NTEK北测 jlac-MRA CNAS 中国认可 国际互认 检测 TESTING CNAS L5516

Report No.报告编号: PN20201103120701

UN38.3 Test Report

UN38.3 检测报告

Name of Products:	Rechargeable Li-ion Cylindrical Battery Pack 18650 1S1P
产品名称：	可充电圆柱形锂离子电池 18650 1S1P
Applicant:	DONGGUAN CHAM BATTERY TECHNOLOGY CO., LTD.
委托单位：	东莞市创明电池技术有限公司
Manufacturer:	DONGGUAN CHAM BATTERY TECHNOLOGY CO., LTD.
生产厂商：	东莞市创明电池技术有限公司
Date of issue： 签发日期：	2020-11-16

Shenzhen NTEK Testing Technology Co., Ltd.

深 圳 市 北 测 检 测 技 术 有 限 公 司

Applicant 委托单位	DONGGUAN CHAM BATTERY TECHNOLOGY CO., LTD. 东莞市创明电池技术有限公司
Address of Applicant 委托单位地址	No.9, Third West Industry Road, Songshan Lake High-Tech Industrial Development Zone, DongGuan, GuangDong, China 中国广东省东莞市松山湖高新技术产业开发区工业西三路 9 号
Manufacturer 生产厂商	DONGGUAN CHAM BATTERY TECHNOLOGY CO., LTD. 东莞市创明电池技术有限公司
Address of manufacturer 生产厂商地址	No.9, Third West Industry Road, Songshan Lake High-Tech Industrial Development Zone, DongGuan, GuangDong, China 中国广东省东莞市松山湖高新技术产业开发区工业西三路 9 号
Name of Products 产品名称	Rechargeable Li-ion Cylindrical Battery Pack 可充电圆柱形锂离子电池
Model/type reference 型号	18650 1S1P

Tested according to 测试依据:

Manual of Tests and Criteria, PART III, section 38.3 Lithium metal and lithium ion batteries, the seventh revised edition (ST/SG/AC.10/11/Rev.7).

联合国《试验和标准手册》，第三部分，38.3 节锂金属和锂离子电池要求，第七修订版(ST/SG/AC.10/11/Rev.7)

Tests performed 测试项目:

Test T.1: Altitude simulation 试验 T.1：高度模拟
Test T.2: Thermal Test 试验 T.2：温度试验
Test T.3: Vibration 试验 T.3：振动
Test T.4: Shock 试验 T.4：冲击
Test T.5: External short circuit 试验 T.5：外部短路
Test T.6: Impact 试验 T.6：撞击
Test T.7: Overcharge 试验 T.7：过度充电
Test T.8: Forced discharge 试验 T.8：强制放电

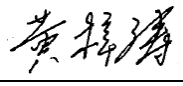
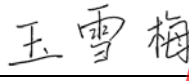
Test Conclusion 试验结论:

The Rechargeable Li-ion Cylindrical Battery Pack submitted by DONGGUAN CHAM BATTERY TECHNOLOGY CO., LTD is tested according to the *Manual of Tests and Criteria, PART III, section 38.3 Lithium metal and lithium ion batteries, the seventh revised edition.*

Test results: PASS

由东莞市创明电池技术有限公司提交的可充电圆柱形锂离子电池按照联合国《试验和标准手册》，第三部分，38.3 节锂金属和锂离子电池要求，第七修订版 (ST/SG/AC.10/11/Rev.7)进行测试。

测试结果：合格

Tested by: 主检人：	Leo Huang 黄梓涛	
Reviewed by: 审核人：	KK Yu 玉雪梅	
Approved by: 批准人：	Wetow Huang 黄文韬	

Seal of NTEK
报告单位（盖章）

General product information 通用产品信息:			
Nominal Voltage 标称电压	3.6V	Rated Capacity 额定容量	3350mAh
Standard Charging Current 标准充电电流	975mA	Nominal energy / Watt-hour rating 额定能量/额定瓦时	12.06Wh
Limited Charging Voltage 充电限制电压	4.2V	Max. Continuous Charging Current 最大持续充电电流	1600mA
Standard Discharge Current 标准放电电流	650mA	Cut-off Voltage 放电截止电压	2.5V
Number of cells 电芯数量	Single cell 单电芯	Max. Continuous Discharge Current 最大持续放电电流	2000mA
Cell's Max. Continuous Discharge Current 电芯最大持续放电电流	4875mA	Rated Capacity of Cell 电芯额定容量	3350mAh
Classification 类别	Small Lithium ion Cells 小型锂离子电芯	Dimension (D×H) 尺寸	19.0×70.4mm
Appearance 外观	Blue and Cylindrical 蓝色、圆柱形		

Date of receipt of test item 接收日期	2020-11-04	Completion Date 完成日期	2020-11-16

Remarks 备注说明:
Batteries of #NE20201009425002-001 ~ #NE20201009425002-005 are fully charged at first cycle;
Batteries of #NE20201009425002-006 ~ #NE20201009425002-010 are fully charged after 25 cycles;
Component cells of #NE20201009425002-011 ~ #NE20201009425002-015 at 50% of the design rated capacity at first cycle;
Component cells of #NE20201009425002-016 ~ #NE20201009425002-020 at 50% of the design rated capacity after 25 cycles;
Batteries of #NE20201009425002-021 ~ #NE20201009425002-024 are fully charged at first cycle;
Batteries of #NE20201009425002-025 ~ #NE20201009425002-028 are fully charged after 25 cycles;
Component cells of #NE20201009425002-029 ~ #NE20201009425002-038 are fully discharged at first cycle;
Component cells of #NE20201009425002-039 ~ #NE20201009425002-048 are fully discharged after 25 cycles;
Test environment condition: Room temperature: 15-25°C; Room humidity: 40-70%
电池#NE20201009425002-001 ~ #NE20201009425002-005 为首次循环满电状态；
电池#NE20201009425002-006 ~ #NE20201009425002-010 为 25 次循环后满电状态；

元件电池芯#NE20201009425002-011 ~ #NE20201009425002-015 为首次循环 50%电荷状态；
元件电池芯#NE20201009425002-016 ~ #NE20201009425002-020 为 25 次循环后 50%电荷状态；
电池#NE20201009425002-021 ~ #NE20201009425002-024 为首次循环满电状态；
电池#NE20201009425002-025 ~ #NE20201009425002-028 为 25 次循环后满电状态；
元件电池芯#NE20201009425002-029 ~ #NE20201009425002-038 为首次循环完全放电状态；
元件电池芯#NE20201009425002-039 ~ #NE20201009425002-048 为 25 次循环后完全放电状态；
试验环境条件：环境温度：15-25°C；环境湿度：40-70%

Summaries of testing 测试摘要:

All rechargeable battery types, including those composed of previously tested cells, shall be subjected to tests T.1 to T.5 and T.7. In addition, rechargeable single cell batteries with overcharge protection shall be subjected to test T.7.

所有可充电的电池组类型，包括由已经通过试验的电芯组成的电池，均须做 T.1 至 T.5 和 T.7 的试验。此外，带有防止过充电保护装置的可充电的单电芯电池也必须承受 T.7 的试验。

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.

电池必须按顺序在相同的一组电池上进行T.1至T.5的试验。T.6和T.8的试验应使用另外未试验过的电池。T.7的试验可以使用先前在T.1至T.5的试验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。

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

$$\text{Mass loss}(\%)=(M_1-M_2)/M_1\times100$$

为了量化质量损失，使用以下公式计算：

$$\text{质量损失}(\%)=(M_1-M_2)/M_1\times100$$

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 below, it is considered as "no mass loss".

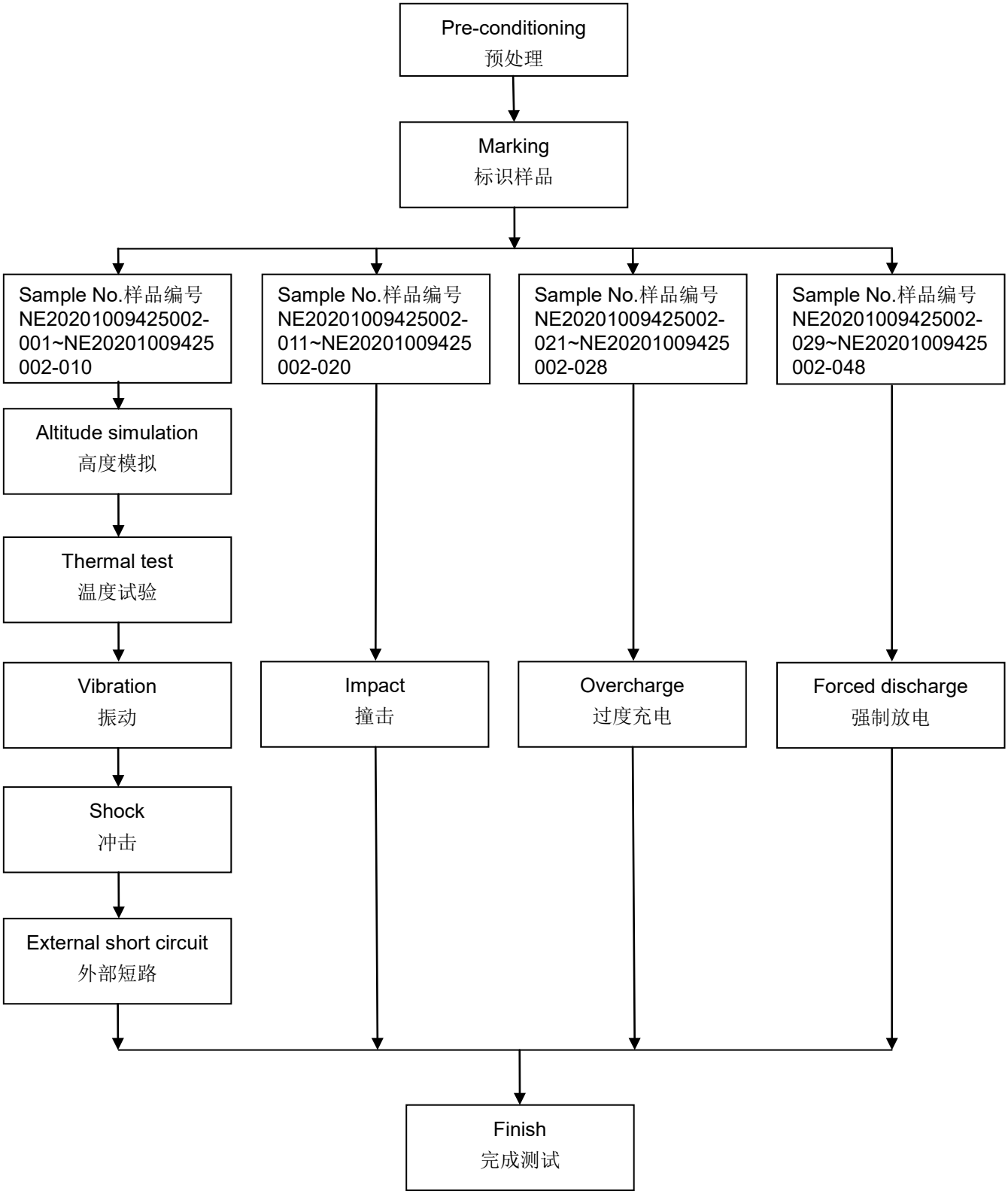
式中：M_1是试验前的质量，M_2是试验后的质量。如果质量损失不超过下表所列的数值，应视为“无质量损失”。

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%

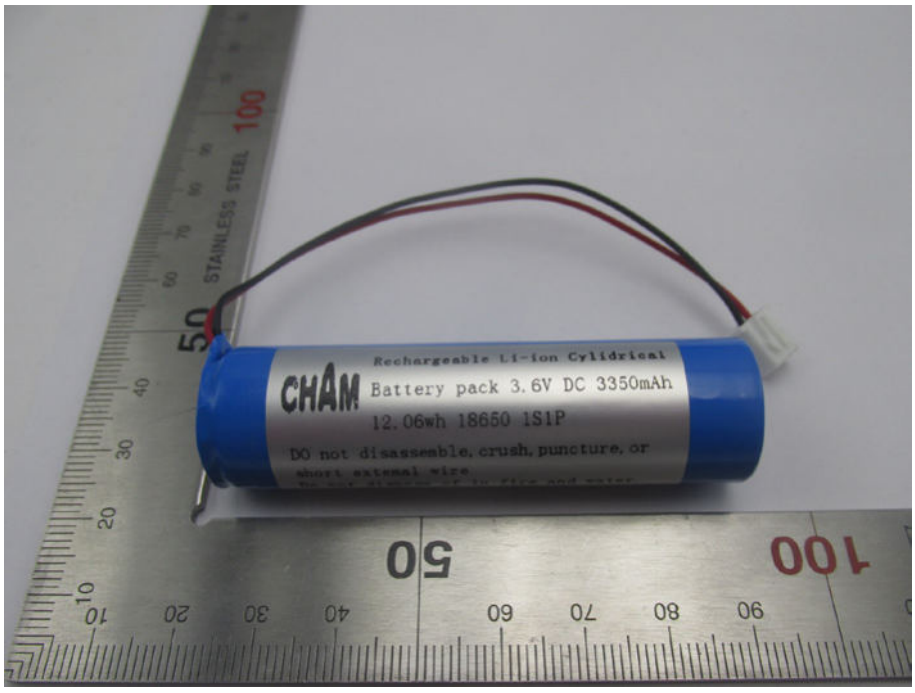
In tests T.1 to T.4, batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test battery after testing is not less than 90% of its voltage immediately prior to this procedure.

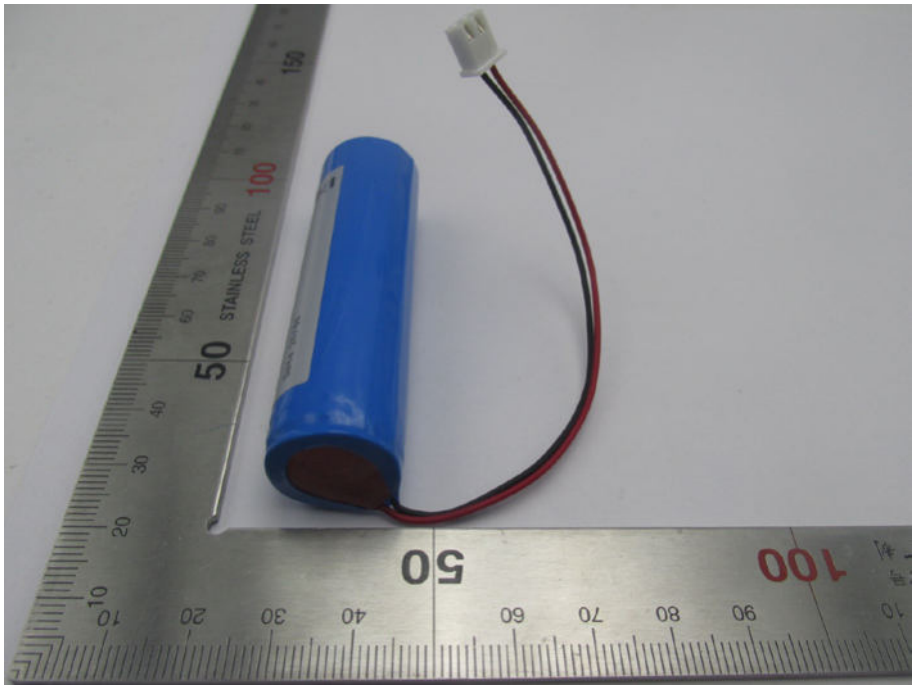
在T.1至T.4的试验中，电池须满足无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的90%。

Test Procedure 测试程序

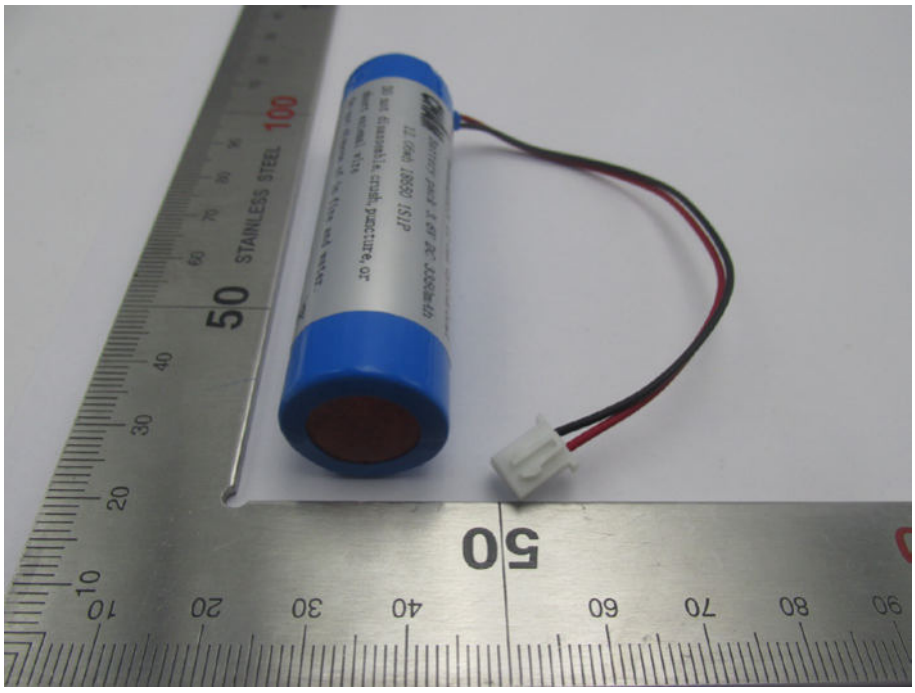


Photos of sample 样品照片

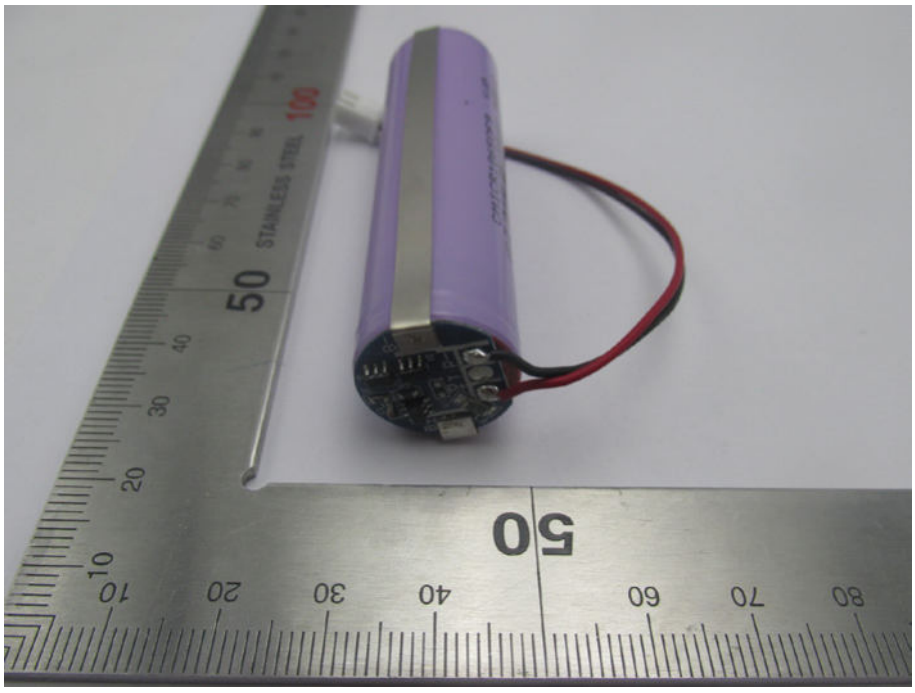


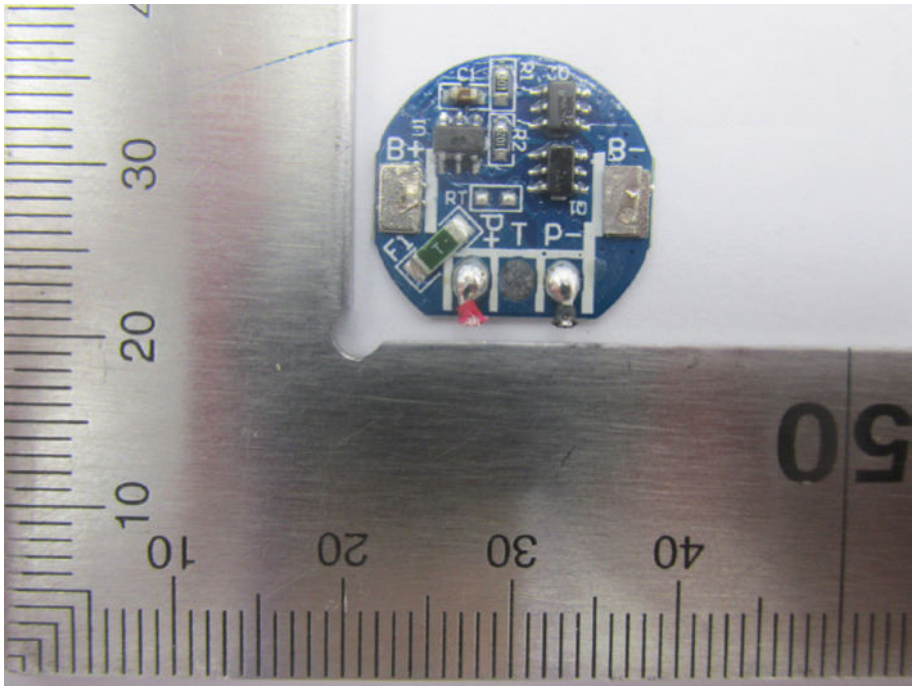


Photos of sample 样品照片

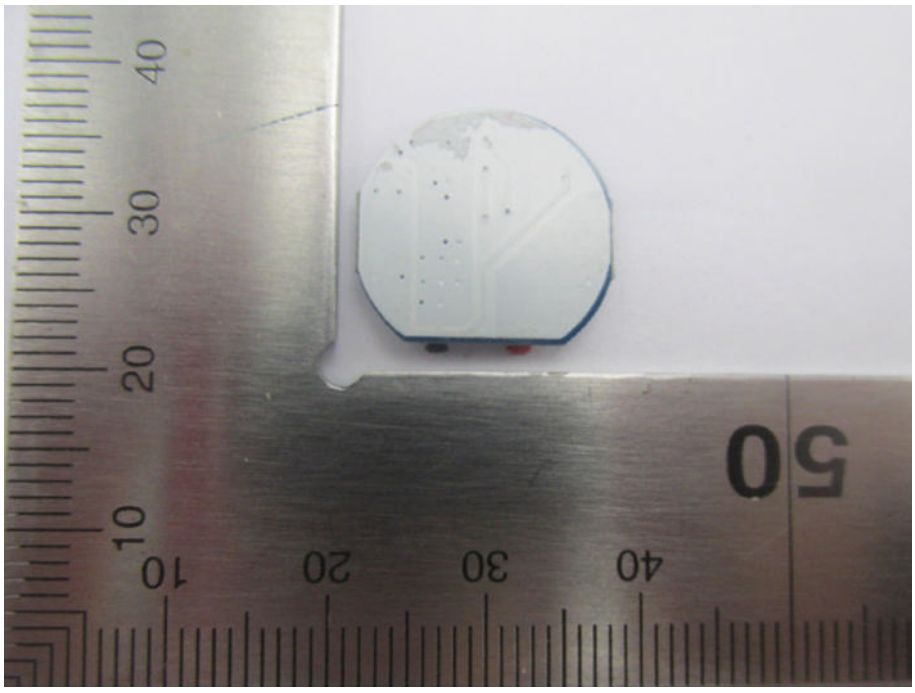


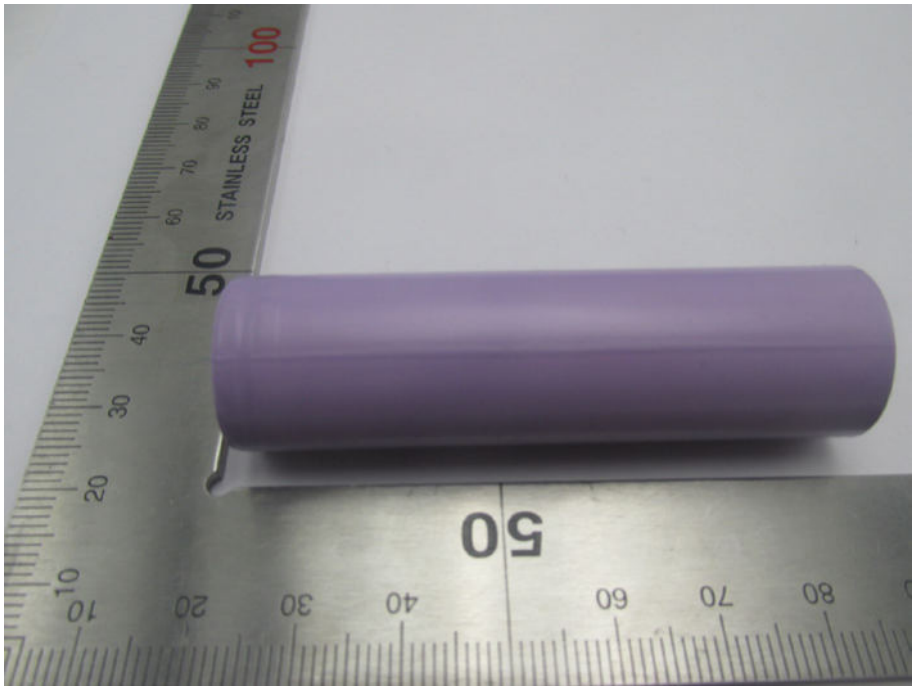
Photos of sample 样品照片





Photos of sample 样品照片





Photos of sample 样品照片

Test results 测试结果:

Test T.1: Altitude simulation 试验T.1：高度模拟

Test method 测试方法

Batteries are stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 ± 5°C).
试验电池被放置在压力等于或低于11.6 kPa和环境温度(20±5°C)下存放至少6小时。

Requirement 要求

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.
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%。

Test Data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Prior to test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/ voltage prior to test 试验后电压/试验前电压 (%)	Results 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-001	49.999	4.188	49.999	4.188	0.000	100.0	PASS 合格
	NE20201009425002-002	49.883	4.188	49.883	4.188	0.000	100.0	PASS 合格
	NE20201009425002-003	49.657	4.187	49.657	4.187	0.000	100.0	PASS 合格
	NE20201009425002-004	50.125	4.187	50.125	4.186	0.000	99.98	PASS 合格
	NE20201009425002-005	49.887	4.188	49.887	4.188	0.000	100.0	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-006	49.578	4.187	49.578	4.187	0.000	100.0	PASS 合格
	NE20201009425002-007	50.089	4.189	50.089	4.189	0.000	100.0	PASS 合格
	NE20201009425002-008	50.033	4.186	50.033	4.186	0.000	100.0	PASS 合格
	NE20201009425002-009	49.754	4.186	49.754	4.185	0.000	99.98	PASS 合格
	NE20201009425002-010	49.892	4.187	49.892	4.187	0.000	100.0	PASS 合格

Notes 注释:

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。
Room temperature 环境温度: 22.7°C

Test T.2: Thermal test 试验T.2：温度试验

Test method 测试方法
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 batteries are to be stored for 24 hours at ambient temperature (20 ± 5°C).
电池放置在试验温度等于72±2°C的条件下存放至少6小时，接着再在试验温度等于-40±2°C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在环境温度(20±5°C)下存放24小时。
Requirement 要求
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.
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%。

Test Data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Prior to test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/ voltage prior to test 试验后电压/试验前电压 (%)	Results 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-001	49.999	4.188	49.984	4.152	0.030	99.14	PASS 合格
	NE20201009425002-002	49.883	4.188	49.870	4.151	0.026	99.12	PASS 合格
	NE20201009425002-003	49.657	4.187	49.643	4.150	0.028	99.12	PASS 合格
	NE20201009425002-004	50.125	4.186	50.110	4.148	0.030	99.09	PASS 合格
	NE20201009425002-005	49.887	4.188	49.871	4.152	0.032	99.14	PASS 合格

After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-006	49.578	4.187	49.561	4.150	0.034	99.12	PASS 合格
	NE20201009425002-007	50.089	4.189	50.075	4.151	0.028	99.09	PASS 合格
	NE20201009425002-008	50.033	4.186	50.018	4.149	0.030	99.12	PASS 合格
	NE20201009425002-009	49.754	4.185	49.738	4.148	0.032	99.12	PASS 合格
	NE20201009425002-010	49.892	4.187	49.877	4.149	0.030	99.09	PASS 合格

Notes 注释:

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。

Room temperature 环境温度: 23.2°C

Test T.3: Vibration 试验T.3：振动

Test method 测试方法

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 is as follows: 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.

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，1次循环时间为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。

对数扫频方式：从7 Hz开始，保持1 g_n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 g_n（频率约为50 Hz）。将峰值加速度保持在8 g_n直到频率增加到200 Hz。

Requirement 要求

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 battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure.

测试中和测试后电池须无渗漏、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%。

Test Data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Prior to test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/ voltage prior to test 试验后电压/试验前电压 (%)	Results 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-001	49.984	4.152	49.984	4.152	0.000	100.0	PASS 合格
	NE20201009425002-002	49.870	4.151	49.870	4.150	0.000	99.98	PASS 合格
	NE20201009425002-003	49.643	4.150	49.642	4.150	0.002	100.0	PASS 合格
	NE20201009425002-004	50.110	4.148	50.110	4.146	0.000	99.95	PASS 合格
	NE20201009425002-005	49.871	4.152	49.871	4.152	0.000	100.0	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-006	49.561	4.150	49.560	4.149	0.002	99.98	PASS 合格
	NE20201009425002-007	50.075	4.151	50.075	4.151	0.000	100.0	PASS 合格
	NE20201009425002-008	50.018	4.149	50.017	4.148	0.002	99.98	PASS 合格
	NE20201009425002-009	49.738	4.148	49.738	4.148	0.000	100.0	PASS 合格
	NE20201009425002-010	49.877	4.149	49.876	4.148	0.002	99.98	PASS 合格

Notes 注释:

During and after the test, there is no leakage, no venting, no disassembly, no rupture and no fire.

测试中和测试后，电池未渗漏、未泄气、未解体、未破裂和未起火。

Room temperature 环境温度: 22.8°C

Test T.4: Shock 试验 T.4：冲击

Test method 测试方法

Batteries are secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each battery is subjected to a half-sine shock of peak acceleration of 150 g_n and pulse duration of 6 milliseconds. Each battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks.

试验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。每个电池须经受峰值加速度150 gn和脉冲持续时间6 ms的半正弦波冲击。每个电池须在三个互相垂直的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

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.

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%。

Test Data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Prior to test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/ voltage prior to test 试验后电压/试验前电压 (%)	Results 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-001	49.984	4.152	49.984	4.152	0.000	100.0	PASS 合格
	NE20201009425002-002	49.870	4.150	49.870	4.150	0.000	100.0	PASS 合格
	NE20201009425002-003	49.642	4.150	49.642	4.150	0.000	100.0	PASS 合格
	NE20201009425002-004	50.110	4.146	50.110	4.146	0.000	100.0	PASS 合格
	NE20201009425002-005	49.871	4.152	49.871	4.152	0.000	100.0	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-006	49.560	4.149	49.560	4.149	0.000	100.0	PASS 合格
	NE20201009425002-007	50.075	4.151	50.075	4.151	0.000	100.0	PASS 合格
	NE20201009425002-008	50.017	4.148	50.017	4.148	0.000	100.0	PASS 合格
	NE20201009425002-009	49.738	4.148	49.738	4.148	0.000	100.0	PASS 合格
	NE20201009425002-010	49.876	4.148	49.876	4.148	0.000	100.0	PASS 合格

Notes 注释:

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。

Room temperature 环境温度: 21.8°C

Test T.5: External short circuit 试验T.5：外部短路

Test method 测试方法

Batteries to be tested are 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 battery and is assessed and documented. Then the battery at 57 ± 4 °C is 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 battery external case temperature has returned to 57 ± 4 °C.

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

试验电池首先被加热或恒定一段时间，使其达到57 ± 4 °C并使其外表面温度均匀恒定在57 ± 4 °C。该加热时间或热恒定时间的长短取决于该电池的尺寸和设计，并同时加以评估及提供文件证明。然后该电池在57 ± 4 °C的条件下承受一个外部总阻抗小于0.1Ω的短路条件。

该短路测试持续到电池外表面温度返回至57 ± 4 °C后再保持至少1小时。

该短路和冷却阶段均被执行在57 ± 4 °C的环境温度下。

Requirement 要求

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 test.

电池外壳温度不超过170°C，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。

Test data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Maximum outer casing temperature 电池表面最高温度 (°C)	Results 结果
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-001	57.4	PASS 合格
	NE20201009425002-002	57.0	PASS 合格
	NE20201009425002-003	57.9	PASS 合格
	NE20201009425002-004	57.1	PASS 合格
	NE20201009425002-005	57.8	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-006	57.0	PASS 合格
	NE20201009425002-007	57.6	PASS 合格
	NE20201009425002-008	57.5	PASS 合格
	NE20201009425002-009	57.2	PASS 合格
	NE20201009425002-010	57.7	PASS 合格

Notes 注释:

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。
Room temperature 环境温度: 23.3°C

Test T.6: Impact 试验T.6：撞击

Test method 测试方法
Each component cell is to be placed on a flat smooth surface. A 15.8 mm ±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 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.
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.
每个元件电池芯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，或电芯的最长尺度，取二者中较大者。将一块 9.1±0.1 kg 的重锤从 61±2.5 厘米高处跌落到钢棒和试样交叉点，使用一个几乎没有摩擦的、对落体重锤阻力很小的垂直导轨或管道加以控制。垂直导轨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，纵轴应与测试平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。
Requirement 要求
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 the test.
元件电池芯外壳温度不超过170°C，并且在试验过程中及试验后6小时内无解体，无起火。

Test data showed in table below 测试数据见下表

State of samples 样品状态	No. 编号	Maximum outer casing temperature 电池芯表面最高温度 (°C)	Results 结果
At first cycle at 50% of the design rated capacity.首次循环50%电荷状态	NE20201009425002-011	115.5	PASS 合格
	NE20201009425002-012	112.5	PASS 合格
	NE20201009425002-013	109.7	PASS 合格
	NE20201009425002-014	111.9	PASS 合格
	NE20201009425002-015	113.8	PASS 合格
After 25 cycles ending at 50% of the design rated capacity. 25 次循环后 50%电荷状态	NE20201009425002-016	114.9	PASS 合格
	NE20201009425002-017	117.3	PASS 合格
	NE20201009425002-018	111.2	PASS 合格
	NE20201009425002-019	108.1	PASS 合格
	NE20201009425002-020	107.5	PASS 合格

Notes 注释:
There is no disassembly, no rupture and no fire during the test and within six hours after the test.
元件电池芯在测试中和测试后 6 小时内未解体、未起火。

Room temperature 环境温度: 22.9°C

Test T.7: Overcharge 试验 T.7：过度充电

Test method 测试方法

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

☒ When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test is the lesser of two times the maximum charge voltage of the battery or 22V.

☐ 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 is 24 hours.

充电电流为制造商建议的最大持续充电电流的两倍。试验的最小电压如下：

☒ 制造商建议的充电电压不大于18V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。

☐ 制造商建议的充电电压大于18V时，试验的最小电压应是电池组最大充电电压的1.2倍。

试验在环境温度下进行。试验时间为24小时。

Requirement 要求

Batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

电池在试验过程中和试验后7天内无解体，无起火。

Test data showed in table below 测试数据见下表

Overcharge current 过充电电流(mA).....:	2×1600=3200mA	
Overcharge voltage 过充电电压(Vdc).....:	2×4.2=8.4V	
Duration of the test 过充试验时间(hours) .....:	24 hours	
State of samples 样品状态	No.编号	Results 结果
At first cycle, in fully charged states 首次循环满电状态	NE20201009425002-021	PASS 合格
	NE20201009425002-022	PASS 合格
	NE20201009425002-023	PASS 合格
	NE20201009425002-024	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	NE20201009425002-025	PASS 合格
	NE20201009425002-026	PASS 合格
	NE20201009425002-027	PASS 合格
	NE20201009425002-028	PASS 合格

Notes 注释:

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，未着火。

Room temperature 环境温度: 23.1°C

Test T.8: Forced discharge 试验 T.8：强制放电

Test method 测试方法

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

每个元件电池芯在环境温度下与 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。

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。每块电芯的放电时间（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

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

元件电池芯在试验过程中和试验后 7 天内无解体，无起火。

Test data showed in table below 测试数据见下表

Initial current 初始电流(mA).....:	4875mA	
Supply voltage 试验电压(Vdc) .....:	12Vdc	
Time interval 试验时间(Minutes).....:	42 Minutes	
State of samples 样品状态	No.编号	Results 结果
At first cycle, in fully discharged states 首次循环完全放电状态	NE20201009425002-029	PASS 合格
	NE20201009425002-030	PASS 合格
	NE20201009425002-031	PASS 合格
	NE20201009425002-032	PASS 合格
	NE20201009425002-033	PASS 合格
	NE20201009425002-034	PASS 合格
	NE20201009425002-035	PASS 合格
	NE20201009425002-036	PASS 合格
	NE20201009425002-037	PASS 合格
	NE20201009425002-038	PASS 合格
After 25 cycles ending in fully discharged states 25 次循环后完全放电状态	NE20201009425002-039	PASS 合格
	NE20201009425002-040	PASS 合格
	NE20201009425002-041	PASS 合格
	NE20201009425002-042	PASS 合格
	NE20201009425002-043	PASS 合格
	NE20201009425002-044	PASS 合格
	NE20201009425002-045	PASS 合格
	NE20201009425002-046	PASS 合格
	NE20201009425002-047	PASS 合格
	NE20201009425002-048	PASS 合格

Notes 注释:

There is no disassembly and no fire during the test and within seven days after the test.

元件电池芯在测试中和测试后 7 天内未解体，未着火。

Room temperature 环境温度: 22.1°C

*********End of Test Report 检测报告结束*********

Important Notice

注意事项

1. The test report is invalid without the Report Seal of NTEK and Paging seal of NTEK.
   本报告书无本公司报告专用章、骑缝章无效.
2. Nobody is allowed to photocopy or partly photocopy this test report without written permission of NTEK.
   未经本公司书面同意，不得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 NTEK 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。

Shenzhen NTEK Testing Technology Co., Ltd.
深圳市北测检测技术有限公司
Address: 1/F, Building C, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China
地址：深圳市宝安区西乡三围奋达科技园 C 栋 1 楼
Tel 电话：400-800-6106, 0755-3699 5508
E-mail 邮箱：Coco@ntek.org.cn　Kevin@ntek.org.cn
Service complaint hotline 客户投诉电话：+86-755-3699 5510
Service complaint e-mail 客户投诉邮箱：Complaint@ntek.org.cn
Website 网址：http://www.ntek.org.cn