

NTEK 北测



中国认可
国际互认
检测
TESTING
CNAS L5516

Report No./报告编号:
S19072202906001-R1

UN38.3 Test Report

UN38.3 检测报告

Name of Products: Rechargeable Lithium ion Battery KH-B1A16BB

产品名称: 可充电锂离子电池 KH-B1A16BB

Applicant: DONGGUAN KOHAM INDUSTRIAL CO., LTD.

委托单位: 东莞市嘉航实业有限公司

Manufacturer: Dongguan iRice Electronics Development Co.,Ltd.

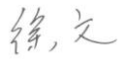
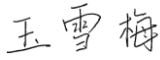

生产厂商: 东莞群赞电子开发有限公司

Date of issue: 2020-01-17

签发日期:

Shenzhen NTEK Testing Technology Co., Ltd.

深圳市北测检测技术有限公司

Manufacturer 生产厂商	Dongguan iRice Electronics Development Co., Ltd. 东莞群赞电子开发有限公司	
Address of manufacturer 生产厂商地址	No. 9 Hudie 1 st Road, Tianxin Village, Huangjiang Town, Dongguan City, China 东莞市黄江镇田心村蝴蝶一路9号	
Factory 工厂	Dongguan iRice Electronics Development Co., Ltd. 东莞群赞电子开发有限公司	
Address of factory 工厂地址	No. 9 Hudie 1 st Road, Tianxin Village, Huangjiang Town, Dongguan City, China 东莞市黄江镇田心村蝴蝶一路9号	
Name of Products 产品名称	Rechargeable Lithium ion Battery 可充电锂离子电池	
Model/type reference 型号	KH-B1A16BB	
Tested according to 测试依据: Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, PART III, section 38.3 Lithium metal and lithium ion batteries, the sixth revised edition, amendment 1 (ST/SG/AC.10/11/Rev.6/Amend.1). 联合国《关于危险货物运输的建议书, 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, 第六修订版修正 1 (ST/SG/AC.10/11/Rev.6/Amend.1)		
Tests performed 测试项目: Test T.1: Altitude simulation 试验 T.1: 高度模拟 Test T.5: External short circuit 试验 T.5: 外部短路 Test T.2: Thermal Test 试验 T.2: 温度试验 Test T.6: Impact 试验 T.6: 撞击 Test T.3: Vibration 试验 T.3: 振动 Test T.7: Overcharge 试验 T.7: 过度充电 Test T.4: Shock 试验 T.4: 冲击 Test T.8: Forced discharge 试验 T.8: 强制放电		
Test Conclusion 试验结论: The Rechargeable Lithium ion Battery submitted by DONGGUAN KOHAM INDUSTRIAL CO., LTD is tested according to the <i>Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, PART III, section 38.3 Lithium metal and lithium ion batteries, the sixth revised edition, amendment 1 (ST/SG/AC.10/11/Rev.6/Amend.1)</i> . Test results: PASS 由东莞市嘉航实业有限公司提交的可充电锂离子电池按照联合国《关于危险货物运输的建议书, 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, 第六修订版修正 1 (ST/SG/AC.10/11/Rev.6/Amend.1)进行测试。 测试结果: 合格		
Tested by: 主检人:	Lix Xu 徐文	
Reviewed by: 审核人:	KK Yu 玉雪梅	
Approved by: 批准人:	Jesse Zhang 张士杰	
		Seal of NTEK 报告单位 (盖章)

General product information 通用产品信息:			
Nominal Voltage 标称电压	14.4V	Rated Capacity 额定容量	2500mAh
Standard Charging Current 标准充电电流	1250mA	Nominal energy / Watt-hour rating 额定能量/额定瓦时	36Wh
Limited Charging Voltage 充电限制电压	16.8V	Max. Continuous Charging Current 最大充电电流	3000mA
Standard Continuous Discharge Current 标准放电电流	1250mA	Cut-Off Voltage 放电截止电压	11.2V
Max. Continuous Discharge Current 最大放电电流	30000mA	Model number of the cell 内部电芯型号	INR18650-25R
Number of cells 电芯数量	4 cells	Connection pattern of cells 电芯连接方式	4S1P 4串1并
Cell's Max. Continuous Discharge Current 电芯最大放电电流	30000mA	Rated Capacity of Cell 电芯额定容量	2500mAh
Classification 类别	Small Lithium ion Batteries 小型锂离子电池	Dimension (T×W×H) 尺寸	51.46×53.41×84.57mm
Appearance 外观	Black and Prismatic 黑色、棱柱形		

Date of receipt of test item 接收日期	2019-07-26	Completion Date 完成日期	2019-08-07
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<p>Remarks 备注说明:</p> <p>Batteries of #S190722029006-001 ~ #S190722029006-004 are fully charged at first cycle;</p> <p>Batteries of #S190722029006-005 ~ #S190722029006-008 are fully charged after 25 cycles;</p> <p>Component cells of #S190722029006-009 ~ #S190722029006-013 at 50% of the design rated capacity at first cycle;</p> <p>Component cells of #S190722029006-014 ~ #S190722029006-018 at 50% of the design rated capacity after 25 cycles;</p> <p>Batteries of #S190722029006-019 ~ #S190722029006-022 are fully charged at first cycle;</p> <p>Batteries of #S190722029006-023 ~ #S190722029006-026 are fully charged after 25 cycles;</p> <p>Component cells of #S190722029006-027 ~ #S190722029006-036 are fully discharged at first cycle;</p> <p>Component cells of #S190722029006-037 ~ #S190722029006-046 are fully discharged after 25 cycles;</p> <p>Test environment condition: Room temperature: 15-25°C; Room humidity: 40-70%</p> <p>Note: This testing report displaces the original report of No. S19072202906001, and the original one No.</p>
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S19072202906001 was invalid since the date of this testing report released
 电池#S190722029006-001 ~ #S190722029006-004 为首次循环满电状态;
 电池#S190722029006-005 ~ #S190722029006-008 为 25 次循环后满电状态;
 元件电池芯#S190722029006-009 ~ #S190722029006-013 为首次循环 50%电荷状态;
 元件电池芯#S190722029006-014 ~ #S190722029006-018 为 25 次循环后 50%电荷状态;
 电池#S190722029006-019 ~ #S190722029006-022 为首次循环满电状态;
 电池#S190722029006-023 ~ #S190722029006-026 为 25 次循环后满电状态;
 元件电池芯#S190722029006-027 ~ #S190722029006-036 为首次循环完全放电状态;
 元件电池芯#S190722029006-037 ~ #S190722029006-046 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%
 注: 本报告替换原报告 S19072202906001, 自本报告签发之日起, 原报告 S19072202906001 作废。

Manufacturer's contact information 制造商联系信息:
 Phone number 电话号码: 0769-83638899
 Email address 电子邮件地址: bw_qiu@iricepower.com
 Website 网址: /

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.

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。

Tests T.1 to T.5 are conducted in sequence on the same battery. Tests T.6 and T.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:

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

为了量化质量损失, 使用以下公式计算:

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

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

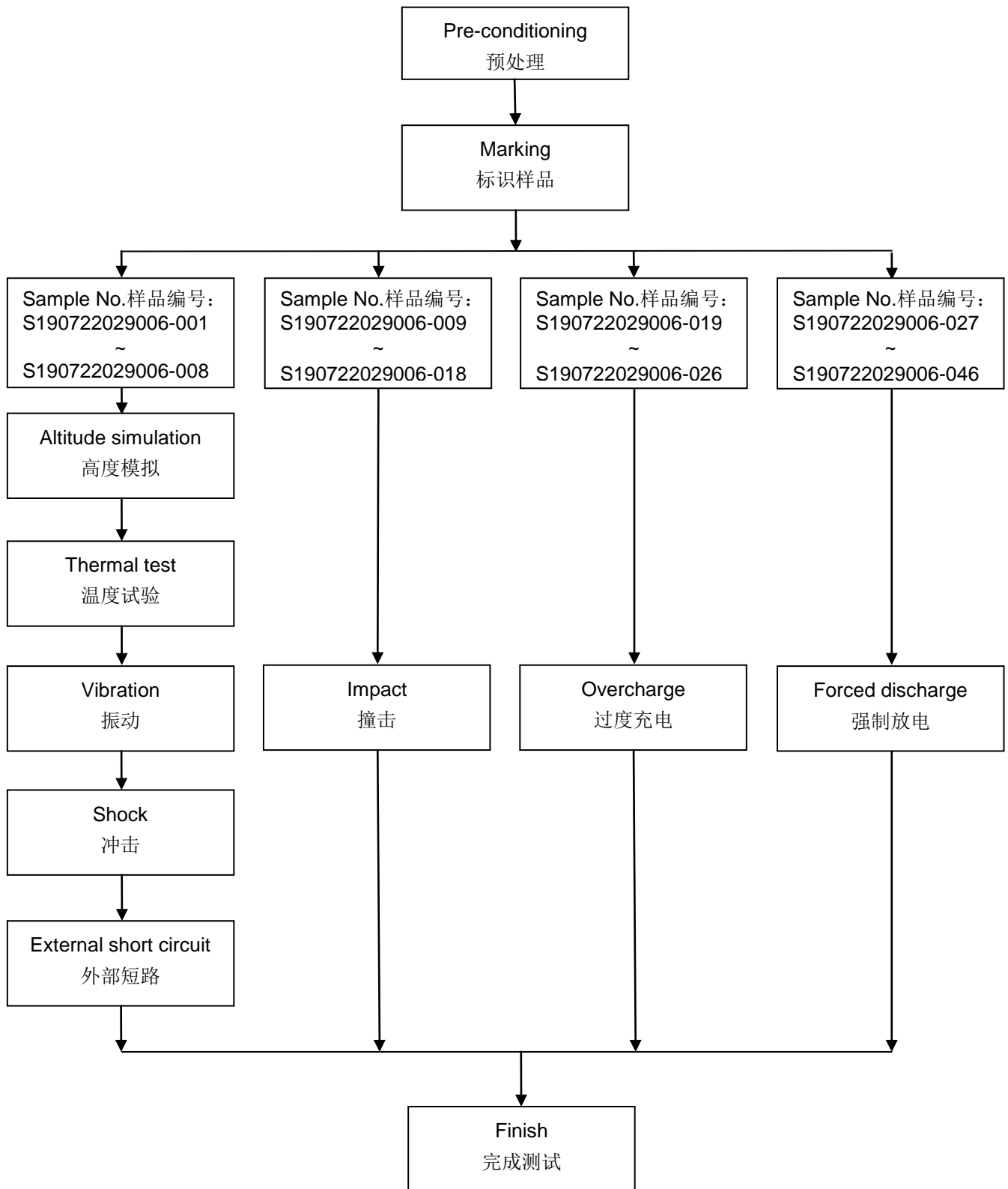
式中: M_1 是试验前的质量, M_2 是试验后的质量。如果质量损失不超过下表所列的数值, 应视为“无质量损失”。

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%
$1g \leq M \leq 75g$	0.2%
$M > 75g$	0.1%

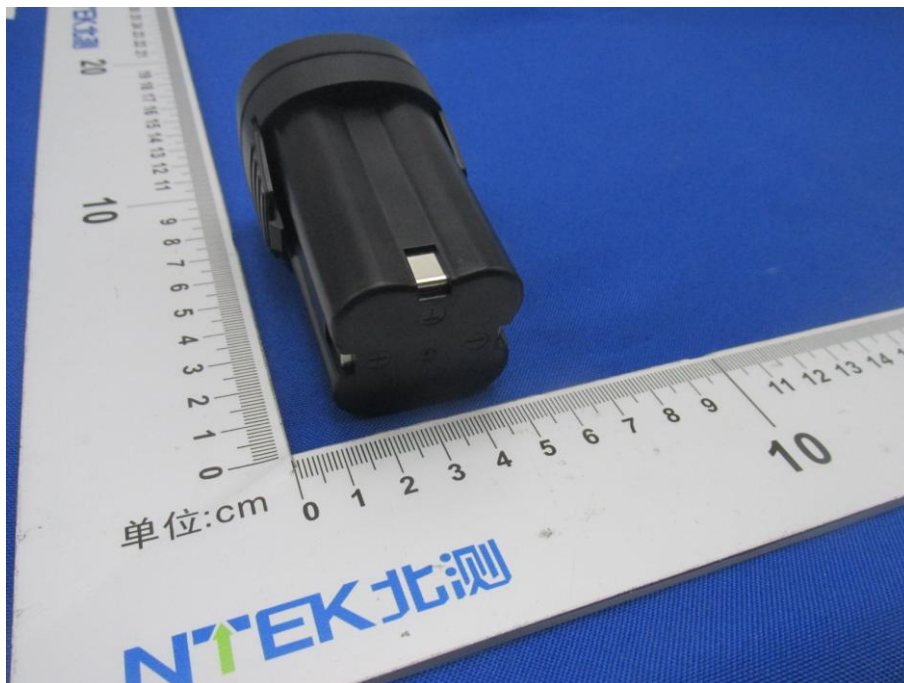
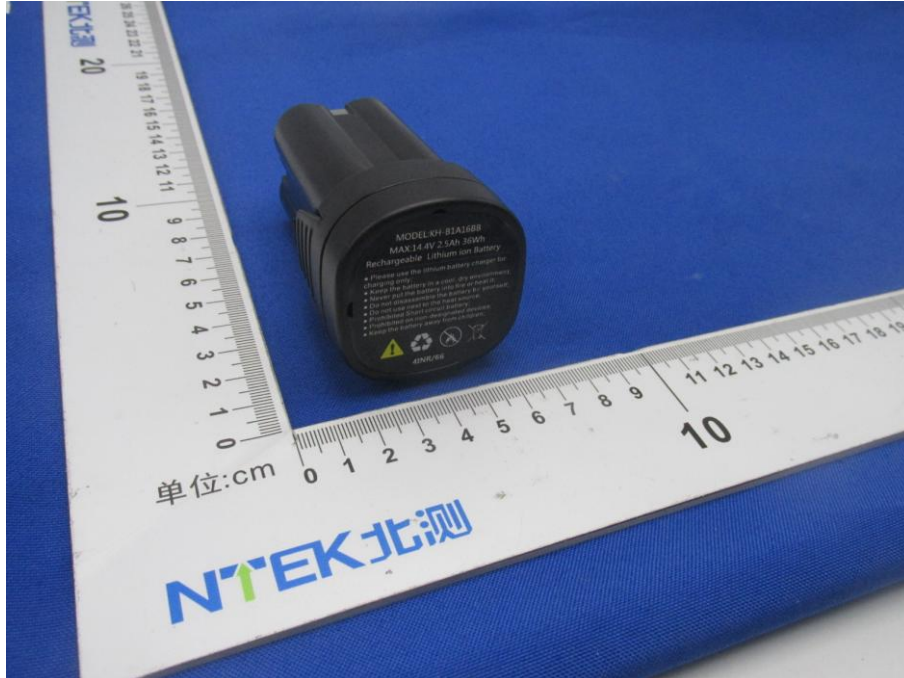
In tests T.1 to T.4, batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test battery after testing is not less than 90% of its voltage immediately prior to this procedure.

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%。

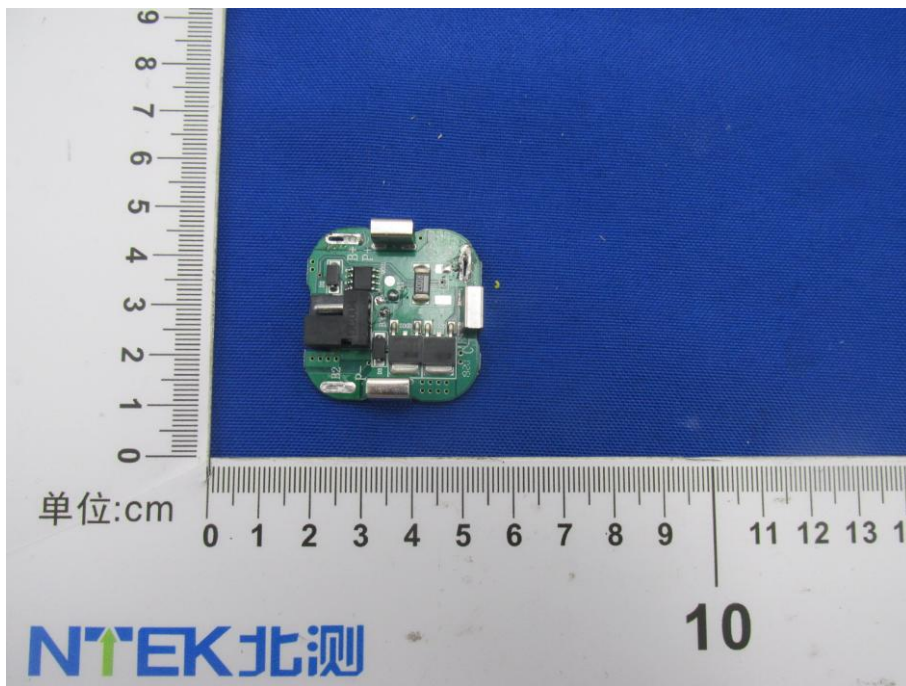
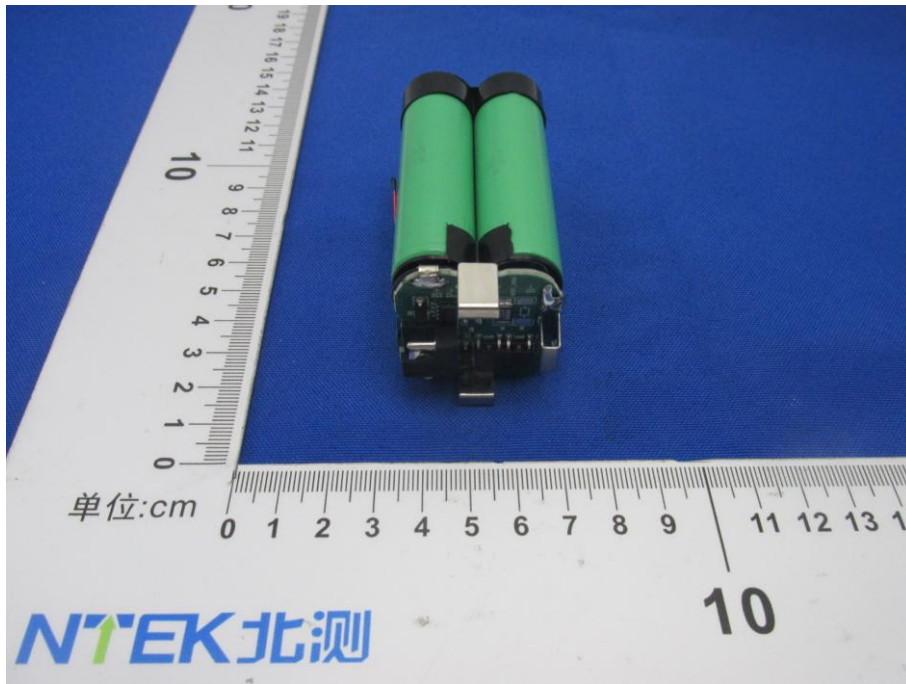
Test Procedure 测试程序



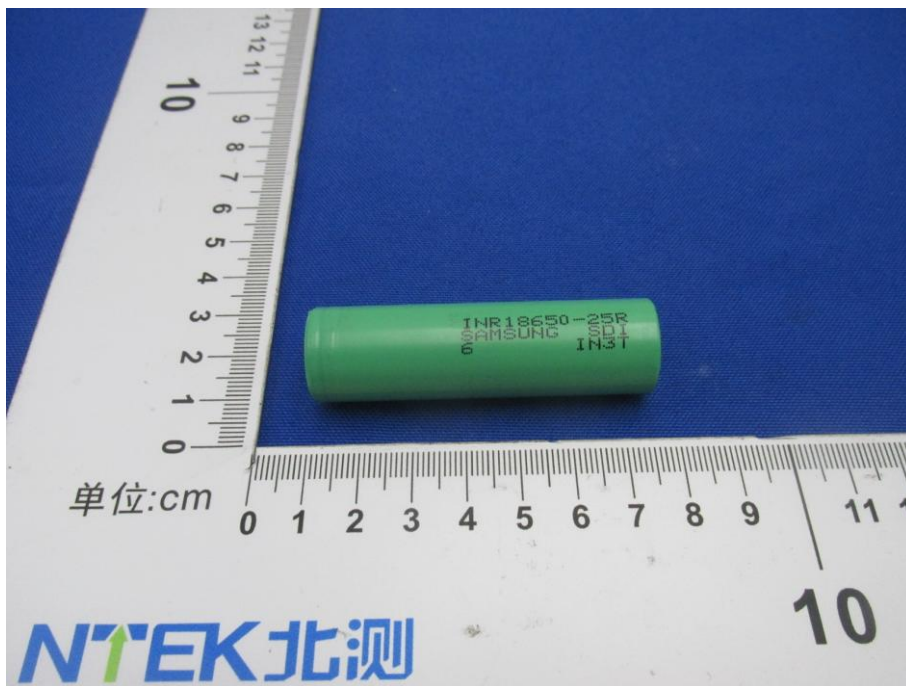
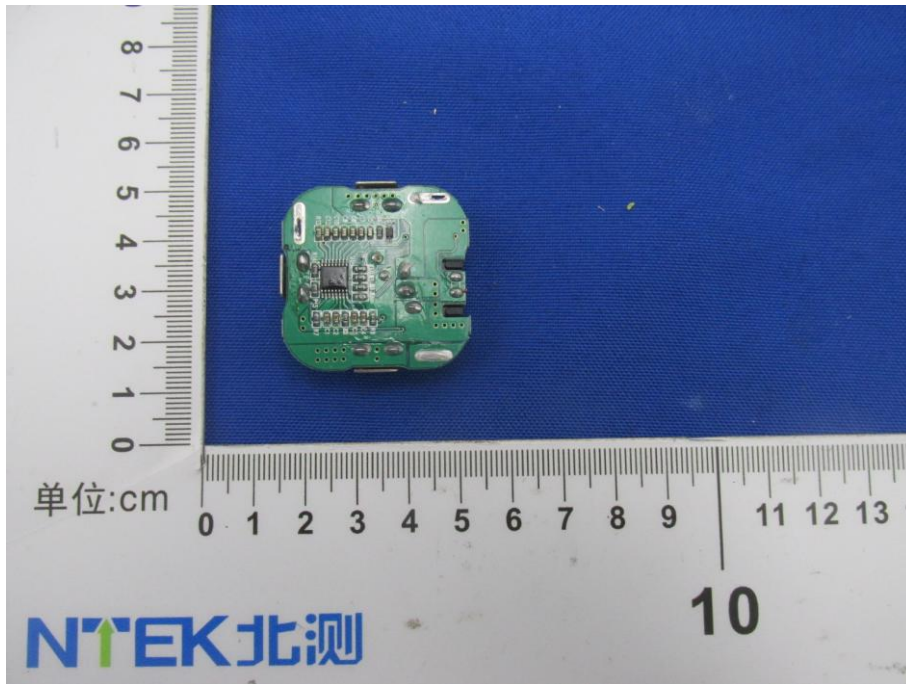
Photos of sample 样品照片



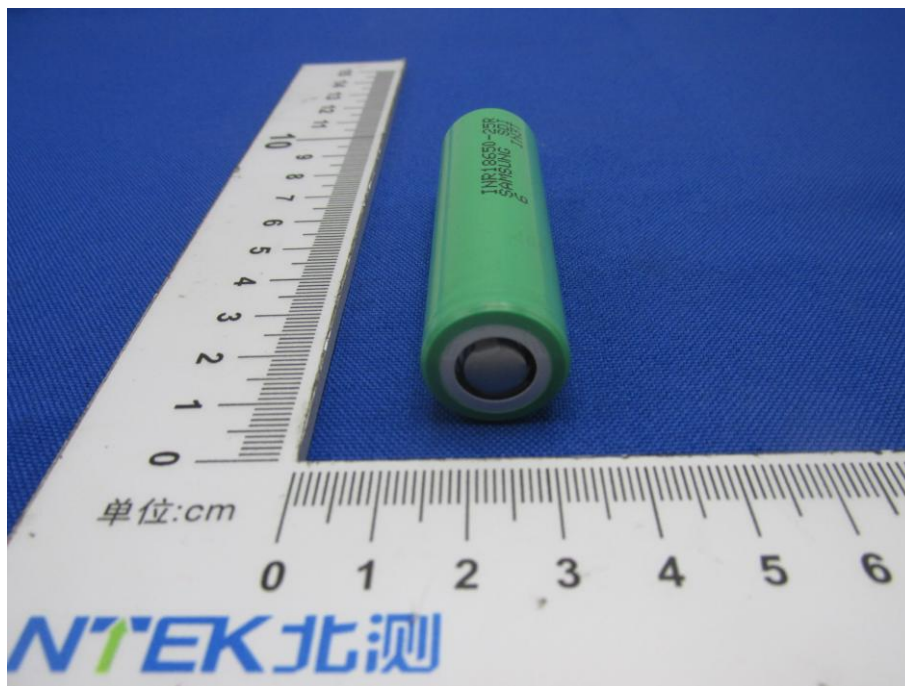
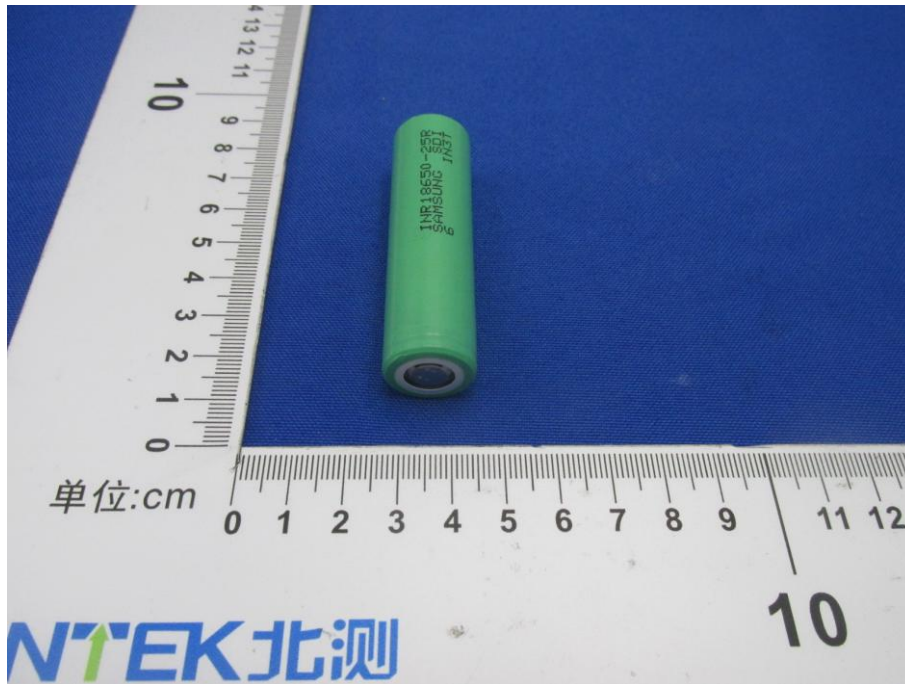
Photos of sample 样品照片



Photos of sample 样品照片



Photos of sample 样品照片



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 ($20 \pm 5^\circ\text{C}$).
 试验电池被放置在压力等于或低于11.6 kPa和环境温度($20\pm 5^\circ\text{C}$)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	S19072202 9006-001	230.53	16.65	230.53	16.64	0.000	99.94	PASS 合格
	S19072202 9006-002	231.36	16.63	231.35	16.63	0.004	100.0	PASS 合格
	S19072202 9006-003	230.67	16.60	230.67	16.60	0.000	100.0	PASS 合格
	S19072202 9006-004	231.57	16.62	231.57	16.62	0.000	100.0	PASS 合格
After 25 cycles ending in fully charged states 25次循环后满 电状态	S19072202 9006-005	231.51	16.63	231.51	16.63	0.000	100.0	PASS 合格
	S19072202 9006-006	230.57	16.62	230.56	16.62	0.004	100.0	PASS 合格
	S19072202 9006-007	230.63	16.63	230.63	16.62	0.000	99.94	PASS 合格
	S19072202 9006-008	231.21	16.63	231.21	16.63	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: 23.1°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 $72 \pm 2^\circ\text{C}$, followed by storage for at least six hours at a test temperature equal to $-40 \pm 2^\circ\text{C}$. 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 ($20 \pm 5^\circ\text{C}$).

电池放置在试验温度等于 $72 \pm 2^\circ\text{C}$ 的条件下存放至少6小时,接着再在试验温度等于 $-40 \pm 2^\circ\text{C}$ 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($20 \pm 5^\circ\text{C}$)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	S19072202 9006-001	230.53	16.64	230.43	16.44	0.043	98.80	PASS 合格
	S19072202 9006-002	231.35	16.63	231.22	16.42	0.056	98.74	PASS 合格
	S19072202 9006-003	230.67	16.60	230.58	16.41	0.039	98.86	PASS 合格
	S19072202 9006-004	231.57	16.62	231.47	16.41	0.043	98.74	PASS 合格
After 25 cycles ending in fully charged states 25次循环后满 电状态	S19072202 9006-005	231.51	16.63	231.41	16.38	0.043	98.50	PASS 合格
	S19072202 9006-006	230.56	16.62	230.45	16.41	0.048	98.74	PASS 合格
	S19072202 9006-007	230.63	16.62	230.52	16.42	0.048	98.80	PASS 合格
	S19072202 9006-008	231.21	16.63	231.09	16.43	0.052	98.80	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: 22.3°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 0.8 mm（总位移 1.6 mm），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	S19072202 9006-001	230.43	16.44	230.42	16.43	0.004	99.94	PASS 合格
	S19072202 9006-002	231.22	16.42	231.22	16.42	0.000	100.0	PASS 合格
	S19072202 9006-003	230.58	16.41	230.58	16.41	0.000	100.0	PASS 合格
	S19072202 9006-004	231.47	16.41	231.46	16.40	0.004	99.94	PASS 合格
After 25 cycles ending in fully charged	S19072202 9006-005	231.41	16.38	231.41	16.38	0.000	100.0	PASS 合格
	S19072202 9006-006	230.45	16.41	230.44	16.41	0.004	100.0	PASS 合格

states 25 次循环后满 电状态	S19072202 9006-007	230.52	16.42	230.52	16.41	0.000	99.94	PASS 合格
	S19072202 9006-008	231.09	16.43	231.09	16.43	0.000	100.0	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: 22.3°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 depending on the mass of the battery. The pulse duration is 6 milliseconds. The formula below is provided to calculate the appropriate minimum peak accelerations.

Mass of the battery	Minimum peak acceleration	Pulse duration
<input checked="" type="checkbox"/> ≤4.482 kg	150 g _n	6 ms
<input type="checkbox"/> >4.482 kg	$Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ Not applicable	6 ms

* Mass is expressed in kilograms.

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。每个电池须经受基于电池质量的一个峰值加速度半正弦波冲击。如下公式用于计算适用的最小峰值加速度:

电池的质量	最小峰值加速度	脉冲持续时间
<input checked="" type="checkbox"/> ≤4.482 kg	150 g _n	6 ms
<input type="checkbox"/> >4.482 kg	$Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ 不适用	6 ms

*质量单位表示为kg.

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	S19072202 9006-001	230.42	16.43	230.41	16.43	0.004	100.0	PASS 合格
	S19072202 9006-002	231.22	16.42	231.22	16.41	0.000	99.94	PASS 合格
	S19072202 9006-003	230.58	16.41	230.57	16.41	0.004	100.0	PASS 合格
	S19072202 9006-004	231.46	16.40	231.46	16.40	0.000	100.0	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满 电状态	S19072202 9006-005	231.41	16.38	231.41	16.37	0.000	99.94	PASS 合格
	S19072202 9006-006	230.44	16.41	230.44	16.41	0.000	100.0	PASS 合格
	S19072202 9006-007	230.52	16.41	230.51	16.41	0.004	100.0	PASS 合格
	S19072202 9006-008	231.09	16.43	231.09	16.42	0.000	99.94	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: 22.3°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	S190722029006-001	57.6	PASS 合格
	S190722029006-002	58.8	PASS 合格
	S190722029006-003	57.3	PASS 合格
	S190722029006-004	56.5	PASS 合格
After 25 cycles ending in fully charged states 25次循环后满电状态	S190722029006-005	59.2	PASS 合格
	S190722029006-006	58.3	PASS 合格
	S190722029006-007	57.2	PASS 合格
	S190722029006-008	59.3	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	S190722029006-009	23.6	PASS 合格
	S190722029006-010	24.5	PASS 合格
	S190722029006-011	23.5	PASS 合格
	S190722029006-012	25.4	PASS 合格
	S190722029006-013	23.3	PASS 合格
After 25 cycles ending at 50% of the design rated capacity. 25次循环后 50%电荷状态	S190722029006-014	24.1	PASS 合格
	S190722029006-015	26.3	PASS 合格
	S190722029006-016	25.2	PASS 合格
	S190722029006-017	23.3	PASS 合格
	S190722029006-018	26.6	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: 22.1°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)	2x3000=6000mA
Overcharge voltage 过充电电压(Vdc).....	22V

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	S190722029006-019	PASS 合格
	S190722029006-020	PASS 合格
	S190722029006-021	PASS 合格
	S190722029006-022	PASS 合格
After 25 cycles ending in fully charged states 25 次循环后满电状态	S190722029006-023	PASS 合格
	S190722029006-024	PASS 合格
	S190722029006-025	PASS 合格
	S190722029006-026	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: 23.3°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)		30000mA
Supply voltage 试验电压(Vdc)		12Vdc
Time interval 试验时间(Minutes)		5 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	S190722029006-027	PASS 合格
	S190722029006-028	PASS 合格
	S190722029006-029	PASS 合格

	S190722029006-030	PASS 合格
	S190722029006-031	PASS 合格
	S190722029006-032	PASS 合格
	S190722029006-033	PASS 合格
	S190722029006-034	PASS 合格
	S190722029006-035	PASS 合格
	S190722029006-036	PASS 合格
After 25 cycles ending in fully discharged states 25 次循环后完全放电状态	S190722029006-037	PASS 合格
	S190722029006-038	PASS 合格
	S190722029006-039	PASS 合格
	S190722029006-040	PASS 合格
	S190722029006-041	PASS 合格
	S190722029006-042	PASS 合格
	S190722029006-043	PASS 合格
	S190722029006-044	PASS 合格
	S190722029006-045	PASS 合格
	S190722029006-046	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: 23.3°C

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

Important Notice

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