	8.373	0.009	99.833	Pass 合格

Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.1℃
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后，电池未渗漏、未泄气、未解体、未破裂和未起火。

T.2. Thermal test 温度试验

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 1 次循环后满电状态	B1#	89.879	8.373	89.852	8.317	0.030	99.331	Pass 合格
	B2#	89.879	8.366	89.848	8.307	0.034	99.295	Pass 合格
	B3#	90.107	8.372	90.082	8.317	0.028	99.343	Pass 合格
	B4#	89.724	8.371	89.699	8.315	0.028	99.331	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B5#	89.824	8.367	89.796	8.309	0.031	99.307	Pass 合格
	B6#	89.635	8.368	89.610	8.312	0.028	99.331	Pass 合格
	B7#	90.046	8.371	90.016	8.310	0.033	99.271	Pass 合格
	B8#	89.999	8.373	89.971	8.315	0.031	99.307	Pass 合格

Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.2℃
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后，电池未渗漏、未泄气、未解体、未破裂和未起火。

T.3. Vibration 振动

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 1 次循环后满电状态	B1#	89.852	8.317	89.841	8.299	0.012	99.784	Pass 合格
	B2#	89.848	8.307	89.838	8.292	0.011	99.819	Pass 合格
	B3#	90.082	8.317	90.071	8.299	0.012	99.784	Pass 合格
	B4#	89.699	8.315	89.690	8.302	0.010	99.844	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B5#	89.796	8.309	89.785	8.292	0.012	99.795	Pass 合格
	B6#	89.610	8.312	89.601	8.298	0.010	99.832	Pass 合格
	B7#	90.016	8.310	90.007	8.297	0.010	99.844	Pass 合格
	B8#	89.971	8.315	89.960	8.297	0.012	99.784	Pass 合格

Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.3℃
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后，电池未渗漏、未泄气、未解体、未破裂和未起火。

T.4. Shock 冲击

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 1 次循环后满电状态	B1#	89.841	8.299	89.836	8.290	0.006	99.892	Pass 合格
	B2#	89.838	8.292	89.835	8.286	0.003	99.928	Pass 合格
	B3#	90.071	8.299	90.066	8.290	0.006	99.892	Pass 合格
	B4#	89.690	8.302	89.687	8.295	0.003	99.916	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B5#	89.785	8.292	89.780	8.283	0.006	99.891	Pass 合格
	B6#	89.601	8.298	89.598	8.293	0.003	99.940	Pass 合格
	B7#	90.007	8.297	90.002	8.290	0.006	99.916	Pass 合格
	B8#	89.960	8.297	89.957	8.292	0.003	99.940	Pass 合格

Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.4℃
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后，电池未渗漏、未泄气、未解体、未破裂和未起火。

T.5. External short circuit 外部短路

The state of cells 样品状态	No. 编号	External Peak temperature(℃) 电池表面最高温度(℃)	Status 结果
Full charged after one cycle 1 次循环后满电状态	B1#	57.8	Pass 合格
	B2#	58.2	Pass 合格
	B3#	57.9	Pass 合格
	B4#	58.4	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B5#	57.8	Pass 合格
	B6#	58.3	Pass 合格
	B7#	58.1	Pass 合格
	B8#	58.2	Pass 合格
Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.2℃ There is no disassembly, no rupture and no fire during the test and within six hours after test. 电池在测试中和测试后 6 小时内未解体、未破裂，未起火。			

T.6. Crush 挤压

The state of cells 样品状态	No. 编号	External Peak temperature(℃) 电池表面最高温度(℃)	Status 结果
50% charged after one cycle 1 次循环后 50%充电状态	C1#	110.2	Pass 合格
	C2#	114.5	Pass 合格
	C3#	105.6	Pass 合格
	C4#	107.1	Pass 合格
	C5#	118.2	Pass 合格
50% charged after twenty-five cycles 25 次循环后 50%充电状态	C6#	116.7	Pass 合格
	C7#	119.1	Pass 合格
	C8#	105.8	Pass 合格
	C9#	113.7	Pass 合格
	C10#	108.5	Pass 合格
Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.3℃ There is no disassembly and no fire during the test and within six hours after test. 电芯在测试中和测试后 6 小时内未解体、未起火。			

T.7. Overcharge 过充电

The state of cells 样品状态	No. 编号	Status 结果
Full charged after one cycle 1 次循环后满电状态	B9#	Pass 合格
	B10#	Pass 合格
	B11#	Pass 合格
	B12#	Pass 合格
Full charged after twenty-five cycles 25 次循环后满电状态	B13#	Pass 合格
	B14#	Pass 合格
	B15#	Pass 合格
	B16#	Pass 合格
Notes 注释: Atmospheric pressure 大气压强:1.013×10^{5}Pa, Ambient temperature 环境温度: 23.3℃ 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后 7 天内未解体，未起火。		

T.8. Forced discharge 强制放电

The state of cells 样品状态	No. 编号	Status 结果
Full discharged after one cycle 1 次循环完全放电状态	C11#	Pass 合格
	C12#	Pass 合格
	C13#	Pass 合格
	C14#	Pass 合格
	C15#	Pass 合格
	C16#	Pass 合格
	C17#	Pass 合格
	C18#	Pass 合格
	C19#	Pass 合格
	C20#	Pass 合格
Full discharged after twenty-five cycles 25 次循环完全放电状态	C21#	Pass 合格
	C22#	Pass 合格
	C23#	Pass 合格
	C24#	Pass 合格
	C25#	Pass 合格
	C26#	Pass 合格
	C27#	Pass 合格

	C28#	Pass 合格
	C29#	Pass 合格
	C30#	Pass 合格

Notes 注释: Atmospheric pressure 大气压强:1.013×10^5Pa, Ambient temperature 环境温度: 23.1℃
There is no disassembly and no fire during the test and within seven days after the test.
电芯在测试中和测试后 7 天内未解体，未起火。

Ⅷ、Conclusion 结论

No. 编号	Test item 测试项目	Sample number 样品数量	Test reference 测试参考	Conclusion 结论
1	Altitude simulation 高空模拟	B1#~B8#	UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.1 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.1 节	Pass 合格
2	Thermal test 温度试验		UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.2 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.2 节	Pass 合格
3	Vibration 振动		UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.3 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.3 节	Pass 合格
4	Shock 冲击		UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.4 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.4 节	Pass 合格
5	External short circuit 外部短路		UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.5 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.5 节	Pass 合格
6	Impact/Crush 撞击/挤压	C1#~C10#	UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.6 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.6 节	Pass 合格
7	Overcharge 过度充电	B9#~B16#	UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.7 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.7 节	Pass 合格
8	Forced discharge 强制放电	C11#~C30#	UN Manual of Test and Criteria, part Ⅲ, subsection 38.3.4.8 UN 试验和标准手册,第Ⅲ部分,第 38.3.4.8 节	Pass 合格

The submitted samples were complied with the stated requirements of UN manual of test and criteria, part Ⅲ, subsection 38.3

经检测，提交的测试样品均符合 UN38.3 的要求，测试结论为合格。

Ⅸ、Photo of The Sample 样品图片

Model 型号: 18650 7.4V 2000mAh

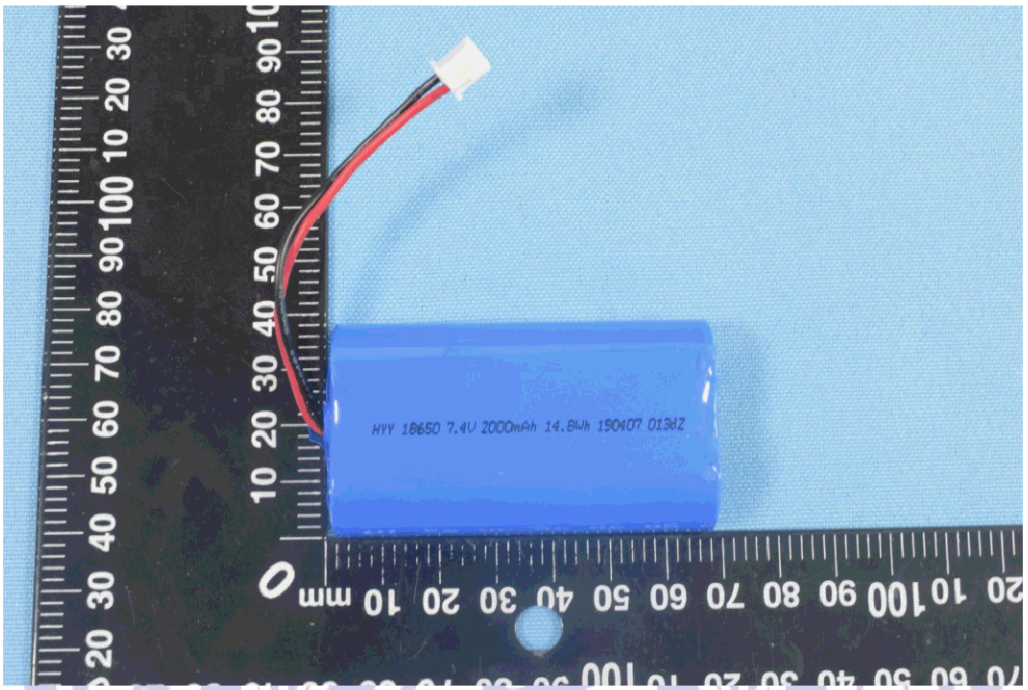


Photo 1 Front 正面

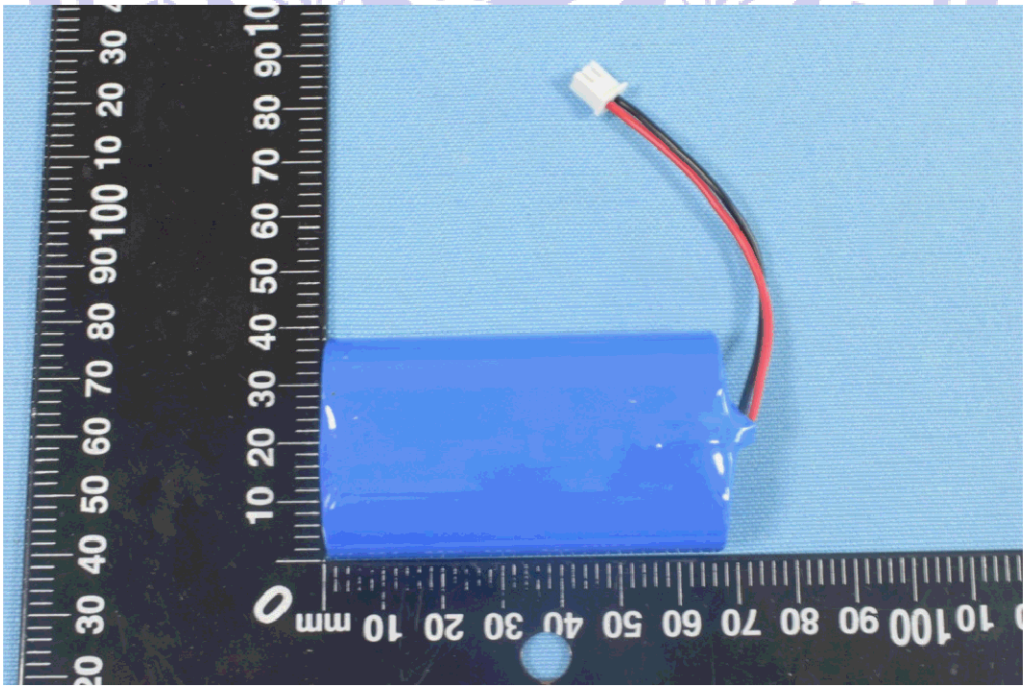


Photo 2 Rear 反面

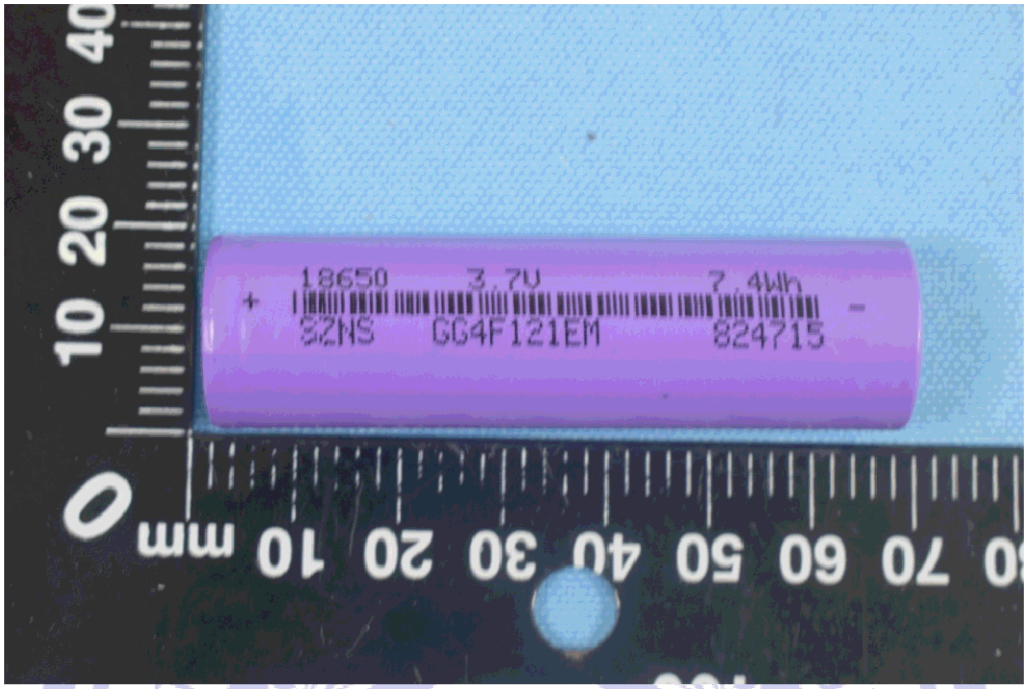


Photo 3 Internal Cell 内部电芯

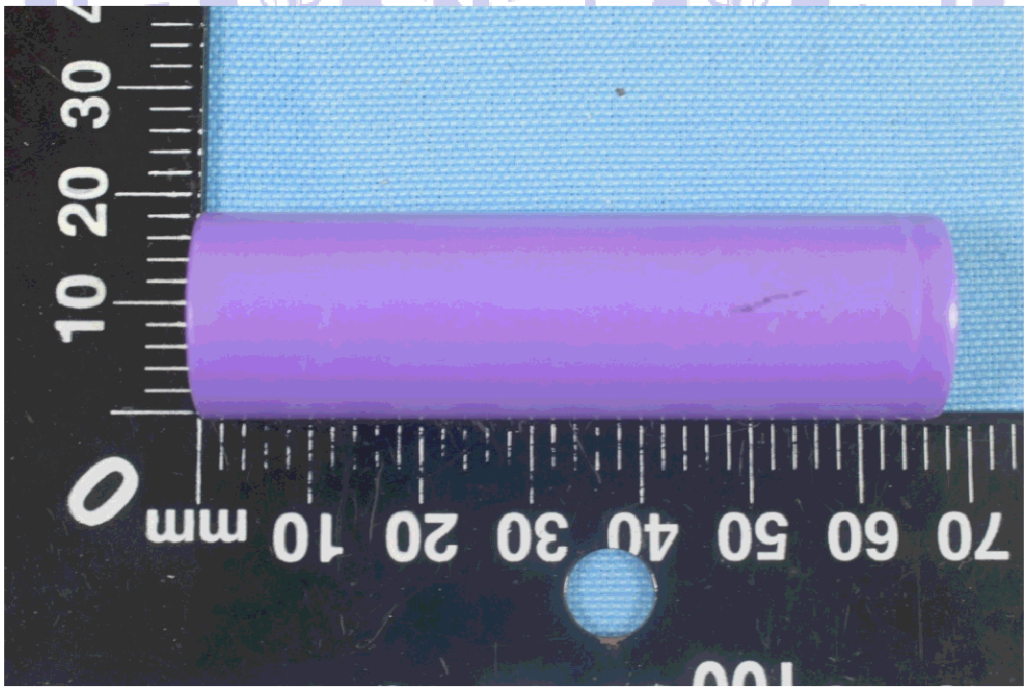


Photo 4 Internal Cell 内部电芯

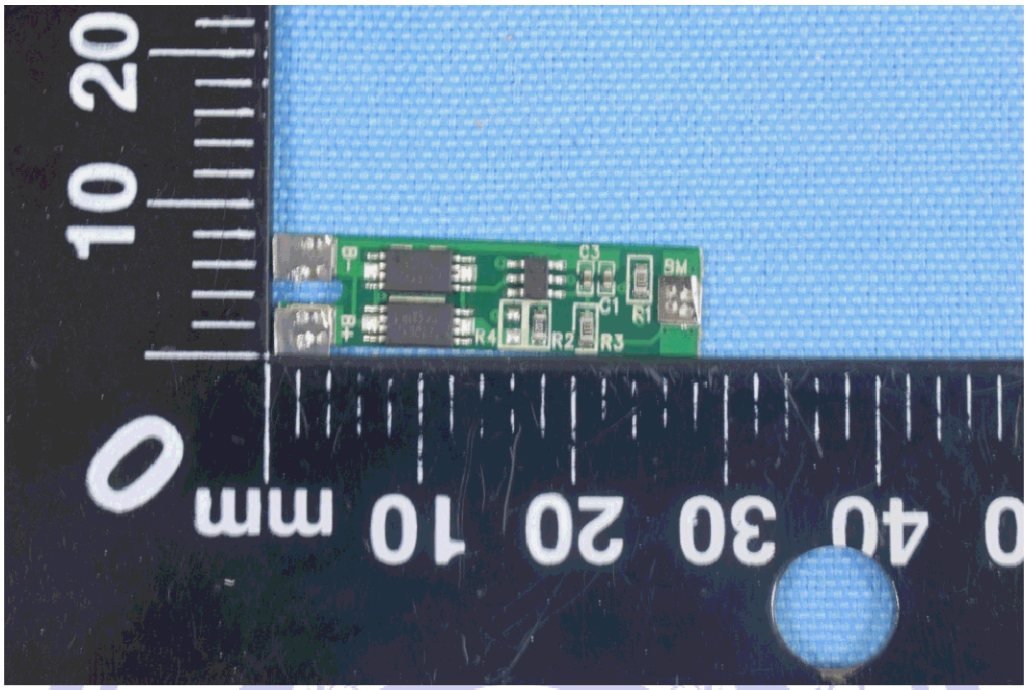


Photo 5 Protection board 保护板

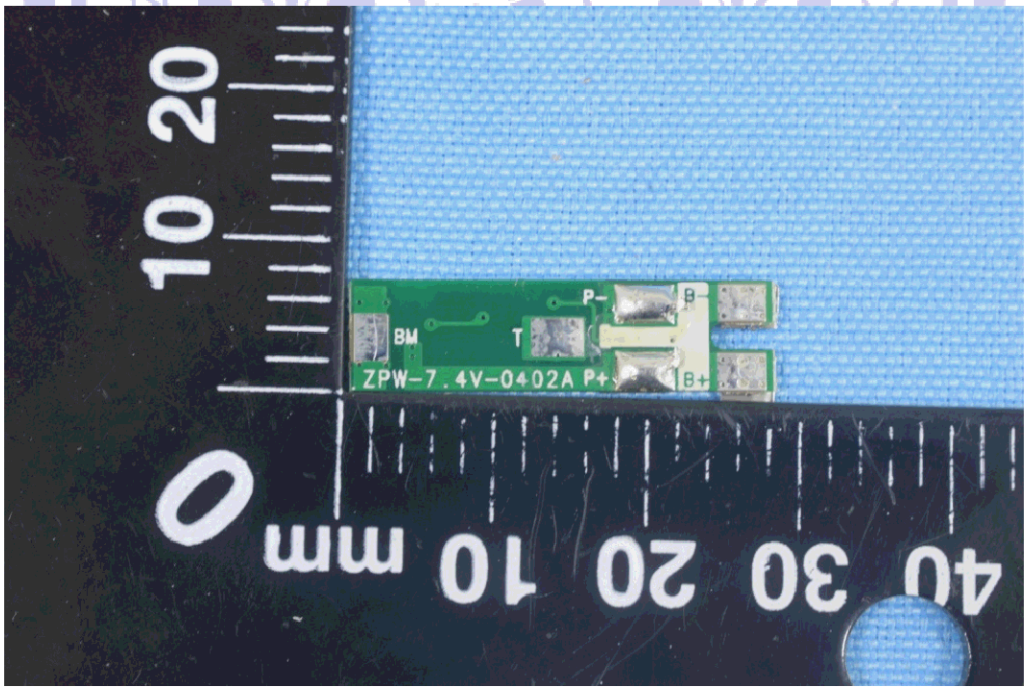


Photo 6 Protection board 保护板

注意事项

Important Notice

1. The test report is invalid without the official stamp of NCT.
   本报告书无 NCT 盖章无效.
2. Nobody is allowed to photocopy or partly photocopy this test report without written permission of NCT.
   未经 NCT 书面同意，不得复制或部分地复制本报告书。
3. The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
   本报告书无批准人、审核人、及主检人签名无效。
4. The report is invalid when anything of following happens – illegal transfer, reproduce, embezzlement, imposture, modification or tampering in any media form.
   私自转让、复制、盗用、冒用、涂改、或以任何媒体形式篡改的报告书无效。
5. Objections to the test report must be submitted to NCT within 15 days.
   对报告书若有异议，应于收到报告之日起 15 天内向本公司提出。
6. The test report is valid for the tested samples only.
   本报告仅对测试样品有效。
7. The Chinese contents in this report are only for reference.
   本报告中的中文内容仅供参考。

********End of Report 报告结束********

化学品安全技术说明书（MSDS）

委托方 Client	广西东来新能源科技有限公司 Guangxi Donglai New Energy Technology Co. LTD
委托方地址 Add. of Client	广西壮族自治区崇左市大新县桃城镇迎宾大道延长线（星光和乐城南侧） (South of Xingguang Hele City)Extension of Yingbin Avenue, Taocheng Town, Daxin County, Chongzuo City, Guangxi, P.R.China
样品名称 Description	可充电锂离子电芯 Rechargeable Lithium Ion Cell
型号规格 Model/Type	18650-2000mAh
标称电压 Nominal Voltage	3.7V
额定容量 Rated Capacity	2000mAh
额定能量 Rated Energy	7.4Wh
制造厂 Manufacturer	广西东来新能源科技有限公司 Guangxi Donglai New Energy Technology Co. LTD
制造厂地址 Add. Of Manufacturer	广西壮族自治区崇左市大新县桃城镇迎宾大道延长线（星光和乐城南侧） (South of Xingguang Hele City)Extension of Yingbin Avenue, Taocheng Town, Daxin County, Chongzuo City, Guangxi, P.R.China
技术依据 Reference documents	ISO 11014:2009 化学品安全技术说明书—内容和项目顺序 ISO 11014:2009 Safety data sheet for chemical products-Content and order of sections GB/T 16483-2008 化学品安全技术说明书 内容和项目顺序 GB/T 16483-2008 Safety data sheet for chemical products-Content and order of sections 国际航空运输协会《危险品规则》（第 65 版） IATA Dangerous Goods Regulation (65th) 国际海事组织《国际海运危险货物规则》（第 41-22 版） IMO International Maritime Dangerous Goods Code (41-22 edition)

出版日期 Date of Receipt	2023 年 12 月 16 号
生效日期 Effective Date	2024 年 01 月 01 号

编写：

审核：

一． 样品信息 Sample information

样品名称 Sample Name	可充电锂离子电芯 Rechargeable Lithium Ion Cell	样品型号 Type	18650-2000mAh
标称电压 Nominal voltage	3.7V	额定容量 Rated capacity	2000mAh
样品外观 Shape	圆柱形 Cylindrical		

二．内容与说明 Content and instructions

1. 化学品及企业标识 Chemical product and company identification

化学品的名称 Name of chemical product		可充电锂离子电芯 Rechargeable Lithium Ion Cell
制造商 Manufacturer	名称 Name	广西东来新能源科技有限公司 Guangxi Donglai New Energy Technology Co. LTD
	地址 Address	广西壮族自治区崇左市大新县桃城镇迎宾大道延长线（星光和乐城南侧） (South of Xingguang Hele City)Extension of Yingbin Avenue, Taocheng Town, Daxin County, Chongzuo City, Guangxi, P.R.China
	电话号码 Telephone number	+86-15310186028
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这份 MSDS 报告由东莞市中认联科检测技术有限公司签发；
This MSDS was prepared by Dongguan ZRLK Testing Technology Co., Ltd.

2. 危险性概述 Hazards identification

1) 主要的物理及化学危险性 Important Physical and chemical hazards

在强压变形、拆解、短路时有起火爆炸与化学烧伤等危险，在高温环境或放置于火焰环境中、超负荷使用时有起火爆炸危险.

When the battery is in extreme pressure deformation, high-temperature environment, overload, short-circuit condition, or disassemble the battery, an explosion of fire and chemical burn hazards may occur.

2) 对人体健康影响 Effects of the human health.

眼睛 Eyes

正常使用下无危害性，但在拆解、弯曲、短路可能会引起电池起火爆炸伤害眼睛。破损时挥发出气体会对眼睛产生刺激。

In normal condition, contact between the battery and eyes will not cause any harms. However, the gas Volatilize from a damaged battery may be harmful to eyes.

皮肤 Skin

正常情况下接触无对皮肤危害性。在电池破损情况下接触有可能引起化学烧伤或皮肤过敏发炎症状。

In normal condition, contact between the battery and skin will not cause any harms. Contact with a damaged battery may cause skin allergies or chemical burns.

吸入 Inhalation

完好电池并无挥发出可供吸入气体情况。破损时会挥发出微量气体会刺激呼吸道，严重者可能引起过敏反应。

A battery volatilizes no gas unless it was damaged. Damaged battery will volatilize little gas that may stimulate the respiratory tract or cause an anaphylaxis in serious condition.

食入 Ingestion

食入会对呼吸道产生伤害、对肠胃产生烧伤，严重会造成永久性损害

Swallowing battery will be damaged to the respiratory tract and cause chemical burns to the stomach; in serious conditions it will cause Permanent damage.

3. 成分/组成信息 Composition/information on ingredients

Hazardous Ingredients (Chemical Name)	Concentration or concentration ranges (%)	CAS Number
镍钴锰酸锂 Lithium Manganese Nickel And Cobalt	30.85	182442-95-1
石墨 Graphite (C)	17.09	7782-42-5
钢 Steel	14.37	12597-68-1

六氟磷酸锂/碳酸二甲酯/碳酸乙烯酯/碳酸甲乙酯 Lithium hexafluorophosphate/ Dimelene carbonate/ Ethylene carbonate/ Carbonate, methyl ethyl	12.37	21324-40-3 616-38-6 96-49-1 623-53-0
铜 Copper Foil (Cu)	12.3	7440-50-8
铝 Aluminum Foil (Al)	8.33	7429-90-5
聚丙烯 Polypropylene	2.2	9003-07-0
其他 Other	2.49	N/A

4. 急救措施 First-aid measures

眼睛 Eyes

如有接触损坏电池，立即用清水清洗眼睛 15 分钟以上直至刺痛/刺激感消失为止，并及时去就医。

If your eyes contact with a damaged battery, flush with copious amount of water for at least 15 minutes until the stinging and irritation subside, and Seek immediate medical attention.

皮肤 Skin

如有接触，立即脱下被污染衣服并用大量清水冲洗皮肤或淋浴，如灼伤感持续立刻去就医。

If your skin contact with a damaged battery, immediately take off contaminated clothing and flush your skin with copious amount of water or have a shower. Seek immediate medical attention if burning sensation continues.

吸入 Inhalation

立刻转移到空气新鲜环境下呼吸新鲜空气，休息。如出现呼吸困难或头晕头痛等症状立刻请人陪同去就医。

Remove to fresh air immediately and have a rest, If you feel dyspnea, dizziness or headache, seek immediate medical attention.

食入 Ingestion

如果食入电池，不要催吐且不要再吃下食物或喝饮料，立刻就医

If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

5. 消防措施 Fire-fighting measures

此产品在强压弯曲或短路等情况下容易起火并冒出大量烟雾，应正确使用并置于阴凉环境下，避免放置在高温、日光照射及受重压的地方。如发生起火，戴上防毒面具在条件允许情况下洒水或用灭火器让毗邻的未起火电池降温避免火势蔓延并用工具把起火电池和其他电池分离，让其自然熄灭；或用大量的水灭火，但起火电池一般都会在内部化学物质反应完后火才熄灭下来。如果有电池起火火势较大，立刻报火警并疏散人员到安全地方。

This battery can get fire easily and made a lot of smoke under the forced bending and short-circuit condition, so it should be properly used and placed in a cool environment and Avoid placing the battery package under heat,

pressure and direct sunlight. In the event of fire, wear gas masks and cool the adjacent batteries and control the spread of fire with water or extinguishers, separate the fire batteries with other batteries as conditions permit, let the fire naturally extinguished, otherwise put out the fire with lots of water. In normal condition the fire is not extinguished until the reactions that between the chemicals contained in the battery are completed. In the event of a big fire, report the fire immediately and evacuate to a safe place.

6. 泄漏应急处理 Accidental release measures

将溢漏物与电池清扫，并放进干燥可密闭的金属容器或材质不易燃的容器中，交由电池回收企业进行环保处理。避免电池弃扔到自然环境中。

Clean the spills and batteries, place them in a dry sealed metal container or nonflammable material container, and bring them to battery recycling companies to deal with environmental protection. Do not throw away the damaged batteries or waste batteries.

7. 操作处置与储存 Handling and storage

操作 Handling

不能擅自组装拆解电池或短路，不能让电池接近火源。运输电池应避免暴力装卸电池货物、避免电池受到挤压或剧烈振动。

Do not assemble and disassemble a battery, battery short-circuit is not allowed too. Keep the battery away from the fire. When transporting these batteries, the battery should be careful handling to avoid the battery being squeezed or excessive vibration.

储存 Storage

长时间存储前先充满电。电池应储存于阴凉环境中。

The battery should be fully charged before long term storage. The battery should be stored in a cool environment.

8. 接触控制和个体防护 Exposure controls/Personal Protection

工程控制 Engineering control

选择合理的通风设备，足够量的防毒面具灭火器及水源，配备存放泄漏电池的金属容器。配备洗浴设备。

Choose the suitable ventilation equipment; provide sufficient quantity of fire extinguishers, gas mask and water; equip with metal storage containers and bathing equipments.

呼吸系统防护 Respiratory protection

正常情况下无必要作防护 Normally there is no need to do protection.

眼睛防护 Eye protection

正常情况下无必要作防护 Normally there is no need to do protection.

身体和皮肤防护 The body and skin protection

正常情况下无必要作防护 Normally there is no need to do protection.

9. 理化特性 Physical and chemical properties

物品外观与形状 Object appearance and shape
圆柱形 Cylindrical

气味 Odour
无 None

10. 稳定性和反应性 Stability and reactivity

稳定性 Stability
正常环境下稳定。 Stable under the regular environment.

应避免的条件 Should avoid conditions
高温或过湿环境，撞击震动或受挤压，正负极反接使用。
High temperature, wet environment, mechanical shock, vibration, crush, reverse polarity used should be avoided.

不相容物质 Incompatible materials
无 None

危险的分解产物 Hazardous decomposition products
在起火时会释放出刺鼻的浓烟雾。
When the battery catches fire, it will release pungent thick smoke.

11. 毒理学信息 Toxicological information

正常情况下接触电池无毒性作用。
In normal condition, contact with the battery is non-toxic.

12. 生态学信息 Ecological information

正常处理电池不会对生态环境产生影响。
Proper disposal of battery does not present ecological hazard.

13. 废弃处置 Disposal considerations

交由电池回收企业进行回收处置，不能随意丢弃于环境中。具体参照有关国家相关法规。
It needs to be referred to the waste battery recycling companies for recycling disposal, cannot arbitrarily discarded in the environment. Specific conditions reference to the relevant national laws and regulations.

14. 运输信息 Transport information

这份报告适用于海运，空运和陆运；
This report applies to by sea, by air and by land;

该电池样品为可充电锂离子电芯,该电池型号已通过 UN38.3 测试。

This battery sample is Rechargeable Lithium Ion Cell and This battery type is proved to meet the Requirements tests in the UN *Manual of Tests and Criteria,* Part III, subsection 38.3.

可充电锂离子电芯应满足 2024 国际航空运输协会《危险品规则》(65 版)的 3.9.2.6.1(e) 规定进行包装空运；

Rechargeable Lithium Ion Cell Can be transport by air according to the International Air transport Association (IATA) Dangerous Goods Regulations relevant regulations (65th) for section 3.9.2.6.1(e).

可按 IATA《危险品规则》中包装说明 PI965 IB、PI966 II 和 PI 967 II 章节相关规定进行包装空运。

Can be transport by air according to the Packing Instructions PI965 IB、PI966 II and PI 967 II Section of IATA

可充电锂离子电芯必须加以保护防止短路，包括防止与同一包装件内可能导致短路的导电材料接触；

Rechargeable Lithium Ion Cell was protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit;

可充电锂离子电芯必须放置于可将其完全封闭的内包装中，再放入外包装。为防止电池损坏和被挤压，内包装必须放电坚固硬质外包装中；

Rechargeable Lithium Ion Cell offered for transport must be packed in inner packaging's that completely enclose the cell or battery; to provide protection from damage or compression to the batteries, the inner packaging's must be placed in a strong rigid outer packaging;

UN No. UN 编号	Proper shipping name/Description (technical name) 运输专用名称	Class or Div. (Sub Hazard) 危险类别	Packing Group 包装等级	Packing Instruction 包装说明	Remark 备注
UN3480	Lithium ion batteries 锂离子电池	--	--	Section IB of PI 965 包装说明 PI965 的第 IB 部分	Lithium-ion cells and batteries must be transported in a state of charge (SoC) not exceeding 30% of their rated capacity; 锂离子电池芯和电池必须在荷电状态（SoC）不超过其额定容量的 30%状态下进行运输；
UN3481	Lithium ion batteries contained in equipment 锂离子电池安装在设备中 or 或 Lithium ion batteries packed with equipment 锂离子电池与设备包装在一起	--	--	Section II of PI 967 包装说明 PI967 的第 II 部分 or 或 Section II of PI 966 包装说明 PI966 的第 II 部分	--

可按 IMO IMDG CODE(2022 版)《国际海运危险货物规则》特殊规定第 188 条相关规定进行包装海运。
Can be transport by sea according to the special provision 188 of IMO *International Maritime Dangerous Goods Code relevant regulations*.
根据 IMO IMDG CODE(2022 版) 的 2.9.4.7，锂电池或电池组的制造商和生产后的销售商应提供联合国《试验和标准手册》第 III 部分第 38.3 小节第 38.3.5 段规定的 UN38.3 试验概要；
According to 2.9.4.7 of IMO IMDG Code (2022 Edition), Manufacturers and subsequent distributors of batteries manufactured shall make available the test summary as specified in the manual of tests and criteria, Part III, sub-section 38.3, paragraph 38.3.5;
根据 ADR-2023 (2023 版) 的 2.2.9.1.7(g), 锂电池组的制造商和生产后的销售商应提供联合国《试验和标准手册》第 III 部分第 38.3 小节第 38.3.5 段规定的 UN38.3 试验概要；
According to 2.2.9.1.7(g) of ADR-2023 (2023 Edition), Manufacturers and subsequent distributors of batteries manufactured shall make available the test summary as specified in the manual of tests and criteria, Part III, sub-section 38.3, paragraph 38.3.5;

15. 法规信息 Regulatory Information

《危险品规则》Dangerous Goods Regulations
《国际海运危险货物规则》IMO International Maritime Dangerous Goods Code relevant regulations.
参照联合国，国家，地方性法规。
Refer to U. N., national, local regulations.

16. 其他信息 Other information

上述信息是基于现有的数据信息，是我们目前所掌握的最佳资料。然而，不对此类信息做出适当性担保或任何其他明示或默示担保，我们也不承担使用此类信息所产生的任何责任。用户应自行调查，以确定信息是否适合其特定目的。虽然在编制本报告所载的数据时采取了合理的预防措施，但仅供你参考、考虑和调查。这份材料安全数据表为安全处理和使用本产品提供了指导方针；它没有也不能就所有可能的情况提出建议；因此，应该评估你对本产品的具体使用情况，以确定是否需要采取额外的预防措施。
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