锂电池 UN38.3 测试报告
Lithium Battery UN38.3 Test Report

委托单位(Client)	:	深圳市朗恒电子有限公司 SHEN ZHEN LANG HENG ELECTRONIC CO.,LTD
生产工厂 (Manufacturer)	:	深圳市优能电源技术有限公司 SHEN ZHEN YOUR POWER TECHNOLOGY CO.,LTD
样品名称(Product)	:	锂离子电池 Li-ion Battery
样品型号(Model)	:	ARB-L16-700P

检测日期 Date of Test	:	2018 年 06 月 18 日 至 2018 年 07 月 03 日 Jun. 18, 2018 to Jul. 03, 2018
报告日期 Date of Report	:	2020 年 02 月 17 日 Feb. 17, 2020

批准 (Approved Signatory)	:	楊諄
审核 (Checked by)	:	何德雯
检测 (Tested by)	:	陈喜良

报告专用章
Stamp

深圳安博检测股份有限公司 检测专用章

1. 样品描述(SAMPLE DESCRIPTION):

样品名称: Sample Name	锂离子电池 Li-ion Battery		电池型号: Battery Model	ARB-L16-700P	
委托单位: Client	深圳市朗恒电子有限公司 SHEN ZHEN LANG HENG ELECTRONIC CO.,LTD				
委托方地址: Add. Of Client	深圳市宝安 33 区东方明工业城 2 栋 8 楼 8/F 2nd Building Dong Fang Ming Industrial center 33rd District Bao' an Shen Zhen China				
生产工厂: Manufacturer	深圳市优能电源技术有限公司 SHEN ZHEN YOUR POWER TECHNOLOGY CO.,LTD				
标称电压: Nominal Voltage	3.6V	额定容量: Rated Capacity	700mAh 2.52Wh	商标: Trademark	FENIX
充电电流: Charge Current	140mA	最大连续充电电流: Maximum Continuous Charge Current	350mA	充电截止电流: End Charge Current	14mA
终止电压: Cut-off Voltage	2.75V	最大放电电流: Maximum Discharge Current	2500mA	充电限制电压: Limited Charge Voltage	4.2V
内含电芯个数: Cells Number	1	电芯型号: Cell Model	INR16320D70	电芯额定容量: Cell Rated Capacity	700mAh
测试开始日期: Client date	2018 年 06 月 18 日 Jun. 18, 2018		测试结束日期: Finished date	2018 年 07 月 03 日 Jul. 03, 2018	

2. 参考方法 (REFERENCE METHOD)

《联合国关于危险货物运输的建议书—试验和标准手册》 (ST/SG/AC.10/11/Rev.6)
《United Nations Recommendations On The Transport Of Dangerous Goods, Manual Of Tests And Criteria》(ST/SG/AC.10/11/Rev.6).

3. 测试项目 (TEST ITEM)

1. 高度模拟 (Altitude simulation)
2. 温度试验(Thermal test)
3. 振动(Vibration)
4. 冲击(Shock)
5. 外部短路(External short circuit)
6. 挤压(Crush)
7. 过度充电(Overcharge)
8. 强制放电(Forced discharge)

4. 本次检测所使用的设备清单：

Major instruments of measurement used in the test:

设备名称/型号 Name of equipment /Model	编号 Serial No.	校准有效期 Due Date
模拟高空低压试验箱 Low Pressure Test Machine BE-DY-125	SE-132	2019-04-09
快速温变箱 High and Low Temperature Chamber BTKS5-150C	SE-1112	2018-08-24
振动台 Vibration Machine EV103VT650VC Susb-2	SE-439	2019-04-09
机械冲击台 Shock Machine HSKT-10	SE-440	2019-04-26
温控型短路试验机 Thermostat Short-circuit Testing Machine BE-1000W	SE-133	2019-04-09
挤压试验机 Crush Machine BE-6045	SE-135	2019-04-09
25V10A 电池充放电仪 Battery Charge and Discharge Machine CT-3008-25V10A-NA	SE-172	2019-04-09

5. 检测地点、环境条件

Place and Environmental Conditions of the test

地点：深圳安博检测股份有限公司电池实验室 温度 （20±5）℃ 相对湿度 （40~70）%RH

Place Temperature R.H.

6. 测试结论(CONCLUSION)

测试项目 ITEM	样品编号 SAMPLE NUMBER	执行标准 STANDARD	结论 CONCLUSION
高度模拟 (Altitude simulation)	C1~C10	UN38.3	通过 (PASS)
温度试验(Thermal test)			通过 (PASS)
振动(Vibration)			通过 (PASS)
冲击(Shock)			通过 (PASS)
外部短路 (External short circuit)			通过 (PASS)
挤压(Crush)	C11~C15		通过 (PASS)
过度充电(Overcharge)	C16~C19 C30~C33		通过 (PASS)
强制放电 (Forced discharge)	C20~C29 C34~C43		通过 (PASS)

说明(Notes)：

C1~C10, C16~C19:为第一个充放电周期完全充电状态的单电芯电池;
Single cell batteries at first cycle in fully charged states;

C11~C15: 为第一个充放电周期 50%设计额定容量状态的电芯;
Cells at first cycle at 50% of the design rated capacity;

C20~C29: 为第一个充放电周期完全放电状态的电芯;
Cells at first cycle in fully discharged states;

C30~C33: 为 50 个充放电周期后完全充电状态的单电芯电池;
Single cell batteries after 50 cycles ending in fully charged states;

C34~C43: 为 50 个充放电周期后完全放电状态的电芯;
Cells after 50 cycles ending in fully discharged states.

7. 测试方法 (TEST METHOD)

小型电芯或电池必须按顺序进行试验 T.1 至 T.5。试验 T.6 和 T.8 应使用未另外试验过的电芯或电池。试验 T.7 可以使用原先在试验 T.1 至 T.5 中使用过的未损坏电池进行，以便测试交替充电放电过的电池。

质量损失依照下式计算：

$$质量损失(\%)= (M_1-M_2)/M_1 *100$$

式中 M1 是实验前的质量，M2 是试验后的质量。如质量损失不超过下表所列数值，即视为"无质量损失"。

Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall be conducted using not otherwise tested cells or batteries. Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

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

Mass loss(%) = (M1-M2) / M1×100

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 blow, it shall be considered as "no mass loss".

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

T.1 高度模拟

试验电芯和电池应在压力等于或低于 11.6 千帕和环境温度为(20℃±5℃) 下存放至少 6 小时。

要求电芯和电池无渗漏、无排气、无解体、无破裂、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实验前电压的 90%。有关电压的要求不适用于完全放电状态的试验电芯和电池。

T.1 Altitude simulation

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

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.

T.2 温度试验

试验电芯和电池应先在试验温度等于 75℃±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，完成 10 次，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。

要求电芯和电池无渗漏、无排气、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%。有关电压的要求不适用于完全放电状态的试验电芯和电池。

T.2 Thermal test

Test cells and batteries are to be stored for at least six hours at a test temperature equal to 75 ± 2 °C, followed by storage for at least six hours at a test temperature equal to - 40 ± 2 °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5 °C). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

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.

T.3 振动

电芯和电池紧固于振动机平台，但不得造成电芯变形，并能准确可靠地传播振动。振动应是正弦波形，对数扫描频率在 7Hz 和 200Hz 之间，在回到 7Hz，跨度为 15 分钟。这一振动过程须对三个相互垂直的电芯安装方位的每一方向重复进行 12 次，共为时 3 小时。其中一个振动方向必须与端面垂直。

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

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

对大型电池：从 7 赫兹开始保持 1gn 的峰值加速度直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米（总行程 1.6 毫米）并增加频率直到最大加速度达到 2gn（频率约为 25 赫兹）。将峰值加速度保持在 2gn 直到频率增加到 200 赫兹。

要求电芯和电池无渗漏、无排气、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%。有关电压的要求不适用于完全放电状态的试验电芯和电池。

T.3 Vibration

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz).A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.

For large batteries: from 7 Hz to a peak acceleration of 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.

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery

directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

T.4 冲击

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

每个电芯须经受最大加速度 150g 和脉冲持续时间 6 毫秒的半正弦波冲击。另外，大型电芯或许须经受最大加速度 50g 和脉冲持续时间 11 毫秒的半正弦波冲击。

电池须经受半正弦波冲击的峰值加速度取决于电池组的质量。对小型电池的脉冲持续时间为 6 毫秒，对大型电池的脉冲持续时间为 11ms.下面的公式用于计算相应的最小峰值加速度。

每个电芯或电池须在三个相互垂直的安装方位的正方向经受三次冲击，接着再反方向经受三次冲击，总共经受 18 次冲击。

要求电芯和电池无渗漏、无排气、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%。有关电压的要求不适用于完全放电状态的试验电芯和电池

T.4 Shock

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.

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

Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

电池 Battery	**最小峰值加速度 Minimum peak acceleration**	**脉冲持续时间 Pulse duration**
小型电池 Small batteries	150 g_n or result of formula $\text{Acceleration(gn)}=\sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller	6 ms
大型电池 Large batteries	50 g_n or result of formula $\text{Acceleration(gn)}=\sqrt{\left(\frac{30000}{\text{mass}^*}\right)}$ whichever is smaller	11 ms

* Mass is expressed in kilograms.

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.

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.

T.5 外部短路

在一定的时间内加热电芯或电池使其外壳达到 57 ± 4℃均匀稳定的温度，温升时间取决于电芯或电池的尺寸和外观，并且被评估和记录。如果这种评估记录不可行，那么小型电芯或电池的暴露时间应至少持续 6 小时，大型电芯或电池应至少持续 12 小时。然后使电芯或电池在 57℃±4℃下经受总外电阻小于 0.1 欧姆的短路条件。

这一短路条件应在电芯或电池外壳温度回到 57℃±4℃后持续至少 1 小时，或者大电池的温度下降至最大温升值的一半并保持低于此温度值。

短路和冷却期间应至少在环境温度下进行。

要求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.5 External short circuit

The cell or battery to be tested shall be shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57 ± 4℃, 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.

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.

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

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

T.6 撞击/挤压

撞击（适用于直径不小于 18 毫米的圆柱形电芯）

试样电芯或组成电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 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 厘米高处跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿水平支撑表面呈 90 度落下。

接受撞击的试样，纵轴应与平坦表面平行并与横放在试样中心的直径 15.8±0.1 毫米弯曲表面的纵轴垂直。每一试样只经受一次撞击。

T.6 Impact / Crush

Impact (applicable to cylindrical cells greater than 18 mm in diameter)

The 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.

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.

挤压（棱柱形、袋装、硬币/纽扣电芯和直径小于 18 毫米的圆柱形电芯）

将电芯或组成电芯放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为 1.5 厘米每秒。挤压持续进行，直到出现以下三种情况之一：

（a） 施加的力量达到 13KN±0.78KN；

（b） 电芯的电压下降至少 100mV；

（c） 电芯变形达到原始厚度的 50%或以上。

一旦达到最大压力、电压下降 100mV 或更多，或电芯变形至少达原厚度的 50%，即可解除压力。

棱柱形或袋装电芯应从最宽的一面施压。纽扣/硬币形电芯应从其平坦表面施压。圆柱形电芯应从与纵轴垂直的方向施压。

每个试样电芯或组成电芯只做一次挤压试验。试样应继续观察 6 小时。试验应使用之间未做过其他试验的电芯或组成电芯进行。

要求电芯或组成电芯外壳温度不超过 170℃， 并且在试验过程中及试验后 6 小时内无解体，无起火。

Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 mm in diameter)

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.

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

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

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

Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.

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

T.7 过度充电

充电电流必须是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：

（a）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 22V 两者中的较小者；

（b）制造商建议的充电电压大于 18V 时，试验的最小电压应为最大充电电压的 1.2 倍。

试验应在环境温度下进行，进行试验的时间应为 24 小时。

要求充电电池在试验过程中和试验后 7 天内无解体，无起火。

T.7 Overcharge

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

(a) When the manufacturer’s recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.

(b) When the manufacturer’s recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature; the duration of the test shall be 24 hours. Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

T.8 强制放电

每个电芯应在环境温度下与 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。

将适当大小和额定值的电阻负荷与试验电池串联，计算得出给定的放电电流。对每个电池进行强制放电，放电时间应等于其额定容量除以初始试验电流。

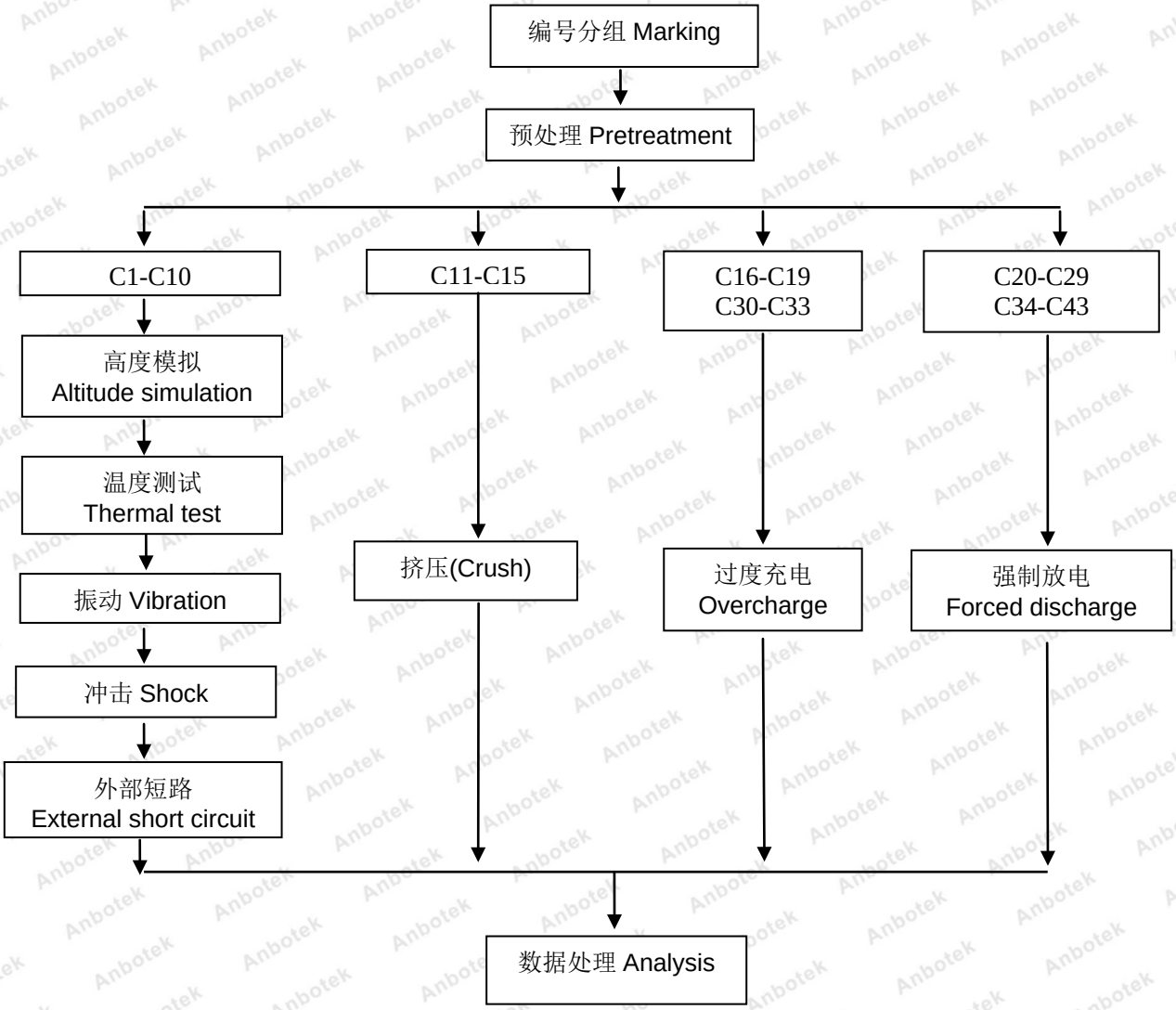
要求原电芯或充电电芯在试验过程中和试验后 7 天内无解体，无起火。

T.8 Forced discharge

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

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.

8. 测试程序 TEST PROCEDURE



9. 测试数据 DATA

T.1 高度模拟(Altitude simulation)

电池编号 No.	测试前 Pre-test		测试后 After test		质量亏损 Mass loss (%)	电压亏损 Voltage loss (%)	有无渗漏，排气，解体，破裂和起火（是/否） Whether leakage, venting, disassembly, rupture, fire (Y/N)
	质量 Mass 克(g)	电压 Voltage 伏(V)	质量 Mass 克(g)	电压 Voltage 伏(V)			
C1	18.499	4.167	18.499	4.167	0.00	0.00	N
C2	18.707	4.172	18.705	4.172	0.01	0.00	N
C3	18.444	4.169	18.444	4.169	0.00	0.00	N
C4	18.507	4.174	18.507	4.173	0.00	0.01	N
C5	18.423	4.165	18.423	4.165	0.00	0.00	N
C6	18.703	4.171	18.701	4.171	0.01	0.00	N
C7	18.415	4.173	18.415	4.173	0.00	0.00	N
C8	18.503	4.169	18.503	4.168	0.00	0.01	N
C9	18.506	4.163	18.506	4.163	0.00	0.00	N
C10	18.628	4.172	18.628	4.172	0.00	0.00	N

T.2 温度测试(Thermal test)

电池编号 No.	测试前 Pre-test		测试后 After test		质量亏损 Mass loss (%)	电压亏损 Voltage loss (%)	有无渗漏，排气，解体，破裂和起火（是/否） Whether leakage, venting, disassembly, rupture, fire (Y/N)
	质量 Mass 克(g)	电压 Voltage 伏(V)	质量 Mass 克(g)	电压 Voltage 伏(V)			
C1	18.499	4.167	18.491	4.151	0.04	0.38	N
C2	18.705	4.172	18.697	4.155	0.04	0.40	N
C3	18.444	4.169	18.436	4.153	0.04	0.38	N
C4	18.507	4.173	18.499	4.156	0.04	0.41	N
C5	18.423	4.165	18.415	4.149	0.04	0.37	N
C6	18.701	4.171	18.693	4.155	0.04	0.38	N
C7	18.415	4.173	18.407	4.157	0.04	0.37	N
C8	18.503	4.168	18.496	4.153	0.04	0.37	N
C9	18.506	4.163	18.498	4.147	0.04	0.38	N
C10	18.628	4.172	18.619	4.156	0.05	0.38	N

T.3 振动(Vibration)

电池编号 No.	测试前 Pre-test		测试后 After test		质量亏损 Mass loss (%)	电压亏损 Voltage loss (%)	有无渗漏，排气，解体，破裂和起火（是/否） Whether leakage, venting, disassembly, rupture, fire (Y/N)
	质量 Mass 克(g)	电压 Voltage 伏(V)	质量 Mass 克(g)	电压 Voltage 伏(V)			
C1	18.491	4.151	18.491	4.151	0.00	0.00	N
C2	18.697	4.155	18.696	4.155	0.01	0.00	N
C3	18.436	4.153	18.436	4.153	0.00	0.00	N
C4	18.499	4.156	18.499	4.156	0.00	0.00	N
C5	18.415	4.149	18.415	4.149	0.00	0.01	N
C6	18.693	4.155	18.693	4.155	0.00	0.00	N
C7	18.407	4.157	18.406	4.157	0.01	0.00	N
C8	18.496	4.153	18.496	4.152	0.00	0.01	N
C9	18.498	4.147	18.498	4.147	0.00	0.00	N
C10	18.619	4.156	18.619	4.156	0.00	0.00	N

T.4 冲击(Shock)

峰值加速度：150 gn， 脉冲时间：6 ms
Peak acceleration: 150 gn, Pulse duration: 6 ms

电池编号 No.	测试前 Pre-test		测试后 After test		质量亏损 Mass loss (%)	电压亏损 Voltage loss (%)	有无渗漏，排气，解体，破裂和起火（是/否） Whether leakage, venting, disassembly, rupture, fire (Y/N)
	质量 Mass 克(g)	电压 Voltage 伏(V)	质量 Mass 克(g)	电压 Voltage 伏(V)			
C1	18.491	4.151	18.491	4.151	0.00	0.00	N
C2	18.696	4.155	18.696	4.155	0.00	0.00	N
C3	18.436	4.153	18.436	4.153	0.00	0.00	N
C4	18.499	4.156	18.498	4.156	0.01	0.00	N
C5	18.415	4.149	18.415	4.148	0.00	0.01	N
C6	18.693	4.155	18.693	4.155	0.00	0.00	N
C7	18.406	4.157	18.406	4.157	0.00	0.00	N
C8	18.496	4.152	18.495	4.152	0.01	0.00	N
C9	18.498	4.147	18.498	4.146	0.00	0.01	N
C10	18.619	4.156	18.619	4.156	0.00	0.00	N

T.5 外部短路(External short circuit)

电池编号 No.	最高温度 Peak temperature (℃)	有无解体，破裂，起火（是/否） Whether disassembly, rupture, fire (Y/N)
C1	57.5	N
C2	57.9	N
C3	57.4	N
C4	57.5	N
C5	57.2	N
C6	57.6	N
C7	58.1	N
C8	57.7	N
C9	57.9	N
C10	58.2	N

T.6 挤压(Crush)

电池编号 No.	最高温度 Peak temperature (℃)	有无解体，起火（是/否） Whether disassembly, fire (Y/N)
C11	25.6	N
C12	25.9	N
C13	25.3	N
C14	25.8	N
C15	25.5	N

T.7 过度充电(Overcharge)

电池编号 No.	有无解体，起火（是/否） Whether disassembly, fire (Y/N)
C16	N
C17	N
C18	N
C19	N
C30	N
C31	N
C32	N
C33	N

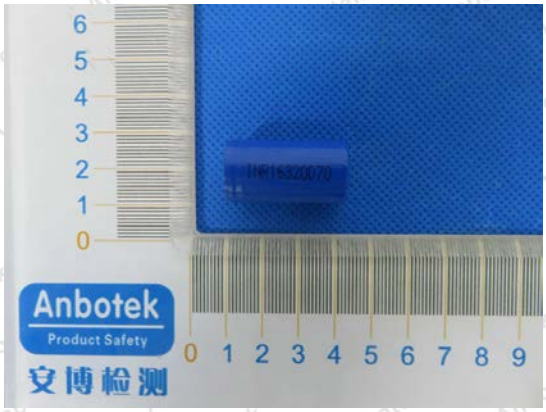
T.8 强制放电(Forced discharge)

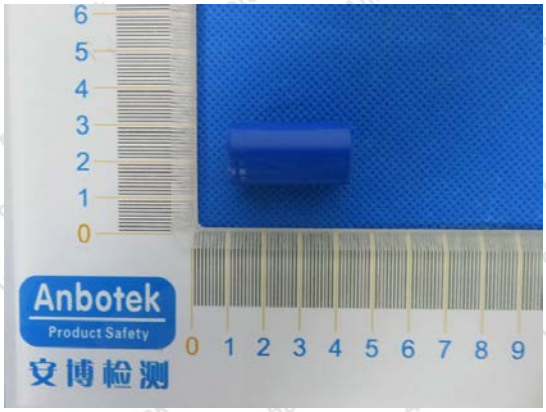
电池编号 No.	有无解体，起火（是/否） Whether disassembly, fire (Y/N)
C20	N
C21	N
C22	N
C23	N
C24	N
C25	N
C26	N
C27	N
C28	N
C29	N
C34	N
C35	N
C36	N
C37	N
C38	N
C39	N
C40	N
C41	N
C42	N
C43	N

10. 样品照片(Photos of the Sample)

电池(Battery)

电芯(Cell)





声明 (DECLARATION)

1. 测试参考文件：《联合国关于危险货物运输的建议书—试验和标准手册 》(ST/SG/AC.10/11/Rev.6)

《United Nations Recommendations On The Transport Of Dangerous Goods, Manual Of Tests And Criteria》(ST/SG/AC.10/11/Rev.6).

2. 测试实验室：深圳安博检测股份有限公司

地址：广东省深圳市宝安区西乡街道后瑞第三工业区A栋四楼东

Test place Lab: Shenzhen Anbotek Compliance Laboratory Limited

East of 4/F., Building A, Hourui No.3 Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

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Test data of this report refers to the orignal report: SZABB180612003-01.

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